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### Call for Papers

OPEN INVITED TRACK (Code: **bbvvd**)

## Control and Optimization of Smart Grids Integrated with Renewable Energy Sources

**IFAC Technical Committee for Evaluation: TC6.3. Power and Energy Systems**

### Organizers:

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### Abstract:

With the growing penetration of Renewable Energy Sources (RESs), such as wind and solar, into the electric power grid, overcoming increasing intermittency and unpredictability and conserving electric power grid resiliency under reduced inertia conditions have become serious issues. The variability and uncertainty from RESs could bring challenges to balancing generation and demand. On the other hand, the replacement of synchronous generators with these inverter-based resources (IBRs) is changing the dynamics of the bulk power system, including, but not limited to, the physical inertia, short-circuit current, and primary and secondary frequency regulation capabilities. This poses challenges to maintaining the stability, reliability, and resilience of the power grid. To solve these problems, Energy Storage Systems (ESSs) need to be integrated with the power grid. There are several ESS concepts developed over the years, such as Battery Energy Storage, Flywheel Energy Storage, Hydrogen Energy Storage, Pumped Storage Hydropower, etc. Some of these have been around for many years and are mature, however, they may not be scaled to suit the needs of large-scale power systems and economically viable. Moreover, they still need to improve the various ancillary services it can provide to the electric power grid, such as frequency control, reactive power control, etc. and provide long-term and short-term energy balancing and flexibility. This open invited track thus aims to bring expertise from academia and industry to share current advances and perspectives about future opportunities and outlook of this important field.

### Topics:

Original contributions related (but not limited) to the following application areas are welcome for submission to this open invited track:

- technology advances in energy storage systems
- advanced pumped-storage hydropower units
- advanced battery energy storage systems
- advanced flywheel energy storage systems
- advanced hydrogen energy storage systems
- modeling, simulation, and control of energy storage systems
- grid integration of energy storage systems
- grid frequency regulation with energy storage systems
- stability and resiliency improvements with energy storage systems
- coordinated control with renewable energy sources and energy storage systems
- optimization of smart grid with renewables and energy storage systems

### Keywords:

Smart grids; Renewable energy sources; Control and optimization of power systems; Control of energy storage systems; Power system planning and operation.

### Submission:

Prospective authors are invited to submit original contributions (standard two-column IFAC format and up to 6 pages) to this Open Invited Track with the Submission Code by the deadline, October 31, 2022.