

Report to the CIGRE Australian Technical Council

Study Committee SC B1 and Australian Panel AU B1 Activities



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AU B1 Report 2025

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cigre

For power system expertise

B1

Insulated cables



SC B1 Insulated Cables: Themes

SC B1 Strategic Plan 2023-2033:

1.4 Goals of the Study Committee

The main goals of SC B1 are the following:

- to promote and to contribute effectively to the progress in insulated cable systems technology and optimizing cable design for “unconventional” usage as part of the **Energy Transition**
- to facilitate the integration of insulated cable systems in electric power networks and in the environment, covering the complete life cycle of cables
- to maintain its leading position in the field of power cables by providing unbiased and without prejudice information on all essential cable aspects
- to be recognized by the Electric Power Industry as a leading and reliable partner with competence in all engineering issues related to insulated cable systems, i.e. technical, economical, ecological and social
- to monitor and assess current trends in cable technology.

Preferential Subjects Paris 2026:



B1 Insulated cables



PS1: Future cable systems and innovative cable applications

- › Cable systems challenges and solutions such as floating applications/deep water, meshed DC grids, overhead-line/substation interfaces.
- › New developments on materials, design and construction challenges such as super-conducting solutions, hydrogen inclusion, high temperature / electric stress, **very large conductors** and cost-effectiveness.
- › Intelligence into cables. Integration of sensor technologies, real-time use of data, predictive maintenance, use of robotics, dynamic management of load demands, digital twins, data use for BIM implementation.

PS2: Recent experience with AC and DC cables, both land and submarine

- › Quality, monitoring, condition assessment, diagnostic testing, after installation testing, fault location, upgrading and uprating methodologies and relevant management.
- › Lessons learned from permitting, consent, interface management cables to other equipment/device/substations and safety issues.
- › Experiences with new test requirements and new tools for cable **ratings calculation**.

PS3: Environmental impact and cable lifecycle

- › Development in more sustainable materials and production methods, **recover, recycle, reuse of cable materials and SF6 alternatives**.
- › Best practices in LCA and environmental certification.
- › Environmental impact of cable systems with regards to climate change.

SC B1 Insulated Cables: Global Trends

- Massive projects for land & submarine interconnector cables, HVDC polymeric 525kV, and cables with very large aluminium conductors up to 4000mm², dramatic increases in manufacturing & laying capacity.
- Offshore wind array and export cables continue to challenge with flexible cables, continuing initiatives to find alternatives to lead sheaths for floating arrays, and development of larger/higher voltage standard connectors.
- Further involvement with MV/distribution cables and asset management of existing cables.



SC B1 Insulated Cables: Major Achievements

- Technical Brochures & Electra articles published:

- Tutorials presented:

- B1.62 "Recommendations for testing DC extruded cable systems for power transmission at a rated voltage up to and including 800 kV", Tutorial at CIGRE workshop in Japan SC-B1, March 2025
- B1.68 "Condition Evaluation and Lifetime Strategy of HV Cable Systems" Tutorial at CIGRE 2025 Symposium Trondheim 12 May 2025
- B1.56 "Power Cable Rating" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.45 "Thermal monitoring of cable circuits and grid operators' use of dynamic rating systems" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.60 "Maintenance on HV Cable Systems" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.68 "Condition evaluation and lifetime strategy of HV cable system" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.52 "Fault location on land and submarine cable links" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.62 "Recommendations for testing DC extruded cable systems" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.66 "Recommendations for testing DC lapped cable systems" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.65 "Installation of Submarine Power Cables" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.61 "Installation of HV Cable Systems" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B1.48 "Trenchless Technologies" Tutorial at B1 SC meeting, The Netherlands, Sep 2025
- B4.B1.C4.73 "Surge and extended overvoltage evaluation of HVDC cable systems for testing – TOVs in HVDC point-to-point systems and LI overvoltages in mixed HVDC OHL-cable systems" Tutorial at Jicable HVDC Turin October 2025
- B1.58 "Condition Assessment and Diagnostic Methods to Support Asset Management of MV Cable Networks" Tutorial at 17th HRO CIGRE Session November 2025
- B1.61 "Installation of HV Cable Systems" Tutorial at AU-B1 panel meeting, Perth, Australia, Nov 2025

