

Report to the CIGRE Australian Technical Council

Study Committee Transformers and Reactors, SC A2 and Australian Panel AU A2 Activities



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cigre
For power system expertise

A2

Power transformers and reactors



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AU A2 Report 2023
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Goals of the Transformers Study Committee

- To monitor current trends in transformer technology;
- To facilitate the integration of transformers in power networks and in the environment;
- To maintain its leading position in the field of transformers by providing unbiased and neutral information on all essential transformer aspects;
- To be recognized by the industry as a leading and reliable partner with competence in all engineering issues related to power transformers
- To encourage more young experts to participate in the work of Study Committee A2
- To encourage the participation of experts from emerging market and developing countries in the activities of Study Committee A2

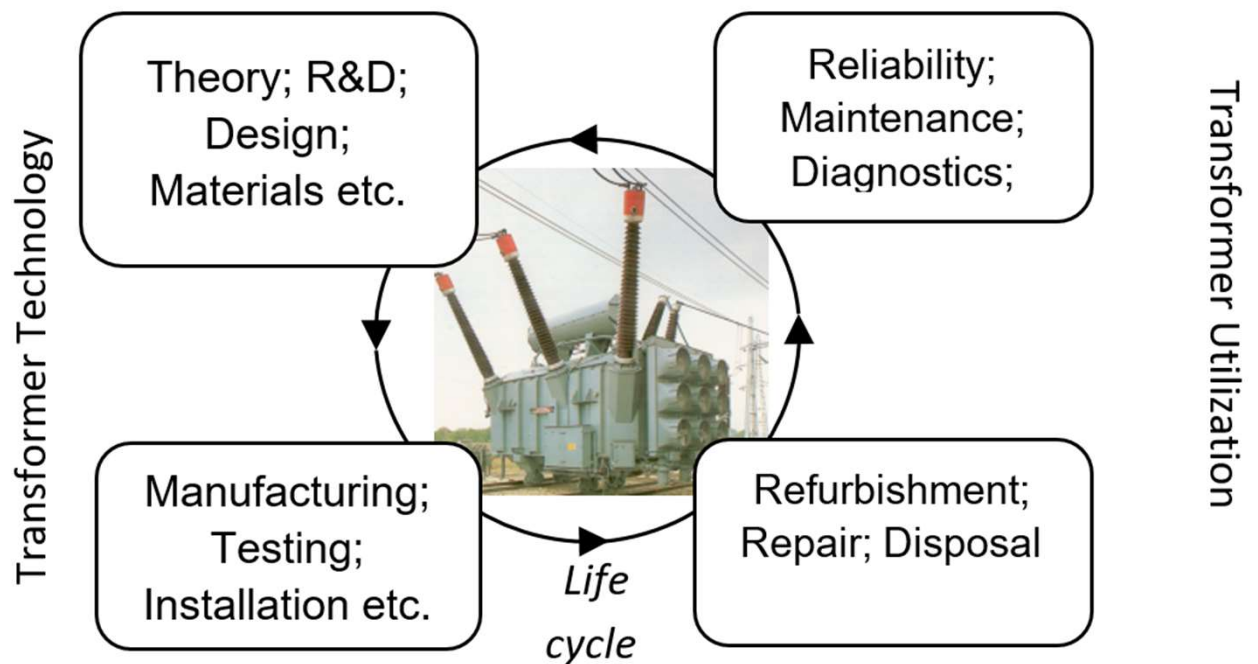


SC A2 Overview

Study Committee Scope

- Power **transformers**, including, industrial, DC converter, phase-shifting and distributed energy resource (DER) transformers
- **Reactors**, including shunt, series, saturated and smoothing;
- All transformer **components**, including **bushings, tap-changers**, and accessories.

