Report to the CIGRE Australian Technical Committee 2023

Australian Panel AU C1 Activities

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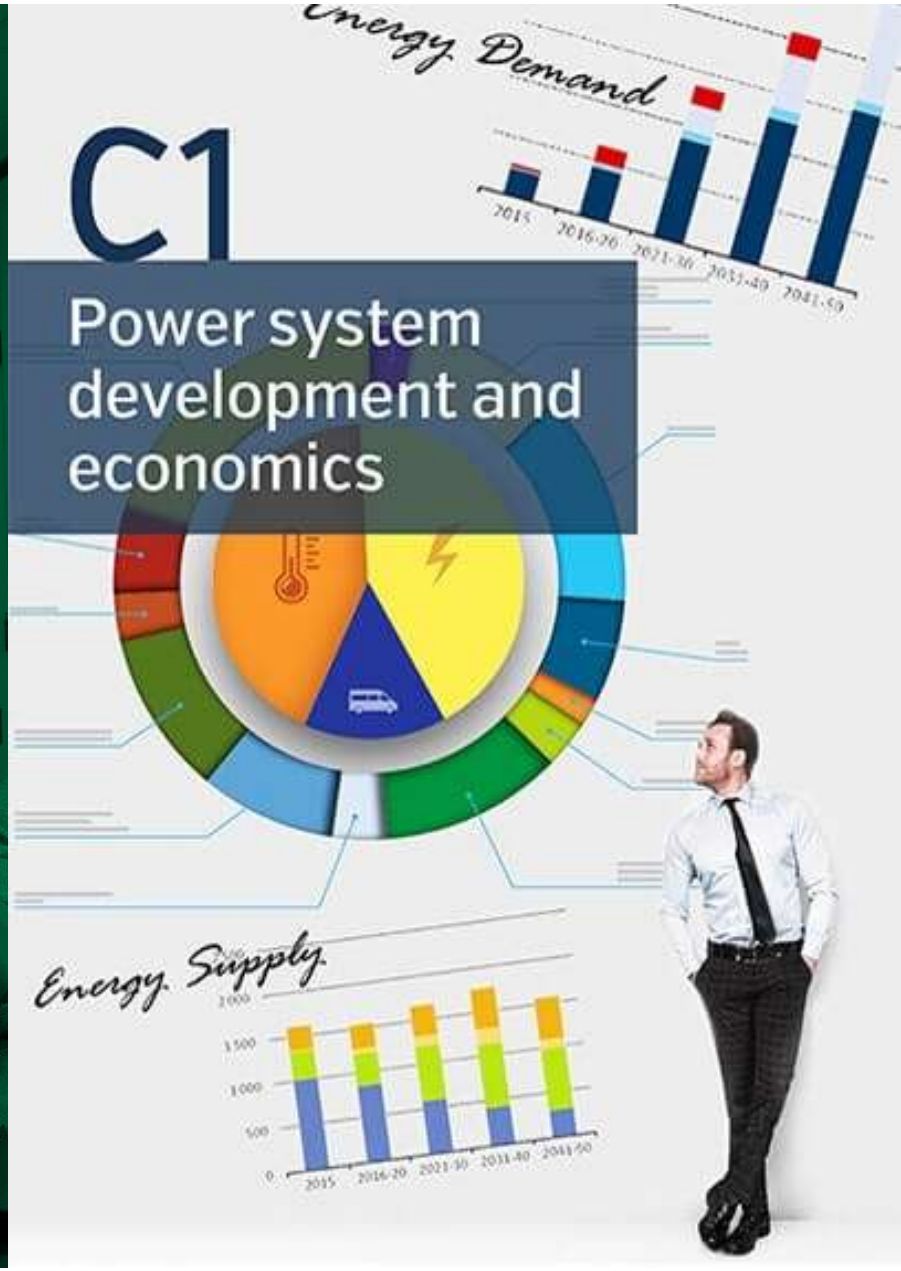

SC C1 Overview

Study Committee Scope

The scope of Study Committee C1 is to study economic and system analysis methods important for the development of power systems and to assist utilities to find the best solutions in various evolving, competitive and unbundled conditions in the context of the overall energy supply system and with social and environmental considerations

Specific Areas of interest for SC C1 :

- Methods and tools for power system analysis
- New approaches to power system planning
- Capacity expansion using risk-based assessment
- Impact of pricing for transmission services on system development
- Asset management strategies
- Long distance transmission and international interconnection
- System planning issues in developing networks
- New generation and DSM solutions and technologies

Australian Panel C1

- 20 Members from transmission and distribution businesses, System Operators, Engineering consultancies, and NGN
- Both Australian & NZ representation.

