Special Issue

Power Supply-Demand Asymmetry and Power Quality Issues in High-Renewable Energy Power Systems

Message from the Guest Editors

Under the low-carbon transformation of global energy, the high proportion of new energy access promotes the power system to shift from "source with load" to "source-grid-load-storage" collaborative interaction. This results in the symmetry of power supply and consumption being broken. The differences in source, network, and load characteristics cause complex transient and steady-state disturbances. Power quality problems are also highlighted. New energy storage, such as hydrogen energy storage, aggravates the complexity of the system. The coordination of multi-energy flow and the regulation of the electric carbon market mechanism are insufficient. It is difficult to balance the symmetrical demand of supply and demand. The traditional governance strategy has limitations in perception and modeling. The existing equipment is difficult to meet the new requirements. It is urgent to study accurate modeling of power quality, new governance equipment, and a multi-energy flow collaborative optimization strategy.

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Deadline for manuscript submissions

31 October 2026

Symmetry

an Open Access Journal by MDPI

Impact Factor 2.2
CiteScore 5.2

mdpi.com/si/239834

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Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

Editor-in-Chief

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