

Report to the CIGRE Australian Technical Council

Study Committee SC C4 and Australian Panel AU C4 Activities



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cigre

For power system expertise

SC C4 Power System Technical Performance

To facilitate and promote the progress of engineering and the international exchange of information and knowledge in the field of **end-to-end power system technical performance**. To add value to this information and knowledge by means of synthesizing state-of-the-art practices and developing recommendations supporting the **energy transition**.

Power System
Dynamics

Power Quality

Electromagnetic
Compatibility
and Interference
(EMC/EMI)

Lightning

Insulation Co-
ordination

SC C4 Structure

- 32 **Regular** Members
- 10 **Observer** Members



SC C4 Chair
Marta Val Escudero

- **44 members**
- 36 countries represented

Regular & Observer Members

SC C4 Secretary
Genevieve Lietz



**Strategic Directions
Advisory Group
(SAG)**

**Customers
Advisory Group
(CAG)**

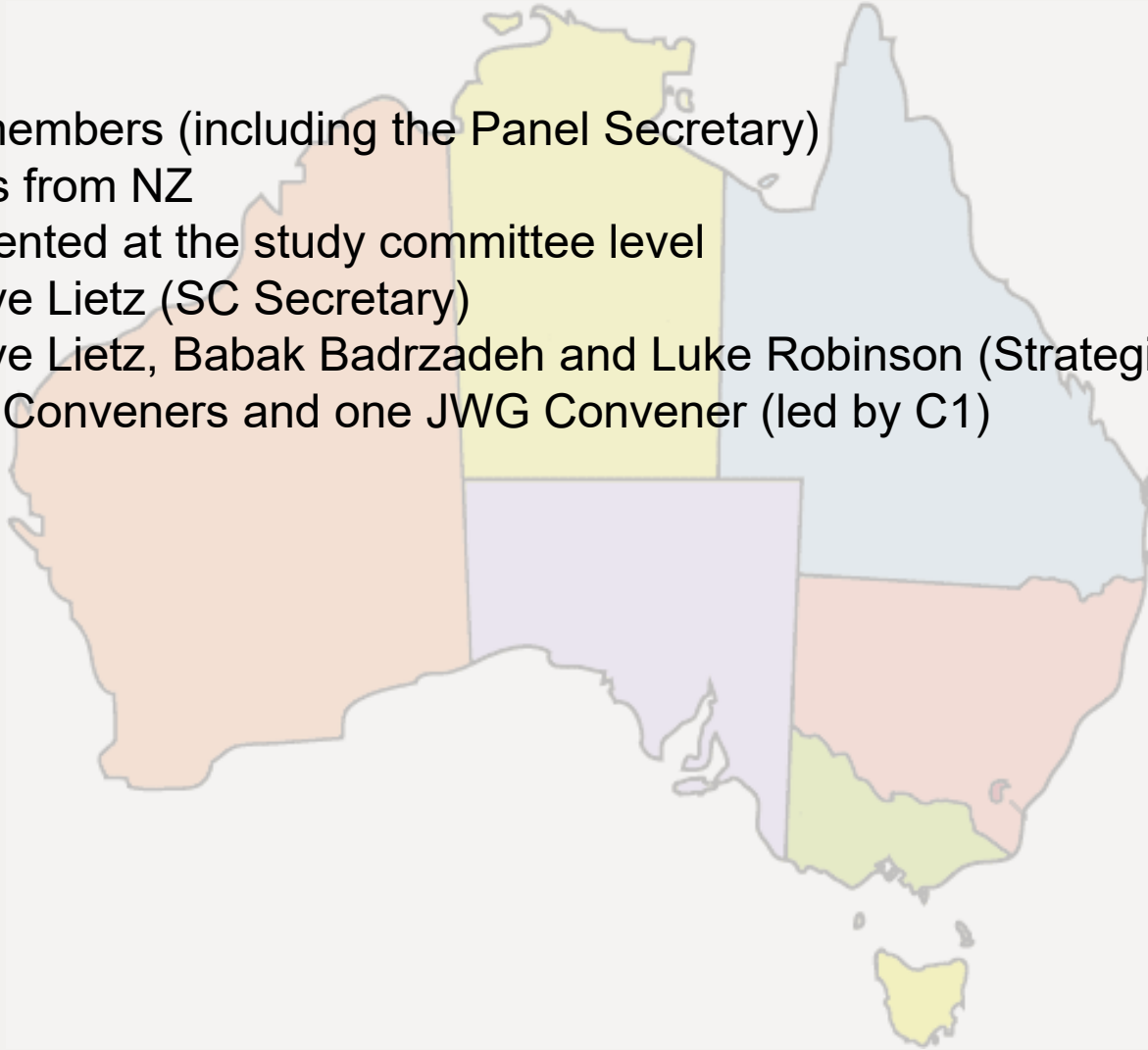
**Tutorials &
Conferences Advisory
Group (TAG)**

