CIGRE strategic direction and technical focus

Rannveig S. J. Løken
CIGRE Vice-president Technical

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20. November 2025

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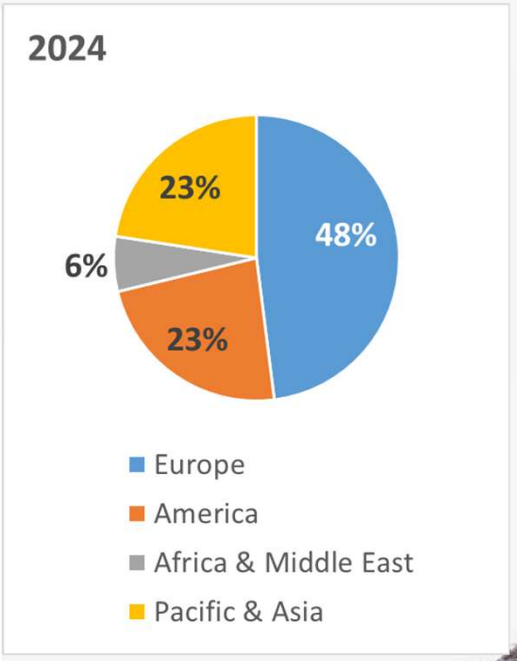
For power system expertise

Rannveig S. J. Løken

Rannveig Loken has worked in the power system sector for more than 30 years. She works for Statnett, the TSO of Norway, and holds a Master of Science in Electric Power engineering from the Norwegian University of Science and Technology (NTNU). She is the Chair of the Norwegian Committee of CIGRE. She has been involved with CIGRE since 2006. She was the Chair of CIGRE SC B5 Protection and Automation between 2018 and 2024. In 2024 she received the Honorary award from CIGRE.

The CIGRE community in 2025 = 60 National Committees



CIGRE members' profiles

- Operators:
  - Transmission Systems (TSO)
  - Distribution Systems (DSO)
  - Power generators
  - Utilities
  - Independant Systems (ISO)
  - T&D asset owners
  - Power markets
- Technology providers:
  - Transmission equipement
  - Distribution equipment
  - Information & communication
- Consulting companies
- Testing laboratories
- Research centres
- Universities
- Regulators
- Professional associations
- Power users

