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Call for Papers for the Special Session on

Forecasting-Driven Resilience of Grid-Interactive Large Data Centers

Organized and co-chaired by

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Technical Outline of the Session and Topics

Large data centers are rapidly becoming grid-critical, converter-dominated mega-loads with highly variable demand driven by compute and cooling. This special session focuses on forecasting-driven resilience for grid-interactive data centers, connecting (i) load/flexibility forecasting, (ii) resilience-oriented planning and operation under contingencies, disturbances, and extreme events, and (iii) multi-fidelity validation using EMT and RMS dynamic studies. Emphasis is placed on capturing fast converter dynamics (UPS/rectifiers/inverters/BESS), control interactions, protection coordination, power-quality impacts, and ride-through performance, and on translating results into actionable interconnection and operational practices. Submissions are encouraged from academia and industry, including utility/TSO-informed case studies and measurement-backed validation.

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

- Data-center load forecasting (minute-ahead to day-ahead) and uncertainty quantification
- Forecasting-driven flexibility estimation (workload shifting, cooling, and storage headroom)
- Resilience metrics, scenario stress-testing, and extreme-event planning for large data centers
- EMT modeling of UPS, rectifiers/inverters, BESS, and MV/MVDC interfaces in data centers
- RMS dynamic studies: voltage/frequency stability, oscillations, and control interaction screening
- Converter-driven stability, impedance/resonance issues, and fast transient phenomena
- Protection coordination and fault behavior in converter-dominated facility networks
- Power quality: harmonics, flicker, resonance, and mitigation strategies
- Ride-through performance and control modes (grid-following/grid-forming, advanced controls)
- Data-center microgrids: islanding, restoration, black start, and coordinated dispatch
- Co-optimization of workload, cooling, and energy resources for grid services and reliability
- Measurement-informed model calibration, benchmarking (RMS vs EMT), and digital-twin frameworks
- Utility/ISO/TSO case studies: interconnection methodologies, screening, and best practices

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.