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OVERARCHING TOPICS

A1 - Power System Modelling and Grid Operations

- A1.1 Large-Scale Load and Data Center Modelling
- A1.2 Grid Code Compliance for Large Loads and Data Centers
- A1.3 Grid Congestion Analysis and Mitigation
- A1.4 Power System Expansion and Planning
- A1.5 Operational Aspects of Power Systems
- A1.6 Synchronous Condenser Technology and Applications
- A1.7 Neighborhood-Based/Cellular Solutions for Distributed Network Operations

A2 - Regulatory Framework and Market Dynamics

- A2.1 Compliance with Regulatory Standards and Policies
- A2.2 Regional Market Structures and Dynamics
- A2.3 Grid Code Testing and Certification Procedures
- A2.4 Demand-Side Management (DSM) Strategies
- A2.5 Demand-Side Regulations and Standards

A3 - Power-to-X Technologies and Sector Integration

- A3.1 Power-to-X System Modelling (e.g., Hydrogen, E-Fuels)
- A3.2 Power-to-X Project Implementation and Case Studies
- A3.3 Grid Code Compliance for Power-to-X Systems
- A3.4 Sector Coupling and Integration with Hydrogen

A4 - Smart Grids, Automation, and Cybersecurity

- A4.1 SCADA (Supervisory Control and Data Acquisition) Systems
- A4.2 Smart Grid Technologies and IT Innovations
- A4.3 Al and Machine Learning for Grid Integration
- A4.4 Cybersecurity Solutions for Critical Infrastructure

A5 - System Stability and Security of Energy Supply

- A5.1 Energy Supply Security and Risk Mitigation Strategies
- A5.2 HVDC (High Voltage Direct Current) and FACTS (Flexible AC Transmission Systems)
- A5.3 Role of Synchronous Condensers in Grid Stability





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A6 - Challenges in Weak Grids and Emerging Markets

- A6.1 Infrastructure Challenges and Solutions for Weak Grids
- A6.2 Global South: Grid Integration Challenges

A7 - Ancillary Services and Forecasting

- A7.1 Ancillary Services for Grid Support
- A7.2 Power System Forecasting and Predictive Modelling
- A7.3 Smart Innovations for Ancillary Services

A8 - Decarbonization and Industrial Applications

- A8.1 Decarbonization Strategies for Energy Sectors
- A8.2 Decarbonizing Industrial Processes

A9 - Grid Codes and Emerging Challenges

- A9.1 Grid Codes and Standards: Current Challenges and Future Trends
- A9.2 Power System Balancing and Stability Aspects
- A9.3 Power System Stability and Frequency-Domain Modelling

WIND POWER RELATED TOPICS

W1 - Grid Integration of Wind Power Plants

- W1.1 Project Experience with Grid Integration of Wind Power Plants
- W1.2 Grid Forming Capabilities and Practical Experience
- W1.3 Transmission Grid and Power System Integration Aspects
- W1.4 Distribution Grid Challenges for Wind Power Integration
- W1.5 Power Quality Aspects in Wind Energy Integration
- W1.6 Compliance with Grid Codes Using New Hardware

W2 - Offshore Wind Power Systems

- W2.1 Offshore Wind Power System Modelling
- W2.2 Offshore Wind Power Projects with HVDC Systems
- W2.3 Project Experience in Offshore Wind Power Integration

W3 - Wind Power System Studies and Modelling

- W3.1 Power System Studies for Wind Energy Integration
- W3.2 Challenges and Solutions in Wind Power System Modelling



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W4 - Hybrid Power Systems with Wind Energy

- W4.1 Modelling of Hybrid Power Systems (Island Systems)
- W4.2 Project Experience with Hybrid Power Systems (Island Systems)
- W4.3 Modelling of Hybrid Power Plants (Wind + Batteries + Other Technologies)
- W4.4 Project Experience with Hybrid Power Plants (Wind + Batteries + Other Technologies)
- W4.5 Battery Storage Aspects: Operation and System Modelling

