34th IEEE International Symposium on Industrial Electronics (ISIE 2025)

Special Session on

"Microgrid/Multi-Microgrid Innovations for Next-Generation Energy Networks"

Organized by

Principal Organizer: **Dr. Abhishek Kumar, SMIEEE** (abhi@zju.edu.cn)
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Co-organizer 1: **Prof. Ramesh Chand Bansal, *FIET (UK), FIE (India),* SMIEE** (rcbansal@ieee.org)
Affiliation: Electrical Eng. Department, University of Sharjah, Sharjah, UAE

Co-organizer 2: **Prof. Deng Yan, SMIEEE** (dengyan@zju.edu.cn)
Affiliation: Research Group for Energy Network Transition (ReGENT)
College of Electrical Engineering, Zhejiang University, China

Organizer Background:

The organizers of this Special Session have deep expertise in power electronics, microgrids, smart grids, and renewable energy systems. Each organizer brings years of research and hands-on experience, making them well-positioned to lead discussions that advance both theoretical and practical understanding in these areas.

1. ***Dr. Abhishek Kumar (SM IEEE):***

Dr. Kumar's research focuses on sustainable low-carbon energy systems, microgrid control, and the integration of renewable energy sources. His work is centered around developing intelligent control strategies and real-time modeling techniques for distributed energy systems. He aims to address the challenges of making energy systems more resilient and efficient, particularly in the context of renewable integration.

2. ***Prof. Deng Yan (SM IEEE):***

Prof. Deng is an authority in power electronics and renewable energy systems. His research addresses the design of advanced power converters, innovative control strategies for energy storage, and the integration of power electronics into microgrids and smart grids. He has made pivotal contributions to advanced converter topologies and energy management systems, helping improve the integration of renewables into

existing grids. Prof. Deng's work mainly focuses on improving the energy efficiency of these systems, ensuring they can operate at optimal performance scalability of renewable energy technologies in power systems with minimal environmental impact.

3. ***Prof. Ramesh C. Bansal (FIET (UK), FIE (India), SM IEEE (USA), CPEngg (UK):***

Prof. Bansal has made significant contributions to renewable energy systems, distributed generation, and microgrids. His work spans various renewable energy sources, including photovoltaic systems and wind energy, as well as the role of energy storage in stabilizing smart grids. His expertise lies in ensuring that these technologies are integrated seamlessly and efficiently into modern power systems. His work bridges the gap between cutting-edge research and real-world applications, aiming to provide sustainable energy solutions for the next generation of transportation and power systems.

Call for Papers

This special session investigates pioneering innovations in Microgrid and Multi-Microgrid (MMG) systems, poised to define next-generation energy networks. It integrates proven microgrid technologies—such as optimized rural electrification designs, renewable energy systems harnessing solar and wind, and advanced power electronics for voltage stability—with cutting-edge MMG advancements. These include blockchain-based peer-to-peer energy trading, 6G-enabled ultra-low-latency control, and AI-driven fault detection for predictive maintenance. Our focus is on scalable, resilient networks that meet diverse needs: delivering reliable power to remote rural communities and supporting industrial facilities with high uptime demands. We emphasize energy storage solutions for load balancing, robust cybersecurity protocols to safeguard interconnected systems, and sophisticated MMG coordination strategies. By merging these established and emerging approaches, this session advances industrial electronics, fostering efficient, adaptable energy infrastructures. It aligns with IEEE ISIE's mission to drive technological progress, addressing global energy challenges with impactful, forward-looking solutions.

Topics of interest include, but are not limited to: (Provide a list of 5-10 special areas)

1	Microgrid design for rural electrification
2	Renewable energy integration in microgrids
3	Power electronics for microgrid stability
4	Energy storage solutions for microgrids
5	MMG coordination and control strategies
6	Microgrids/ Multi-microgrid energy sharing/trading frameworks using Blockchain
7	6G-enabled real-time MMG management
8	AI-based fault detection and predictive maintenance in microgrids and MMGs
9	Cybersecurity and resilience strategies in interconnected MMG systems
10	Industrial applications of microgrid systems
11	Energy storage optimization techniques in MMG systems
12	Socio-technical models for sustainable microgrid solutions

Reviewers (Provide 10-20 names with email and affiliation address)

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Submission Procedure:

All the instructions for paper submission are included in the conference website: **https://ieee-isie-2025.org/**

Sponsoring IES Technical Committee(s):
IEEE IES Technical Committee on Smart Grids and Power Electronics

Deadlines:

Full paper submission:	March 31, 2025
Paper acceptance notification:	April 15, 2025
Camera-ready paper submission:	May 14, 2025