Special Session II

Special Session Basic Information:

专栏题目 **Session Title**	中文：可持续能源转型赋能的新型智能技术 英文：Novel Intelligent Technologies Empowered by Sustainable Energy Transition

专栏介绍和征稿主题
Introduction and topics

中文：

"可持续能源转型赋能的新型智能技术"特刊汇集前沿研究成果，聚焦可持续能源领域的技术革新方向，深入探索新型智能技术在能源转型进程中的创新发展与实践落地。本特刊全面收录相关研究成果、技术方法及应用案例，系统凸显这类新型智能技术对构建低碳化、智能化能源生态系统的核心赋能作用。

可持续能源转型是全球能源革命的核心议题，其推进深度依托于新型智能技术、大数据分析及跨领域融合技术的突破性发展。在全球"双碳"目标引领及对高效、可靠、可持续能源系统需求持续攀升的背景下，可持续能源转型催生的新型智能技术，已成为推动能源体系迭代升级、加速脱碳进程的核心驱动力。然而，这类新型智能技术的研发与规模化应用仍面临多重挑战：能源系统多环节耦合的复杂性、多源异构数据的协同处理需求、技术落地的成本控制及跨行业标准统一诉求，均为能源领域与科技行业带来亟待突破的瓶颈。此外，新型智能技术的多元化路径与不同能源场景的适配差异，也对技术间的协同兼容提出更高要求，进一步增加了落地推广的实施难度。

本特刊聚焦可持续能源转型赋能的新型智能技术最新突破与创新应用，重点探讨这类技术在优化能源生产与储存配置、提升能源系统整体效率、促进多类型可再生能源协同并网等方面的核心价值。从能源基础设施的智能升级改造，到全链路能源消耗的精准管控，特刊全面覆盖多场景应用研究；同时深入探索新型智能技术在综合能源系统调控、储能技术优化，以及应对能源供需波动、跨区域能源调度挑战中的实践路径。

感兴趣的主题包括但不限于：
1. 新型智能技术驱动的综合能源系统优化
2. 可持续能源转型下的可再生能源智能整合技术
3. 新型智能技术赋能的能源系统网络安全
4. 可持续能源运营的智能大数据分析
5. 基于新型智能技术的能源需求响应与调控策略
6. 新型智能技术赋能的分布式能源与储能协同管理
7. 跨领域融合的能源智能通信与协同管控技术
8. 新型智能技术助力的区域能源低碳转型路径优化

英文：

Novel Intelligent Technologies Empowered by Sustainable Energy Transition

The special issue "Novel Intelligent Technologies Empowered by Sustainable Energy Transition" collects cutting-edge research findings, focuses on the direction of technological innovation in the field of sustainable energy, and in-depth explores the innovative development and practical application of novel intelligent technologies in the process of energy transition. This special issue comprehensively includes relevant research results, technical methods and application cases, and systematically highlights the core enabling role of such novel intelligent technologies in building a low-carbon and intelligent energy ecosystem.

Sustainable energy transition is a core topic of the global energy revolution, and its advancement relies heavily on the breakthrough development of novel intelligent technologies, big data analytics and cross-field integration technologies. Against the backdrop of the global "dual carbon" goal and the rising demand for efficient, reliable and sustainable energy systems, novel intelligent technologies driven by sustainable energy transition have become the core driving force for promoting the iterative upgrading of the energy system and accelerating the decarbonization process. However, the

research and development as well as large-scale application of such novel intelligent technologies still face multiple challenges: the complexity of multi-link coupling in energy systems, the demand for collaborative processing of multi-source heterogeneous data, the cost control of technology implementation and the appeal for unified cross-industry standards all bring bottlenecks that urgently need to be broken through for the energy and technology industries. In addition, the diversified paths of novel intelligent technologies and the adaptation differences in different energy scenarios also put forward higher requirements for the coordination and compatibility between technologies, further increasing the difficulty of implementation and promotion.

This special issue focuses on the latest breakthroughs and innovative applications of novel intelligent technologies empowered by sustainable energy transition, and mainly discusses the core value of such technologies in optimizing energy production and storage configuration, improving the overall efficiency of energy systems, and promoting the coordinated grid connection of various renewable energy sources. From the intelligent upgrading and transformation of energy infrastructure to the precise management and control of full-link energy consumption, the special issue covers a wide range of multi-scenario application research; it also in-depth explores the practical paths of novel intelligent technologies in integrated energy system regulation, energy storage technology optimization, as well as addressing the challenges of energy supply and demand fluctuations and cross-regional energy dispatch.

