Special Session 40: Key Technologies for Energy Storage and Virtual Power Plants Participating in Power System Operations

Session Organizer:

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Brief Description of the Session Thematic:

The consumption of new energy is the main support for achieving the dual-carbon national strategic goal. However, with the continuous increase in the penetration rate of new energy, conventional generation units as the main flexibility regulation resources in power grids are gradually being phased out, which results in the inability to guarantee the secure operation for power systems and thus greatly restricts the consumption of new energy. Flexible regulation resources including energy storage and virtual power plants can play an important role in power grid operations, and reasonable application them can help better ensure the secure, high-quality, economical, and low-carbon operations for power systems. However, the participation of the flexible resources in the regulation and operation and related market mechanisms require research and exploration to adapt to the construction and development of new power systems. This subject is to conduct extensive solicitation for key technologies related to the participation of flexible resources such as energy storage and virtual power plants in the operations and regulation of power systems, as well as commercial mechanisms, to promote the full utilization of flexible regulation resources and solve theoretical problems for flexible resources in new power systems.

Topics and Keywords:

1. Planning, configuration, dispatch, and control strategies for energy storage and virtual power plants participating in power system operations.
2. Business modes and trading mechanisms of energy storage and virtual power plants in power systems.
3. Dispatchable capacities and control strategies for distributed flexible resource aggregation.
4. Aggregation, trading, dispatch, and control strategies for distributed energy storage resources and virtual power plants.
5. Collaborative control of the main-distribution network to support the flexible role of distributed resources.
6. Integration application and technical effectiveness of big data and artificial intelligence technology with energy storage and virtual power plants.
7. Analysis and optimization control of frequency security and stability mechanisms

in new power systems.
8. Inertia support technology and frequency regulation capability evaluation for new power systems.
9. Coordination control for multi-type regulation resources with flexibility support in new power systems.
10. Modeling establishment and predictive evaluation theories of user energy consumption characteristics for dual-carbon goals.
11. Classification and design of load forecasting application scenarios under the influence of multiple factors.
12. Coordination optimization and control of multiple resources for conventional power sources, new energy, energy storage, and virtual power plants.
13. Theory and key technologies of distributed resource participation in the electricity retail market.