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Editorial

# The Journal of *Smart Energy Systems Research*, a Critical Platform for Interdisciplinary Study of Energy Science and Artificial Intelligence

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## 1. Introduction

We are proud to introduce *Smart Energy Systems Research (SESR)*, a premier open-access, peer-reviewed international journal dedicated to advancing intelligent energy infrastructure with a focus on power systems innovation. *SESR* serves as a critical platform for interdisciplinary research bridging cutting-edge technologies, policy frameworks, and industrial applications to address the global energy transition.

## 2. Why Smart Energy Systems?

The urgent demands of decarbonization, renewable integration, and grid resilience require transformative solutions. Despite breakthroughs in digitalization and renewable technologies, challenges persist in optimizing energy efficiency, ensuring grid stability amid distributed energy penetration, and navigating the socio-techno-economic complexities of large-scale system integration. Emerging advances—from AI-driven grid analytics to cyber-physical architectures—are redefining energy system design and operation. Simultaneously, the rise of multi-energy networks, prosumer ecosystems, and cross-sector coupling (e.g., transportation electrification) demands novel approaches to system-level coordination. *SESR* emerges to tackle these challenges by fostering knowledge exchange across academia, industry, and policymakers.

## 3. Scope and Innovation Pathways

*SESR* prioritizes research that translates theoretical breakthroughs into scalable solutions, focusing on:

- **Smart Grid Architectures** with digital twin integration and real-time adaptability;
- **AI/ML-driven Energy Analytics** for predictive grid management and anomaly detection;
- **Resilient Cyber-Physical Systems** balancing operational efficiency and cybersecurity;
- **Distributed Energy Orchestration** (DERs, microgrids, and virtual power plants);
- **Grid Modernization Strategies** for renewables-dominated infrastructure (wind, solar, storage);
- **Cross-Sector Synergies** (e.g., green hydrogen production, EV-grid integration, industrial decarbonization);
- **Policy-Economic Models** enabling equitable energy transition and investment prioritization.

## 4. Our Commitment

*SESR* upholds rigorous peer review, rapid dissemination, and global inclusivity. Our editorial board comprises leading experts spanning power engineering, data science, policy studies, and industrial practice. We welcome submissions that advance:

- Fundamental principles of adaptive energy networks;
  - Field demonstrations of smart grid technologies;
  - Lifecycle sustainability assessments of energy infrastructure;
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- Socio-technical frameworks for energy justice.

## 5. Join the Energy Evolution

Launched in Q2 2025 and headquartered in South China University of Technology, *SESR* invites researchers, engineers, and policymakers worldwide to contribute original research, reviews, case studies, and perspectives. Together, we will shape robust, equitable energy systems for a net-zero future.

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