Liaison with other CIGRE SCs
and external organizations

WORKING GROUPS

Australian Panel AU C4

- 47 members
- Three NGN members (including the Panel Secretary)
- Two members from NZ
- Highly represented at the study committee level
 - Genevieve Lietz (SC Secretary)
 - Genevieve Lietz, Babak Badrzadeh and Luke Robinson (Strategic advisory group members)
 - Two WG Conveners and one JWG Convener (led by C1)



Key updates

CIGRE
Trondheim
Symposium

CIGRE
Paris 2026

CIGRE
Adelaide
Conference

Others
(WGs, GB,
etc)

Main themes relevant to C4 in Trondheim

Power system
oscillations

Grid-forming
inverters

Wide-area
EMT
modelling, and
interoperability

Frequency-
domain and
impedance-
based tools

Harmonic
resonances
and stability

System
stability under
high IBR
scenarios

AU C4 contribution in Trondheim

- **Investigation of Inertia Services on Grid Stability with Low-Inertia Systems in Victoria , S. Srimannarayanan et al, AEMO**
- **System strength impact on harmonic voltage management in transmission systems in relation to IBR (Inverter Based Resources) connections, U. Jayatunga et al, Transgrid**
- **Comparison Between Synchronous Condensers and Grid Forming BESS in Providing System Strength Support to IBRs in Weak and Strong Power Systems Using EMT Simulation, N. Aghanoori et al, Transgrid**

C4 activities in CIGRE Adelaide Conference

- **AP C4 AGM**
 - **More than 40 attendees**
- **More than half of the presentations were of interest to C4**
- **One Tutorial on the Green Book on Power System Dynamic Modelling**

Main themes relevant to C4 in Adelaide Conference

Grid-forming
inverters

New modelling
techniques and
future power
system
modelling

Power system
oscillations

System
strength

Grid connection
of IBR and IBL

Power system
harmonics

Australian contribution to SC C4 preferential subjects for Paris Session 2026

	Global	AU
PS1: Power system stability aspects of decarbonization of power systems and the road to net zero	110	23
PS2: Power quality (PQ) and EMC/EMI aspects of decarbonization of power systems and the road to net zero	33	1
PS3: Insulation co-ordination and lightning research	25	1

- 226 submissions for SC C4.
- 168 were accepted to progress to full paper submission.
- The room size allows for approximately 100 e-posters.

Main themes of Australian C4 submissions

Grid-forming
inverters

Modelling

Plant/system
performance
and services

Stability and
control

Oscillations

Batteries

SC C4 current focus area

- Grid-forming inverters (jointly with B4)
 - A Workshop will be organised for Paris Session 2026
- Inverter-based loads
 - A taskforce has recently started
 - A new WG will likely start in Q1 2026
 - A Workshop will likely be organised for Paris Session 2026
- Wide-area EMT simulation
 - A workshop will likely be organised for Pariss Session 2026
- Working groups
 - 29 led by C4
 - 11 supported by C4

AU C4's contribution to Working groups

- WG C4.77 “Best practices for individual and collective conformity assessment”. Convener: Babak Badrzadeh (Australia)
- WG C4.65 “ Specification, Validation and Application of Harmonic Models of Inverter Based Resources . Convener: Jason David (Australia)
- JWG C1/C4.46 “Optimising power system resilience in future grid design. Convener: Christian Schaefer (Australia)
- Several AU C4 members in various WGs

CIGRE C4 Green Book

- “Power System Dynamic Modelling and Analysis in Evolving Networks” published in early August 2024.
- Reference guide for practicing engineers around the world to understand, model, and analyse more confidently various forms of system stability in a rapidly changing power system with increasing uptake of inverter-based resources.
- **Workshop** during Paris 2024 session: Wednesday 28th August, from 14:00 to 18:00
- **Editors:** Babak Badrzadeh and Zia Emin



Babak Badrzadeh
(Bespoke Energy)



Genevieve Lietz
(AEMO)



Nilesh Modi
(AEMO)



Sorrell Grogan (Bespoke
Energy)



Andrew Halley
(Amplitude
Consultants)