Specific Activities of SC A2



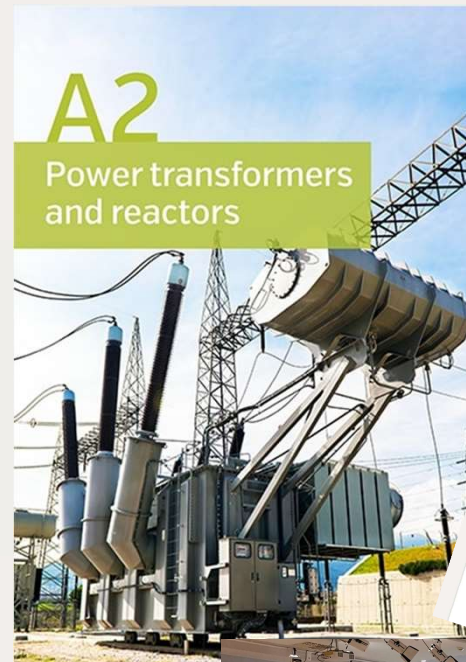
SC A2 at a Glance

SC A2 is constituted as follows:

- Chair and Secretary
- 24 regular members
- 18 observer members
- 6 additional members
- 27 Conveners of AGs, WGs, TFs
- NGN and WIE Liaisons

Technical work:

- 7+ Advisory Groups
- 10 Working Groups
- 2 preparatory Task Forces
- 7 Joint Working Groups



Active WGs and JWGs



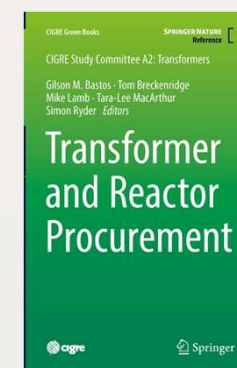
WG/JWG	Working Group	Expected Finish	AU/NZ Members
A2.54	Audible Sound Requirements	Q2 2023	Finalising
A2.56	Transformer Efficiency	Q2 2023	Finalising
A2.57	Effects of DC Bias on Power Transformers	Q3 2023	Finalising
A2.58	Site Installation and Pre-commissioning of Power Transformers and Shunt Reactors	Q3 2023	Ross Willoughby Matthew Gibson
A2.60	Dynamic Thermal Behaviour of Power Transformers	Q1 2024	Seamus Allan
A2.62	Analysis of Transformer Reliability	Q4 2023	Dan Martin
A2.63	Transformer Impulse Testing	Q4 2023	Arun Mathur
A2.64	Condition of Cellulose Insulation in Oil Immersed Transformers after Factory Acceptance Test	Q2 2023	Alan Vietch
A3/A2/A1/B1.44	Limitations in Operation of High Voltage Equipment Resulting of Frequent Temporary Overvoltages	Q2 2023	NEW
A2/D2.65	Transformer Digital Twin – Concept and Future Perspective	Q1 2025	NEW
A2/D1.66	Breathing Systems of Liquid Filled Transformers And Reactors	Q1 2025	Robert Li
A2/D1.67	Guidelines for DGA Monitoring	Q1 2025	Tara-lee MacArthur
A2.68	Failure Survey of Lower Voltage Generator Step Up Transformers Installed in Wind Farms and PV Parks	Q1 2025	Dan Martin
A2.69	Guide for Transformer Maintenance – Update	Q1 2025	Ross Willoughby
D1/A2.79	Understanding of Dynamic Behaviour of Winding Insulating Materials in Liquid Insulated Transformers	Q1 2026	NEW

Publications

WG number	Name of the Publication	Publication details
JWG A2/C4.52	TB 900 High-Frequency Transformer and Reactor Models for Network Studies	Published 2023
A2.55	TB 887 Life extension of oil filled transformers and shunt reactors	Published 2022
JWG A2/D1.51	TB 861 Improvements to PD measurements for factory and site acceptance tests of power transformers	Published 2022
A2.58	Site Installation and Pre-commissioning of Power Transformers and Shunt Reactors	Nearing completion due 2024

Green Books

- Green Book on Transformer and Reactor Procurement - published Sept 22
- New Green Book on Transformer and Reactor Life Management in progress.
 - Main idea is to consolidate A2 work on transformer life management over many years into a single handbook for engineers. Planned completion 2025.



