

DISCUSSION MEETING SUMMARY

Study Committee B2

Overhead lines

Tuesday August 25, 2026

Chair: Pierre Van Dyke

Secretary: Vivek Chari

Special Reporters:

PS1: Hugo Valente (PT) and Janos Toth (CA)

PS2: Sébastien Langlois (CA), Nancy Fulk (US)

PS3: Ruy Menezes (GB)

1. Introduction

To encourage the sharing and promotion of knowledge in these important fields, SC B2 selected the following three preferential subjects for the 2026 CIGRE Session:

- PS1 - OHL modernization and emerging technologies
- PS2 - Health assessment and refurbishment of OHL
- PS3 - Sustainability and climate change impacts

A total of 118 SC B2 papers were selected including four NGN papers.

2. Running of the meeting

The Group Discussion Meeting was chaired by the Study Committee Chair, Pierre Van Dyke, with Special Reporters Hugo Valente (PS1), Janos Toth (PS1), Sébastien Langlois (PS2), Nancy Fulk (PS2), Ruy Menezes (PS3), and Vivek Chari as SC B2 Secretary.

3. Contributions to Preferential Subject 1

Preferential Subject 1 (PS1) focused on the modernization and optimization of overhead line (OHL) infrastructure to address the dual challenges of the energy transition: integrating renewable energy sources and meeting increasing electricity demand within constrained environments. This primary theme is characterized by a shift from traditional, conservative design methods toward data-driven, resilient, and capacity-maximizing strategies.

The Preferential Subject was divided into 3 main themes:

- Theme 1.1 - Uprating or upgrading existing lines including conductors' replacement and associated towers modifications and foundations reinforcement and other line components and technologies.
- Theme 1.2 - Accelerating the design and construction of new lines, reducing the cost and the manpower required in view of scarcity of skilled workforce and expertise.
- Theme 1.3 - Preassembled overhead line components, man less installation of overhead line components.

PS1 accepted a total of 50 papers, of which 2 were accounted as NGN. These papers were grouped according to their focus areas into 13 topics, for some of which the special reporters formulated questions, having received a total of 19 accepted contributions presented and discussed in the Group Discussion Meeting (GDM).

For the first topic, Advanced Conductors, there were two contributions and a spontaneous contribution from the audience regarding the PMC (Polymer-Matrix Composite) conductors, about aeolian and galloping performance.

Other topic, Compacting Lines, had two contribution and the spontaneous contributions focused on why quad bundle should be used with Horizontal "V", in detriment of triple or single conductor.

In the topic of, Generative Design, two contributions were received and the spontaneous contribution and discussion was around the theme of how to deal with the retirement of a significant number of senior engineers. The hypotheses discussed was how AI could be training to capture as much knowledge as possible, from these engineers, and act as a mentor to young engineers that won't be able to receive experience and knowledge from older colleagues.

One of the final topics discussed was, Foundation Optimization, with two contributions and some spontaneous contributions. The discussion on this topic was the advantages or not, of doing geotechnical testing and geophysical surveys at the same time but also if when testing the terrain for a tower foundation, if afterwards the design considers the influence of the structure and the fact that it has 4 legs.

The topic with most contributions was, Safety Devices, which presented innovations to improve safety and efficiency during transmission line construction. There were five contributions presented and discussed with focus on the method to live-line insulators washing and the possibility to use it in composite or silicon coated insulators. Also, there was some discussion about the implications of using tubular members in towers, especially in what concerns corrosion inside these members and expected lifetime for these structures.

Overall PS1 opened the GDM session, with very interesting contribution presentations and some important topics raised by spontaneous contributions, giving way to some discussion and relevant conclusions.

4. Contributions to Preferential Subject 2

Preferential Subject 2 was dedicated to Health assessment and refurbishment of OHL. Utilities face major challenges and a high level of pressure to extend the life of existing overhead transmission lines. Many technologies are becoming available for the monitoring, maintenance and refurbishment of lines. However, extensive research and development works are needed to adapt these technologies to the practical reality of overhead lines.

