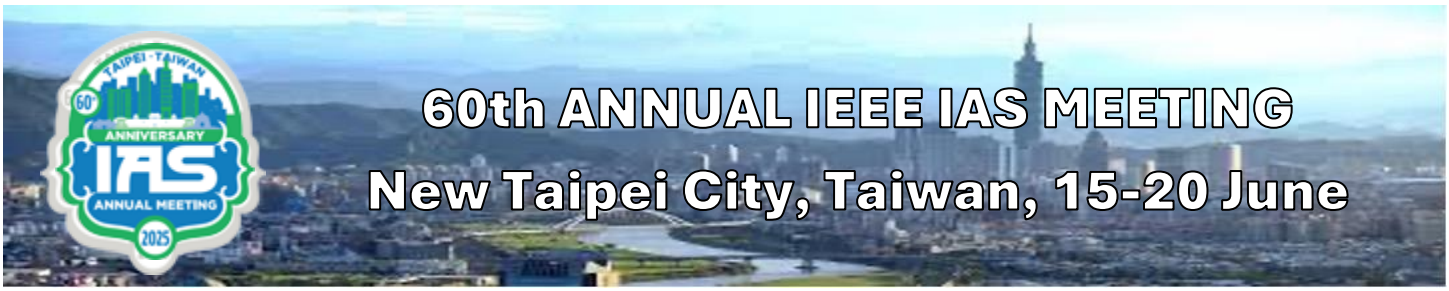

Special Session on

Orienting Future Power-Electronics-Dominated Power Grids Towards Sustainability

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Technical Outline of the Session and Topics:

The increasing urgency to transition towards sustainable energy systems has spurred significant interest in innovative technologies that can decarbonize the power grid. Among these technologies, hydrogen (H_2) holds considerable promise due to its ability to store and generate energy with minimal environmental impact. The concept of an "H_2 Loop," which integrates hydrogen production, storage, and utilization within the power grid, offers a pathway to enhance grid flexibility, stability, and sustainability. This research proposal aims to explore the potential of the H_2 Loop to transform the future power grid, making it more resilient, efficient, and environmentally friendly.

The scope of this Special Session includes but is not limited to the topics below:

- Modeling and digitalization of H_2 loop dominated microgrids
- Control and operation of islanded microgrids with fuel cells and electrolyzers
- AI-driven optimal operation of fuel cells and electrolyzers for higher efficiency
- Power electronics technologies contributing to H_2 loop based systems

Submission of papers: deadline follows the deadline for the regular papers. All the instructions for paper submission are included in the conference website: https://ias-am.ieee.org/2025/