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Panel Session

# Resilience Assessment and Defense Mechanism of New Power Systems

## Introduction and topics

In recent years, the power system has shown characteristics such as a high proportion of renewable energy, access to electronic equipment, diversified load, and highly integrated information physics. In addition, security threats from both internal and external sources have increased, and the security situation of the power grid is severe. Significant power outages frequently occur worldwide due to extreme natural disasters, deliberate attacks, accidents, etc. For example, in 2021, the United States suffered multiple natural disasters, including hurricanes and wildfires, resulting in long-term and widespread power outages. In the same year, due to the multi-energy coupling characteristics, a fault chain propagation event occurred in Texas, USA, after a fault, ultimately leading to power rationing events.

Given the gradual emergence of climate sensitivity and vulnerability characteristics on the new power system's source and load sides, its physical "resilience" is insufficient, and its response strategies need to shift towards "adapting" to climate risks. In the new power system with a high proportion of new energy and deep integration of information and physics, the relationship between power supply guarantee and climate conditions will become increasingly close. Therefore, there is a consensus on the power system's resilience to address extreme climate risks and ensure power supply.

Currently, many types of extreme events are difficult to predict, and even their existence is unknown before they occur. Many scholars have devoted themselves to establishing a universal defense mechanism that responds to changes with immutability to improve the power grid's security and resilience support system.

This panel session mainly focuses on enhancing the autonomous operation capability of local power grids at all levels through resource decentralization, exploring flexibility to increase the types and volumes of resources that can participate in system regulation, and enhancing multi-agent collaboration to expand the complementary and mutually beneficial space between multiple energy systems.

## Panel Session Chairs

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Professor, doctoral supervisor of China Three Gorges University, Chutian scholar, Three Gorges scholar. Leader of university science and technology innovation team of young and middle-aged in Hubei Province. He has hosted a number of projects of National Natural Science Foundation and provincial and ministerial level, and is the International standard member for IEEE P2781 load Modeling and Simulation, the initiator of the Interdisciplinary Forum of China Three Gorges University.

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