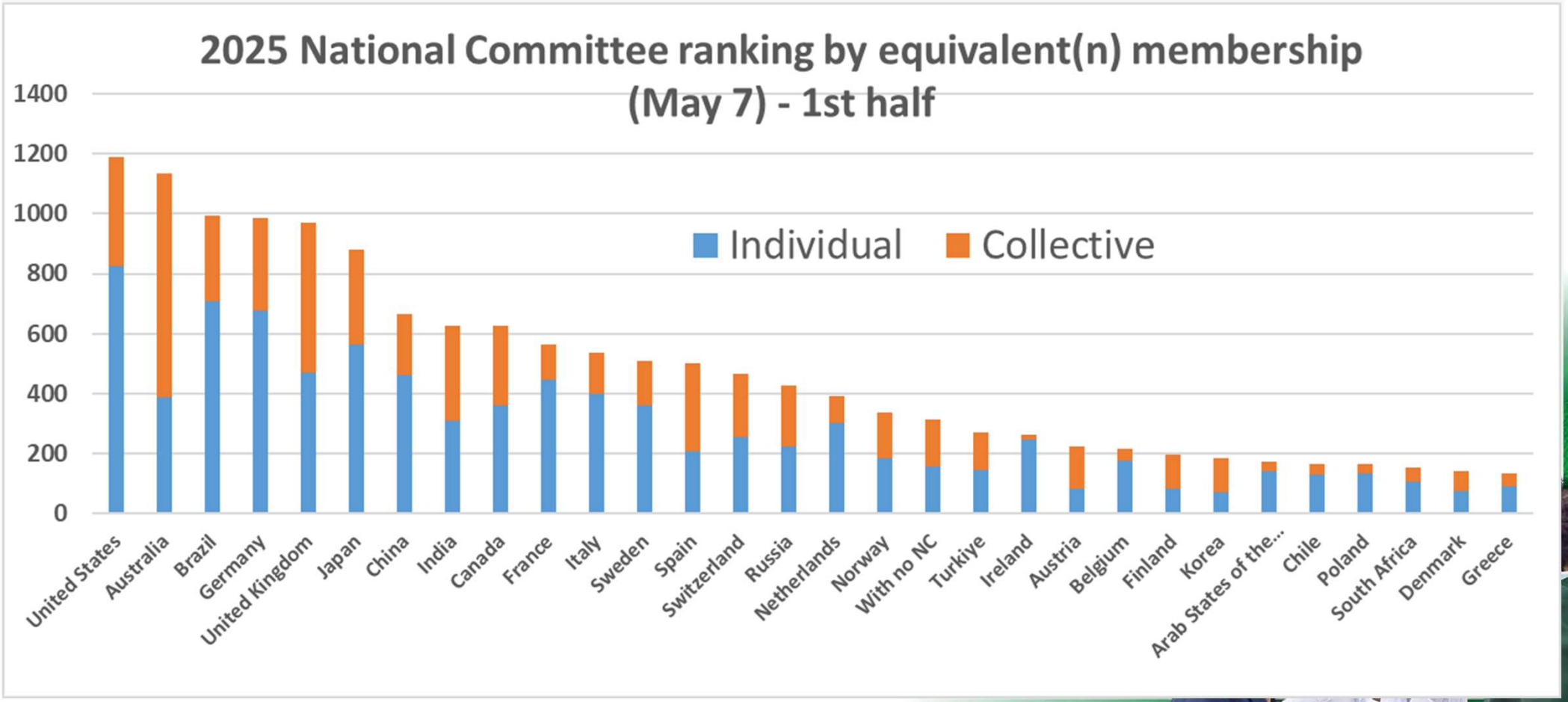
13,000 individual members

30% young professional (<35)

