Special Issue

Next-Generation Microgrids: Intelligent Modeling, Control, and Digital Integration of Renewable Energy Systems

Message from the Guest Editors

The transition to a sustainable and resilient energy future relies heavily on the deployment of renewable energy-based microgrids. These systems enable decentralized energy generation, improved reliability, and the efficient integration of diverse sources such as solar, wind, and energy storage.

The topics of this Special Issue include the development of DC and AC microgrids, control strategies for both islanded and grid-connected operation, and the role of power electronics in integrating renewable energy and electric vehicles. Emphasis is also placed on energy management systems (EMS), power quality, load balancing, and the contribution of storage technologies to system stability.

We welcome submissions addressing the use of digital technologies—such as the Internet of Things (IoT), cloud computing, and edge-based architectures—for real-time monitoring and smart control. In addition, this Special Issue highlights the role of artificial intelligence in forecasting renewable generation and demand, intelligent control strategies, and predictive maintenance within microgrid environments.

Guest Editors

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Message from the Editor-in-Chief

As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal Applied Sciences has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

Editor-in-Chief

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