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Power and Energy Challenges in Port Microgrids

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Special Session Description The rapid electrification of port infrastructures and maritime operations is a key driver for sustainable transportation and decarbonization. The increasing deployment of electric cranes, shore-to-ship power systems, automated terminals, and electric vehicles has led to significant growth in electricity demand in port areas. However, existing power grids often face capacity limitations and operational constraints, which restrict large-scale electrification.

Grid congestion, peak load management, and reliability issues are becoming major challenges for modern ports, especially with the increasing integration of renewable energy sources. To address these issues, advanced energy storage systems, intelligent demand management, coordinated scheduling, and port and maritime microgrids are emerging as effective solutions.

This Special Session aims to provide a forum for presenting recent advances in modeling, optimization, control, and management of energy systems in electrified ports, supporting the transition toward smart, resilient, and sustainable port infrastructures.

Topics of Interest

- **Electrical and energy challenges in ports and harbor areas**
- **Grid capacity limitations and congestion management**
- **Integration of renewable energy and energy storages in ports**
- **Port and maritime microgrid concepts and operation**
- **Smart energy management and demand response**
- **Scheduling and optimization of port energy systems**