



Call for Papers

IEEE Journal of Emerging and Selected Topics in Power Electronics

Special Issue on Interactive Power Converters for Renewable Energy Grid-Tied Systems

In the pursuit of sustainable energy solutions, the field of renewable energy generation, conversion, storage, and utilization has garnered significant attention globally. Within this domain, power converters serve as critical components, acting as bridges/interfaces between renewable energy generation systems, energy storage sources, and the grid/load. They facilitate efficient and flexible energy utilization. Interactive power converters, leveraging various technologies, enable functions such as DC/AC, AC/DC, and DC/DC conversion, voltage level regulation, electrical isolation, power transmission, coordination among multiple sources, power quality enhancement, load matching, and grid-connected/off-grid operations. By intelligently managing or optimizing the energy flow among these converters, we can maximize efficiency, minimize losses, and ultimately enhance the overall performance of renewable energy generation, conversion, storage, and utilization. Building upon current technologies, future trends in this field may include: 1) Intellectualization and digitalization: With the rapid advancement of the Internet of Things (IoT), Artificial Intelligence (AI), digitally implemented technologies, future power converters may become more intelligent and adaptive, capable of real-time monitoring and adjustment of energy flows. 2) High Efficiency and Power Density: Continuous advancements in power semiconductor and passive components may lead to more compact, efficient, and higher power density power converters, reducing system volumes and improving energy utilization. 3) Multi-source Integration: Future power converters might integrate multiple energy inputs, such as solar, wind, and energy storage systems, for more flexible and reliable energy conversion and management. 4) Intelligent Microgrids for Renewable Energy: The application of power converters in microgrids will become increasingly crucial, providing efficient integration and management of renewable energy for smaller areas. By delving into these research areas and driving these trends forward, interactive power converters will continue to play a crucial role in advancing renewable energy systems, leading us towards a more sustainable energy future.

The aim of this special issue is to actively involve the academic community in the exploration of the cutting-edge modeling, components, topologies, controls, and modulation techniques for interactive power converters within grid-tied renewable energy systems. This issue is centered on the realm of renewable energy power electronics, spanning energy generation, conversion, storage, and utilization. We welcome submissions from prospective authors that present original research contributions and forward-thinking papers within these domains. The thematic scope of this special edition includes, but is not limited to, the following topics:

- Power converter topology construction and derivation methods for renewable energy grid-tied systems.
- Innovative solutions for voltage level conversion, power regulation, and electrical isolation in renewable energy generation and utilization.
- Fault diagnosis, fault tolerance, protection, and cyber security control of interactive power converters.
- Advanced modeling, analysis, and control strategies for power converter dominated systems.
- Hardware-in-the-loop (HIL) simulation and digital-twin techniques for renewable energy power converter simulation systems.
- Modulation and control of multiport, multilevel, and multiphase converters for efficient AC/DC, DC/DC, AC/AC, and DC/AC power conversion.
- Selection and optimization of semiconductor devices, gate driving techniques, and passive components design for high-frequency electromagnetic power conversion in renewable energy systems.
- Advanced power converter-based hybrid energy storage, management, and utilization techniques.

All submissions should be made through *Manuscript Central* at <http://mc.manuscriptcentral.com/jestpe-ieee>. The cover page should be clearly marked with "Special Issue on Interactive Power Converters for Renewable Energy Grid-Tied Systems" and the appropriate manuscript type should be selected when uploading the submission. Manuscripts submitted for this special issue will be handled by the guest editorial board outlined below. For more information on special issues and electronic submissions, please go to <http://www.ieee-pels.org/publications/jestpe>.



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Deadline for Submission of Manuscript: **31 Aug 2025**

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Proposed Timeline

- **15 Apr 2025:** Call for papers to IEEE JESTPE Editorial Office
- **31 Aug 2025:** Manuscript submission deadline
- **30 Nov 2025:** Final acceptance notification
- **31 Dec 2025:** Manuscript forwarded to IEEE for publication
- **Feb 2026:** Special Issue appears in IEEE JESTPE