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Panel Session 16

Fundamental Theory and Methodology of Energy Management of Large Scale Integrated Energy Systems

INTRODUCTION AND TOPICS

This panel session focuses on the latest advancements in fundamental theory, methodology, and technologies pertaining to energy management in large-scale integrated energy systems. The green and low-carbon transformation of the energy system is a major issue in the world. Integrated energy systems can effectively enhance energy efficiency, reduce the renewable energy curtailment, ensure the security of energy systems. Exploiting the flexibility of integrated energy systems can contribute to achieving the goal of carbon neutrality. With the construction of infrastructure such as pipeline networks, provincial and city-level large-scale integrated energy systems have emerged. Large-scale integrated energy systems confront the challenge of the "curse of dimensionality," which significantly complicates their analysis and optimization. Moreover, their temporal scales span from milliseconds to hours, making numerical simulations prone to instability. Additionally, the prevalent barriers among the multiple agents severely constrain the integration of renewable energy and lead to frequent cross-energy flow safety incidents, posing significant risks to the security and efficient operation of the integrated energy systems. Therefore, it is urgent to conduct research on the energy management of large-scale integrated energy systems, supporting the secure and efficient operation of energy systems during the pursuit of carbon neutrality.

PANEL SESSION CHAIRS

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Bin Wang (Fellow IET, Senior Member IEEE) received the B.S. and Ph.D. degrees in electrical engineering, Tsinghua University, Beijing, China, in 2005 and 2011, respectively. He is currently served as Associate Professor with the Department of Electrical Engineering, Tsinghua University. He has been selected for the Young Changjiang Scholars Program by the Ministry of Education of China. His research interests include renewable energy optimal dispatch and control, automatic voltage control.

Dr. Bin Wang has published more than 80 SCI/EI-indexed papers in IEEE Xplore. He won the First-Class Prize, National Award for Technological Progress of China in 2018. Additionally, he has been awarded ten provincial/ministerial science and technology first-class prizes. Over the past five years, as the Principal Investigator (or co-PI), Dr. Bin Wang has led his research group in conducting more than 20 research projects with a total funding of 60 million CNY. He is serving as the Deputy Director at Distribution Network and New Energy Research Institute of Tsinghua Sichuan Energy Internet Research Institute from June 2021, and the Deputy Director at Tsinghua University - Towngas Energy Investment Limited Virtual Power Plant Technology Joint Research Center.nagement Innovation in Jiangsu Province. He serves as Secretary-General of the IEEE PES Nanjing Chapter on various IEEE PES committees.

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Yixun Xue received the B.S. degree from Xi'an Jiaotong University in 2016, and received Ph.D. degrees from Tsinghua University, in 2021. In 2021, he joined Taiyuan University of Technology, Taiyuan, China, where he is currently an Associate Professor. His research interests include coordinated planning and optimization, and resilience enhancement in integrated energy systems. He has presided over many national level programs as the principal investigator, such as the National Natural Science Foundation of China(Integration Program, Key Program, Youth Science Foundation Program). He has won the Second Prize for Scientific and Technological Progress in Shanxi Province, Seoul International Invention Exhibition Gold Award, Young Elite Scientists Sponsorship Program by CSEE and etc.

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Haotian Zhao received the Ph.D. degree in the Department of Electrical Engineering, Tsinghua University, Beijing, China, in 2022. Now he is serving as an Assistant Research Fellow as well as a postdoctoral research fellow in the Department of Electrical Engineering, Tsinghua University. He has been selected for the "Shuimu Scholars" Program of Tsinghua University. His research interests include the energy management in integrated energy systems, virtual power plant technologies and demand response.

He has won the MPCE Journal's Annual Best Paper Award and the Best Paper Award at IEEE international conference. He has published over 30 SCI/EI journal articles, applied for over 30 invention patents, and developed an Integrated Energy Management System (IEMS), which has been successfully deployed in 17 smart towns/cities and 42 low-carbon smart parks across 16 provinces including Beijing, Shanghai, Hebei, Jiangsu, Sichuan, Zhejiang, Jilin and Guangdong, supporting the green energy supply for the 2022 Beijing Winter Olympics.

PAPER SUBMISSION

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