Special Session XI

Special Session Basic Information:

专栏题目 **Session Title**	中文：高耗能工业用户的需求侧响应与市场交易 英文：Demand Response and Trading of Energy-Intensive Industries

专栏介绍和征稿主题
Introduction and topics

中文：随着能源需求的持续增长和可再生能源的快速发展，负荷调节已成为平衡供需、提升电网可靠性的关键手段。高耗能工业用户由于其用电量大、生产过程灵活，在负荷调节方面具有显著优势。通过智能控制方法，这些工业负荷可以根据电力系统的需求动态调整，从而降低峰值负荷并提高低谷负荷的利用率。这不仅有助于提高能源效率、降低能源成本，还能促进可再生能源消纳，助力全球能源转型和低碳发展目标。

近年来，实现高耗能工业用户的节能降碳和供需协同互动具有重要意义。然而，在工艺设计和节能改造过程中，对由供需互动引发的变工况条件考虑不足，可能导致安全风险和能源效率下降等问题。此外，缺乏完全协调的电网-负荷互动技术，限制了其巨大调节潜力的充分释放。同时，缺乏有效的市场机制和激励措施，导致企业参与供需互动的意愿较低。为有效解决这些矛盾，亟需在高耗能产业的建模与可调容量预测、能碳效率协同优化、多时间尺度供需互动、以及电碳协同激励机制等四个方面取得突破。在本专题中，我们的主要目标是分享高耗能工业负荷在电网-负荷互动技术和市场交易策略等领域的最新研究成果和创新思路。

英文： With the continuous growth in energy demand and the rapid development of renewable energy, load regulation has become a crucial means of balancing supply and demand and enhancing power grid reliability. Energy-intensive industries, due to their large power consumption and flexible production processes, have significant advantages in load regulation. Through intelligent control methods, these industrial loads can dynamically adjust according to the needs of the power system, thereby reducing peak loads and increasing the utilization of off-peak loads. This not only helps improve energy efficiency and reduce energy costs but also facilitates the integration of renewable energy, contributing to global energy transition and low-carbon development goals.

In recent years, achieving energy conservation, carbon reduction, and coordinated supply-demand interaction in energy-intensive industries is important. During process design and energy-saving retrofits, insufficient consideration is given to variable operating conditions triggered by supply-demand interactions, which can lead to issues such as safety risks and reduced energy efficiency. Furthermore, the lack of fully coordinated grid-load interaction technology limits the full release of their significant regulation potential. Additionally, the absence of effective market mechanisms and incentive measures results in low participation willingness from enterprises in supply-demand interactions. To effectively resolve these conflicts, breakthroughs are urgently needed in four areas: modeling and adjustable capacity prediction for energy-intensive industries, energy-carbon efficiency co-optimization, multi-timescale supply-demand interaction, and electricity-carbon collaborative incentive mechanisms. In this special session, our main objective is to share the latest research findings and innovative ideas in areas such as grid-load interaction technology and market transaction strategies for energy-intensive industrial loads.

Special Session Chair(s):

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Organizer's Brief Biography

中文：张儒峰，男，博士，教授，博士生导师，IEEE Senior Member，东北电力大学电气工程学院电力工程系支部书记、系副主任，新加坡南洋理工大学访问学者，**吉林省“长白英才计划”青年拔尖人才**，“新锐计划”入选者，“东电学者”入选者，吉林省优秀博士学位论文获得者。主持国家自然科学基金面上项目 1 项、青年基金项目 1 项(优秀结题)，任《Applied Energy》、《Protection and Control of Modern Power Systems》、《Energy Storage and Applications》、《电力自动化设备》、《电力系统保护与控制》、《电力建设》、《东北电力大学学报》期刊青年编委，入选斯坦福全球前 2%顶尖科学家榜单(年度影响力),获吉林省自然科学二等奖 1 项（排名第 1），吉林省科技进步一等奖 1 项、二等奖 2 项，中国电工技术学会科技进步二等奖 1 项，录用和发表 SCI/EI 收录期刊论文 60 余篇，其中 ESI 热点论文 2 篇，高被引论文 5 篇，1 篇论文入选 F5000 论文。

英文：I'm presently a **Professor** with the Department of Electrical Engineering, Northeast Electric Power University. I have led more than 10 scientific research projects including National Natural Science Foundation of China. I serve as a Youth editorial board member or associate editor of ***Applied Energy, Protection and Control of Modern Power Systems (PCMP), Power System Protection and Control (in Chinese)*** and Review Editor of Frontiers in Energy Research. I also serve as guest editor of IET Energy Systems Integration and International Journal of Electrical Power & Energy Systems. I have published more than 60 papers related to market and economics topics. I'm also a reviewer of several IEEE PES transactions including TSG, TSTE and TPWRS.

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Organizer's Brief Biography

中文：靳小龙，天津大学电气工程系，英才副教授、特聘研究员，天津大学电动汽车与能源互联网中英联合研究中心副主任。长期从事负荷侧资源调控互动策略及市场机制的研究，近年来主持智能电网国家科技重大专项课题 1 项、国家自然科学基金 1 项、国重研发计划子课题 1 项、天津市基金等省部级项目 5 项。担任中国电机工程学会电动交通智能充换电网络专业委员会委员、担任《电力建设》、《南方能源建设》等多个期刊青年编委。获省部级科技进步二等奖 1 项，获 2023 年、2024 年全球前 2%顶尖科学家。

英文：Xiaolong Jin is an Associate Professor in the Department of Electrical Engineering at Tianjin University, serves as Deputy Director of the university's China-UK Joint Research Center for Electric Vehicles and Energy Internet. Specializing in demand-side resource regulation strategies and power market mechanisms, he has led multiple high-impact research initiatives, including a National Science and Technology Major Project on smart grids, a National Natural Science Foundation of China grant, a sub-project under the National Key R&D Program, and five provincial-level projects. He holds membership in the Electric Transportation Intelligent Charging-Swapping Network Committee of the Chinese

Society for Electrical Engineering and serves on the youth editorial boards of journals like Electric Power Construction and Southern Energy Construction. His achievements have been recognized with a Second-Class Provincial and Ministerial Science and Technology Progress Award and consecutive inclusions in Stanford University’s World’s Top 2% Scientists list (2023, 2024).