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Special Session on

Smart Grid-Integrated Electric Vehicle Battery Charging Infrastructure

Organized and co-chaired by

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Technical Outline of the Special Session

Smart grids prioritize environmentally friendly systems and enhancing consumer lifestyles. As electric vehicle (EV) usage surges, challenges such as building charging infrastructure, predicting peak loads, and optimizing system efficiency arise. EV technology's integration into electric power distribution systems, particularly through vehicle-to-grid (V2G) infrastructure, is crucial for improving transportation reliability and sustainability. EVs serve as versatile assets, functioning as power dispatchers, storage units, and ancillary service providers. By leveraging V2G and grid-to-vehicle (G2V) modes, onboard chargers can be transformed into intelligent EV chargers with multifunctional capabilities. Integration between the grid and EVs must ensure adherence to well-defined limits regarding grid current total harmonic distortion (THD) in V2G mode and ripple effects during G2V mode. However, challenges persist, such as optimizing charging times to align with low electricity prices, addressing slow charging speeds, managing end-of-charge period scenarios, and preventing power feedback to the grid. This Special Issue seeks original research encompassing technical, economic, and policy aspects related to EVs' impact on power systems. Submitted papers will undergo a rigorous peer review process to facilitate rapid dissemination of research findings and applications. We cordially invite you to contribute your innovative research to this Special Issue.

Topics of the Special Session

- Electric vehicles (EVs), hybrid EVs, plug-in hybrid EVs, and range extended EVs
- Utility issues related to plug-in vehicles and other grid-interactive transportation.
- Batteries for mobile transport
- Battery management systems
- Vehicle connectivity modules
- Vehicle-to-grid (V2G), vehicle-to-infrastructure (V2I), and vehicle-to-home (V2H) interfaces
- Vehicle-to-grid communication and control
- Vehicular power electronics, electric machines, and motor drives
- Charging stations
- On-board and off-board chargers, fast chargers, and opportunity chargers
- Coordinate EV charging periods and pricing tariffs.
- Grid interface technologies.
- Hybrid and electric powertrains
- ESS (Energy Storage Systems)
- DC and AC microgrid
- Inductive charging
- Dynamic charging in roadways
- Mass transit and public transportation electrification