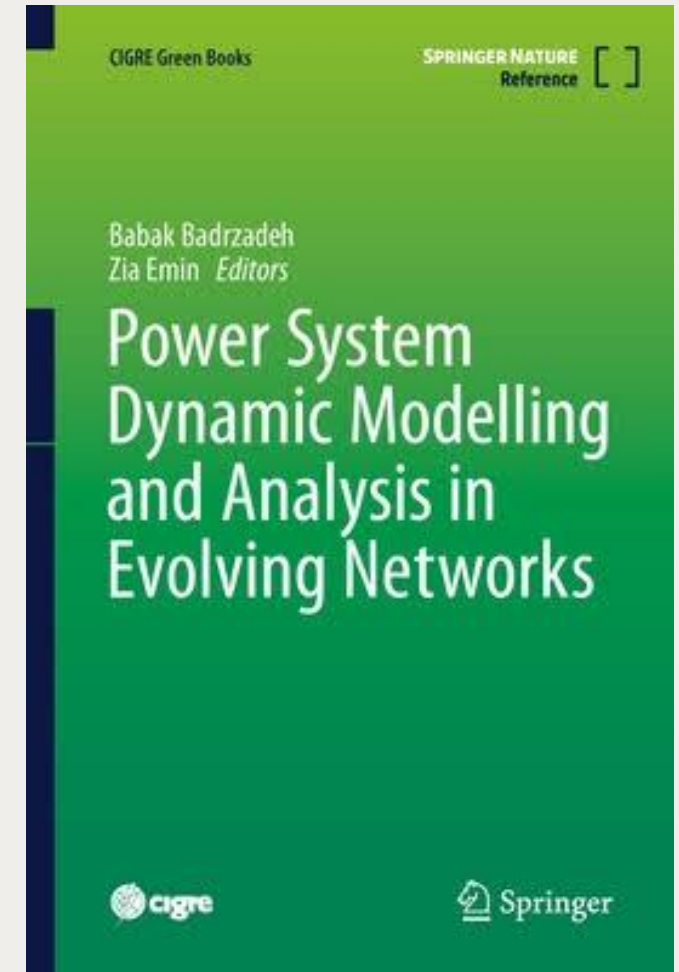
Qiming Zhang
(ElectraNet)



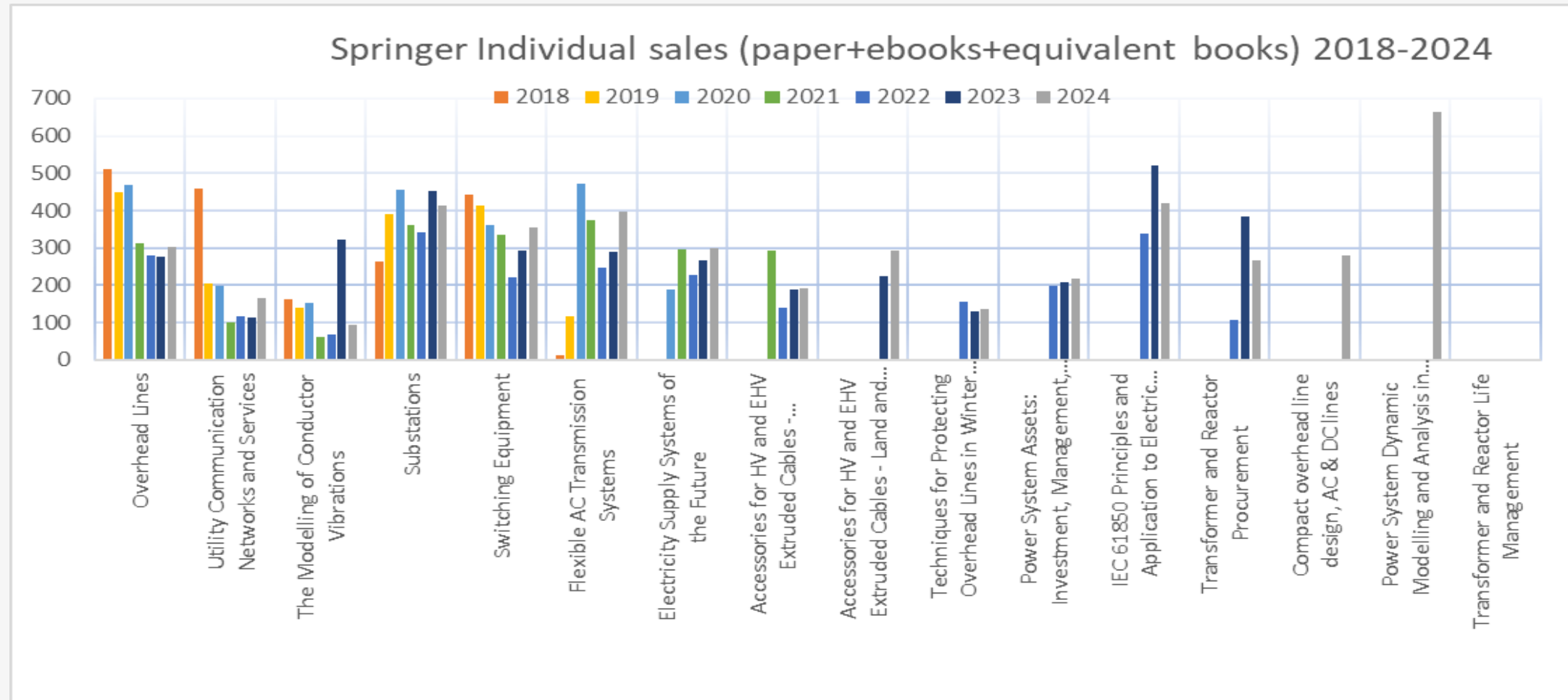
Jingwei Lu (AEMO)



Hitesh Bavarva (GridWise)



Green Book statistics



THANK YOU



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