



Assemblea dei Soci

Comitato Nazionale Italiano Cigre

16 Luglio 2024



Sessione Consiglio Tecnico

Agenda

Orario	Comitato Tecnico	Relatori
13.55 – 14.00	Introduzione e moderazione della sessione	M. Rebolini, M. Forteleoni
14.00 - 14.10	A1 (Rotating Electrical Machines)	B. Grieco
14.10 - 14.20	A2 (Power Transformers and reactors)	S. Sacco, D. Difino
14.20 - 14.30	A3 (Transmission and Distribution Equipment)	P. Mazza
14.30 - 14.40	B1 (Insulated Cables)	L. Colla
14.40 - 14.50	B2 (Overhead Lines)	P. Berardi
14.50 - 15.00	B3 (Substations and Electrical Installations)	F. Palone
15.00 - 15.10	B4 (DC Systems and Power Electronic)	A. Derviskadic
15.10 - 15.20	B5 (Protection and Automation)	E. Casale, D. Bavastro
15.20 - 15.30	Coffee Break	

Agenda

Orario	Comitato Tecnico	Relatore
15.30 – 15.40	C1 (Power System Development and Economics)	C. Vergine
15.40 – 15.50	C2 (Power System Operation and Control)	G. Giannuzzi
15.50 – 16.00	C3 (Power System Environment Performance)	N. Rivabene
16.00 – 16.10	C4 (Power System Technical Performance)	C. Pisani
16.10 – 16.20	C5 (Electricity Markets and Regulation)	M. Turchiano
16.20 – 16.30	C6 (Active Distribution System and Dispersed Energy Resources)	S. Ferrero
16.30 – 16.40	D1 (Materials and Emerging Test Techniques)	F. Scatiggio
16.40 – 16.50	D2 (Information Systems and Telecommunication)	Y. Rasega
16.50 - 17.30	Q&A e Conclusioni	E.M. Carlini

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC A1 – MACCHINE ELETTRICHE ROTANTI

Assemblea Soci del 16 Luglio 2024



cigre

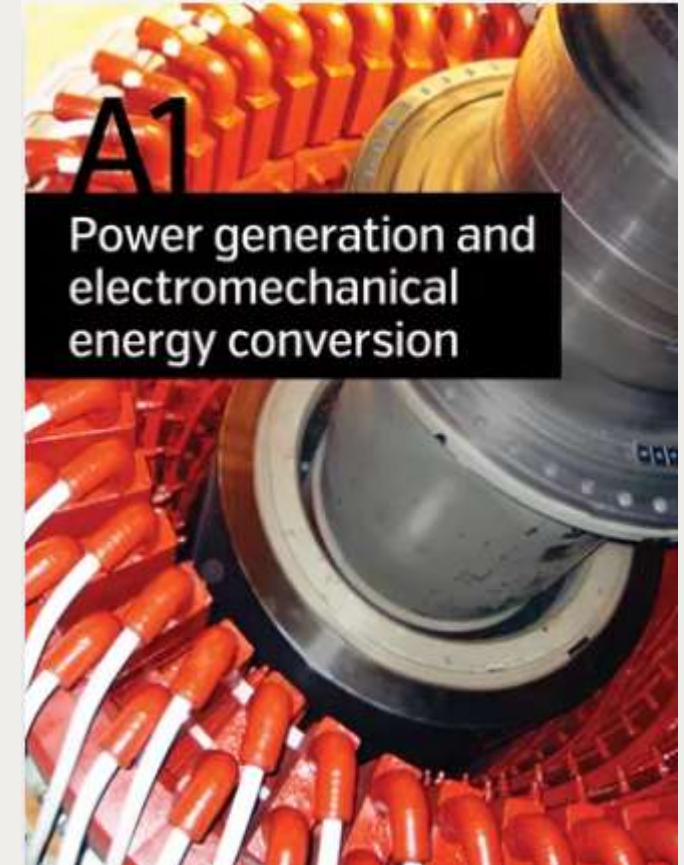
For power system expertise

Boris Grieco

COMITATO DI STUDIO SC A1



Il comitato di studio A1 copre tutti gli aspetti delle apparecchiature elettromeccaniche di conversione dell'energia, delle macchine elettriche rotanti per la generazione di energia, del supporto della rete e della conversione dell'energia nelle applicazioni industriali. Ciò include ricerca, sviluppo, progettazione, produzione e collaudo di apparecchiature per la generazione di energia e di conversione elettromeccanica dell'energia e dei relativi ausiliari associati, messa in servizio, funzionamento, valutazione delle condizioni, manutenzione, estensione della vita utile, ristrutturazione, aggiornamenti, miglioramento dell'efficienza, conversione, stoccaggio e smantellamento .



STRUTTURA

CHAIR Kevin Mayor

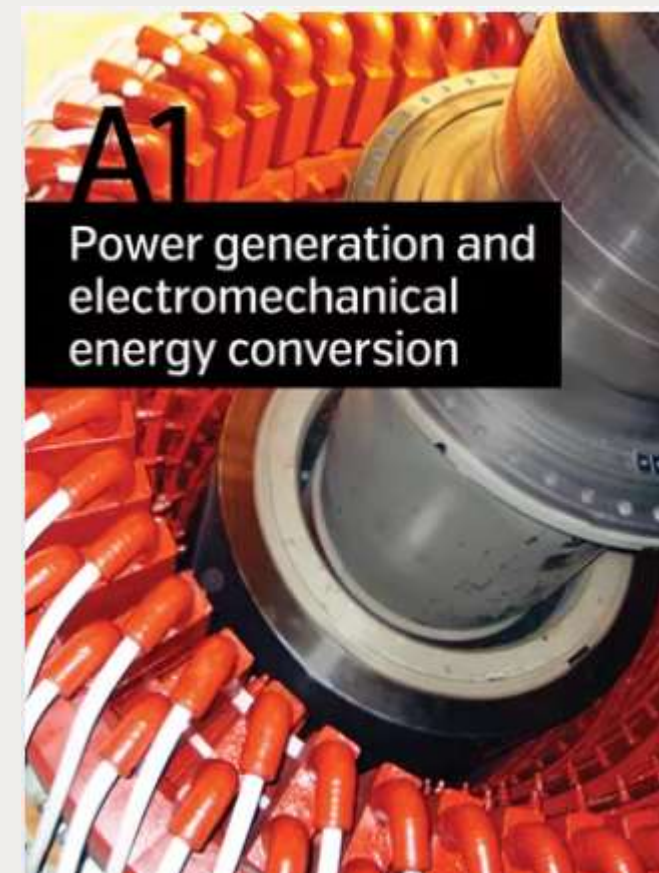
SEGRETARIO Peter Wiehe

MEMBERSHIP 24 regular members in 2023
5 additional regular members
16 observer members

RAPPRESENTANTE ITALIANO Boris Grieco

SEGRETARIO ITALIANO Francesco Guastavino

23 WORKING GROUP attivi + 1 JWG



DIREZIONI STRATEGICHE DEL COMITATO A1

Le aree di interesse chiave all'interno del comitato sono incorporate in specifiche famiglie che vengono costantemente riesaminate al fine di garantirne l'adeguatezza alla evoluzione del sistema di generazione di energia.

- SD 1: gestione delle macchine
- SD 2: interazione macchine / rete
- SD 3: generazione da fonti rinnovabili
- SD 4: monitoraggio e diagnosi delle macchine
- SD 5: efficienza delle macchine elettriche

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
SD1	GESTIONE MACCHINE				
WG A1.42	Influence of key requirements to optimize the value of hydro Generators Mira a raggiungere consenso tra cliente e fornitore in ambito idrogeneratori, in modo che i requisiti di specifica tecnica siano allineati allo stato dell'arte.	Eduardo Guerra (Argentina)	2013	--	TB in attesa revisione finale
WG A1.55	Survey on Split Core Stators Sta conducendo una indagine sugli statori idro divisibili in più parti, soluzione necessaria per motivi di trasporto in alcuni casi ma più critica rispetto al pacco statore in pezzo unico per aspetti di vibrazioni, rumore, vita.	Sun YUTIAN (Cina)	2016	--	Report in attesa di revisione
WG A1.56	Survey on Lap and Wave Winding and their Consequences on Maintenance and Performance Ha completato una indagine su avvolgimento embricato e ondulato in termini di manutenzione e performances di idrogeneratori e fornisce una guida per la scelta.	Richard Perers (Svezia)	2016	--	TB in attesa revisione finale