Topics of interest include but are not limited to:
1. Novel intelligent technology-driven integrated energy system optimization
2. Renewable energy intelligent integration technology under sustainable energy transition
3. Energy system cybersecurity empowered by novel intelligent technologies
4. Intelligent big data analytics for sustainable energy operation
5. Energy demand response and regulation strategies based on novel intelligent technologies
6. Distributed energy and energy storage coordinated management empowered by novel intelligent technologies
7. Cross-field integrated energy intelligent communication and coordinated management technology
8. Regional energy low-carbon transition path optimization assisted by novel intelligent technologies

Special Session Chair(s):

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Organizer's Brief Biography

中文：许旭博士，江苏省双创博士人才。目前在西交利物浦大学智能工程学院担任助理教授、博士生导师以及可持续能源硕士项目专业主任。许旭博士毕业于香港理工大学电气工程专业并获得博士学位，还曾在香港理工大学、香港大学和新加坡南洋理工大学劳斯莱斯电力实验室进行博士后研究工作。在科研实践方面，许旭博士主持且深度参与多项国内外电网和工业领域研究项目，部分研究成果成功转化落地。此外，许旭博士多次受邀在国际能源领域会议作报告，并荣获最佳论文奖与最佳演讲报告奖。作为国际电气电子工程学会会员，许旭博士在多场国际能源领域会议中担当会议分会主席与技术委员会成员，近年发表了 30 余篇 SCI 和 EI 学术论文。

英文：Dr. Xu Xu is a talent of the "Double Innovation Doctor" program in Jiangsu Province. Currently, he serves as an assistant professor, doctoral supervisor, and the program director of the Master of Sustainable Energy at the School of Intelligent Engineering, Xi'an Jiaotong - Liverpool University. Dr. Xu Xu graduated from the Department of Electrical Engineering, The Hong Kong Polytechnic University, and obtained his doctorate degree. He has also conducted post - doctoral research at The Hong Kong Polytechnic University, the University of Hong Kong, and the Rolls - Royce Power Laboratory at Nanyang Technological University, Singapore. In terms of scientific research practice, Dr. Xu Xu has presided over and been deeply involved in a number of research projects in the power grid and industrial fields at home and abroad. Some of his research achievements have been successfully transformed and implemented. In

addition, Dr. Xu Xu has been invited to give reports at international energy conferences on many occasions and has won the Best Paper Award and the Best Presentation Award. As a member of the Institute of Electrical and Electronics Engineers (IEEE), Dr. Xu Xu has served as the conference session chair and a member of the technical committee in many international energy conferences. In recent years, he has published more than 30 SCI and EI academic papers.

姓名 **Name**	Weitao Yao (姚巍涛)
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Organizer's Brief Biography

中文： 姚巍涛，2015 年在中国广州的华南理工大学获得电气工程及其自动化专业的工学学士学位。他分别于 2018 年和 2023 年在新加坡南洋理工大学获得电气工程专业的硕士和博士学位。在加入西交利物浦大学之前，他曾在新加坡南洋理工大学电气与电子工程学院的罗尔斯·罗伊斯-南洋理工大学联合实验室担任研究助理。2023 年，他加入西交利物浦大学，担任电气与电子工程系的助理教授。作为 IEEE 会员，他定期为一些 SCI 期刊和 EI 会议担任审稿人。近年来，他在多个顶级 SCI 期刊和 EI 会议上发表了多篇论文。他的研究兴趣包括微电网、电力系统稳定性、可再生能源的分布式控制以及信息物理系统。

英文： Dr. Weitao Yao received a B.Eng. degree in electrical engineering and automation from the South China University of Technology, Guangzhou, China, in 2015. He obtained his M.Sc. and Ph.D. degrees, both in power engineering from Nanyang Technological University, Singapore, in 2018 and 2023, respectively. Prior to joining XJTLU, he was a Research Associate in the Rolls-Royce@NTU Corporate Laboratory with the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. In 2023, he joined as an assistant professor in the Department of Electrical and Electronic Engineering, at Xian Jiaotong-Liverpool University. As an IEEE member, he regularly serves as the reviewer for some SCI journals and EI conferences. In recent years, he has published multiple top-tier SCI journals and EI conference papers. His research interests include microgrids, power system stability, distributed control for renewable energy, and cyber-physical systems.