



# Call for Papers

Special Issue on

## *Hydrogen-Electricity-Computing-Networks: Resilience Empowerment and Reliability Optimization*

### Background

As a new type of energy infrastructure integrating power flow, computing flow, data flow, and hydrogen energy flow, the hydrogen-electricity-computing-network co-optimization serves as an important carrier supporting the deep integration of new energy systems and the intelligent economy. Driven by the high penetration of renewable energy, the large-scale growth of computing loads, and the high-level coupling of multiple energy flows, the traditional system faces challenges in such key aspects as temporal energy aggregation, efficient source-load matching, and coordinated multi-energy flow regulation. The inherent contradiction between the strong randomness of renewable energy output, the rapid fluctuations of computing loads, and the rigid operation of the power grid remains unresolved. There is still a lack of a unified theoretical framework for temporal energy scheduling, dynamic source-load matching, and multi-energy flow collaborative optimization. In open and dynamic environments, the system's ability to resist disturbances, achieve self-healing, and maintain secure and stable operation is severely tested. Meanwhile, the hydrogen-electricity-computing-network system deeply integrates new energy generation, flexible loads, computing power centers, power electronics equipment, distribution grids, and information communication systems. The intertwined and coupled risks of cybersecurity and functional safety mean that conventional security protection models can no longer meet the requirements for efficient and reliable system operation.

### Aims and Scope of the Special Issue

To address these challenges, this special issue focuses on resilience empowerment and reliability optimization for the hydrogen-electricity-computing-network system. Aiming at integrated security assurance and the enhancement of energy network efficiency and resilience, the issue centers on topics such as computing-energy integration, computing-power synergy, source-grid-load-storage interaction, high-proportion renewable energy integration, and grid endogenous security. We specifically invite original contributions on resilience fundamentals, reliability optimization methods, collaborative control technologies, fault self-healing mechanisms, endogenous security, and engineering demonstration applications. The goal is to advance theoretical achievements in complementary multi-energy supply, AI empowerment, resilience interconnection, and the synergistic enhancement of security and reliability. This will help break through key technologies for coordinated optimization of main-distribution-microgrids, efficient renewable energy integration, and the strengthening of energy internet architectures. Ultimately, it will drive the evolution of energy and power systems from passive adaptation and rigid connections to active integration and collaborative optimization, providing solid theoretical and engineering support for the high-quality development of new energy systems, the achievement of the "dual carbon" goals, and the sustainable growth of the intelligent economy.

This special issue covers (but not limited to) the following topics:

- Theoretical architectures and key technologies for the collaborative optimization of Hydrogen-Electricity-Computing-Networks
- Temporal energy aggregation and efficient source-load matching theories for Hydrogen-Electricity-Computing-Networks
- Computing-power synergy and multi-objective scheduling decision-making for Hydrogen-Electricity-Computing-Networks
- Integrated planning, operation, and control methods for Hydrogen-Electricity-Computing-Networks
- Heterogeneous computing synergy and flexible regulation under high-proportion renewable energy penetration
- High-reliability, high-availability, and high-efficiency collaborative integration technologies for Hydrogen-Electricity-Computing-Networks
- AI-enabled master decision-making and collaborative optimization for Hydrogen-Electricity-Computing-Networks
- Computing-network synergy and computing-energy joint optimization methods
- Endogenous security assessment, risk warning, and active defense technologies for Hydrogen-Electricity-Computing-Networks
- Integrated cybersecurity and functional safety assurance theories and methods for energy internet
- Fault self-healing, disturbance suppression, and resilience enhancement mechanisms for Hydrogen-Electricity-Computing-Networks
- High-reliability, low-latency, and robust collaborative control technologies for Hydrogen-Electricity-Computing-Networks

### Submissions

Authors should submit their manuscripts online directly at: <https://sands.nestor-edp.org> and choose, during submission, the special issue: **Hydrogen-Electricity-Computing-Networks: Resilience Empowerment and Reliability Optimization**. All relevant papers will be carefully considered and peer-reviewed by a distinguished team of international experts. The instructions for authors are detailed at: <https://sands.edpsciences.org/author-information/instructions-for-authors>.

**Submission deadline – 30 August 2026**

**Article Processing Charges** - S&S is an Open Access journal and APC is 1100 Euro in 2026.

### Guest Editors

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## Guest Editor Biographies



**Rashid Al-Abri** is an Associate Professor in the Department of Electrical and Computer Engineering, and the Dean of the College of Engineering and Architecture, University of Nizwa (UoN), Oman. He also serves as Executive Director of the Research Center for Energy, Materials and Semiconductors. His research interests include power electronics applications, renewable energy, power quality, energy efficiency, power systems, smart grid technologies, and power system stability.



**Rabie A. Ramadan** is a Professor in the Department of Information Systems, University of Nizwa (UoN), Oman. His research interests include Artificial Intelligence (AI), the Internet of Things (IoT), sensor networks, mobile computing, and computational intelligence. He is leading various research groups in the fields of IoT and computational intelligence. He has published over 140 journal and conference papers. He also served as the general chair, co-chair, and Technical Program Committee (TPC) member for various international academic conferences and journals.



**Chenghui Zhang** is currently a Distinguished Professor, the Dean of the School of Control Science and Engineering, and the Vice Chairman of the Academic Committee of Shandong University, China. He serves as the Director of the National Engineering Research Center for New Energy System Control. He is an IEEE Fellow, and holds fellowships in the Chinese Association of Automation and the China Power Supply Society. His research focuses on the control of new energy systems and the co-optimization of computing power and electricity.



**Fan Zhang** is currently a Tenured Professor, Doctoral Supervisor, and the Director of the Intelligent Computing System Laboratory at the Institute of Big Data, Fudan University, China. He also serves as Executive Director of the IEEE PES China Technical Committee on Power System Communication and Network Security, and Executive Editor-in-Chief of Computer Engineering. His long-term research focuses on theoretical exploration and technological innovation of high-efficiency, high-performance and high-security computing architectures based on variable-structure computing. Currently, he serves as an Associate Editor of *Security and Safety*.



**Bin Chen** is an Assistant Professor and Doctoral Supervisor at the Institute of Big Data, Fudan University, China. His research focuses on intelligent assessment and governance of ecological and environmental risks associated with critical resources in the energy transition, as well as data-driven and AI-driven climate risk simulation and resilience regulation of infrastructure systems.