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG A1.59	Survey on Industry Practices and Effects associated with the Cutting out of stator Coils in Hydrogenerators Ha valutato diverse tecniche e soluzioni per riparare in emergenza avvolgimenti statore di idrogeneratori escludendo le bobine danneggiate ed esercendo la macchina con fasi sbilanciate.	C. Millet (Canada)	--	2023	TB 915 emessa
WG A1.60	Guide on economic evaluation for refurbishment or replacement decisions on hydro generators Sta predisponendo una guida per valutazioni economiche per decisioni circa il ripristino o la sostituzione di idrogeneratori.	Mark Bruintjies (Sudafrica)	2017	--	Analisi feedback questionario 2023 in corso
WG A1.62	Thrust Bearings for Hydropower - A Survey of Known Problems and Root Causes analizza vari problemi relativi a guasti o limiti operativi di cuscinetti di spinta di tipo a pattini su idro-generatori.	Fritz Neumayer (Austria)	2018	--	Poche risposte ricevute dal questionario
WG A1.63	Turbo Generator Stator Winding Bushings – Design and Field Experience Esaminerà esperienze di utilities riguardo terminali passanti e collegamenti flessibili	Juergen R. Weidner (Germania)	2018	--	Analisi feedback questionario 2023 in corso

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG A1.64	Guide for Evaluating the Repair/Replacement of Standard Efficiency Motors sta predisponendo una guida per valutazioni economiche per decisioni circa il ripristino o la sostituzione di motori.	Erli Ferreira Figueiredo (Brasile)	2018	--	TB attualmente in bozza
WG A1.67	State of the Art in methods, experience and limits in end winding corona testing for Hydro Generators è incaricato di redigere una guida sullo stato dell'arte dei metodi di prova per l'effetto corona in testata degli idrogeneratori, tecniche e apparecchiature usate	Hélio de Paiva Amorim Junior (Brasile)	2019	--	Ricerca di un nuovo convenor
WG A1.71	Survey on damper-winding concepts and its operational experience on hydro generators and motor-generators L'obiettivo è di descrivere varie filosofie progettuali di gabbia smorzatrice per idrogeneratori e generatori	Thomas Hildinger (Germania)	2020	--	Fase iniziale
WG A1.72	Survey on multi-turn coils with dedicated turn insulation versus coils without dedicated turn insulation Confronta due soluzioni di sistema di isolamento di spira sotto l'aspetto tecnico e economico	Yoon Duk Seol (Canada)	2020	--	Fase iniziale

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG A1.73	Customer Requirements for Qualification of Form Wound Stator Insulation Systems for Hydro Generators Ha come obiettivo descrivere i requisiti dei clienti per la qualifica del sistema di isolamento	Franz Ramsauer (Austria)	2020	--	Fase iniziale
WG A1.74	Evaluating quality of electric motors Creazione di una guida con le procedure per la valutazione della qualità delle prestazioni dei motori	Kondra Nagesh (India)	2023	--	Fase iniziale
WG A1.75	Large air-cooled turbo-generator – state of the art, limits and perspectives for Small Modular Reactors Analisi dei requisiti per caratteristiche e prestazioni dei turbogeneratori con raffreddamento in aria impiegati in impianti con piccoli reattori modulari (SMR)	Vincent Fernagut (Francia)	2023	--	Fase iniziale
WG A1.76	Study on Eco-Design, Circular economy and impacts on generator production process Analisi gli impatti del processo di costruzione dei generatori sull'ambiente includendo un metodo per il calcolo delle emissioni equivalenti di CO2	Raül Morales Garcia e Vincent Fernagut (Francia)	2023	--	Fase iniziale

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG A1.77	Survey on Insulation Reliability of Induction and Synchronous Motors Ha come obiettivo la creazione di un database con le performances dei sistemi di isolamento dei motori in esercizio per aiutare gli utilizzatori a definire le strategie di manutenzione	Franz Ramsauer (Austria)	2020	--	Fase iniziale
SD 2	INTERAZIONE MACCHINE/RETE				
JWG A1/C4.52	Wind generators and frequency-active power control of power Systems l'unione tra i gruppi A1 e C4 mira a documentare lo stato dell'arte sia dell'incremento di potenza dei generatori eolici che delle performances dei sistemi di controllo e l'impatto sulla progettazione delle macchine.	Nicholas Miller (USA)	2015	--	Report in draft fine prevista nel 2024

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
SD 3	GENERAZIONE DA FONTI RINNOVABILI Non ci sono gruppi di lavoro attivi				
SD4	MONITORAGGIO E DIAGNOSI DELLE MACCHINE				
WG A1.43	State of the art of rotor temperature measurement Analizza lo stato dell'arte dei sistemi di misura della temperatura rotore.	Ante Elez (Croazia)	2013	--	Report terminato, prevista pubblicazione 2024
WG A1.61	Hydro-Generator Excitation Current Anomalies Ha l'obiettivo di integrare informazioni circa la diagnosi PD predittiva dell'isolamento di avvolgimenti di grandi motori (oltre 800kW e 1000V).	André Tomaz de Carvalho (Brasile)	2017	--	Report in corso di compilazione

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG A1.69	Hydro-Generator Excitation Current Anomalies Analisi delle cause delle differenze tra i valori della corrente di eccitazione calcolata e rilevata degli idrogeneratori	J. Johnny Rocha E. (Brasile)	2020	--	Fase iniziale
WG A1.70	Dielectric Dissipation Factor Measurements on Stator Windings Partendo dal risultato della TB769 relativa alle misure di tangendelta su barre statoriche si focalizza sulle misure effettuate su avvolgimenti statore completi.	Monique Krieg-Wezelenburg (Paesi Bassi)	2020	2023	TB918 parte 1 In progress parte 2
SD 5	EFFICIENZA DELLE MACCHINE ELETTRICHE Non ci sono gruppi di lavoro attivi				

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TB 915	WG A1.59	Survey on industry practices and effects associated with the cutting out of stator coils in hydrogenerators	2023
TB 918	WG A1.70	DDF Measurements on Stator Windings – Part 1 Survey Answers	2024
NOTE		Cinque gruppi di lavoro hanno obiettivo di completamento nel 2024	
Colloquium in Kyoto, Japan		27 presentazioni and 3 tutorials	2023
Jemimah Akiror (Uganda)		"Survey on Industry Practices and Effects associated with the Cutting Out of Stator Coils in Hydrogenerators" (basato sul lavoro del WG A1.59)	2023
Dhananjay Chaturvedi (India)		"Renewable Power Integration – Synchronous Condenser role in Grid Stability" (basato sul lavoro del JWG A1/C4.66 reported in TB 885)	2023
Hiroshi Hatano, Hiroshi Sako, Kazuhiro Kudo (Japan)		"History of High Thermal Conductivity Insulation Development and Application" descrive le esperienze e le tecnologie per isolamento barre statore ad alta conduttività termica	2023

PROSSIMO EVENTO COMITATO STUDIO A1

- Study Committee Meeting Paris
- Session 2024, August 25 - 30

59 compendi proposti al comitato di studio A1
di cui 32 accettati per la preparazione di articoli

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC A2 – Power transformers and reactors

Assemblea Soci del 16 luglio 2024



cigre

For power system expertise

SIMONE SACCO

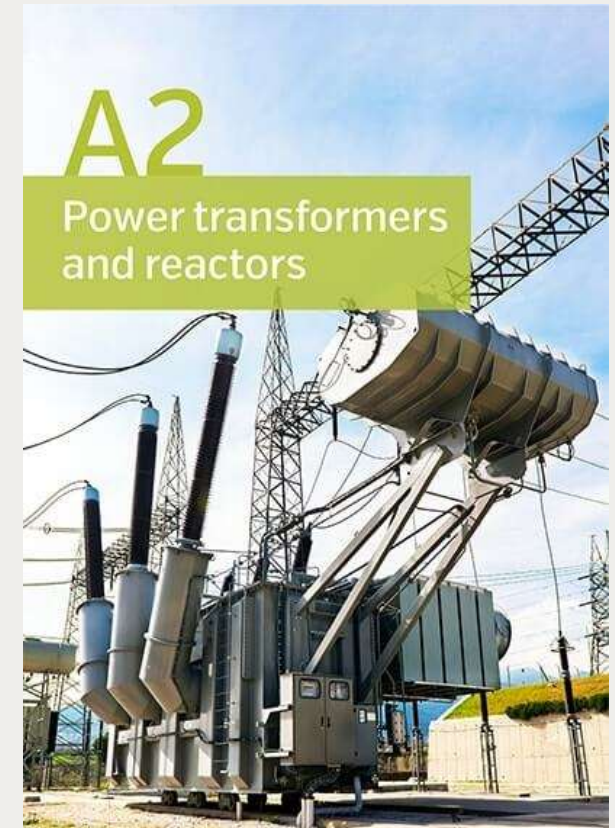
COMITATO DI STUDIO A2

Power transformers and reactors

La missione del Comitato di Studio A2 è promuovere il progresso dello sviluppo tecnologico e condividere la conoscenza nel campo dei trasformatori e dei reattori.

