



SPECIAL SESSION XIII

Strategic Planning and Management for Future Transmission and Distribution Networks: A Renewed Vision

ORGANIZED AND CHAIRED BY

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In the past few decades, the pursuit of a sustainable energy future has propelled the extensive penetration of Renewable Energy Sources (RESs) into transmission and distribution electrical grids. The integration of RESs like Wind Turbines (WTs) and Photovoltaic (PV) units, along with Battery Energy Storage Systems (BESS), into the existing electric infrastructure, whether as replacements or supplements for traditional Synchronous Generators (SGs), poses challenges across safety, adequacy, management, control, and forecasting.

The primary outcomes of the rising adoption of RES include a reduction in the electric system's inertia and a decrease in its short-circuit power, resulting in issues of frequency and voltage instability during severe perturbations. Moreover, the installation of RESs into a network without compromising reliability or quality for other customers is constrained by overvoltage and overcurrent limits, defining the so-called hosting capacity. Indeed, as the share of renewable electricity production rises, the likelihood of overloading network components and the potential for users to encounter over-voltages also increase. Consequently, addressing these challenges requires the development of strategies for optimal management of RES production and advanced control techniques for converters that connect PVs, WTs, and BESS to the grid. Enhancing the integration of RESs stands as a critical necessity for the forthcoming transmission and distribution networks.

Authors are requested to submit papers on (but not limited to) the following topics:

- **Evaluation of voltage and frequency stability in the future power grids**
- **Ancillary services offered by RESs**
- **Techniques for synthetic inertia in low-inertia grids**
- **Control methods for inverters to satisfy electric grid code requirements**
- **Optimal algorithms for enhanced management of RES integration**
- **Optimization techniques for sizing RES and storage systems**
- **Tecno-economical strategies for future power network planning**