Forty papers were proposed. They were regrouped under three subtopics as follows:

- 2.1 Remaining life of assets, increasing the life of assets, and refurbishment of OHL.
- 2.2 Reducing maintenance and operation costs, evaluating durability and maintenance costs.
- 2.3 Monitoring, predictive maintenance and digital twins.

From these three subjects, eight questions were proposed by the special reporters: 4 questions on subject 2.1, 2 questions on subject 2.2, 2 questions on subject 2.3.

One contribution dealt with existing efforts in Japan to assess the residual life of conductors. Another prompt contribution focused on PMC conductor core residual strength testing, which is like the residual strength testing performed on NCI insulator cores. A question regarding the testing and assessment methods of insulators received four contributions. The technical considerations to decide between reuse, reinforcement and replacement of towers and foundations were discussed in two contributions. The question of reinforcement and life extension of poles was discussed, and the aim is to avoid when possible complete replacement. Finally, two contributions concerned the grounding and lightning protection improvements to support enhanced power system reliability and power quality.

A total of 9 contributions were proposed about maintenance and the discussion showed that there is a clear interest to shift to automated inspection methods such as those involving artificial intelligence. These methods still show some limitations, but there is a great potential to exploit in future years. Some other contributions showed that the expected service life of some components is not always reached and strategies to identify problems and optimize maintenance are still being developed by TSOs. A prompt contribution from India shared their experience on joints reinforcement with a variant that can apply to tension joints as expressed by the contributor.

The last two questions sparked four contributions and showed that technological tools such as drones, artificial intelligence, remote sensing, digital twins, etc. are getting in full use to help TSOs with the monitoring of their assets. One conclusion is that we need to combine the information into consistent strategies that yields meaningful information for the overhead line engineers.

Twenty-four contributions covered the wide range of challenges that TSOs are facing, as well as the enhancements that have been made in recent years. Some of these topics are already being addressed through existing CIGRE publications and Working Groups. However, other areas, such as data management or testing criteria, would greatly benefit from additional guidance and recommendations developed by CIGRE committees.

5. Contributions to Preferential Subject 3

Preferential Subject 3 was on Sustainability and climate change impacts. The session examined how transmission systems must evolve to address climate change, emerging weather hazards, environmental constraints, and the demands of the energy transition.

Key contributions highlighted the need to move beyond historical weather data towards future risk-informed design, incorporating climate projections and improved understanding of hazards such as extreme winds, icing, and volcanic ash. Contributors stressed the importance of balancing simplicity in design standards with targeted resilience measures based on evolving risk profiles. A strong theme was the growing role of digital technologies including AI, forecasting tools, advanced sensing, GIS, and digital twins in shifting transmission planning and operations from reactive to predictive and adaptive approaches. Contributions also explored how lifecycle carbon considerations should influence material and technology selection, alongside cost, performance, and reliability. Finally, speakers highlighted the challenge of expanding transmission infrastructure while reducing environmental impacts, improving public acceptance, and supporting biodiversity goals.

The main conclusion was that future transmission networks must be climate-resilient, digitally enabled, carbon-conscious, and environmentally responsible, balancing reliability and affordability with the urgent need for grid expansion.

6. Awards

The 2026 SC B2 Technical Award was presented by the SC B2 chair, Pierre Van Dyke, to Tetsuya Yamanaka from Japan for his impressive technical contributions to multiple Working Groups, his leadership roles in AORC, his service as secretary of Technical Advisory Group B2.06, his organization of SC B2 events in Japan and, his support in preparing the CIGRE Symposium 2027 in Bangkok, Thailand. He has also encouraged and supported many colleagues to participate in CIGRE.

7. Conclusion

This year, a total of 118 papers were accepted which is an increase of 20% compared to 2024. The Special reporters prepared 25 questions addressed to CIGRE experts and 59 prepared contributions were accepted. Contributions came from 19 countries, with 20% from Japan and 19% from Brazil.

The questions and contributions led to lively discussions across a wide range of topics and the most discussed ones were:

- Advanced conductors' performance

- Line compacting strategies
- AI knowledge transfer
- Foundation testing practices
- Safety device innovations
- Automated maintenance inspection
- Climate-resilient design