

Special Issue

Data-Driven Approaches to Power Grids: Planning, Control and Integration of Renewable Energy Systems

Message from the Guest Editors

The transition toward variable renewable energy (VRE) introduces significant grid complexity and uncertainty. Traditional models often struggle with VRE intermittency, but the growth of IoT and SCADA data allows AI and Machine Learning to extract reliable grid dynamics without prior model knowledge. These methodologies improve forecasting, state estimation, and intelligent fault detection to ensure secure, sustainable operations. Our goal is to showcase cutting-edge analytics that address the critical planning, control, and integration challenges of modern power systems.

Key Topics Include:

- Stochastic optimization and advanced predictive control.
- Demand Response (DR) and energy storage.
- Model-free identification and predictive maintenance.
- Virtual Power Plants (VPPs) and Demand-Side Management.
- Data integrity and cybersecurity.
- Virtual Power Plants (VPPs) and Distributed Energy Resource (DER) aggregation.

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Message from the Editor-in-Chief

Energies is an international, open access journal in energy engineering and research. The journal publishes original papers, review articles, technical notes, and letters. Authors are encouraged to submit manuscripts which bridge the gaps between research, development and implementation. The journal provides a forum for information on research, innovation, and demonstration in the areas of energy conversion and conservation, the optimal use of energy resources, optimization of energy processes, mitigation of environmental pollutants, and sustainable energy systems.

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