



# Key take aways C1 POWER SYSTEM DEVELOPMENT AND ECONOMICS

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# cigre

For power system expertise





# Introduction to SC C1, opening words by chairman

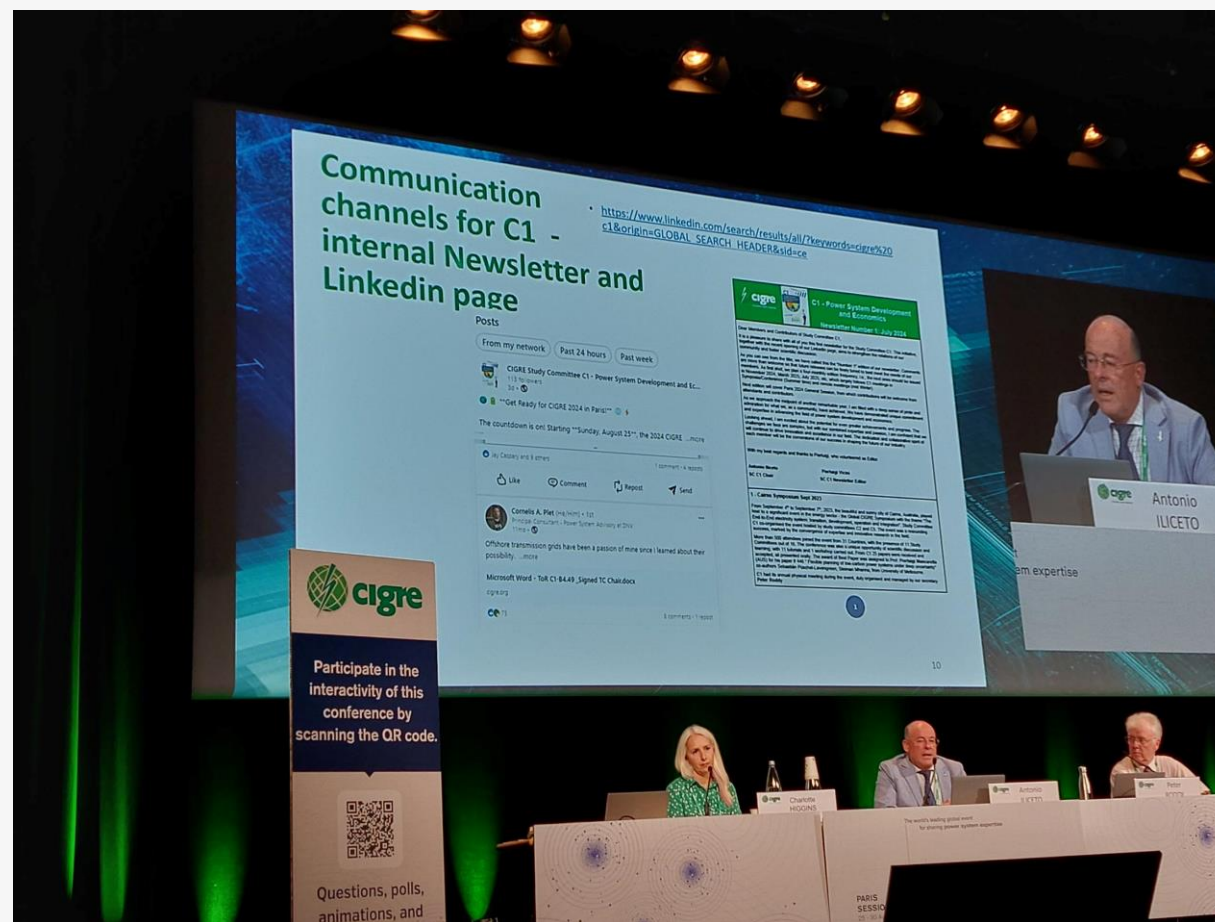


- C1 = all system development and economic challenges relevant to the electricity power industry including those relating to asset management.
- Decarbonisation, change in energy consumption and production
- Changed distribution and transmission network planning functions
- Holistic system development and coupling with other energy sectors ((renewable) gas, mobility, heat)
- C1 in the centre of energy system transition, enabling this transition
- New components and carriers: storage, hydrogen
- Complex: lots of uncertainty and uncoordinated transition paths
- Increased emphasis on
  - Flexibility at planning stage
  - Resilience on system level
  - TSO DSO coordination