WG number	Convener	Name of the Publication	Publication date	Publication number
JWG B1/B3.74	Jianbin Fan Pierre Mirebeau	Recommendations for a performance standard of insulated busbars	Published 11/2024	TB 945
JWG B1/B3/D1.79	Cornelis Plet Maria Kosse	Recommendations for dielectric testing of HVDC gas insulated system cable sealing ends	Published 02/2025	TB 957
WG B1.54	Harry Orton Sudhakar Cherukupalli	Behavior of cable systems under large disturbances (earthquake, storm, flood, fire, landslide, climate change)	Published 03/2025	TB 959
WG B1.87	James PILGRIM Ola THYVRIN	Finite Element Analysis for Cable Rating Calculations : IEC 62095 update	Published 05/2025	TB 963
JWG B1/D1.75	Anders Gustafsson HERGERT Alexander	Interaction between cable and accessory materials in HVAC and HVDC applications	Published 08/2025	TB 968
TF B1.93	Jianbin FAN	Application of autonomous platforms/robots in power cable operation and maintenance	Published 08/2025	Electra 341

SC B1 Insulated Cables: Task Forces & Working Groups

- 22 Task Forces & Working Groups.
- 16 have AU-B1 members.

B1 WG/TF	Conveners	Title
WG B1.67	Volker Werle	Loading Patterns on Windfarm Array and Export Cables
JWG B1/C4.69	Thinus Du Plessis	Recommendations for the insulation coordination on AC cable systems
WG B1.70	Roman Svoma	Recommendations for the use and the testing of optical fibres in submarine cable systems
WG B1.72	Frank de Wild	Cable ratings verification (2nd part)
JWG B4.C4.B1.73	Markus Saltzer	Surge and extended overvoltage evaluation of HVDC cable systems for testing
JWG B1/D1.75	Anders Gustafsson	Interaction between cable and accessory materials in HVAC and HVDC applications
WG B1.76	Christian Freitag	Enhancing Quality Assurance/Quality Control Procedures for HV and EHV Cable Systems
WG B1.80	Sudhakar Cherukupalli (CA)	Guidelines for Site Acceptance Test of DTS and DAS systems
WG B1.82	Paul Knapp	MV DC cables topics
WG B1.83	Christian Remy- Bob Hobson (US)	Grounding aspects for long HVDC land cable connections
JWG B1/C3.85	Kieron Leeburn	Environmental impact of decommissioning of underground and submarine cables
WG B1.86	Julio Lopes	Assessment, Prevention and Mitigation of Safety Risk in Cable Systems
WG B1.87	James PILGRIM	Finite Element Analysis for Cable Rating Calculations : IEC 62095 update
WG B1.88	Pierre Mirebeau (FR)	Non-SF6 GIS terminations
WG B1.89	Ross WILSON (GB)	Guidance for conducting cable systems failure analysis
WG B1.90	Sara Anild Rachel Mosier	Cable Systems Electrical Characteristics (Update of TB 531)
JWG B2/B1.90	Jacco Smit (for B1)	Transition facilities between overhead and underground lines
WG B1.91	Frederic LESUR (FR) Minh NGUYEN (FR)	Transient Thermal Modelling of Power Cables (update to IEC 60853)
WG B1.92	Massimiliano MAURI	Qualification of Lead-free Submarine Cables at 72.5kV<Um<170 kV
TF B1.93	Jianbin FAN (CN)	Robotic supervision of tunnels
TF B1.94	Peter van der Wielen	Grid operations (switching etc ...) and Transient voltages in XLPE insulated cable systems possibly causing accelerated
WG B1.95	Søren Krüger Olsen, DK	Mechanical performance and limits of submarine cables – modelling and testing

SC B1 Annual Meeting, The Netherlands, 23rd-25th Oct 2025

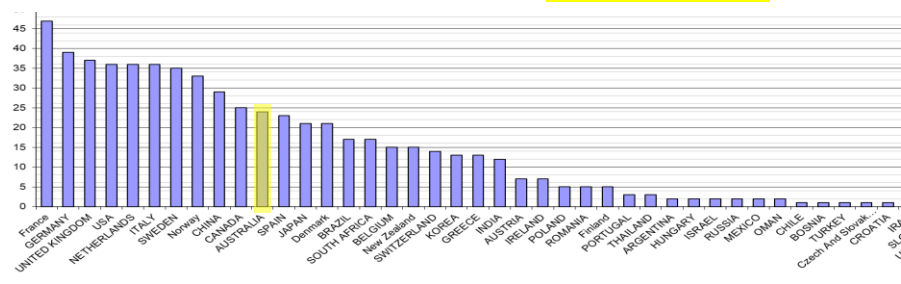


- Three AU-B1 members attended:
 - Rob Bradley as AU-B1 convenor & SC-B1 member / AU national representative.
 - Russell Wheatland as Reliability Advisory Group convenor.
 - Ken Barber.
- Communications strategy: newsletters & LinkedIn posts (NGN).
- Membership & WG participation stats.
- TF/WG reports – track progress, check-in with AU-B1 members if any concerns.
- Continuing push to ensure proper WG participation and speed up TB production.