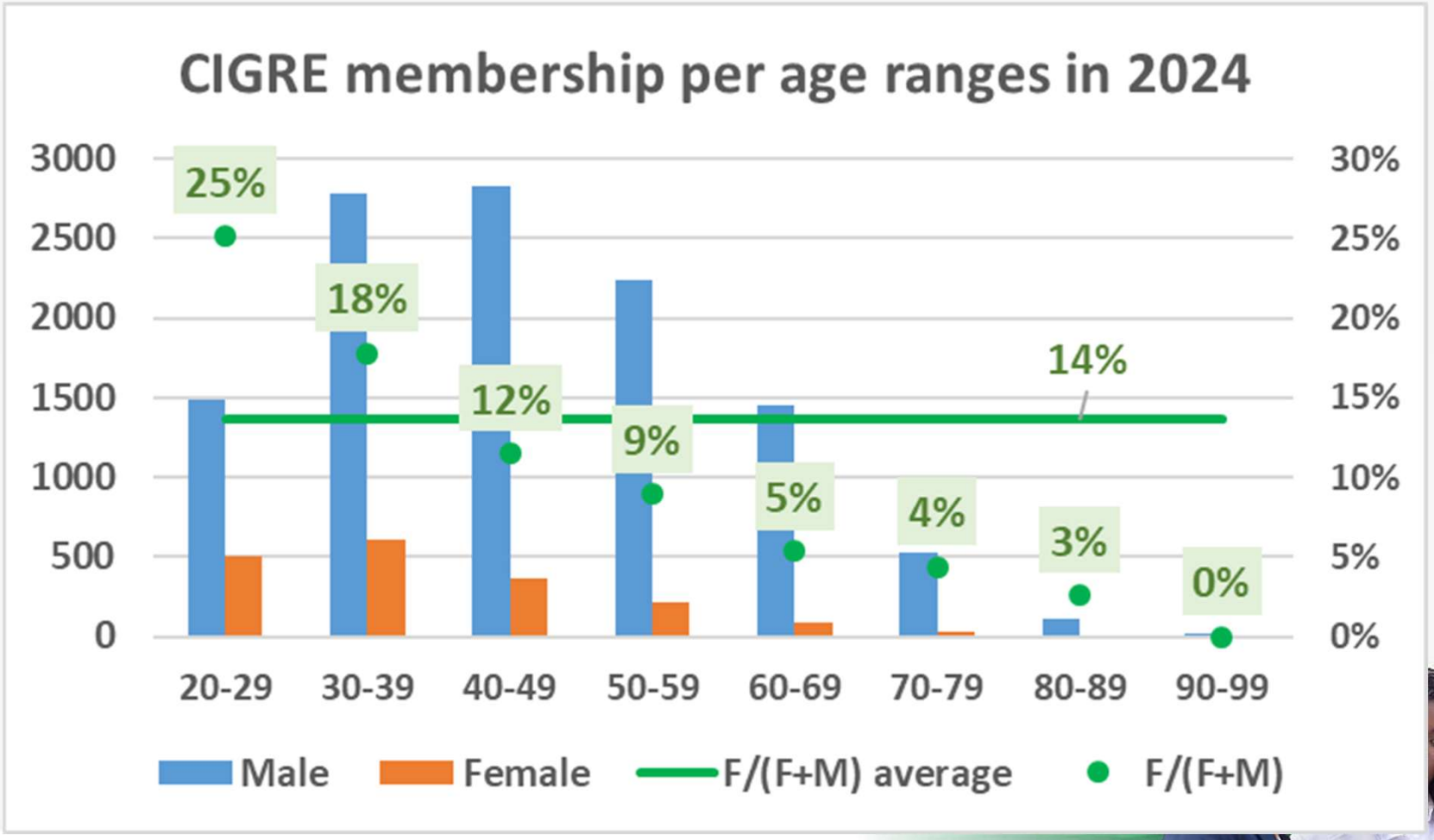
13.8% women

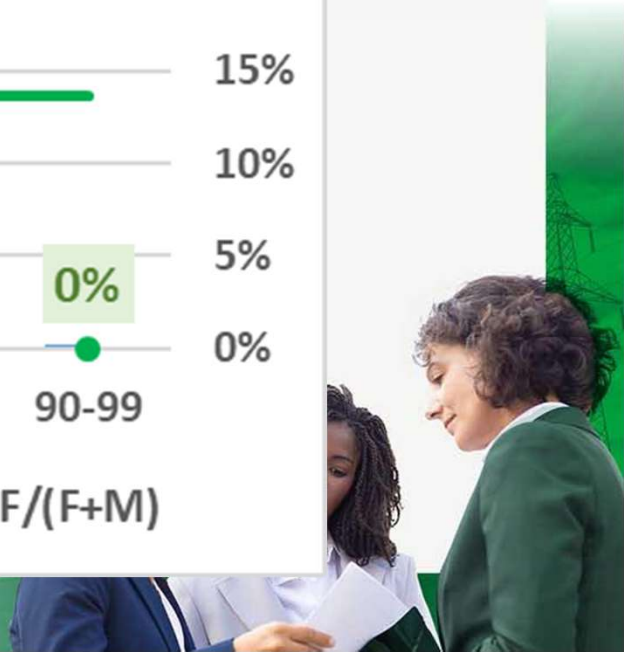
1,450 collective members

Membership


2025 National Committee ranking by equivalent(n) membership
(May 7) - 1st half
1400
1200
1000
800
600
400
200
0
Individual
Collective
United States
Australia
Brazil
Germany
United Kingdom
Japan
China
India
Canada
France
Italy
Sweden
Spain
Switzerland
Russia
Netherlands
Norway
With no NC
Turkiye
Ireland
Austria
Belgium
Finland
Korea
Arab States of the...
Chile
Poland
South Africa
Denmark
Greece

CIGRE membership



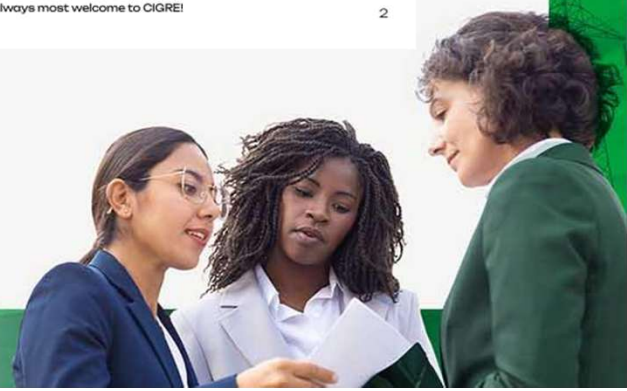


CIGRE is an event organiser

In total, several hundreds of CIGRE events per year

- **Paris Session** in even years, the reference congress for all members organized by the Central Office (CO) (4,575 delegates from 99 countries in August 2024)
- **Symposia,** two per odd years outside of Paris, organised by one National Committee (NC), the Technical Council (TC) and the CO
- **Colloquia** organised by a Study Committee in association with a NC
- **Regional conferences** organised by groups of NCs
- **National Conferences** organised by NCs
- **Webinars** organised by the Study Committees with the CO or by the NCs