Il campo di attività del Comitato di Studio A2 riguarda:

- Trasformatori di potenza, inclusi quelli per applicazioni industriali, DC converter, PST
- Reattori (Shunt, Series, Saturated, Smoothing)
- Componenti (Bushings, OLTC)



STRUTTURA

CHAIR Pascal Mueller

SEGRETARIO Marc Foata

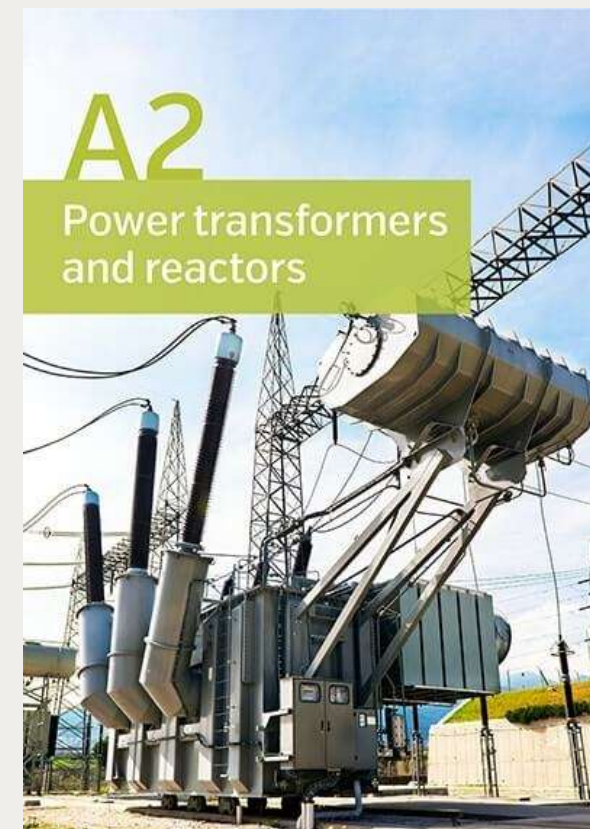
MEMBERSHIP 24 regular members, 6 additional regular members



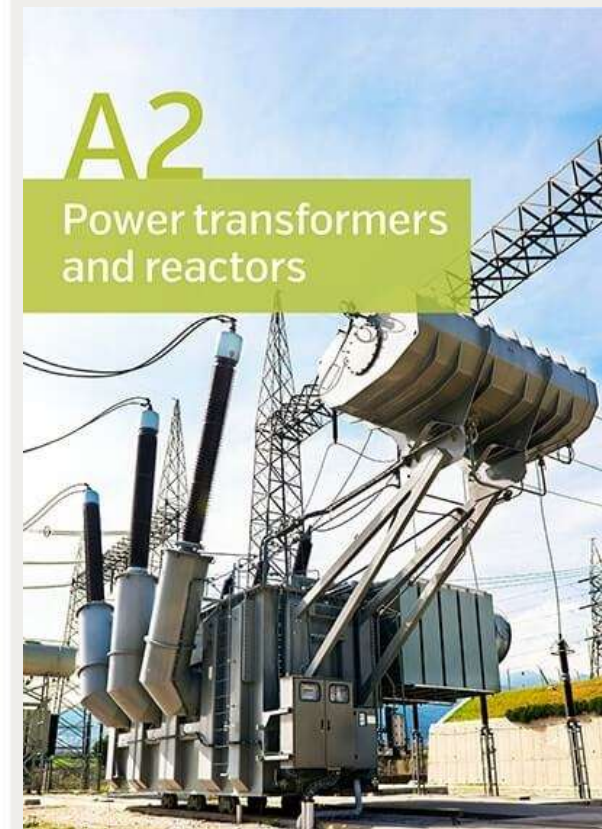
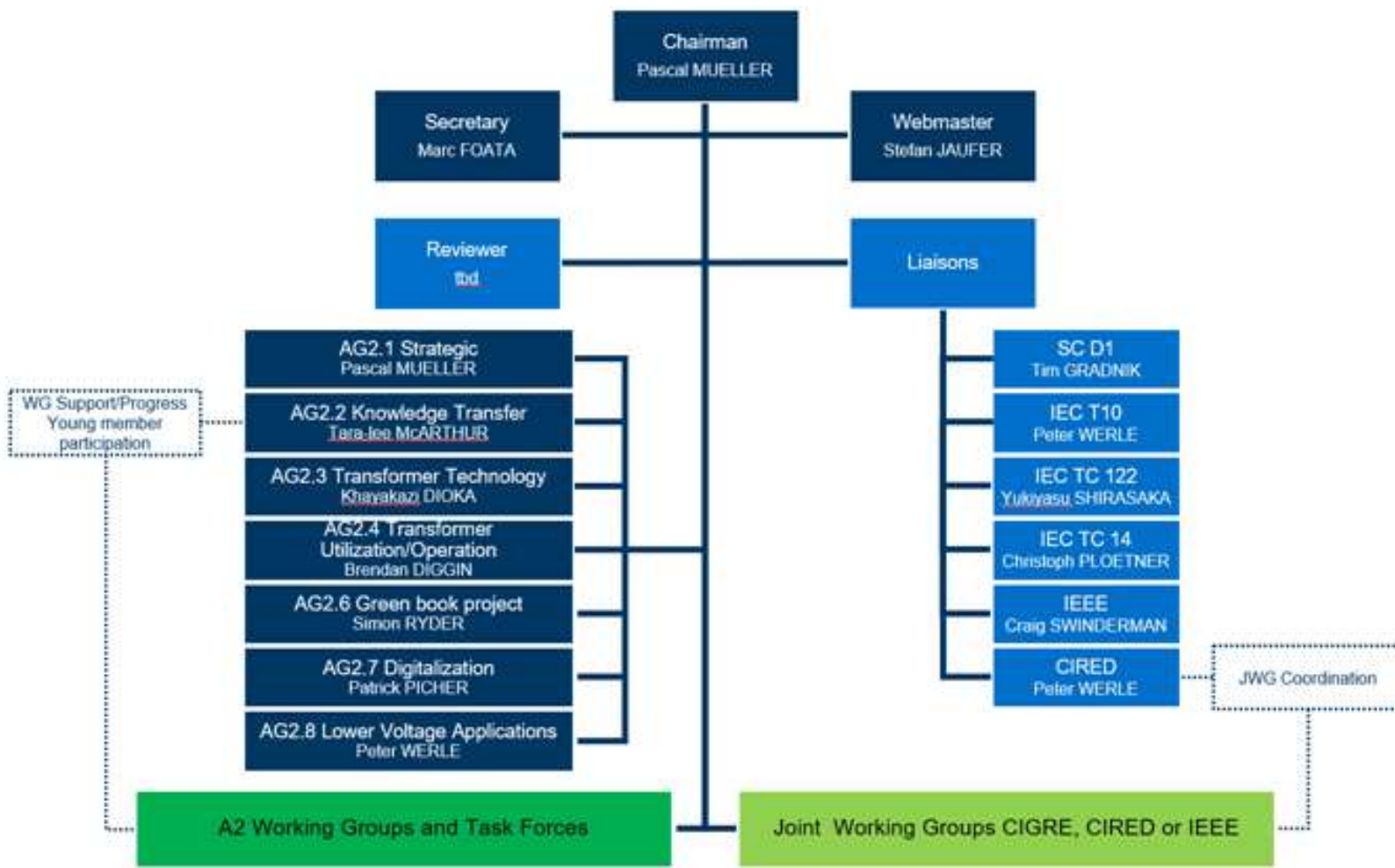
RAPPRESENTANTE ITALIANO Simone Sacco

SEGRETARIO ITALIANO Luca Lombini

9 WORKING GROUP attivi + 10 JWG + 3 Task Force



STRUTTURA



NUOVI WG/JWG



WG	Titolo	Convenor	Anno apertura
A2/C3.70	Life Cycle Assessment of Power Transformers	Myles MARGOT (DE)	2023
A2/D1.71	Modern Insulating Liquid Qualification for OLTC, Bushings and other Accessories	Lars LIDEN (SE)	2023
A2/D1.72	Retrofill of mineral oil in transformers – Motivations, considerations and guidance	Roberto ASANO (BR)	2023
D1/A2.79	Improved understanding of dynamic behaviour of winding insulating materials in liquid insulated power transformers	Orlando GIRLANDA (SE)	2023
D1/A2.80	Functional properties of non-metallic solid materials for liquid filled transformers and reactors and their compatibility	Dejan VUKOVIC (DE)	2023

WG E JWG ATTIVI



WG	Titolo	Convenor	Anno apertura
A2.54	Audible Sound Requirements	Christoph PLÖTNER (DE)	2015
A2.56	Transformer Efficiency	Zarko JANIC (HR)	2016
A2.57	Effects of DC Bias on Power Transformers	Dejan SUSA (NO)	2016
A2.58	Site Installation and Pre-commissioning of Power Transformers and Shunt Reactors	Ross WILLOUGHBY (AUS)	2017
A2.60	Dynamic Thermal Behaviour of Power Transformers	Tim GRADNIK (SI)	2018
A2.62	Analysis of Transformers Reliability	Stefan TENBOHLEN (DE)	2018
A2.63	Transformer Impulse Testing	Ebrahim RAHIMPOUR (DE)	2018