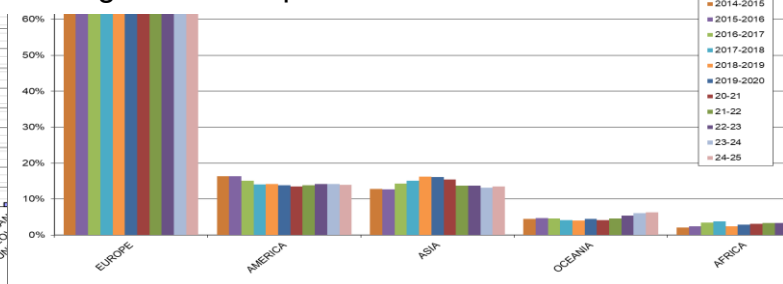
Tactical Plan 2025–2026

- Q4 2025 – LinkedIn campaign
- Q1 2026 – Newsletter on cable innovation
- Q2 2026 – Symposium + AGM with live coverage
- Q4 2026 – Annual meeting report + WG call
- Ongoing – Biweekly/Monthly LinkedIn spotlights

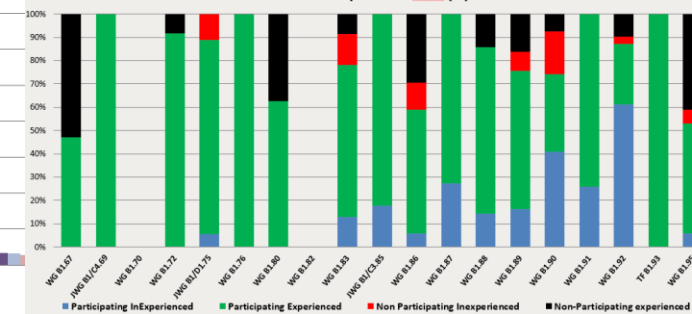
No. members of TF/WG/AG: AU-B1 is **11th in the world**



Rising membership in Oceania



2025 Participation in WGs (%)



SC B1 Annual Meeting, The Netherlands, 23rd-25th Oct 2025



- New Work Items
 - New proposals from SC members > TF
 - Strategic topics > WG
 - TF ToR approved > WG
- Three AU-B1 panel members will transition from TF to WGs:
 - B1.94 Grid operations causing failure TF > WG
 - B1.96 Accessory hazard mitigation TF > WG
 - B1.99 Sustainable cables TF > WG
- Also proposing new AU-B1 member for new WG B1.105 thermal monitoring/dynamic rating.



2025 new WG and TF							
NWI number	NWI proposals 2025 and TF	Strategic NWI	Decision : Yes / No	VOTES	WG or TF	number	Countries / Comments
TF B1.94	Grid operations (switching etc ...) and Transient voltages in XLPE insulated cable systems possibly causing accelerated failure		Yes	13	WG	94	CH, BE, NL, GB, IE, ES, IT, AU, DE, CN, US, NO
TF B1.96	Cable accessory failure hazard mitigation		Yes	16	WG	96	CN, CH, BE, FR, ES, NL, CA, GB, PT, SE, IT, AU, DE, US, IN, NZ
TF B1.99	Evaluation of sustainable Power cables		Yes	12	WG	99	CH, CN, JP, FR, KR, NL, GB, IE, AT, PT, SE, IT, AU, DE, US, NO, BR
348	Guide for robust qualification procedures of DMR cable	Yes	Yes		WG	100	BE, JP, FR, NL, GB, SE, IT, DE, US
342	DC Superconductive Cable Systems	Yes	Yes		WG	101	CN, BE, FR, KR, NL, IT, DE, US
371	IEC : Specific tests and characteristics of Large Cross Section conductor of cables	Yes	Yes		WG	102	CN, CH, BE, FR, KR, NL, CA, GB, IE, AT, PT, SE, IT, DE, US, IN, NO, BR, DK
343	Recommendations for Spare Parts management		Yes	13	TF	103	BE, FR, ES, GB, IT, DE, IN, NO, BR
366	Cable Lifetime Extension		Yes	9	TF	104	CH, GB, DE, US, IT, NO
372	Update of TB 756 "Thermal monitoring of cable circuits and grid operators' use of dynamic rating systems"		Yes	19	WG or TF ?	105	CN, FR, DK, KR, NL, ES, CA, GB, AT, ZA, SE, IT, DE, US, NO, BR
							SAG will review current draft TOR, update it and then distribute it. Then WG starts with a balance between members

SC B1 Annual Meeting, The Netherlands, 23rd-25th Oct 2025



Site visits

- Offshore windfarm Hollandse Kust (Noord) & (West-alpha/beta).
- 220kV export submarine cable up to transition joint on the beach, HDDs to inland substation.



