

Title: Risk Assessment of Renewable-Rich Power System Operational Security

Abstract:

Renewable energy is playing an vital role in facilitating the decarbonization of modern power systems. However, the unique nature of renewable energy has also posed major threats to the power system operational security as evidenced by many recent incidents. This talk will firstly introduce the growing insecurity risks in the operation of modern power systems featured by the large-scale integration of renewable energy. Then some conventional techniques to tackle these emerging and critical challenges will be reviewed and compared. On this basis, the talk will move on to a series of effective risk assessment techniques recently developed for the uncertainty characterization and propagation analysis to deal with multiple types of grid insecurity issues, so that the secure and economic operation of renewable-rich power systems can be ensured.

Bio:



Siqi Bu received the Ph.D. degree from the electric power and energy research cluster, The Queen's University of Belfast, U.K., where he continued his postdoctoral research work before entering industry. Then he was with National Grid UK as an experienced UK National Transmission System Planner and Operator. He is an Associate Head and Associate Professor with Department of Electrical and Electronic Engineering, The Hong Kong Polytechnic University, Hong Kong, and Associate Director of Research Centre for Grid Modernisation. He is also a Chartered Engineer with UK Royal Engineering Council, U.K.. His research interests include power system stability, operation and economics considering renewable energy integration, smart grid application and transport electrification.

Dr Bu is an Editor of IEEE Transactions on Power Systems, IEEE Transactions on Consumer Electronics, IEEE Power Engineering Letters, IEEE Open Access Journal of Power and Energy, CSEE Journal of Power and Energy Systems, Protection and Control of Modern Power Systems, Journal of Modern Power Systems and Clean Energy, and Advances in Applied Energy. He is the Standing Director of IEEE PES Power System Relay and Control Satellite Committee, and Executive of IEEE PES Hong Kong Chapter. He is also the Vice-Chairman of IET HK Power and Energy Section. He serves as the Chairman of IET HK Power Symposium 2024, and Co-Chairman of IET International Conference on DPSP 2025 and IET International Conference on APSCOM 2025. He is a Fellow of IET, the K.C. Wong Fellow and ranked World's Top 2% Most-cited Scientists. He has received multiple Gold Awards from the Geneva International Exhibition of Inventions and National Grid UK.