New Working Groups

Nominate now!

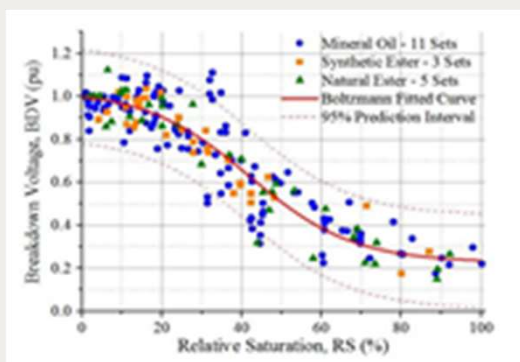
WG number	Title
JWG A2/C3.70	Life Cycle Assessment (LCA) of Transformers
JWG A2/D1.71	Modern Insulating Liquids Qualification for OLTC, Bushings and other accessories
JWG A2/D1.71	Retro-fill of Mineral Oil in Transformers – Motivations, Considerations and Guidance

Proposed Future WG Topics

- Transformer failure investigation
 - What should trigger an investigation – protection, DGA, testing?
 - Methods
 - Incident management
 - Guidelines for investigation
- If you or your organisation have a topic, please let us know.

Tutorials and webinars

Unveiling the Secrets of Insulating Liquids for Transformers



- Joint webinar based on the recently published material in TB 856 “Dielectric Performance of Insulating Liquids for Transformers”.

Presenter: **Lars Lundgaard**

Risk-Based Approaches to Distribution Transformer Replacement

Distribution transformers Failure modes

The following are our monitored failure modes:-

- Lightning
- Bushfire
- Overloading
- Corrosion / rust
- Fauna
- Faulty gaskets
- Vandalism
- Insulation degradation
- Moisture ingress
- Network faults
- Vehicle strikes
- Peripheral network equipment failure.



7 | Commercial-in-confidence

18/8/2023



- Run-to-fail, low-cost assets vs proactive maintenance & replacement, failures due to storms (joint AU/NZ).

Speakers: **Russell Watson, David Shephard, Dan Martin**

Australian Panel AU A2

The AU Panel has representatives from both AU & NZ:

- We are growing
- Currently 33 members, 3 new in the last year, plus 2 unfilled positions

- Online AU A2 panel meeting in August
- Joint AU/NZ A2 technical discussion day in conjunction with Cairns Symposium in September:
 - Geomagnetically Induced Currents and transformers – Prof. Andrew Laphorn
 - Esters and semi-hybrid transformers – Dr Bhaba Das
 - High frequency switching transients & harmonic impacts on data centre transformers – Jimmy Kuang
 - Aust/NZ framework for quantifying risk/cost-benefit & NPV for mid-life refurbishment – Matt Ridgley