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SC C1 Overview

Four Study Areas

- ✓ **Grid Planning & System Development**
- ✓ **Business & Economics**
- ✓ **Interconnections & Sector Integration**
- ✓ **Asset Management**

Ref.	Title	Convenor/ Lead
C1. SAG	Strategy Discuss, propose and fine-tune SC strategy. Coordinate all WGs for the C1 strategic goals.	Antonio Iliceto (Italy)
	• System Planning Grid planning and power system development	Ronald Marais (South Africa)
	• Asset Management Maintenance philosophies, asset planning, securization and optimisation of asset management	Graeme Ancell (New Zealand)
	• Business & Economics Projects assessment, business environment + its impact on investment in the power system	Chongqing Kang (China)
	• Interconnections – Horizontal, Vertical Spanning from macro grids (HV large scale interconnections) to micro grids, TSO-DSO integrated and smart grid planning; sector coupling	Juan Carlos Araneda (Chile)
	• Education and Tutorials Organisation of tutorials as required.	Keith Bell (UK)

SC C1 Preferential subjects

PS1: **Steering the Energy Transition: cooperation, achieving top-down targets through bottom-up investment decisions**

Interconnections & System Integration

- Governance of the different sectors of the integrated energy system, role of system operators, role of regulation & markets; achieving public targets through private investments, coordinated decision-making processes and international cooperation
- Power-to-Gas & Hydrogen as energy carrier and as long-term storage; energy efficiency & infrastructure efficiency in the interconnected electricity/gas/hydrogen system; large interconnection projects
- System aspect aggregation of the electrification of transport, industry, and buildings: conditions and barriers, role of stakeholders in the End-to-End system

PS2: **Flexibility as pivotal criterion for system development**

Grid Planning & System Development

- Including in the planning process the flexibility options both within and outside the grids; non-network-assets and non-electric solutions: Storage, Demand Response, Energy Communities, behind-the-meter resources
- Matching flexibility needs with flexibility sources: market design evolution, value of various flexibility products, optimal flexibility portfolio; prioritization of sector coupling initiatives; role of forecasts of demand and variable generation
- Storage device evolution, technical & economic performances, short/medium term measures for balancing the grid, and managing the energy system in the longer term, including thermal & molecular long duration energy storage

PS3: **Resilience as pivotal criterion for system development**

Asset Management & Economics

- Metrics and criteria to plan resilience and strength of the future power system; flexibility means as enhancers also of resilience
- Optimal planning and efficient use of resilience measures: risk assessment, prevention, mitigation, adaptation, re-start measures
- Resilience improvements from grid architecture and grid components: including the role of power electronics control and grid forming features, smart load shedding, and fast restoration methods

C1 2023 Publications and activities

Publications in 2023

- **C1.41: Closing the gap in understanding between stakeholders and electrical energy specialists**
- **C1.43: Requirements for Asset Analytics Data Platforms and Tools in Electric Power Systems**

WGs nearing completion with a TB expected before late 2023

- **[nearing finalisation] C1.23: Transmission investment decision points and trees**
- **[awaiting approval for publication] C1/C4.36: Review of large city & metropolitan area power system development trends taking into account new generation, grid and information technologies**
- **C1/C6.37: Optimal transmission and distribution investment decisions under increasing energy scenario uncertainty**
- **C1.44: Global Interconnected and sustainable electricity system – effects of storage, demand response and trading rules**
- **C1.47: Energy Sectors Integration and impact on power grids**

Other in progress WG of interest

- **C1.33: Interface and allocation issues in multi-party and/or cross-jurisdiction power infrastructure projects**
- **C1/C6.42: Planning tools and methods for systems facing high levels of distributed resourcing**
- **C1.45: Harmonized metrics and consistent methodology for benefits assessment in Cost Benefit Analysis of electric interconnection projects**
- **C1/C4.46: Optimizing power system resilience in future grid design**
- **C1.48: Role of green hydrogen in energy transition**
- **C1.51: The potential roles of energy storage in electric power systems**

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CIGRE Cairns September 2023

GENERAL PRECEDINGS

- All Group discussion meetings (2), tutorials (1), working groups (2), and paper session (1) were held in person over the course of four days
- C1 provided 25 papers to the event
- Informal pre-meeting presentation on Australian system development by Simon Bartlett

PREFERENTIAL SUBJECTS for Paris 2024 have been reviewed, and special reporters nominated:

PS1: **Steering the Energy Transition: cooperation, achieving top-down targets through bottom-up investment decisions**

PS2*:* **Flexibility as pivotal criterion for system development**

PS3*:* **Resilience as pivotal criterion for system development**

PROPOSED NEW WORKING GROUPS

1. **Offshore transmission planning**
2. **Global sustainable energy systems coupling electricity and hydrogen**
3. **Assessment of system reserves and flexibility needs in the power systems of the future**
4. **Virtual Power Plants role and deployment in large power systems' operation and planning**
5. **Forecasting demand to include consumer behaviour decisions influenced by market signals.**

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The year gone and looking ahead

- AU C1 held three virtual meetings in 2023 and a reduced attendance face to face get together in Cairns – aiming to have at least one face to face gathering in 2024 and reconnect.
- Locally will further expand the membership and develop contributions ahead of the Cairns symposium in 2023.
- Internationally C1 has been and continues to be engage widely:
  - Oman Symposium March 2023
  - Cairns Symposium September 2022
  - C1.45 Tutorial at CIGRE SEERC Istanbul November2023
  - Israel Symposium 2025
  - C1.47 or C1/C4.46 Tutorial to be presented in Paris 2024

AU C1 FOCUS IN 2023:

- Development of a summary paper of planning related topics:
  social licencing, integrated planning, impact of new technologies, electrification, role of planning in energy transition, planning standards, carbon quantification
- Preparing contribution to Paris 2024 Tutorial – Resilience planning for the Australian power system
- Reconnect for face to face meeting in Q1 of 2024

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