# WG's

- In flight:
  - C1.49 Off shore grids planning
  - C1.50 Global grids incl. hydrogen impact
  - C 1.51 Storage
- Initial:
  - C1.52 Virtual power plants and DER aggregation
  - C1.53 Demand forecast (JWG with C5)
  - C1.54 Reserve and flexibility assessment
  - C1.55 Survey on AM practices (ToR)
- Final stage / technical brochures:
  - TB 910 (C1.43) business requirements for AM performance
  - TB 922 (C1-C4.36) Large city & Metropolitan area power system development trends
  - TB 923 (C1-C6-37) optimal transmission and distribution investment decisions under increasing energy scenario uncertainty
- Under publication
  - WG C1.23 Transmission investment decision points and trees
  - WG C1.44 Global grids including storage and demand response
- In final C1 review
  - C1.48 Hydrogen fundamentals
- Expected in 2024
  - C1.47 energy sectors integration
  - C1.45 advanced cost benefit analysis

# Communication channel – internal newsletter and LinkedIn page





## Preferential subjects

- PS1. Steering the Energy Transition: Cooperation, achieving Top-Down Targets through Bottom-Up Investment Decisions System
- PS2. Flexibility as Pivotal Criterion for System Development
- PS3. Resilience as pivotal criterion for system development

➔ READ the special report!!!  
It's the best summary you can get

# Personal highlights (besides wheelchair basketball)



- Paper C1-10918  
Competitive Process for Transmission Margin Contracting by Wind and Solar Generators in Brazil's Transmission Network.
  - Interessante wijze van prioritering i.g.v. transportschaarste, nl. o.b.v. maatschappelijke waarde(n) i.p.v. FCFS
- Paper C1-10516  
Optimal power system planning through P2G and P2H system integration and flexibility.
  - Alternatieven voor netverzwaring: P2G in combinatie met G2P
- Paper C1-10963  
Energy Supply Chain from Hydrogen Production to End Use by PtoG for Carbon Neutrality 2050
  - Optimale energiedrager bepalen voor eindgebruiker, en infrastructuur daarop aanpassen



## Personal highlights (2)

- Paper C1-10633  
Planning Tool Integration of Demand Flexibility: Focus on Electric Vehicles
  - Hoe flexibiliteit te gebruiken in planning process



## Personal highlights (3)

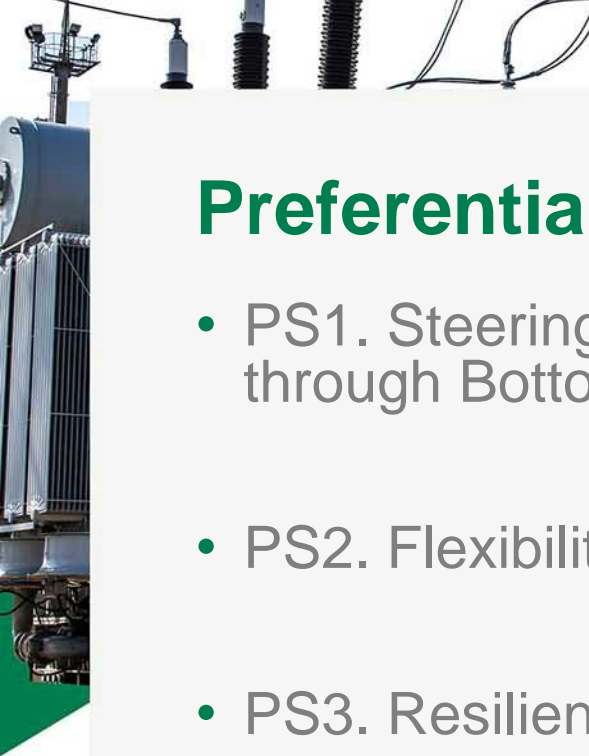
- Paper C1-10238  
A Data-driven planning method for regional hybrid energy storage systems with decoupled operation and planning stages.
  - How multi-time scale uncertainties in both planning and operations are addressed and how time-coupling aspect creating complexity is handled.
- Paper C1-10435  
A new class of flexibility products: DER-provided reserve services.
  - Reserve services from distribution system connected sources.
- Paper C1-10433  
Creating a sustainable national electric infrastructure while maintaining reliability and resiliency of the grid
  - Challenges w.r.t planning and operations of the grid: practical insights by experts.





## Personal highlights (4)

- Paper C1-11103  
Machine learning method to improve stability requirements calculation for the planning process.
  - Addressing stability issues into transmission planning, proposing a clustering-based approach for scalability.



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