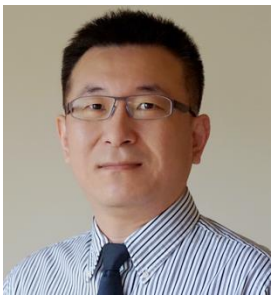
PSGEC 2024 SPEAKERS



Biography: Fei Wang is a Professor with the Department of Electrical Engineering and the State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources at North China Electric Power University (NCEPU). He is the Director of Smart Energy Network Integrated Operation Research Center (SENIOR) at NCEPU. He was a Visiting Professor with the Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA, from 2016 to 2017. Prof. Wang is an Associate Editor of IEEE Transactions on Systems, Man, and Cybernetics: Systems, IEEE Transactions on Intelligent Transportation Systems. He is the Expert Member of IEC SC8A/WG2. He was the recipient of the 2021, 2022 and 2023 Elsevier China Highly Cited Scholar. His research interests include renewable energy power/electricity price/electricity load forecasting, electricity market, demand response, smart grid, microgrid and integrated energy system.

Title: Large-scale wind and solar power forecasting technology for diverse terrain and complex weather
面向多样化地形和复杂天气的大规模风/光发电功率预测技术

Abstract: To achieve the carbon peaking and carbon neutrality goals, the development of new energy power generation represented by wind power and PV is rapidly growing. With the continuous development of wind power and PV resources, more and more wind farms and PV stations are being built in diverse terrain and complex weather conditions, leading to increasingly complex and volatile power fluctuations in new energy power generation, making power prediction increasingly difficult. Under diverse terrain and complex weather scenarios, existing technology is difficult to adapt to abnormal/extreme resource characteristics and abrupt evolutionary processes, therefore cannot achieve accurate and refined forecasting. For wind power forecasting, pattern adaptive modeling based ultra-short-term forecasting, and low-level wind speed short-term forecasting considering ground drag force of the meteorological numerical model are proposed. For PV power forecasting, ultra-short-term forecasting considering complex cloud motion, and short-term forecasting integrates nearby station resources and power information are proposed.
为实现碳达峰和碳中和目标，以风电和光伏为代表的新能源发电发展迅速。随着风电和光伏资源的不断开发，越来越多的风电场和光伏电站建设于多样化地形和复杂天气条件场景中，导致新能源发电的功率波动越来越复杂多变，功率预测难度日益增加。在多样化地形和复杂天气场景下，现有技术难以适应非常态/极端态的资源特征与突变性的环境演化过程，无法实现精细化准确预测。因此，针对风电功率预测，研究提出了基于风形态自适应建模的超短期预测方法，以及考虑气象数值模式次网格地面拖曳力的低层风速短期预测方法；针对光伏功率预测，研究提出了考虑云团复杂运动影响的超短期预测方法，以及融合临近场站资源与功率信息的短期预测方法。