WG E JWG ATTIVI



WG	Titolo	Convenor	Anno apertura
A2.64	Condition of cellulose insulation in oil immersed transformers after factory acceptance test	Claes BENGTSSON (SE)	2019
D1/A2.77	Test for Insulating Fluids	Fabio SCATIGGIO (IT)	2020
A2/D2.65	Transformer Digital Twin	Patrick PICHER (CAN)	2022
A2/D1.66	Breathing systems of liquid filled transformers and reactors	Daniel KOCH (DE)	2022
A2/D1.67	Guideline for online dissolved gas analysis monitoring	Tara-lee MacARTHUR (AUS) & Khayakazi DIOKA (ZA)	2022
A2/D1.68	Failure survey of lower voltage generator step up transformers installed in wind farms and photovoltaic parks	Peter WERLE (DE)	2022
A2.69	Guide for transformer maintenance update	Claude RAJOTTE (CAN)	2022

TASK FORCE ATTIVE



ToR	Convenor	Anno apertura
Power Transformer Tank Specification for Passive Protection Against Internal Arc	Jean-Bernard DASTOUS (CAN)	2022
Power Transformers Sound Levels on Site	Janine DICKINSON (UK)	2022
Silver Corrosion in Transformers	Jelena LUKIC (SRB)	2024

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Mese/Anno pubblicaz.
904	JWG A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part E: Measurements and transformer design details	Aprile 2023
903	JWG A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part D: Model interfacing and specifications	Aprile 2023
902	JWG A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part C: Grey Box Models	Aprile 2023
901	JWG A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part B: Black-Box Models	Aprile 2023
900	JWG A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part A: White-Box Models	Aprile 2023
887	WG A2.52	Life extension of oil filled transformers and shunt reactors	Dicembre 2022
861	JWG A2/D1.51	Improvements to PD measurements for factory and site acceptance tests of power transformers	Febbraio 2022

ALTRE PUBBLICAZIONI



2022:

- Green Book: Transformer and Reactor Procurement
- Position Paper: The condition of solid transformer insulation at End-of-Life (Electra 321 April 2022)

EVENTI COMITATO STUDIO A2

- Session 2024 – 25-30 agosto 2024 – Parigi
- Colloquium 2025 – 19-24 ottobre 2025 - Seoul
- Symposium 2025 - TBD

CIGRE SESSION 2024



Preferential subject:

- PS 1: Design of Resilient Transformers
- PS 2: Advances in Transformer Analytics
- PS 3: Reliability of Transformers for Renewable Energy

SOCIAL



Sito web: <https://a2.cigre.org/>

Pagina LinkedIn: CIGRE SC A2

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC A3 – Transmission and Distribution Equipment

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

PAOLO MAZZA

ROBERTO NICOLINI

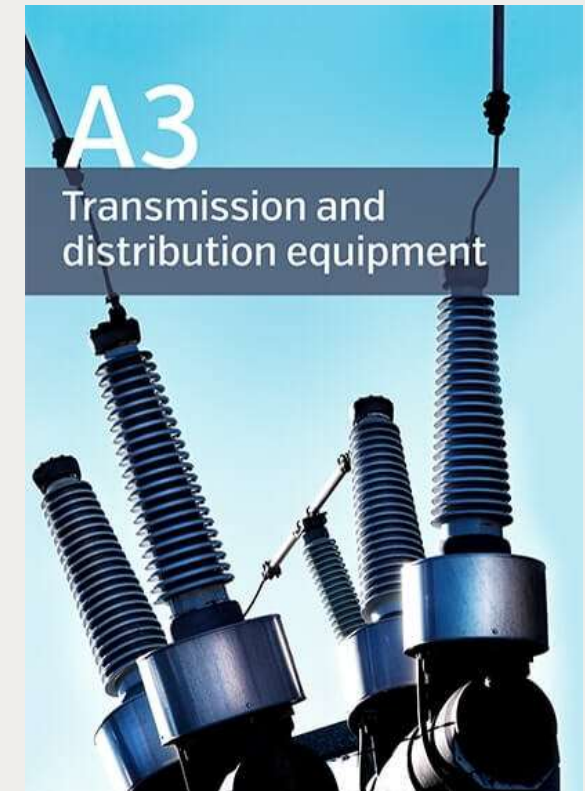
COMITATO DI STUDIO A3

Transmission and Distribution equipment

Il campo di attività del Comitato di Studio A3 copre le apparecchiature di commutazione, interruzione o limitazione di correnti, compresi interruttori, interruttori di manovra, *recloser*, *Ring Main Unit* (RMU), sezionatori, sezionatori di terra e fusibili limitatori di corrente, indipendentemente dalla tecnologia.

Comprende anche scaricatori di sovratensione, condensatori, sistemi sbarre, isolatori, trasformatori di misura, e tutte le altre apparecchiature non specificamente coperte da altri comitati di studio relativi ad apparecchiature.

Infine, sono considerati tutti i tipi di isolamento (aria, gas o isolamento solido) e mezzi di interruzione (vuoto, gas...).



STRUTTURA

CHAIR Nenad Uzelac (G&W – US)

SEGRETARIO Frank Richter (50 Hz – Germany)

MEMBERSHIP 24 regular members (+6 additional)
15 observers

RAPPRESENTANTE ITALIANO Paolo Mazza

SEGRETARIO ITALIANO Roberto Nicolini

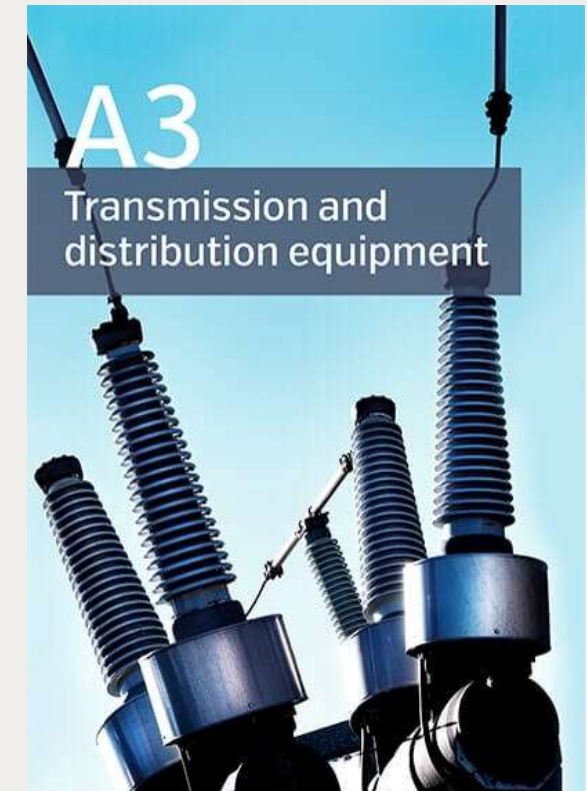
9 WORKING GROUP attivi + 5 JWG con partecipazione di A3

3 ADVISORY GROUP

AG 01 Strategic Planning (H. Ito)

AG 02 Tutorial Planning (R. Smeets)

AG 03 Greenbook Project on “Switching Equipment (H. Ito)



WORKING GROUP E JOINT WORKING GROUPS



WG/JWG	Titolo	Convenor	Esperti italiani	Anno apertura	Anno chiusura
A3.39	Application and field experience with Metal Oxide Surge Arresters	R. le Roux (IE)	A. Sironi	2017	2024
A3.42	Failure analysis and risk mitigation for recent incidents of AIS instrument transformers	Z. Roman (US)	L. Giovanelli, E. Stella	2018	2024
A3.43 /CIRED	Tools for lifecycle management of T&D switchgear based on data from condition monitoring systems	N. Gariboldi (CH)	A. Sironi	2018	2024
A3/A2/A1/ /B1.44	Limitations in Operation of High Voltage Equipment Resulting of Frequent Temporary Overvoltages	B. Rusek (DE)	E. Stella	2019	2025
A3.45	Methods for identification of frequency response characteristic of voltage measurement systems	E. Sperling (CH)	G. Crotti	2019	2024
A3.46	Generator Circuit-Breakers: review of application requirements, practices, in-service experience and future trends	P. Novak (DE)		2020	2025
A3.47	Lifetime Management of Medium Voltage Indoor Switchgear	A. Maheshwari (IN)	D. Corti	2021	2025

