

## //// Panel Session 05 ////

**Advanced Methods for Optimization and  
Stable Grid-forming Operation in Converter-dominated Power Systems**

## ○ INTRODUCTION AND TOPICS ○

As China continues to advance its "Dual Carbon" goals, the potential for renewable energy generation is being further tapped, with expansion gradually moving from load centers to remote regions such as offshore areas, deserts, and barren lands. Compared to traditional renewable energy bases, these remote regions lack the support of conventional synchronous power sources, making grid-forming technology a relatively mature solution for the export of renewable energy in current projects. Although some technological progress has been achieved in certain engineering applications, research in this domain remains relatively sparse, with most projects still in the demonstration and planning phases. Converter-dominated power systems encounter significant challenges across multiple levels: At the equipment level, there is an urgent need to address the optimization and grid-forming of diverse heterogeneous devices under highly stochastic conditions, considering the limitations of energy storage. At the system level, the transition of grid structures from being dominated by synchronous generators to power electronic converters, and even the advent of fully power electronic systems, underscores the need for comprehensive research into stability analysis methods and enhanced control strategies. The development of fully power electronic systems marks a pivotal milestone in the deep exploration of renewable energy, carrying significant implications for fostering in-depth collaboration between engineering practice and academic research.

This topic has also been selected for special issues in the journals Electric Power Construction and Electric Power Engineering Technology, where I am the guest editor. Moreover, to highlight the impact of this special issue, we will apply the support of Automation of Electric Power Systems. We believe this panel session can attract more attendees to assist in the successful organization of the 2024 IEEE EI<sup>2</sup>.

## ○ PANEL SESSION CHAIRS ○

**Dr. Qiang Fu** The Hong Kong Polytechnic University, China

Dr. Qiang Fu is a Hong Kong Scholar and Research Associate Professor, conducting full-time research at The Hong Kong Polytechnic University and part-time at Sichuan University. Dr. Fu is a key member of both the New Energy Power System Engineering Team and The Hong Kong Polytechnic University's Power Systems Team. His research primarily focuses on the stability analysis and control of energy storage and VSC-based DC transmission systems for renewable power. He has published 18 papers in top IEEE Transactions SCI journals and 11 papers in Ei journals, holds 10 patents, and authored one book. His research is closely tied to projects like Zhangbei and Rudong. Dr. Fu has led 12 national research projects and received multiple awards, including the IEEE PES Outstanding Young Engineer Award and several best reviewer awards. He also serves as a youth editorial board member, youth editor, and reviewer for several prestigious journals.

**Prof. Lu Zhang** China Agricultural University, China

Lu Zhang, Professor at China Agricultural University, Senior Member of IEEE. Prof. Zhang has been selected for the young elite scientist sponsorship program by Beijing association for science and technology, the Editorial Board Member of the journal "Distribution & Utilization," an Associate Editorial Board Member of the journal "Automation of Electric Power Systems," and a Youth Editorial Board Member of journal "Applied Energy." His primary research interests include technologies for integrating distributed energy resources and electric vehicles, AC/DC hybrid distribution systems, and enhancing the resilience of distribution networks. Prof. Zhang has led and undertaken over 20 significant projects, including the National Natural Science Foundation of China, the Young Scientists Fund of the National Natural Science Foundation of China, the National Key Research and Development Program of China, International Cooperation and Exchange of the National Natural Science Foundation of China, the Science and Technology Project of State Grid Corporation of China. He has published more than 60 academic papers in prestigious journals, including IEEE Transactions on Smart Grid, IEEE Transactions on Power Systems, Applied Energy, Proceedings of the CSEE, and Automation of Electric Power Systems. Several of his papers have been recognized as annual excellent papers and have been selected as highly cited papers.

## ○ PAPER SUBMISSION ○

For panel sessions, please contact panel chairs at  
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before submission.

## ○ ORGANIZATIONS ○

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