CIGRE Paris 2026 – 23-28 August 2026- Full paper



Call for papers | Session CIGRE

CIGRE's 16 domains of work = 16 Study Committees

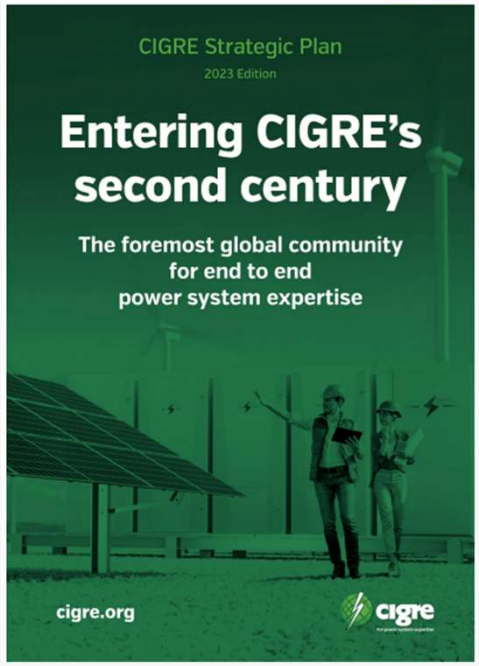
More than 260 active Working Groups

CIGRE Strategic Plan – 2023 Edition

Technical Knowledge Advancement

- CIGRE at its core is the development and dissemination of unbiased technical knowledge for power system expertise, for electricity end-to-end (E2E), and to broaden to all facets of the energy transition.
- The CIGRE Technical Council is the center of this advancement as are the National Committees with their local initiatives in conferences and in assisting the Technical Council.

https://www.cigre.org/GB/about/official-documents



CIGRE Energy Transition Topics

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Digitalisation VIEW	**Solar PV and Wind** VIEW
Storage VIEW	**Hydrogen** VIEW
Grids and Flexibility VIEW	**Consumers, Prosumers and Electric Vehicles** VIEW
Sustainability and Climate VIEW	**Sector Integration** VIEW

DIGITALISATION:

- Transformer Digital Twin – concept and future perspectives
- Tools for lifecycle management of T&D switchgear based on data from condition monitoring systems
- Condition monitoring and remote sensing of overhead lines
- HVDC Digital Twin – concepts and roadmap
- **Requirements for Information Technologies (IT) and Operational Technology (OT) managed of Protection, Automation and Control Systems (PACS).**
- Technology and Applications of Internet of Things in Power Systems

STORAGE:

- Global interconnected and sustainable electricity system: Effects of storage, demand response and trading rules
- The potential roles of energy storage in electric power systems
- **Development of Grid Forming Converters for Secure and Reliable Operation of Future Electricity Systems**
- Industrial implementation and application of grid forming energy storage systems (GFM ESS)
- Wholesale and Retail electricity cost impacts of flexible demand response

GRIDS and FLEXIBILITY:

- **Power-electronics-based transformer technology, design, grid integration and services provision to the distribution grid**
- Technical requirements and scenario considerations on grid-forming capabilities of VSC-HVDC systems
- Optimising power system resilience in future grid design
- Planning tools and methods for systems facing high levels of distributed energy resources
- The Impact of DER on the Resilience of Distribution Networks
- Development of Grid Forming Converters for Secure ad Reliable Operation of Future Electricity Systems

SUSTAINABILITY and CLIMATE:

- **User guide for non-SF6 gases and gas mixtures in Substations**
- Environmental impact of decommission of cables
- Replacement gas for SF6 in cable accessories
- Guidelines for life cycle assessment in substations considering the carbon footprint evaluation
- Interactions between wildlife and emerging renewable energy sources and submarine cables
- Partial discharge properties of non-SF6 insulating gases and gas mixtures

SOLAR PV and WIND:

- Wind generators and frequency-active power control of power systems
- Failure survey of lower voltage generator step up transformers installed in wind farms and photovoltaic parks
- Loading pattern on cables connected to windfarms
- HVDC connection of power system with high proportion of photovoltaic (PV) generation
- Protection Roadmap for Low Inertia and Low Fault Current Networks
- **The impact of offshore wind power hybrid AC/DC connections on system operations and system design**
- EMC for Large Photovoltaic Systems

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HYDROGEN:

- Role of green hydrogen in energy transition: opportunities and challenges from technical and economic perspectives
- **Energy Sectors Integration, and system impact**
- Integration of Hydrogen into electricity markets and regulation
- Hydrogen source tracing

CONSUMERS, PROSUMERS AND ELECTRIC VEHICLES:

- Large city & metropolitan area power system development trends, taking into account new generation, grid and information technologies
- Wholesale and Retail electricity cost impacts of flexible demand response
- Summary of current uses of electric vehicle charge-discharge flexibility in wholesale energy markets and reliable grid operation
- **Electric Vehicles as Distributed Energy Resource (DER) systems**

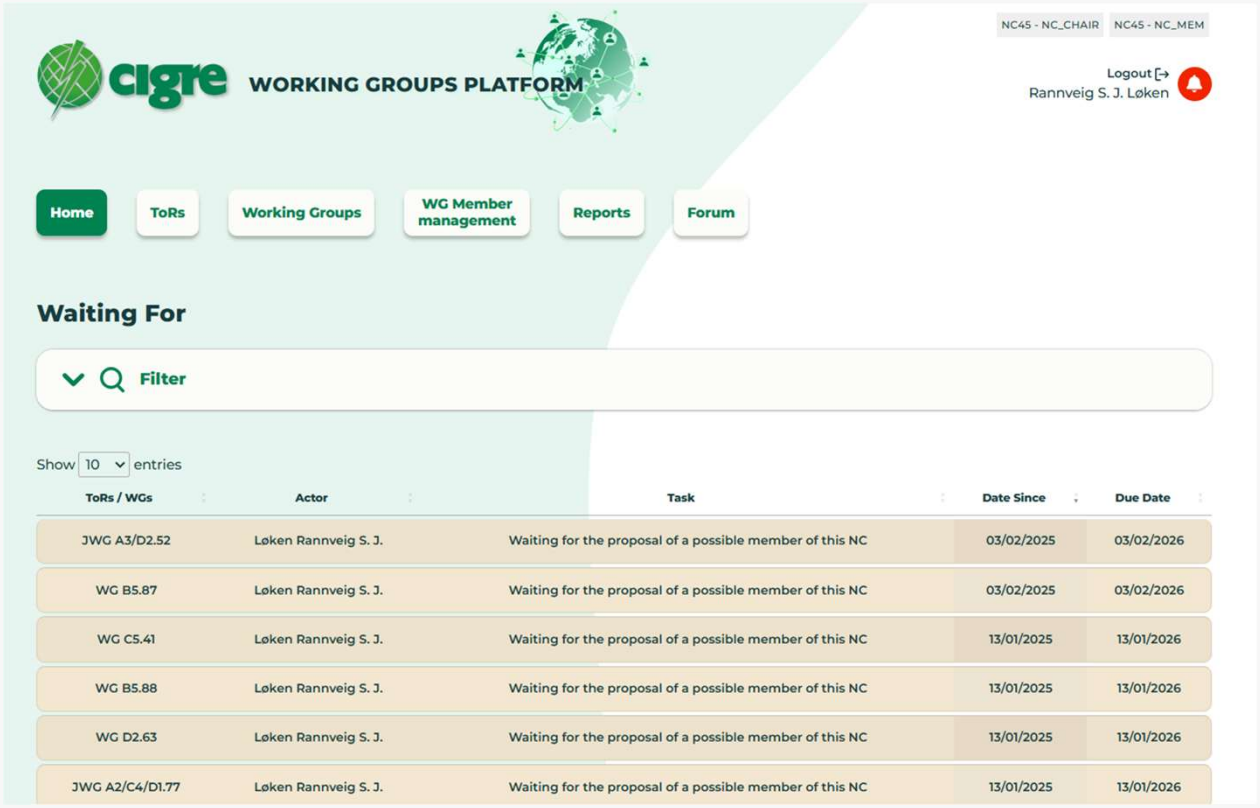
SECTOR INTEGRATION:

