Special Session II

Special Session Basic Information:

专栏题目 Session Title	中文：气候变化下新型电力系统的风险评估与弹性提升 英文：Risk Assessment and Resilience Enhancement of New-Type Power Systems under Climate Change

专栏介绍和征稿主题
Introduction and topics

中文：

气候变化已成为新型电力系统安全运行的重大威胁，2022 年四川高温干旱、2021 年美国得州冬季风暴等事件表明，极端天气对电力供需平衡、基础设施可靠性和可再生能源出力均造成系统性冲击。当前，新型电力系统面临“双碳”目标驱动的能源结构转型与气候风险加剧的双重挑战：一方面，高比例可再生能源并网加剧了“极热无风”“极寒无光”等气候敏感性问题；另一方面，配电网因设备老化、城乡网架差异等成为极端天气下的脆弱环节。传统风险评估方法难以量化气候与电力系统的动态耦合效应，而弹性提升技术需融合气象预测、AI 算法与多能协同策略。本专题聚焦“气候-电力-AI”跨学科交叉，旨在构建覆盖风险识别、量化评估到弹性提升的全链条技术体系。议题涵盖极端天气建模、新能源出力不确定性分析、新型电力系统防灾抗灾优化、需求侧资源协同等方向，推动从“被动防御”向“主动适应”的范式转变。

征稿方向：

1. 气候风险建模与预测
2. 新型电力系统脆弱性量化评估
3. 弹性提升关键技术
4. 需求侧协同与市场机制
5. 政策与案例研究

英文：

Climate change has emerged as a critical threat to the secure operation of new-type power systems. Recent incidents, such as the 2022 Sichuan extreme heatwave and drought and the 2021 Texas winter storm, demonstrate that extreme weather events systematically disrupt power supply-demand balance, infrastructure reliability, and renewable energy generation. The new-type power system now faces dual challenges: energy structure transformation driven by "dual-carbon" goals and escalating climate risks. On one hand, the high penetration of renewable energy exacerbates climate sensitivity issues like "extreme heat with low wind" and "extreme cold with low solar irradiance." On the other hand, distribution networks, plagued by aging equipment and urban-rural grid disparities, have become vulnerable under extreme weather. Traditional risk assessment methods struggle to quantify dynamic climate-power system coupling effects, while resilience enhancement requires integrating meteorological forecasting, AI algorithms, and multi-energy collaboration strategies.

This session focuses on "Climate-Power-AI" interdisciplinary integration, aiming to establish a full-chain technical framework covering risk identification, quantitative assessment, and resilience enhancement. Topics include extreme weather modeling, uncertainty analysis of renewable generation, disaster prevention optimization for new-type power systems, and demand-side resource coordination, fostering a paradigm shift from passive defense to active adaptation.

Call for Papers (Topics Include but Not Limited to)

1. Climate Risk Modeling and Prediction
2. Vulnerability Quantification and Assessment for New-Type Power Systems
3. Key Technologies for Resilience Enhancement

4. Demand-Side Coordination and Market Mechanisms
5. Policy Innovations and Case Studies

Special Session Chair(s):

姓名 **Name**	Gengfeng Li
称谓 **Prefix**	Professor
部门 **Department**	Department of Electrical Engineering
单位 **Organization**	Xi'an Jiaotong University
城市/地区 **City/Region**	Xi'an, Shaanxi

Organizer's Brief Biography

中文：李更丰，西安交通大学电气工程学院教授、博导，国家优秀青年基金获得者。目前担任陕西省智能电网重点实验室主任，全国微电网与分布式电源并网标准化技术委员会委员、中国电机工程学会分布式发电及智能配电专委会委员等。主要从事主动配电系统可靠性、电力系统弹性评估与提升、综合能源系统分析与优化等方向的科研工作，主持国家自然科学基金集成项目等国家级科研项目 5 项，获国家自然科学二等奖，中国青年科技奖，陕西省科技进步一等奖等科研奖励多项。

英文：Professor and Doctoral Supervisor, School of Electrical Engineering, Xi'an Jiaotong University; Recipient of the National Science Fund for Excellent Young Scholars. Currently serving as Director of the Shaanxi Key Laboratory of Smart Grid, Member of the National Technical Committee on Microgrid and Distributed Power Integration Standardization (SAC/TC564), and Member of the Distributed Generation and Smart Distribution Committee of the Chinese Society for Electrical Engineering. His research focuses on reliability of active distribution systems, resilience assessment and enhancement of power systems, and optimization of integrated energy systems. He has led five national-level research projects, including the Integrated Program of the National Natural Science Foundation of China, and has been awarded the Second Prize of National Natural Science Award, China Youth Science and Technology Award, and First Prize of Shaanxi Provincial Science and Technology Progress Award for his groundbreaking contributions