- Tata Steel IJmuiden
- Decarbonisation plan.



SC B1 Insulated Cables: Future Events

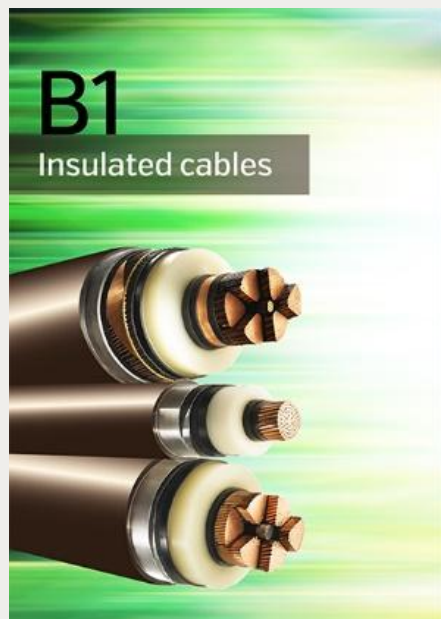
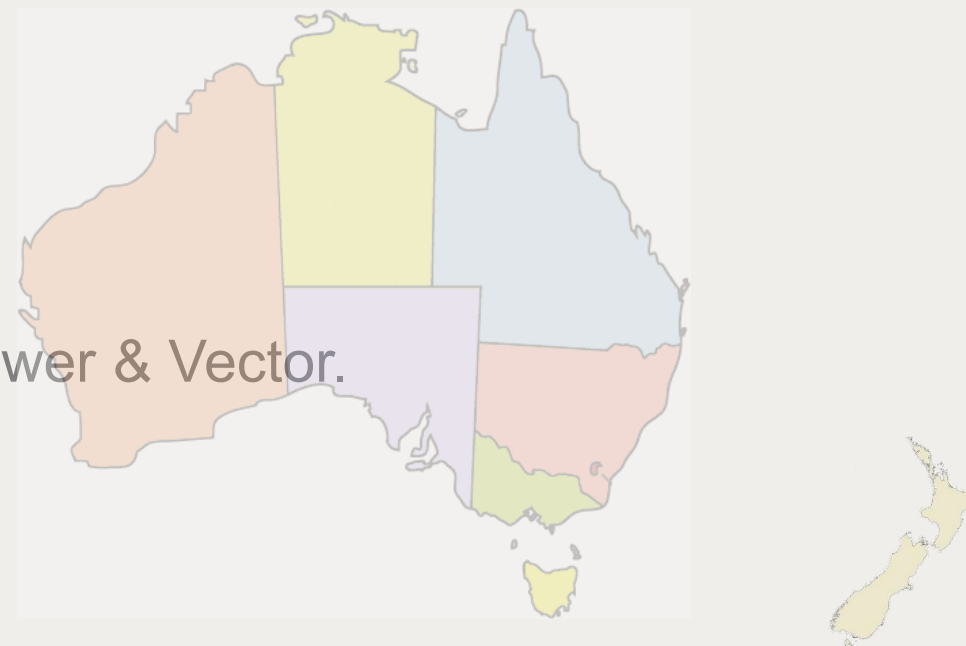
- 2026 Paris Session.
- 2027 possible Symposia in Thailand & Germany, SC-B1 *may* be involved.
- 100th anniversary of the Insulated Cables Study Committee in 2027, this will be celebrated at Jicable 27 in Lyon, France.

SC B1 Insulated Cables: New Convenor

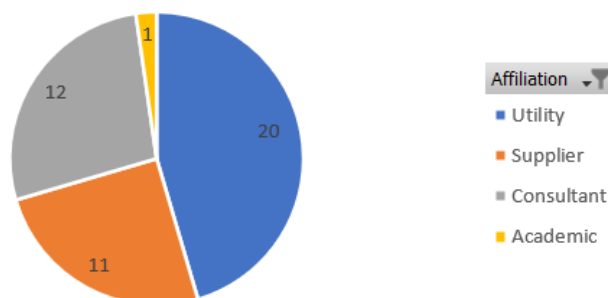
- New convenor from 2026 Paris Session: **Danijela Palmgren, NKT Sweden**

