

## **Special Session 9: Artificial Intelligence Based Planning, Operation and Control of Modern Power System with Large-Scale Renewable Energy Generations**

### **Session Organizers:**

Hao Xiao, Institute of Electrical Engineering, Chinese Academy of Sciences,  
xiaohao09@mail.iee.ac.cn

### **Brief Description of the Session Thematic:**

The rapid development and utilization of renewable energy generations (REGs), such as wind power, photovoltaic power, is an important measure to achieve the goal of carbon neutrality and resolve the issue of global energy crisis in the modern power system. However, the randomness and volatility of renewable energy generations lead to significant reliability concerns and financial risks to different decision-makers, and the large-scale integration of power electronic brings great challenges to the design, operation and control of renewable energy-based systems. Therefore, to achieve the integration of large-scale renewable energy generations, advanced artificial intelligence (AI) based planning, operation and control strategies for modern power system are required to be developed based on the state-of-the-art power system technologies and artificial intelligence technologies. The aim of this Session is to discuss the latest advancements in AI based planning, operation and control of large-scale renewable energy generations in modern power system to solve potential difficulties and challenges.

### **Topics and Keywords:**

1. Application of new AI technologies in modern power system with large-scale REGs planning, generation and transmission network coordinate planning, distribution network planning, etc.
2. Application of new generation information technology in modern power system with large-scale REGs operation optimization, including power system unit commitment, economic dispatch, optimal power flow, etc.
3. AI based energy trading mechanism and stochastic game method for renewable energy generations in electricity market.
4. AI application for renewable energy generations optimization in modern power system.
5. Multi-agent autonomous operation and evolution strategy in the power distribution and utilization system
6. Artificial intelligence technologies based renewable energy power prediction