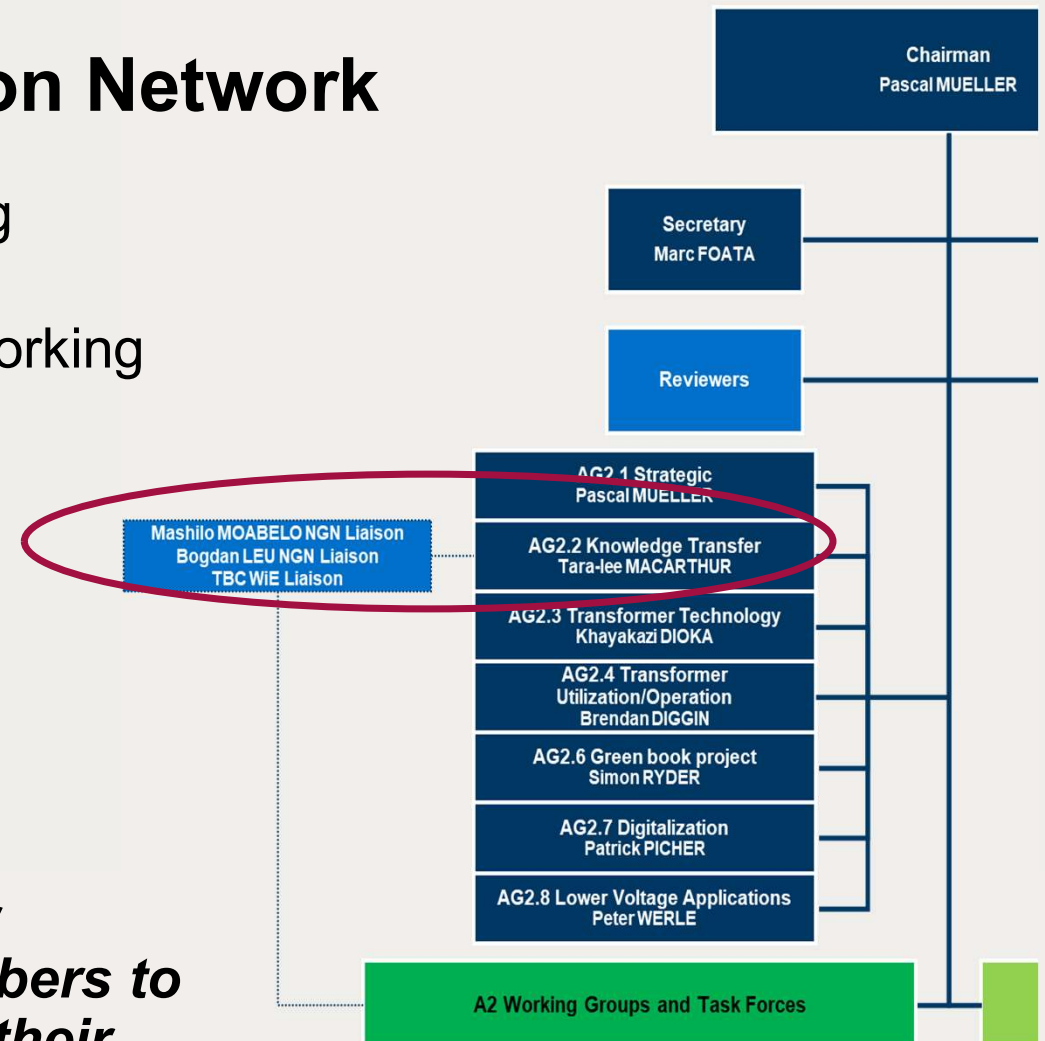
CIGRE A2 & Next Generation Network

Transformers Study Committee is helping NGNs;

- Become members or secretaries of a working group,
- Invitations to attend meetings,
- Be special reporters and poster session coordinators,
- Join an advisory group.

Highly recommend

“Co-chairing and shadowing of senior members is a great way for NGN members to learn more about CIGRE and develop their own CIGRE network”



CIGRE A2 & Next Generation Network

- If you work with a graduate or young member mention us to them
 - Someone that is 35 years and under please contact us we would love to get them involved.

"Empowering SC A2 through knowledge sharing, engagement with young professionals, and fostering professional growth."

Technical Brochure 898 - Knowledge transfer of substation engineering and experiences

- Case studies and examples from SCA2



NGN A2 Upcoming Events



- A2 NGN event at Wilson Transformer Company allowing members to tour the manufacturing facilities on February 16th 2024
- A networking event will be held February 16th
- TBC NGN A2 webinar on Ground Induced Currents produced by Coronal Mass Ejections
- Sub-committee within NGN is being developed to increase NGN enrolment at Universities



