
Clean Energy Generation and Integration in Power Systems

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Introduction

Extensive researches are being performed on clean energy generation and integration into the power systems due to environmental friendliness and decreasing fossil resources. Innovative methods in clean energy generation and power electronics based integration into the power grids are rapidly becoming attractive. There are many applications to integrate clean energy resources to existing utility grid or microgrid or isolated load. These applications require advanced control for which power electronics & drives plays an important role. The increased efficiency of power semiconductor devices and robustness of machines enable to improve many types of power conversion. On the other hand, alternate energy vehicles and energy storage systems are widely integrated with clean energy sources.

In this special issue, emerging technologies, advanced design and control studies on “Clean Energy Generation and Integration in Power Systems” will be focused. This special issue will be inviting substantially extended versions of selected good quality papers presented at the 2nd International Conference on Sustainable Power and Energy Research (ICSPER-2025) and other research papers related to the special issue.

This special issue aims to explore emerging technologies, advanced design and control studies on clean energy generation and integration in power systems. The call for the special issue was having ten sections i.e.

renewable energy sources based clean energy generation, effective and efficient operation of clean energy sources, integration of clean energy sources into power grid, power electronics based control of clean energy sources, application of drives for generation of clean energy, novel control of energy storage systems, advanced control and management of clean energy systems, optimized operation of clean energy resources, smart grid forming control strategies for clean energy and clean energy charging topologies for electric vehicle.

In this special issue, the guest editors have acknowledged a total of twenty-eight papers. Among these twenty-eight papers, twenty-one papers got rejected and only seven papers have been accepted. The papers rejected were not meeting the standards of the journal. Thus, the overall submissions were of good quality, which results in the success of this special issue.

Biographies



Farhad Ilahi Bakhsh (Senior Member, IEEE) received B. Tech degree in Electrical Engineering and M. Tech. degree in Power Systems & Drives from Aligarh Muslim University (AMU), Aligarh, India in 2010 and 2012, respectively. Then he pursued Ph.D. from Indian Institute of Technology Roorkee, India in 2017. During his Ph.D. he developed a new method for grid integration for wind energy generation system which has been recognized worldwide. Currently he is serving as Assistant Professor in Department of Electrical Engineering, National Institute of Technology Srinagar, Jammu & Kashmir, India. He is founder and Counselor of IEEE Student Branch, NIT Srinagar.

He has won “10 for 10 Typhoon HIL Award” from Switzerland, Europe. He delivered a number of Keynote talks, Invited talks and Expert Lectures at National and International level in conferences, workshops, STC, etc. He has

more than 100 published papers in Scopus or Web of Science based International reputed Journals and Conferences. He has also published many books in Springer, Wiley, IEEE, Scrivener Publishing and River Publishers with more than 20 book chapters. He has been enlightened with “Award of Excellence in Research” by VALLWAY International. Many times, he got best paper awards in International reputed conferences. Moreover, he has Indian, Australian and South African granted patents in his credit. Recently, he has received “Typhoon HIL Best Paper Award Europe 2025”. In this award, they have received a Typhoon HIL 604 Emulator which costs around 50 lakhs INR. He served as Lead Guest Editor in IET Generation, Transmission and Distribution Journal; Lead Guest Editor in IET Power Electronics Journal; Guest Editor in IET Renewable Power Generation Journal; Guest Editor in Frontiers in Energy Research; Guest Editor in Renewable Energy Focus, Elsevier; Guest Editor in Recent Advances in Electrical & Electronic Engineering; and Associate Editor of e-Prime- Advances in Electrical Engineering, Electronics and Energy, Elsevier. He is the Associate Editor of Distributed Generation & Alternative Energy Journal. His research area of interests includes Performance Analysis and new applications of Variable Frequency Transformer, Application of Power Electronics & Drives in Renewable Energy Systems (Solar & Wind), Multilevel Converters, Multilevel DC-DC DAB Converters, Alternate Energy Vehicles (Electric/ Hybrid) and Multi-phase Drives.



Hafiz Ahmed received the Ph.D. degree in automatic control from the University of Lille, France, in 2016. From 2016 to 2023, he held research and academic positions at various universities in U.K., USA, and Bangladesh. He was the Head of the Control and Instrumentation Group at the University of Sheffield’s Nuclear Advanced Manufacturing Research Centre. He is

currently a Senior Researcher with the School of Electrical and Electronic Engineering at the University of Sheffield. His research interest includes control engineering applications, particularly in the areas of energy and the environment. In 2017, he was awarded the Best Ph.D. Thesis Award by the European Embedded Control Institute, as well as the Best Ph.D. Thesis Award from the CNRS Research Cluster on Modelling, Analysis, and Management of Dynamic Systems (GDR-MACS) in France. He serves on the editorial board of the IEEE Journal of Emerging and Selected Topics in Industrial Electronics, Scientific Reports, and the International Journal of Electrical Engineering & Education.