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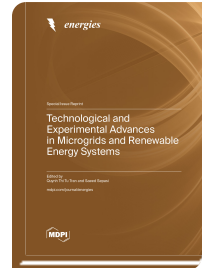
Special Issue Reprint

Technological and Experimental Advances in Microgrids and Renewable Energy Systems

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Edited by
Quynh Thi Tu Tran
Saeed Sepasi

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Research is underway to expedite the development of green and sustainable energy solutions, which is crucial for achieving net zero emissions by 2050. Among these efforts, the integration of microgrids and renewable energy systems emerges as a pivotal area, enhancing the flexibility and autonomy of the power infrastructure. This Special Issue covers a broad spectrum of the most recent technological and experimental advancements to facilitate the global expansion of microgrids and renewable energy systems. Various aspects were presented, such as the following: the development of a new custom supervisory system based on Internet of Things (IoT) concepts to control and manage the microgrid operation; a strategic planning methodology for efficiently utilizing distributed generation units under power mismatch conditions during their islanded operation; a practical platform to investigate the impact of various cyber-attacks and communication disruptions on MGs using hardware-in-the-loop (CHIL) testbed; and a novel controller design based on PID scheme to minimize frequency and power deviations of an isolated diesel–wind system. Different advanced methods and technologies were also mentioned to investigate the impact of communication system latency and failures, physical events, and cyber-attacks on the grid. These papers collectively contribute to advancing knowledge in addressing challenges related to renewable energy integration, grid resilience, and cybersecurity at various grid levels.



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