WORKING GROUP E JOINT WORKING GROUPS



WG/JWG	Titolo	Convenor	Esperti italiani	Anno apertura	Anno chiusura
A3.48	4th CIGRE Reliability Survey on Transmission and Distribution Equipment	H. Ito (JP)	G. Guenzi	2021	2024-5
B3/A3.60	User guide for non-SF6 gases and gas mixtures in Substations	Piet Knol (NL)		2021	2025
B4/A3.86	Fault Current Limiting Technologies for DC Grids	Z. He (CN)		2020	2025
A3.49	Aging effects on accuracy class of Instrument Transformers	R. Tinarelli (IT)	E. Scala	2023	2025
A3.50	On-site calibration and verification of the accuracy of instrument transformers	P. Mazza (IT)	G. Crotti L. Peretto E. Scala	2023	2026
A3.51	Requirements for HV T&D Equipment operating under Abnormal Weather Conditions	S. K. Annadurai (IN)		2024	2026
B3/A3.67	Operational safety of Medium Voltage GIS in case of abnormal leakage	M. Hyrenbach (DE)		2024	2026

WORKING GROUP E JOINT WORKING GROUPS



WG/JWG	Titolo	Convenor	Esperti italiani	Anno apertura	Anno chiusura
C4/A3/B2/B4.75	Guide to Procedures for the creation of Contamination Maps required for Outdoor Insulation Coordination	M. Marzinotto (IT)	A. Balzarini G. Pirovano	2023	2026
JWG B3/A2/A3/C3/D 1.66	Guidelines for Life Cycle Assessment in Substations considering the carbon footprint evaluation	A. Prabakar (NL)		2024	2026

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TB 873	B4/A3.80	Design, test and application of HVDC circuit breakers	2022
TB 871	A3.41	Current Interruption in SF6-free Switchgear	2022
TB 914	B3/A3.59	Guidelines for SF6 end-of-life treatment of T&D equipment (>1 kV) in substations	2023
TB 921	C4/A3.53	Applying Low-Residual-Voltage Surge Arresters to Suppress Overvoltages in UHV AC Systems	2023
TB 931	A3.40	Technical requirements and field experiences with MV DC switching equipment	2024
WEBINAR		The fundamentals of current interruption in SF6 and its alternatives	2023
WEBINAR		Fundamentals of Current Interruption in (High-Voltage) Vacuum Circuit Breakers	2024

MEETING PANEL ITALIANO SC A3 (MILANO, 18/4/2023)



- **R 50 Esperti** (TSO, DSO, Istituti di Ricerca e Università, Laboratori di Prova e di Taratura, Costruttori)...
- **Attività e visione strategica SC A3** (N. Uzelac, Chair)
- Risultati e novità **Session 2022** a Parigi (P. Mazza, R. Nicolini)
- Attività **gruppi di lavoro internazionali** in corso (Membri italiani WG)
- **Next Generation Network** (A. Satta)
- **Women in Energy** (A. Guarneri)
- **Case Study R&D** apparecchiature T&D (Esperti in sala e da remoto).
- **Apparecchiature superconduttive, sensori e apparecchiature di misura innovativi, sostituzione SF6, resilienza rete T&D**
- **Visita dei laboratori di CESI e di RSE.**



Session 2024 - Preferential Subjects



■ **PS1: Energy transition involving T&D equipment**

- Innovative technologies to reduce total cost of ownership and to foster the energy transition.
- Novel applications especially DC and increased duties on equipment due to DER.
- Improvement of grid resilience due to climate change: the impact on equipment requirements.

■ **PS2: Lowering the carbon footprint of T&D equipment**

- Performance & maturity of SF6 alternatives – report on industry experience.
- Life cycle assessment of T&D Equipment.
- Life cycle management and life extension of existing equipment.

■ **PS3: Maintaining and management T&D assets**

- Smart sensors, low power instrument transformers, monitoring, condition assessment and application of IoT.
- Digital twin and equipment reliability modelling also covering new / higher load profiles.
- Big data management and data ownership, with respect to equipment condition assessment.

TEMI IN DISCUSSIONE



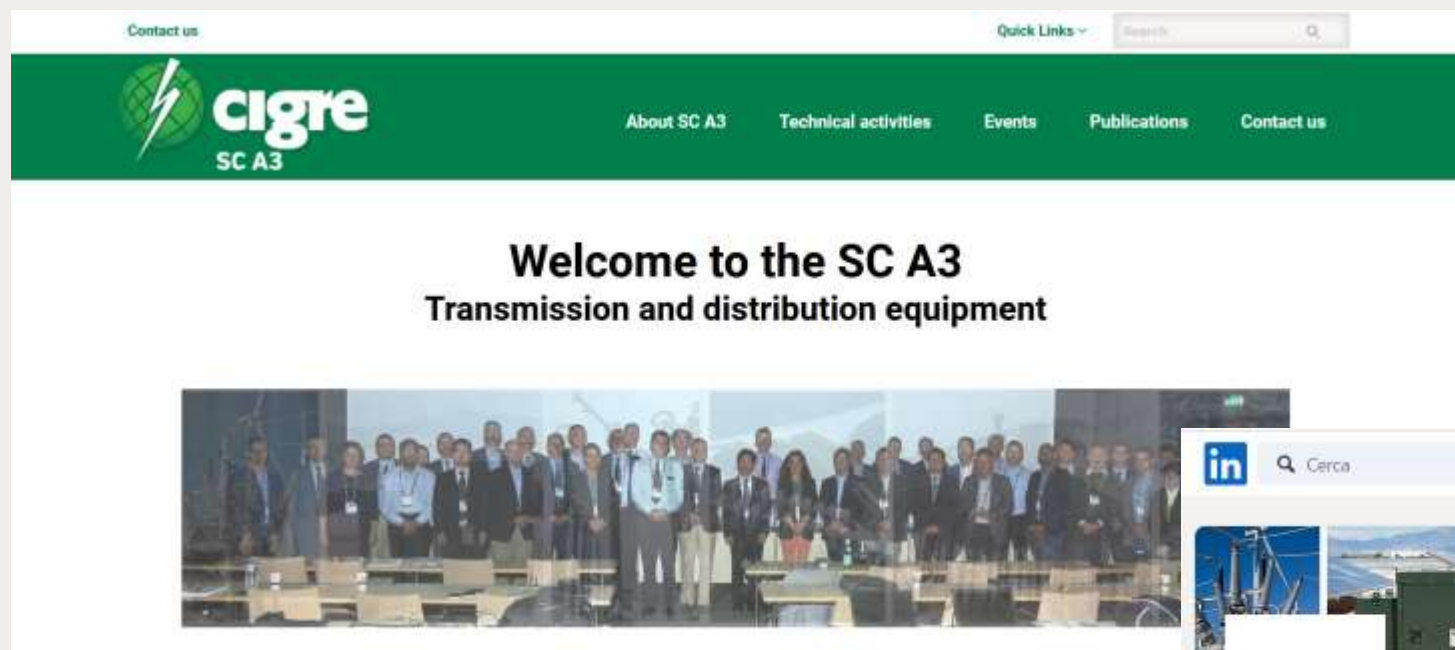
- **Low distances** between MV equipment and **buildings**
- Application of **digital twin** in switchgear
- **Testing requirements** for MV equipment
- **Partial discharge** measurement in switchgear
- **Sustainability and circular economy** of T&D equipment
- Role of T&D equipment in **grid resilience**
- Challenges of T&D assets due to **changing grid conditions**

PROSSIMI EVENTI SC A3



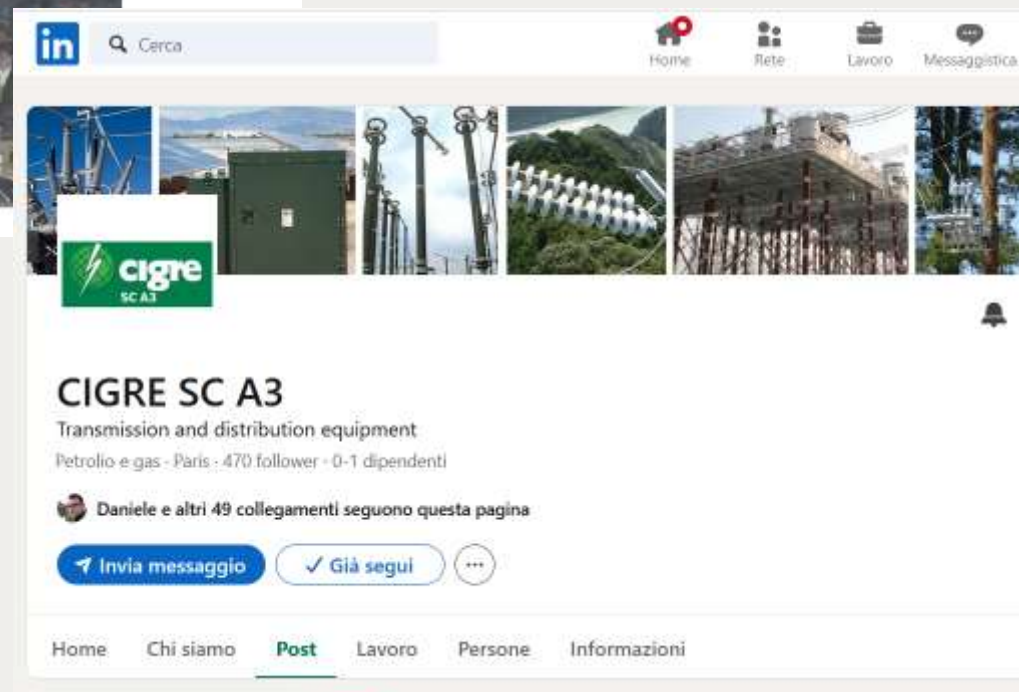
EVENTO	Altri Comitati coinvolti	Luogo	Data
Session 2024	Tutti	Parigi (FR)	25-30/08/2024
Forum	B3	Klingenberg (DE)	24-28/03/2025
Symposium	B1, B2, B3, B4, B5, C2, C3, C4, C6, D2	Trondheim (NO)	12-15/05/2025
Symposium	A1, B2, B3, B4, C1, C5, C6, D2	Montreal (CA)	22-26/09/2025

