

## ENERGY FLEXIBILITY AND DIGITAL SOLUTIONS FOR SUSTAINABLE ENERGY SYSTEMS

### ORGANIZED BY

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### SCOPE AND MOTIVATION

The transition towards 100% renewable energy sources presents significant challenges related to grid stability, energy flexibility, and system resilience. The growing electrification of heating, cooling, and mobility sectors increases energy demand peaks, requiring cost-intensive grid reinforcements and innovative flexibility mechanisms. To address these challenges, the integration of digital solutions, AI-driven forecasting, and decentralized energy management platforms is crucial.

This special session will explore innovative approaches to energy system flexibility, highlighting advanced energy storage solutions, AI-based energy management, blockchain applications, and Vehicle-to-Grid (V2G) technologies. It aims to bring together researchers, industry experts, and policymakers to discuss novel frameworks, market strategies, and real-world applications that enhance flexibility, efficiency, and sustainability.

### TOPICS OF INTEREST

The session welcomes contributions related, but not limited to:

- Digital platforms for energy flexibility and decentralized energy management
- Artificial Intelligence and machine learning for real-time energy forecasting and optimization
- Energy storage innovations (batteries, hydrogen, thermal storage, compressed air)
- Vehicle-to-Grid (V2G) and sector coupling for grid balancing
- Blockchain and smart contracts for secure and transparent energy transactions
- Market designs and regulatory frameworks for energy flexibility
- Interoperability and standardization of energy systems
- Pilot projects and case studies on flexibility solutions in residential, tertiary, and industrial sectors

