

Title: Operation of Power Systems with High Penetration of IBRs towards Carbon-Neutrality: A Stability-constrained Optimization Approach

Abstract: Power systems are facing new challenges in system operation, security and stability towards Carbon-Neutrality, due to the large-scale integration of Inverter-Based Resources (IBRs). In this talk, I will present a new generation of optimal system operation strategies to maintain the security and stability of the grid at a minimum cost. On one hand, the dynamics-based stability constraints are derived and incorporated into the system scheduling model. On the other hand, the fast and accurate control capabilities of the IBRs are modelled in the optimization problem, which connects the device-level control and system-level optimization to maximize the overall economic benefit. Specifically, I will focus on the challenges in different areas ranging from frequency and low inertia issues to short circuit current shortage and voltage problems in high IBG-penetrated systems. The impacts of different stability constraints on system operating conditions and operational cost as well as their interactions are also investigated.

Bio:



Dr Fei Teng received BEng from Beihang University (BUAA), China in 2009 and PhD from Imperial College London in 2015. He is currently the Director of Education in Energy Futures Lab, a pan-university hub promoting inter-disciplinary research in energy, and a Senior Lecturer in the Department of Electrical and Electronic Engineering, Imperial College London. He also holds visiting positions at MINES ParisTech, France and PolyU, Hong Kong. His research focuses on the power system operation with high penetration of Inverter-Based Resources (IBRs) and the Cyber-resilient and Privacy-preserving cyber-physical power grid. He is the editor of several international journals published by IEEE, IET, Elsevier and Springer, including the IEEE Transactions of Power Systems and IEEE Open Access Journal of Power and Energy. He has authored more than 80 scientific publications in leading power system journals and conferences. His research has been funded by EPSRC, ESRC, Innovate UK, Research England, Royal Society, EDF Energy, Hitachi, and National Grid ESO.