SC A3 – STAY TUNED



<https://a3.cigre.org/>

<https://www.linkedin.com/company/cigre-sc-a3>



Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC B1

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

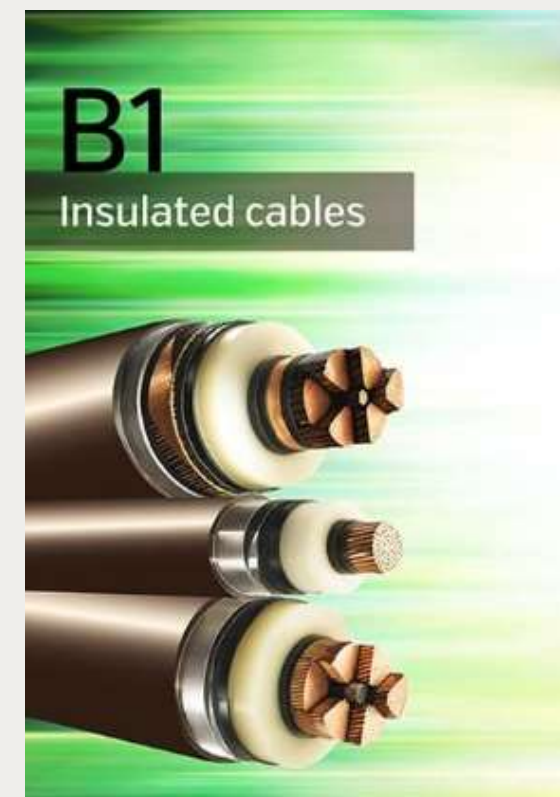
LUIGI COLLA

COMITATO DI STUDIO B1

Il comitato ha l'obiettivo di facilitare e promuovere il progresso dell'ingegneria e lo scambio di informazioni e conoscenze nel campo dei cavi (terrestri e marini, AC e DC).

Questo avviene tramite la sintesi dello stato dell'arte e lo sviluppo di raccomandazioni tecniche.

Il comitato B1 si occupa dei cavi nell'arco del loro intero ciclo di vita



STRUTTURA

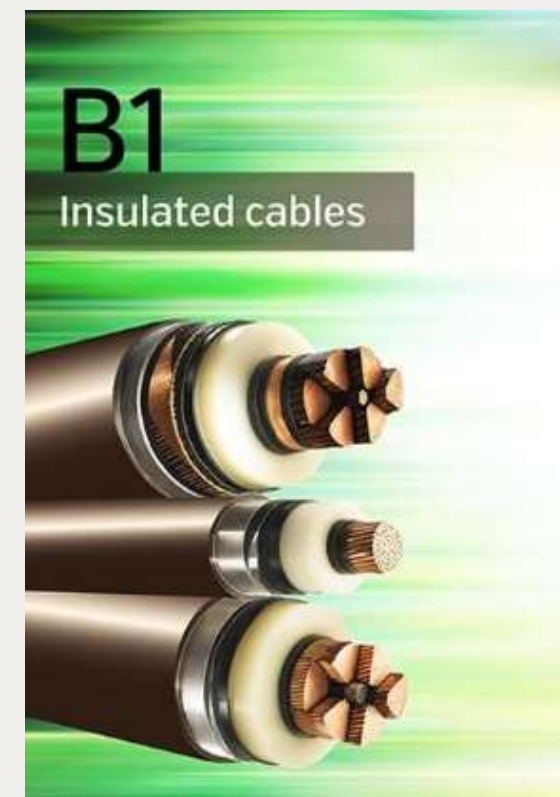
CHAIR Geir Clasen

SEGRETARIO Matthieu Cabau

MEMBERSHIP 24 regular members e 14 observer members

RAPPRESENTANTE ITALIANO Luigi Colla

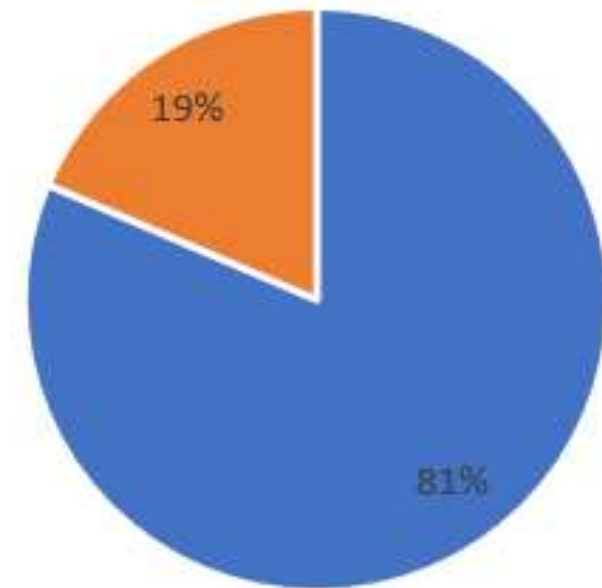
15 WG + 4 TF + 6 JWG attivi



Il Panel Italiano B1 e gli esperti coinvolti nei WG

WG# & TF#	WG & TF Title	Partecipanti
WG B1.82	MVDC Cable System Requirements	Alessandro Tundo
WG B1.83	Grounding aspects for long HVDC land cable connections	Stefano Cotugno
WG B1.86	Assessment, Prevention and Mitigation of Safety Risk in Cable Systems	Uberto Vercellotti Grazia Berardi (Young expert)
WG B1.87	Finite Element Analysis for Cable Rating Calculations	Lucia de Merich
WG B1.88	Non-SF6 GIS terminations	Paolo Boffi Andrea Iadanza (Young expert)
WG B1.89	Cable systems failure analysis	Dario Pini
WG B1.90	Cable Systems Electrical Characteristics (Update of TB 531)	Luca Buono Claudia Farci (Young expert)
WG B1.92	Qualification of Lead-free Submarine Cables at 72.5kV<U _m <170 kV	Luigi Colla

Panel B1 Italia 70 membri



■ M ■ F

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure	
WG B1.54	Behavior of cable systems under large disturbances (earthquake, storm, flood, fire, landslide, climate change)	Harry Orton (CA)	2015	2023	In revisione	●
WG B1.67	Loading Patterns on Windfarm Array and Export Cables	Volker Werle	2018	2024		●
WG B1.70	Recommendations for the use and the testing of optical fibres in submarine cable systems	Roman Svoma	2019	2024		●
WG B1.72	Cable ratings verification (2nd part)	Frank de Wild	2019			●
WG B1.76	Enhancing Quality Assurance/Quality Control Procedures for HV and EHV Cable Systems	Christian Freitag	2019	2024		●
WG B1.80	Guidelines for Site Acceptance Test of DTS and DAS systems	Sudhakar Cherukupalli (CA)	2020	2024		●

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG B1.82	MV DC cables topics	Paul Knapp	2020	2024	
WG B1.83	Grounding aspects for long HVDC land cable connections	Bob Hobson (US)	2021	2024	
WG B1.86	Assessment, Prevention and Mitigation of Safety Risk in Cable Systems	Julio Lopes	2021	2024	
WG B1.87	Finite Element Analysis for Cable Rating Calculations : IEC 62095 update	James PILGRIM	2021	2024	
WG B1.88	Non-SF6 GIS terminations	Pierre Mirebeau (FR)	2022	2025	
WG B1.89	Guidance for conducting cable systems failure analysis	Ross WILSON (GB)	2022	2025	

