Editorial

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Biographical notes: Prasanta K. Ghosh is a Professor in the Department of Electrical Engineering and Computer Science at Syracuse University. He has been conducting research in the area of microelectronics and power engineering. He has authored or co-authored many journal articles and conference papers in the area of thin films, solid state devices, and power engineering. His current research focus includes smart grid, sensors, and optimisation of distribution system with distributed sources. He is a senior member of IEEE.

Ehab F. El-Saadany is a Full Professor at the ECE Department, University of Waterloo, Canada. His main research is in the areas of distribution system operation and control, distributed generation, smart grid applications, self-healing mechanisms, and power quality. He is a senior member in the IEEE and Registered Professional Engineer in Ontario. He graduated 35 PhD and MASc students and has published 320 journal and conference papers. He received the Early Research Award from the Government of Ontario in 2007. In 2009, he became a Canada Research Chair CRC in Energy Systems in recognition of his contributions to the areas of distributed generation and MicroGrids. In 2014, he received CRC award in Smart Distribution Systems.

Hossam A. Gabbar is a Professor in the Faculty of Energy Systems and Nuclear Science, and cross appointed in the Faculty of Engineering and Applied Science, University of Ontario Institute of Technology (UOIT). He obtained his PhD degree (Energy Process Safety) from Okayama University (Japan), while his undergrad degree (BSc degree, with First Class of Honours) and Master degree courses are in the area of automatic control from Alexandria University, Egypt. He is specialised in safety, protection, and control engineering and their applications on smart energy grids infrastructures and energy and nuclear facilities.

To meet the future economic growth and the societal need, it is becoming apparent that the current power grid needs to be modernised to make it more reliable, flexible, efficient, and resilient. That leads to the concept of the smart grid; a controlled electrical grid that connects diverse power generation resources, transmission, and distribution, using sensor, communication, and control technologies. Major paradigm shifts in the power grid include integration of distributed generators with variable outputs, and two-way power flow to allow electricity generation in real-time based on consumer demands and power requests. However, there are many obstacles in implementing the smart grid vision.

This special issue is intended to publish and disseminate the state-of-the-art research in the smart grid area. Articles published in this special issue address many of the challenges engineers and researchers are facing in their effort to realise the vision of smart grid in a true sense. Topics covered in this issue include, but are not limited to, renewable energy, distributed energy source integration and control, power delivery, storage, electric vehicles, communication, economic impact, and demand response.

Another important purpose of this special issue is to encourage researchers in the multiple fields, especially in power engineering, control and communication to work together to overcome challenges to build the future smart grid. The guest editor would like to take this opportunity to thank all the researchers for their quality work and all the reviewers for their thoughtful and constructive critic. We hope that readers will find these papers interesting and informative. Last but certainly not the least, we are thankful to Dr. Hossam Gabbar for his vision and generous help in making this special issue a reality.