AU B1 Insulated Cables: Status

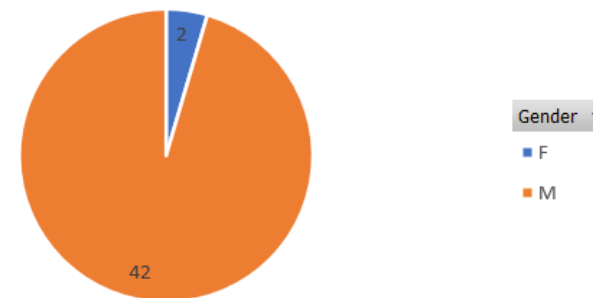
- 44 panel members, highest ever.
- Nearly 40% are members of TF/WG/AG.
- 50/50 utilities/vendors.
- Almost all Australian utilities + two NZ Transpower & Vector.
- 2 NGN members.



AU B1 membership affiliation



AU B1 membership gender



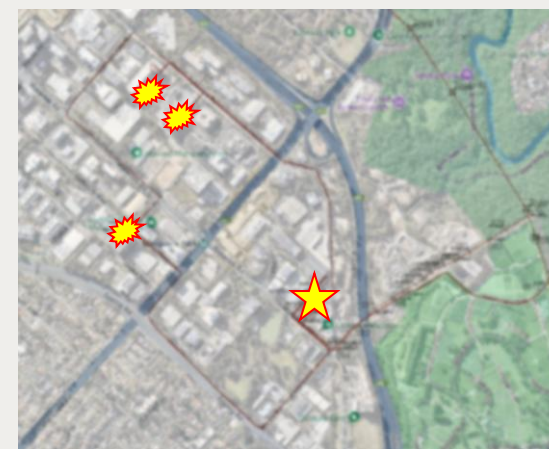
AU B1 Insulated Cables: Australian Trends 1

Net-zero energy transition

- New utility infrastructure.
- Renewable Energy Zones for connection of solar/windfarms + BESS
- BESS grid-scale battery connections.
 - Capacities approaching 1GW/several GWh.
 - Connections from 11kV to 500kV.
 - Internal cabling up to 33kV.
- Offshore wind – soon? Learn from European experience.

Datacentres

- Many GWs of new demand.
- Clustered together in technology areas.



AU B1 Insulated Cables: Australian Trends 2

MV accessories – reliability & competence

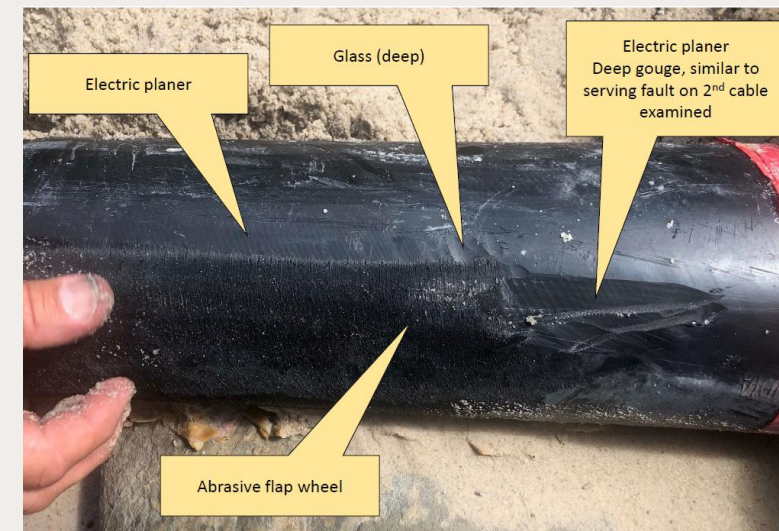
- Simple accessories.
- Installation errors.
- Renewable connections – heavy/intermittent loading can expose vulnerabilities, lack of cable expertise.

MV cable failures

- Manufacturing defects.
- Installation problems.

What can we do?

- Accessory supplier training, strict control of approvals, drawings & jointing instructions.
- PD detection.
- Joint waterproofing tests.
- Better awareness of QA controls.
- Encourage renewable participation in AU-B1 panel, learn & grow.



Australian AU-B1 panel meetings 2025

- Mid-year online catchup 22nd May 2025, 36 attendees.
- Annual face to face meeting 11th & 12th Nov 2025, hosted by Western Power in Perth, 33 attendees.
 - Reports on “what’s happening in your patch” and TF/WG members.
 - Discussion of new TFs/WGs and AU nominations for these.
 - New AU-B1 involvement in Standards Australia Technical Committee EL-003 Electric Wires & Cables, report by Brett Cleaves.
 - Our first Tutorial in many years: B1.61 TB 889 “Installation of HV Cable Systems”, presented by Peter Robinson.



THANK YOU



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For power system expertise