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG B1.90	Cable Systems Electrical Characteristics (Update of TB 531)	Rachel MOSIER (US)	2022	2025	
WG B1.91	Transient Thermal Modelling of Power Cables (update to IEC 60853)	Minh NGUYEN (FR)	2022	2025	
WG B1.92	Qualification of Lead-free Submarine Cables at 72.5kV<Um<170 kV	Massimiliano MAURI (NO)	2023	2026	
JWG B1/C4.69	Recommendations for the insulation coordination on AC cable systems	Thinus Du Plessis	2023	2026	
JWG B4.C4.B1.73	Surge and extended overvoltage evaluation of HVDC cable systems for testing	Markus Saltzer		2023	
JWG B1/B3.74	Recommendations for a performance standard of insulated busbars	Jianbin Fan		2024	

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
JWG B1/D1.75	Interaction between cable and accessory materials in HVAC and HVDC applications	Anders Gustafsson		2024	
JWG B1/C3.85	Environmental impact of decommissioning of underground and submarine cables	Kieron Leeburn	2021		
TF B1.81	How to have statistics every 2 years	Soren Mikkelsen		2024	
TF B1.93	Robotic supervision of tunnels	Jianbin FAN (CN)	2022	2024	
TF B1.94	Grid operations (switching etc ...) and Transient voltages in XLPE insulated cable systems possibly causing accelerated failure modes	Peter van der Wielen (NL)	2023	2024	
TF B1.95	Mechanical performance and limits of submarine cables – modelling and testing	Søren Krüger Olsen, DK	2023	2024	

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TB 912	WG B1.68	Condition evaluation and lifetime strategy of HV cable systems	2023
TB 908	WG B1.64	Losses in Armoured Three Core Power Cables	2023
TB 899	WG B1.73	Recommendations for the use and testing of Fibre Optic Cables used in Land Cable Systems	2023
TB 889	WG B1.61	Installation of High Voltage (HV) Cable Systems	2023
TB 883	WG B1.65	Installation of Submarine Power Cables	2022
TB 880	WG B1.56	Power Cable Rating Examples for Calculation Tool Verification	2022
TB 862	WG B1.63	Recommendations for mechanical testing of submarine cables for dynamic applications	2022

TOR in discussione



Canada, New Zealand	Cable accessory failure hazard mitigation
CA	Utilities' experience with permanent online monitoring of HV cables
CA	How does one evaluate the seismic performance of land and submarine cable systems
CN	Aging mechanism and condition assessment of DC cable insulation
CN	Design of HVDC cable accessories
CN	Operation and maintenance of DC cable systems; Lack of experience and guidance
CN	Standards on material and product of MV and HV cables with non-crosslinked insulation
FI/SE	Effect of impact of changing operating condition on longevity of Mass Impregnated cables. Rapid power directions etc.
FR	Recommendations for testing of DC Superconducting cable systems. Supplement to TB 538
FR	Recommendations for storage of HV cables and accessories
NL	Connection of large cable conductor size GIS cable compartments
NL	Improvements of Range of Approval criteria for HV and EHV power cables
NL	Test Recommendations for Earth Screen Power Cable Connections in Wind Farm Array Cabling
AT	Digital Twins of Power Cable Systems
GE	Guide for robust qualification procedures of MR cable
SE	Guide to judge extrusion line equality
FR	Recommendations for testing of HV subsea power connectors and penetrators
CH	Evaluation of sustainable Power cables

EVENTI COMITATO STUDIO B1

- Aggiornamento Panel Italiano B1 Nov 2023
- Session 2024 + Study Committee meeting
- 2024 CIGRE Canada Conference & Exhibition
- SEERC Conference 2024
- SEERC Conference 2025
- Symposium 2025 in Trondheim

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC B2 – Overhead lines

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

PIERO BERARDI

COMITATO DI STUDIO B2 – Overhead lines

Technological field of activity of Study Committee B2:

- Increase the ampacity of existing lines
- Ensure reliable lines, establish/improve the reliability of existing lines
- Ensure environmentally compatible lines
- Assessment of lines, methods, new tools and materials



STRUTTURA

CHAIR Pierre Van Dyke (CA vandyke.pierre@hydroquebec.com)

SEGRETARIO Vivek T. Chari (IN vivek@tagcorporation.net)

MEMBERSHIP 24 regular members + 17 observer

RAPPRESENTANTE ITALIANO Piero Berardi (piero.berardi@terna.it)

29 WG + 6 JWG + 4 TAG

TAG 04 Electrical performance

TAG 05 Tower/Foundation/Insulators

TAG 06 Mechanical behaviour of conductors and fittings

TAG 07 Asset management – Reliability and availability of OHL

96 TB dal 1994



WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B2.40	Preparatory studies for revision of IEC standard	Robert Lake (NZ)	2008		
B2.50	Safe handling of fittings and conductors	Peter Dulhunty (AU)	2010		
B2.59	Forecasting Dynamic Line Ratings	J. Iglesias (ES)	2014	2016	
B2.60	Affordable Overhead Transmission Lines for Sub-Saharan Countries	V. Naidoo (NO)	2015	2019	
B2.65	Detection, Prevention and Repair of Sub-surface Corrosion in Overhead Line Supports, Anchors and Foundations	R. Meijers (NL)	2015	2018	
B2.66	Safe handling and installation guide for high temperature low sag (HTLS) conductors	Vivek T. Chari (IN)	2016	2019	

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B2.67	Assessment and Testing of Wood and Alternative Material Type Poles	Nathan Spencer (AU)	2017	2020	
B2.70	Aircraft warning markers and bird flight diverters for Overhead Lines – Experience and recommendations	Naji Sahlani (US)	2018	2020	
B2.71	Recommendations for Interphase Spacers of Overhead Lines	J.P. Paradis (CA)	2018	2022	
B2/C4.76	Lightning & Grounding Considerations for Overhead Line Rebuilding and Refurbishing Projects, AC and DC	W. A. Chisholm (CA)	2019	2022	
B2/D2.72	Condition Monitoring and Remote Sensing of Overhead Lines	Chen Ying (CN) Akshat Kulkarni (UK)	2019	2022	
B2.73	Guide for Prevention of Vegetation Fires Caused by Overhead Line Systems	Peter Dulhunty (AU)	2019	2022	

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B2.74	Use of unmanned aerial vehicles (UAVs) for assistance with inspection of overhead power lines	Nishal Mahatho (ZA)	2019	2022	
B2.75	Application guide for insulated and un-insulated conductors used on medium and low voltage overhead lines	Bruce McLaren (ZA)	2019	2022	
B2.77	Risk Management of OHL networks - A model for identification, evaluation and mitigation of operational risks	Asif Bhangor (AU)	2020	2023	
B2.78	Use of High Temperature Conductors in New Overhead Line Design	Rob Stephen (ZA)	2020	2024	
B2.79	Enhancing Overhead Line Rating Prediction by Improving Weather Parameters Measurements	George Watt (CA)	2020	2022	
B2.80	Numerical Simulation of electrical fields on AC and DC Overhead Line Insulator Strings	Fabian Lehretz (DE)	2020	2023	

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure	
B2.81	Increasing the Strength Capacity of Existing Overhead Transmission Line Structures-reva	S. Langlois (CA)	2020	2023		●
B2.82	Overhead Line Foundations for Difficult Soil and Geological Conditions	Lukasz Nazimek (PL)	2020	2024		●
B2.83	Mitigation of induced noises by corona activity in overhead AC and DC lines	O. Regis (BR)	2020	2024		●
B2/C1.86	Approach for Asset Management of Overhead Transmission Lines	Viktor Lovrenčić (SI) Yury Tsimberg (CA)	2021	2024		●
B2.84	Assessment of the methodologies to analyze wind induced overhead line conductors motion: applications and limitations	G. Diana (IT)	2021	2023		●
B2.85	Emergency Restoration Systems for Overhead Lines - Guide for Design, Planning and Installation	M. Abdolhosseinpour (IR)	2021	2024		●

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B2.87	Live line and vicinity working on overhead lines - Safe Management Guidelines	Bálint Németh (HU)	2022	2024	
C4/A3/B2/B4 .75	Guide to procedures for the creation of contamination maps required for outdoor insulation coordination	Massimo Marzinotto (IT)	2023	2026	
C3/B2.24	Methods of reducing electrocution of birds from power lines	Frode Johansen (NO)	2023	2026	
B2.88	Guidelines for safety of overhead line construction, maintenance & operation	John McCormack (AU)	2023	2026	
B2.89	Impact of rain upon the characteristics of corona discharge from HV AC and DC overhead transmission lines	Bo Zhang (CN)	2023	2025	
B2.91	Long overhead line spans design practices and field experience-rev1	Boris Adum (NO)	2023	2028	

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B2/B1.90	Transition facilities between overhead and underground lines	Antonio Useros (ES)	2024	2027	
B2.92	Update on overhead transmission lines construction methodologies	Hugo Valente (PT)	2024	2028	
B2.93	Artificial intelligence (AI) augmented image-based transmission line inspection and condition assessment	Janos Toth (CA)	2024	2027	
B2.94	Inspection after installation, maintenance and end of life of high temperature conductors and fittings	Baptiste Gary (FR)	2024	2027	
B2.95	Impact of extreme weather events under climate change on high voltage overhead line design standards	Asif Bhangor (AU)	2024	2028	