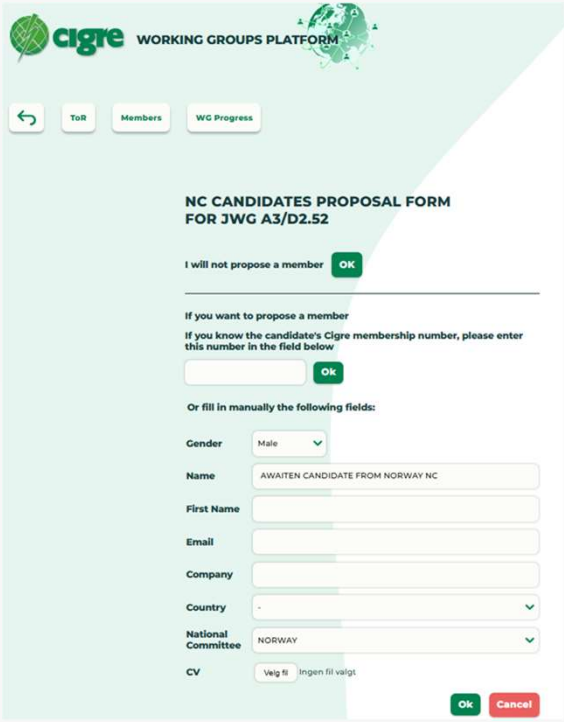
- **Energy Sectors Integration, and system impact**
- Market integration of EVs

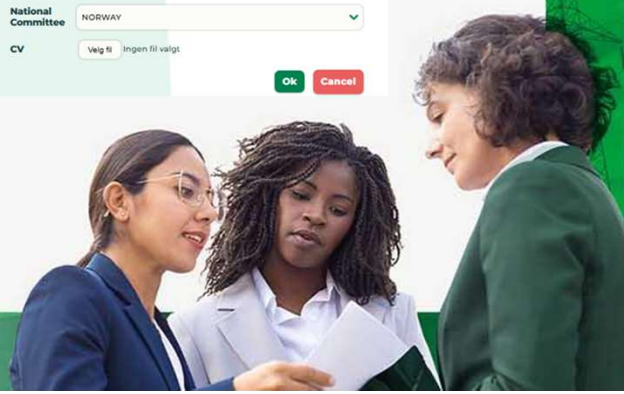
CIGRE contribution to the energy transition

1. Based on the experiences of its members, CIGRE is addressing the challenges of the energy transition, and appointed Working Groups to propose state of the art, best practices and recommendations on system planning, design, construction and operation in the new context of the energy transition
2. By selecting relevant topics for its conferences (Paris Session, Symposia), CIGRE facilitates the sharing of operational experiences
3. The « Large disturbance workshop » of the Paris Session is an opportunity for experts to share lessons learnt from large incidents or blackouts due to the integration of large amounts of renewable energy sources
4. CIGRE stimulates technical innovations by bringing together experts from the operators, research centers, consultants, and technology providers, to solve problems at a global level

WG management tool







CIGRE New Working Groups 2025 (1)

JWG D1/A2.84	Silver Corrosion in Power Transformers	06/11/2025
WG D1.83	Optical Spectral Sensing Technologies for Partial Discharge (PD) a...	06/11/2025
WG A2.81	Guide for Power Transformer Design Review	20/10/2025
WG D2.67	Power Embodied Intelligence Technology and Application	17/10/2025
JWG C4/A3.79	Temporary overvoltage protection technologies for high-voltage t...	31/08/2025
JWG C4/B1/B2/B4.78	Interference effects between HVDC circuits and nearby metallic i...	11/08/2025
JWG A3/A2/B3/B4/C4.53	Inductive load Switching in transmission and distribution systems	13/10/2025
WG B5.89	Protection Redundancy and Backup for Modern Power Systems	29/09/2025
WG B3.73	Asset management and digital integration of mobile substations ...	08/07/2025
JWG C6/C1/CIRED.50	Planning distribution networks under significant uncertainties	14/07/2025

CIGRE New Working Groups 2025 (2)

WG C6.49	Virtual power plant (VPP) aggregation of distributed energy reso...	02/08/2025
WG C6.48	DER's integration in Distribution Systems Operation and Control	02/08/2025
JWG C1/D2.56	Electrical-Cyber Integration to meet Net Zero Goal by support of ...	16/07/2025
JWG C1.55	A Benchmarking survey on the use of Asset Investment Planning ...	18/06/2025
WG B3.72	Integration of asset information in modern substations for (asset) ...	02/08/2025
WG A2.80	Guide to Transformer Supplier Qualification and Development	27/05/2025
WG A1.78	Guide for the Application of Electrical and Current Signature Anal...	05/06/2025
WG D2.66	Low Voltage Power Line Carrier Communications Application	26/04/2025
WG D2.65	Optical Transport Communication Networks for Electric Power Uti...	26/04/2025
JWG A2/C3.79	Power Transformers and Reactors Sound Levels On Site	08/05/2025