SOLAR POWER RELATED TOPICS

S1 Grid Integration of Solar PV and Battery Systems

- S1.1 Case Studies and Lessons Learned: Integrating PV and Battery Systems into Transmission Grids
- S1.2 Grid-Forming Capabilities and Operational Experience: Voltage and Frequency Control in PV Systems
- S1.3 Power System Studies: Stability, Capacity, and Operational Behavior with High PV Penetration
- S1.4 Distribution Grid Challenges: Voltage Regulation, Load Balancing, and Infrastructure Upgrades with PV Integration
- S1.5 Transmission Grid Challenges: Stability, Capacity, and Reactive Power Management for High PV Penetration
- S1.6 Power Quality Aspects: Addressing Harmonics, Voltage Fluctuations, and Flicker in PV-Integrated Grids
- S1.7 Grid Code Compliance and Future Requirements: Ensuring PV Systems Meet Current and Future Standards
- S1.8 Ancillary Services from PV and Battery Systems: Frequency Regulation, Spinning Reserve, and Voltage Support
- S1.9 Power System Balancing: Strategies for Managing Variable Solar PV Generation

S2 - Modelling and Operational Strategies for PV and Storage Systems

- S2.1 Modelling Challenges: Simulating PV and Battery System Behavior Under Varying Conditions
- S2.2 Battery Storage Operation and System Modelling: Performance Optimization in Grid Applications



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S3 - Digitalization, Forecasting, and Smart Grid Solutions

- S3.1 Aggregation and Management of Distributed Energy Resources (DER): Coordinating Distributed Solar PV Resources for Grid Services
- S3.2 Forecasting Solar PV Generation: Optimizing Grid Operations and Market Participation
- S3.3 Smart Grid Technologies and IT Innovations: Enhancing PV Grid Integration and Resilience
- S3.4 Artificial Intelligence and Machine Learning: Optimizing Grid Management, Forecasting, and Fault Detection for PV Systems

S4 - Energy Market, Policy, and Sector Coupling

- S4.1 Energy Market Structures and Regulatory Frameworks: Governing PV and Battery Storage Integration
- S4.2 Sector Coupling Solutions: Integrating PV Systems with Hydrogen Production and Storage
- S4.3 Decarbonization of Energy Sectors: Leveraging PV and Battery Storage to Reduce Carbon Emissions

S5 - Hybrid Power Systems with PV

- S5.1 Modelling and Operation of Hybrid Power Systems: PV, Storage, and Other Energy Sources
- S5.2 Project Experience with Hybrid Power Plants: Deployment and Operational Case Studies
- S5.3 Energy System Management: Coordinating Hydrogen Production and PV Systems for Grid Stability

HYDROGEN RELATED TOPICS

H1. Hydrogen for Power System Stability and Balancing

- H1.1 Power System Balancing with Hydrogen-Based Solutions: Stabilizing Electricity Supply and Demand through Hydrogen Production, Storage, and Consumption
- H1.2 Ancillary Services from Hydrogen Systems: Frequency Regulation, Voltage Control, and Reserve Power Provided by Hydrogen Technologies

H2. Modelling and Simulation of Hydrogen Systems

- H2.1 Electrolyzer System Modelling for Grid Integration: Simulation of Electrolyzer Behavior and Performance in Power Systems
- H2.2 Electrolyzer Modelling for Power System Studies: Detailed Analysis of Electrolyzer Operation in Grid Applications
- H2.3 Fuel Cell System Modelling: Simulating Fuel Cell Performance for Integration into Energy Systems
- 2.4 Hydrogen Plant and System Modelling: Comprehensive Modelling of Hydrogen Systems for Grid Applications



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H3. Renewable Hydrogen Technologies and Applications

H3.1 Renewable Hydrogen Technologies: Innovations in Hydrogen Production, Storage, and Consumption for Renewable Energy Integration

H3.2 Applications of Hydrogen in Renewable Energy Systems: Practical Deployment and Use Cases of Hydrogen in Power and Energy Sectors

H4. Energy System Management and Hydrogen Integration

H4.1 Energy System Management with Hydrogen: Strategies for Coordinating Hydrogen Production, Storage, and Consumption in Energy Systems

H4.2 Energy System Modelling with Hydrogen: Analyzing Hydrogen's Role in Optimizing Energy Flows and Enhancing Grid Stability

H5. Hydrogen Market Dynamics and Regulations

H5.1 Hydrogen Energy Market Dynamics: Market Mechanisms and Trading Strategies for Hydrogen in the Energy Sector

H5.2 Regulatory Frameworks for Hydrogen: Policies and Standards Governing Hydrogen Systems in Energy Markets