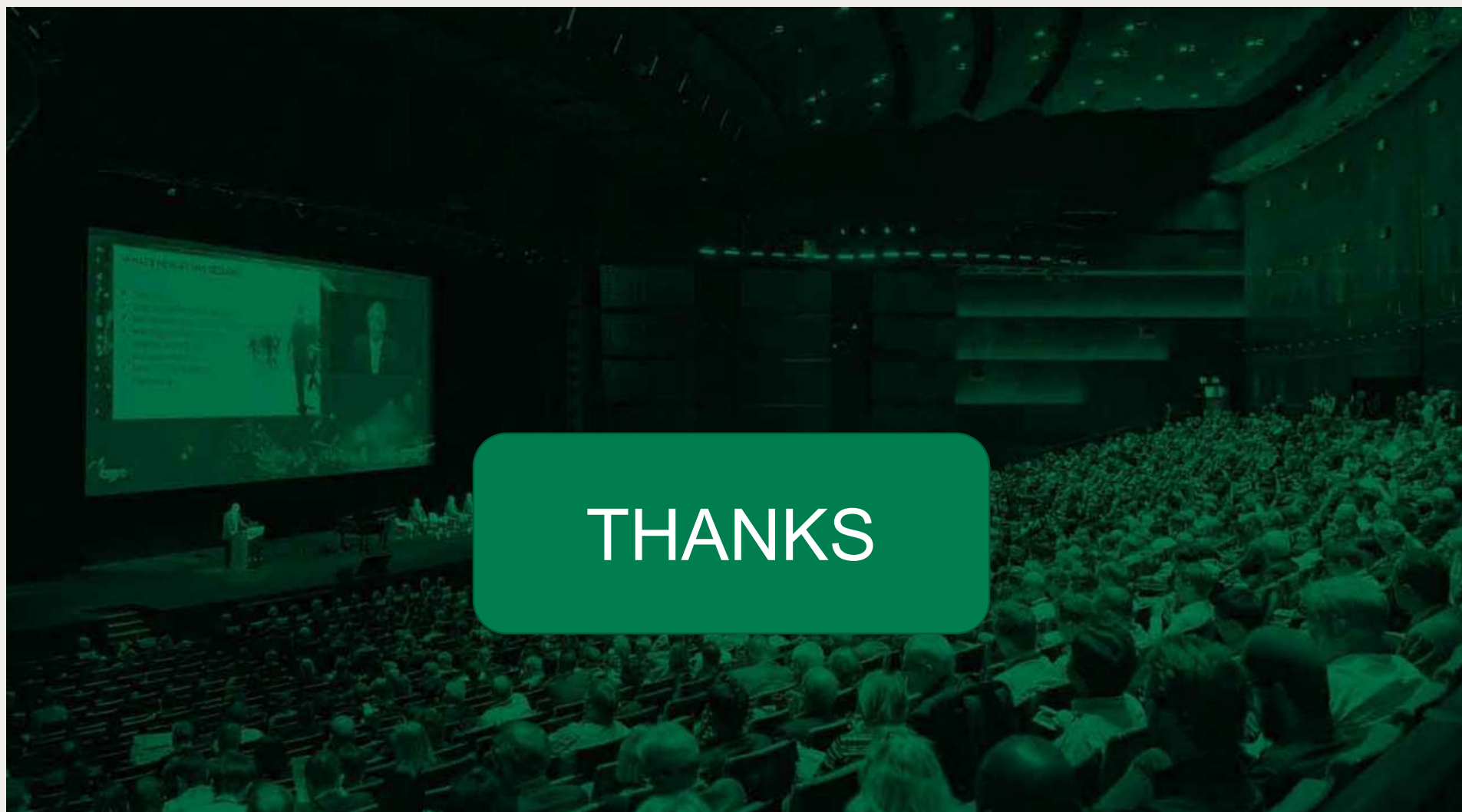
SC A2 Future Events

2023

- A2 SC & Colloquium in Split, Croatia (28th Nov – 1 Dec)
 - Digital twins
 - Trends in transformer maintenance

2024

- Proposed AU Transformer workshop day “**SAVE THE DATE**”
 - Asset Management
 - Hands on training
- **CIGRE Paris Session** & SC meeting



THANKS