Special Session I

Special Session Basic Information:

专栏题目 Session Title	中文：综合能源系统运行风险分析与优化 英文：Operational Risk Analysis and Optimization of Integrated Energy Systems

专栏介绍和征稿主题
Introduction and topics

中文：

随着全球能源转型和可持续发展战略的深入推进，以电力系统为核心的单一能源系统正逐步向多能互补、高效协同的综合能源系统演进。综合能源系统通过整合电力、热力、燃气、交通等多种能源形式，实现能源的梯级利用和多源协调优化，对提升能源效率、降低运行成本、减少碳排放具有重大意义。然而，综合能源系统的多能耦合性、多源异构性以及复杂性对其安全稳定运行带来了前所未有的挑战。传统的面向单一能源系统风险评估和优化方法已难以适应综合能源系统的特性。因此，迫切需要深入研究综合能源系统的运行风险机理、评估方法及其优化策略，以确保其安全、可靠、经济运行。为此，我们设立此专题，旨在汇聚综合能源系统运行风险分析与优化领域的最新研究成果和前沿思想，为保障综合能源系统的安全稳定经济运行提供理论支撑和实践参考。征稿主题包括但不限于：

1. 综合能源系统运行风险建模与评估
2. 综合能源系统韧性提升与恢复策略
3. 综合能源系统运行风险预警与防控
4. 综合能源系统优化与决策
5. 先进技术在综合能源系统风险管理中的应用

英文：

With the deepening global energy transition and sustainable development strategies, single energy systems primarily centered around power systems are progressively evolving towards integrated energy systems (IES) that feature multi-energy complementarity and efficient synergy. IES integrate various energy forms such as electricity, heating, natural gas, and transportation, enabling cascaded energy utilization and multi-source coordinated optimization. This approach holds significant implications for improving energy efficiency, reducing operational costs, and decreasing carbon emissions. However, the multi-energy coupling, multi-source heterogeneity, and inherent complexity of IES pose unprecedented challenges to their safe and stable operation. Traditional risk assessment and optimization methods designed for single energy systems are increasingly inadequate for addressing the unique characteristics of IES. Therefore, there is an urgent need for in-depth research into the operational risk mechanisms, assessment methodologies, and optimization strategies for IES to ensure their safe, reliable, and economic operation.

To address this critical need, we are launching this special issue. It aims to gather the latest research findings and cutting-edge ideas in the field of operational risk analysis and optimization for IES, providing theoretical support and practical references for safeguarding the secure, stable, and economic operation of integrated energy systems.

Topics of interest include, but are not limited to:

1. Operational Risk Modeling and Assessment of Integrated Energy Systems
2. Resilience Enhancement and Restoration Strategies for Integrated Energy Systems
3. Operational Risk Early Warning and Prevention & Control for Integrated Energy Systems
4. Optimization and Decision-Making for Integrated Energy Systems
5. Applications of Advanced Technologies in Integrated Energy System Risk Management

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Organizer's Brief Biography

中文：重庆大学副教授、博导，从事综合能源系统和新型电力系统可靠性与风险方向的研究工作。主持国家重点研发计划课题、国家自然科学基金面上项目和青年项目等，获重庆市科技进步一等奖，入选中国科协青年人才托举工程项目。

英文：Associate Professor and Doctoral Supervisor at Chongqing University, with expertise in the reliability and risk analysis of integrated energy systems and next-generation power systems. Has led key projects funded by the National Key R&D Program and the National Natural Science Foundation of China. Honored with the First Prize for Scientific and Technological Progress of Chongqing Municipality and recognized as a rising talent by the China Association for Science and Technology.

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Organizer's Brief Biography

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英文：

Tao Wu received the Ph.D. degree in electrical engineering from Southern Methodist University, Dallas, TX, USA, in 2023. He is currently an Assistant Research Fellow with the School of Electrical Engineering, Chongqing University, Chongqing, China. His research interests include Power-Hydrogen integrated energy systems and AI applications to power systems.