

Special Session 03

Advanced Operation, Control, and Optimization of Renewable-Rich Microgrids and Energy Systems

Introduction and Topics

The global transition towards carbon neutrality has significantly accelerated the integration of renewable energy sources into modern power grids. Consequently, renewable-rich microgrids and integrated energy systems have emerged as critical infrastructures to facilitate the reliable and efficient utilization of distributed energy resources, including solar, wind, energy storage, and green hydrogen. However, the high penetration of power electronics and the inherent intermittency of renewables introduce unprecedented challenges regarding system stability, protection, situational awareness, and optimal energy management.

Bridging the gap between lower-level physical control and upper-level economic optimization is essential for the sustainable development of future grids. Therefore, this Special Session aims to provide a premier platform for researchers and engineers to explore state-of-the-art methodologies and emerging technologies in the modern power sector. We invite original research that leverages advanced control theories, artificial intelligence, data-driven analytics, and novel market mechanisms to enhance the resilience, efficiency, and flexibility of renewable-dominated energy systems.

Topics including but not limited to:

- Advanced control, protection, and stability analysis of power electronic-dominated grids
- AI and data-driven methods for grid situational awareness and forecasting
- Optimal planning, operation, and control of integrated smart energy systems
- Energy management and synergistic control of distributed energy storage and hydrogen systems
- P2P energy trading and novel market mechanisms in active distribution networks
- Smart meter data analytics and demand-side management
- Emerging technologies for DC/AC microgrids and multi-energy networks

Special Session Chairs



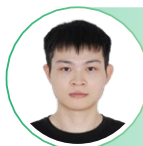
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Paper Submission

Submission Method



- * View paper submission instruction on website <https://www.ieee-icps.com/sub.html>
- * Submit your paper through the website or QR code <https://easychair.org/conferences/?conf=ieeicpsasia2026>

Important Dates

Submission Deadline	April 30, 2026
Notification Deadline	May 30, 2026
Early-bird Registration Deadline	June 15, 2026
Author Registration Due	June 15, 2026

Publication

Submissions to IEEE I&CPS 2026 will be peer reviewed on the basis of technical quality, relevance to conference topics, originality, significance, clarity, etc. Accepted papers will be submitted for inclusion into IEEE Xplore subject to meeting IEEE Xplore's scope and quality requirements. Excellent papers will be recommended for review by IEEE **Trans on Industry Applications** (proportion can reach up to 50%), **Global Energy Interconnection** and **DeCarbon**.