ICSCGE 2025

The 5th International Conference on Smart City and Green Energy

Time December 12-14, 2025

Venue Melbourne, Australia

Special Session 01

Smart and Low-Carbon Operation of Green Hydrogen-Integrated Multi-Energy Systems

The accelerated global transition toward carbon neutrality has triggered a critical transformation in the operational paradigm of multi-energy systems (MES), where green hydrogen—derived from renewable sources like solar and wind—emerges as a pivotal zero-carbon medium to bridge the intermittency of renewables and the diversity of end-user demands (e.g., power supply, industrial heating, transportation). Green hydrogen-integrated MES enable seamless conversion and optimal allocation of cross-energy carriers (electricity, heat, hydrogen), yet they confront unique challenges: the variability of green hydrogen production induced by weather fluctuations, the nonlinear coupling of multi-energy flows, and the trade-off between operational economics and carbon abatement targets. A key evolving trend is the deep integration of green hydrogen with flexible assets, such as hydrogen fuel cell vehicle (FCV) fleets, portable hydrogen storage units, and mobile refueling stations, which enhances the spatial-temporal flexibility of energy distribution but also introduces uncertainties in load forecasting and system stability. This proposal aims to explore cutting-edge advancements, unresolved challenges, and transformative opportunities in the smart and low-carbon operation of green hydrogen-integrated MES, with a focus on innovative operational methodologies, intelligent control technologies, and scenario-specific optimization strategies.

Topics of interest include but are not limited to:

>> Multi-Time-Scale AI Optimization for Smart Operation of Green Hydrogen-Integrated MES

>> Low-Carbon Resilience Enhancement of Green Hydrogen-MES Under Extreme Weather Events

>> Synergistic Operation of Green Hydrogen Production, Grid Injection, and Industrial Heat Supply in MES

>> Digital Twin-Based Dynamic Regulation for Green Hydrogen-Integrated Urban Multi-Energy Systems

>> Hybrid Energy Storage (Battery-Hydrogen) Co-Dispatch for Low-Carbon Operation of Green Hydrogen-MES

>> Distributed Optimization for Green Hydrogen-Integrated MES with Mobile Hydrogen Refueling Vehicles

>> Privacy-Preserving Cyber-Physical Protection for Smart Green Hydrogen-MES Operation

>> Carbon Footprint-Oriented Economic Operation of Green Hydrogen-Integrated Industrial MES

>> Demand-Side Flexibility Activation for Green Hydrogen-MES in Peak Load Management and Carbon Reduction

>> Real-Time Carbon Emission Tracking and Optimization for Green Hydrogen-Integrated MES Operation

SPECIAL SESSION CHAIRS

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PAPER SUBMISSION & PUBLICATION

Submission Guideline

Submissions will be reviewed by the conference technical committees, and accepted papers will be published in ICSCGE 2025 International Conference Proceedings, which will be submitted for inclusion in the IEEE Xplore Digital Library, and submitted for indexing by EI compendex and Scopus.

Submission Link: https://easychair.org/conferences/?conf=icscge2025

Submission Deadline by September 10, 2025

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