Call for Papers for the Special Session on

Next-Gen Electric Vehicles: Hybrid Energy Storage, Power Electronics and Grid-Interactive Charging.

Organized and co-chaired by

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Technical Outline of the Session and Topics

Electric mobility is pushing energy systems beyond their original limits. As EV adoption scales, energy storage must deliver high peak power, rapid charging, and long service life making hybrid battery-supercapacitor systems a practical solution when supported by efficient converters, coordinated control, and adaptive energy management. At the same time, tighter EV-grid coupling increases stresses from renewable variability, higher distribution loading, and voltage/power-quality constraints. AI/ML is becoming essential for real-time monitoring, early fault detection, and predictive maintenance across EV components and grid-connected power electronics, while fast charging amplifies the need to understand network impacts and long-term resilience.

Topics of the session include, but are not limited to:

- Design, modelling, and control of hybrid battery–supercapacitor energy storage systems for EV traction
- Real-time energy-management and optimal power-split strategies for hybrid energy storage
- SOC/SOH/SOP estimation using model-based, data-driven, and AI-assisted approaches
- Advanced DC/DC converter topologies and control for hybrid storage and fast-charging integration
- Fault detection, protection, condition monitoring, and intelligent diagnostics of hybrid energy storage and EV power converters
- Power-electronic control for bidirectional, grid-interactive, and V2G/V2H charging systems
- Grid impact assessment, power-quality enhancement, and stability support under fast and ultra-fast EV charging
- Integration of EV charging with renewable energy sources, local storage, and intelligent grid-support functions

Timeline for Authors

All the instructions for paper submission are available on the conference website. Please visit www.iecon2026.org or scan the QR code for the timeline.