



Call for Papers

IEEE Journal of Emerging and Selected Topics in Power Electronics

Special Issue on

Power Electronics Role in Future Renewables and Power-to-X Systems

Decarbonization of major energy-consuming sectors is a top priority of the 2015 Paris Agreement and the Intergovernmental Panel on Climate Change (IPCC) climate change 2023 report. This has significantly challenged today's energy systems with the development of long-term sustainable energy production and storage. Perhaps one of the most promising strategies for addressing this challenge is the implementation of hydrogen and power-to-X solutions, in which renewables can be heavily utilized and new ways of storing and transporting this green energy can be followed. This term, i.e. power-to-X (also known as PtX or P2X), is a collective term for conversion technologies that turn electricity into carbon-neutral synthetic fuels, such as hydrogen, synthetic natural gas, or chemicals.

In this context, power electronics is expected to play a key role in enhancing the performance and reducing the final product cost of such systems, where different systems are expected to be integrated together, e.g. different types of renewables to feed a cluster of electrolyzers for hydrogen production, with potentially a grid connection, where grid support might be a possible option as well. Moreover, electrolyzers and fuel cells, as key elements in such Power-to-X systems, are low-voltage high-power elements, where their voltage varies significantly under different loading conditions and over lifetime. Therefore, the utilized power converters must ensure high performance over a wide range of operation from beginning to end of life, while meeting the requirements on the source or load side.

Hence, this special issue is aimed at providing a unique opportunity to all the power electronics researchers and developers to share their innovative and cutting-edge technology in the field of future renewables and power-to-X. We invite original contributions focusing on power electronics-related topics in the field of power electronics applications in Power-to-X. Submitted manuscripts should include experimental verification.

Topics of interest include, but are not limited to:

- System integration of power electronics-based renewables to X systems
- Hybrid operation/power management of P-to-X systems with batteries/fuel cells
- Converter topologies for renewables-fed electrolyzers
- Grid support in Power-to-X systems
- Control schemes of renewables-fed power electronics-based power-to-X systems
- Component and system modeling in electrolyzers/fuel cell-based power-to-X systems
- Chemistry-aware digital twin modeling of power-to-X solutions

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 Power Electronics Role in Future Renewables and Power-to-X 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>.

Deadline for Submission of Manuscript: **31 July 2024**

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Proposed Timeline

- **01 Feb. '24:** Call for papers to IEEE JESTPE Editorial Office
- **30 Jun '24:** Manuscript submission deadline
- **31 Oct. '24:** Final acceptance notification
- **31 Dec. '24:** Manuscript forwarded to IEEE for publication
- **Feb. '25:** Special Issue appears in IEEE JESTPE