CIGRE New Working Groups 2025 (3)

WG D2.64	Application of AI in Cybersecurity Defence of Power Systems	18/03/2025
JWG C2/C4.47	Wide Area Operational Security Systems to enable the Energy Tra...	12/05/2025
WG A2.78	Bushing Diagnostics: Off-Line Testing and On-Line Monitoring Sys...	18/03/2025
JWG C5/C1.43	Approaches to account for the contribution of short-duration elec...	11/05/2025
WG C5.42	Market pricing issues and solutions for low short-run marginal-co...	15/03/2025
WG B2.96	Composite Insulated Cross-arms for New-build and Retrofitted Tr...	18/03/2025
WG B3.71	Substations Improvements to Support Network Black Start Capab...	03/11/2025
WG B3.70	Guidelines for the Use of Advanced Technologies for Information ...	14/07/2025
WG B3.69	Process Requirements for Commissioning and Inspection of Air In...	18/02/2025
WG B5.88	Implementation Guide for fully digital IEC 61850-based Protection...	13/01/2025

CIGRE New Working Groups 2025 (4)

WG B5.87	Digital Transformation of Protection, Automation and Control Syst...	03/02/2025
WG C5.41	Regulation and market design to foster decarbonation through in...	13/01/2025
JWG A3/D2.52	Application of Digital Twin in Switchgear	03/02/2025
WG D2.63	Inter-Control Center Communications Protocol (ICCP) Security an...	13/01/2025
WG D2.62	Efficient spectrum allocation and utilisation for electric power ind...	13/01/2025
JWG A2/C4/D1.77	Design of transformers for very fast transient overvoltages	13/01/2025

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CIGRE Technical Brochures published in 2025 (1)

- The impact of offshore wind power hybrid AC/DC connections on system operations and system design, Ref 972 • 2025, SC C2/B4
- Transformer Efficiency, Ref 971 • 2025, SC A2
- The Potential Roles of Energy Storage in Power Systems, Ref 970 • 2025, SC C1
- Forecasting Dynamic Thermal Line Ratings, Ref 969 • 2025, SC B2
- Interaction between cable and accessory materials in HVAC and HVDC applications, Ref 968 • 2025, SC B1/D1
- Mechanical properties of insulation materials for power transformers, Ref 967 • 2025, SC D1
- Sustainable corridor management, Ref 966 • 2025, SC C3
- Best environmental and socioeconomic practices for improving public acceptance of high voltage substations, Ref 965 • 2025, SC C3
- Increasing the Strength Capacity of Existing Overhead Transmission Line Structures, Ref 964 • 2025, SC B2
- Finite Element Analysis for Cable Rating Calculations, Ref 963 • 2025, SC B1
- Guide for transformer maintenance, Ref 962 • 2025, SC A2

CIGRE Technical Brochures published in 2025 (2)

- Interoperability in HVDC systems based on partially open software, Ref 961 • 2025, SC B4
- Certification of the electricity used to produce hydrogen, Ref 960 • 2025, SC C5/C1
- Behaviour of Cable Systems under Large Disturbances, Ref 959 • 2025, SC B1
- Guidelines for use of real-code in EMT models for HVDC, FACTs and inverter based generators in power systems analysis, Ref 958 • 2025, SC B4/IEEE
- Recommendations for dielectric testing of HVDC gas-insulated cable connection assemblies, Ref 957 • 2025, SC B1/B3/D1
- Protocol for Reporting the Operational Performance of HVDC Systems, Ref 956 • 2025, SC B4
- Lightning Transient Sensing, Monitoring and Application in Electric Power Systems, Ref 955 • 2025, SC C4
- Electric Vehicles as Distributed Energy Resource (DER) Systems, Ref 954 • 2025, SC C6
- Tools for lifecycle management of T&D switchgear based on data from condition monitoring, Ref 953 • 2025, SC A3
- Evaluation of Dynamic Hydrophobicity of Polymeric Insulation Materials Under AC Voltage Stress, Ref 952 • 2025, SC D1

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Participation opportunities for members are extensive within CIGRE's global knowledge development programme. Typically 250 working groups are active at any one time.

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Beyond the things your membership qualifies you for there are many benefits to a CIGRE membership. Read about the top nine here.

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