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TB 865	WG B2.64	Inspection and testing of tools, equipment and training for live-line work on overhead lines	2022
TB 905	WG B2.68	Sustainability of overhead line conductors and fittings – Conductor condition assessment and life extension Volume 1: State of the art	2023
TB 916	WG B2.50	Correct handling of fittings and conductors for overhead lines	2023
TB 919	WG B2.57	Experience with and Application Guide for Composite Line Insulators	2023

PUBBLICAZIONI 2022-2024

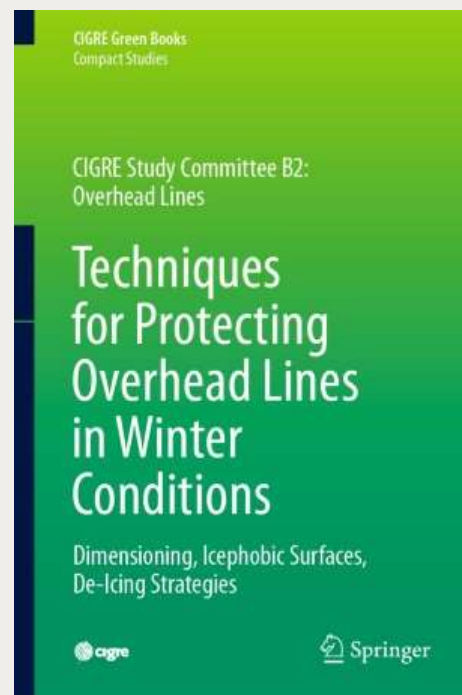


Green Books



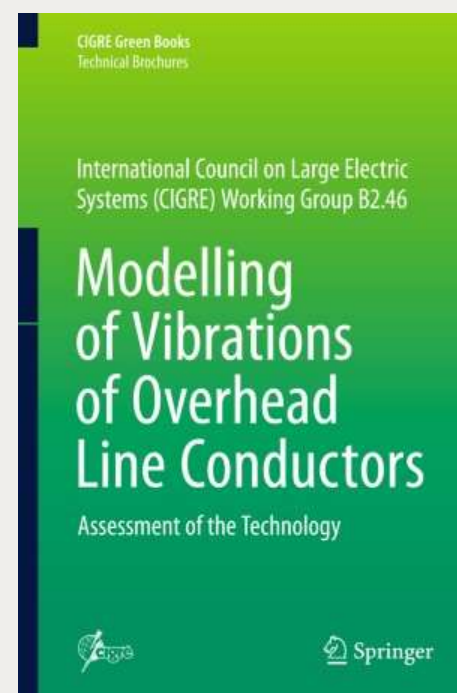
GB 15

2024



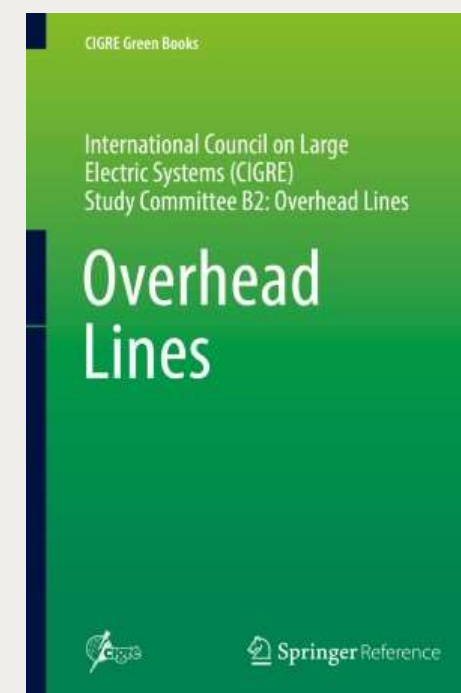
GB 11

2022



GB 4

2018



GB 1

2017

EVENTI COMITATO STUDIO B2

SC B2, C3 & C4 Joint Colloquium - Sendai/Japan – October 3 to 7, 2023



Recent Overhead Transmission Line Technology and Environmental Measures

➤ PS1: Sustainable OHL, Environment and Planning (joint PS with C3):

DLR (Dynamic Line Rating), upgrading/uprating, minimizing deforestation, DC transmission, environmental assessment, carbon neutrality, social acceptance, EMF (ElectroMagnetic Field), biodiversity, SDGs (Sustainable Development Goals), eco-designs, risk communication, asset management, renewable energy.

➤ PS2: Reliability of OHL, Advanced Construction and Maintenance (joint PS with C4):

monitoring, life extension measures, drones, robotics, digitalization (AI, IoT, utilization of data, etc.), maintenance management (corridor management), lightning overvoltage, insulation coordination, power quality, EMC (Electro-Magnetic Compatibility), systematic analysis.

➤ PS3: Resilience of OHL, Recent Technologies for Disaster Recovery

new recovery techniques, response to natural disasters (typhoons, localized heavy rains, earthquakes, ice and snow, tsunamis, fires, etc.), resiliency, risk assessment.



EVENTI COMITATO STUDIO B2

Paris session – August 25 to 30, 2024



PS1: Challenges from renewables integration and influences of energy transition on OHL

- Technical solutions for increasing power transfer capabilities of existing OHLs, methods for enhancing line/corridor utilization.
- Methods and strategies to accelerate approval and permit processes, stakeholder engagement.
- Innovative solutions and construction techniques for overhead lines.

PS2: Asset management, strategies, technologies and methods for OHL

- Safeguarding of existing OHL from impacts of external infrastructure, encroachments, vandalism, sabotage.
- Asset health index (AHI), time-based and risk-based inspections, ageing, residual life assessments, protective treatment of components.
- Innovative maintenance methods, use of artificial intelligence (AI), augmented and virtual reality techniques (AR-VR) and increasing resilience.

PS3: Impacts from climate change on OHL

- Impact on OHL design and operations due to climate change.
- Lessons learned for TSO/DSO, studies and practical experiences from a changing environment.

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC B3 – Substations and electrical
installations

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

FRANCESCO PALONE

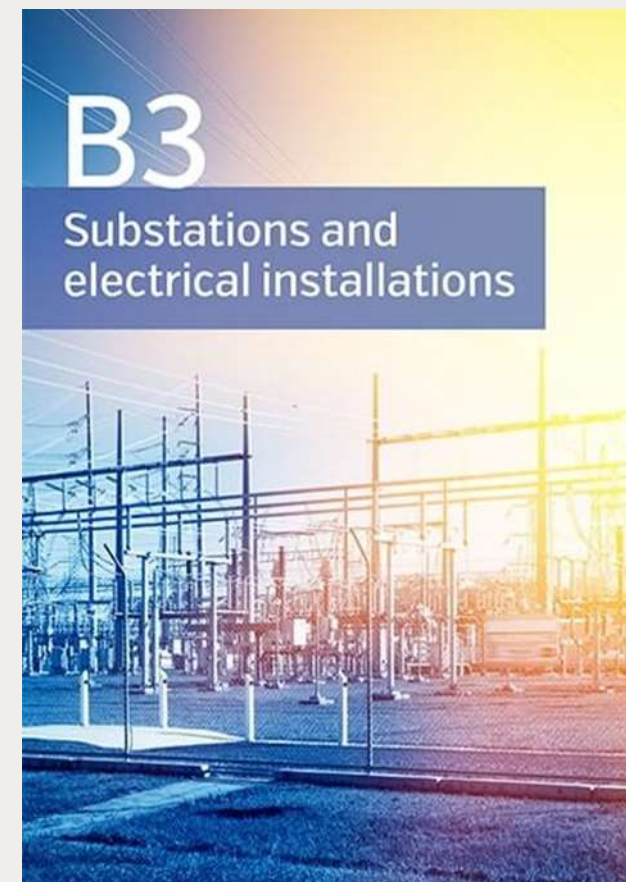
COMITATO DI STUDIO B3

Sottostazioni ed impianti elettrici



Le attività del B3 riguardano la **progettazione**, la **costruzione**, l'**esercizio/ manutenzione** delle **sottostazioni** e degli **impianti elettrici** (sottostazioni, incluse quelle annesse alle **centrali elettriche**); le attività si articolano nelle seguenti direzioni:

- T1: **Soluzioni innovative** per sottostazioni (criteri di progettazione, disposizioni elettromeccaniche, riduzione dell'impronta di CO2)
- T2: **Gestione delle sottostazioni** (aspetto organizzativi, inclusi HR e formazione, aspetti ambientali, di safety e security)
- T3: **Ciclo di vita** delle sottostazioni (monitoraggio, manutenzione predittiva, estensione di vita)
- T4: **Digitalizzazione** delle sottostazioni (AI, IoT e loro applicazioni alla progettazione ed esercizio delle sottostazioni)



STRUTTURA

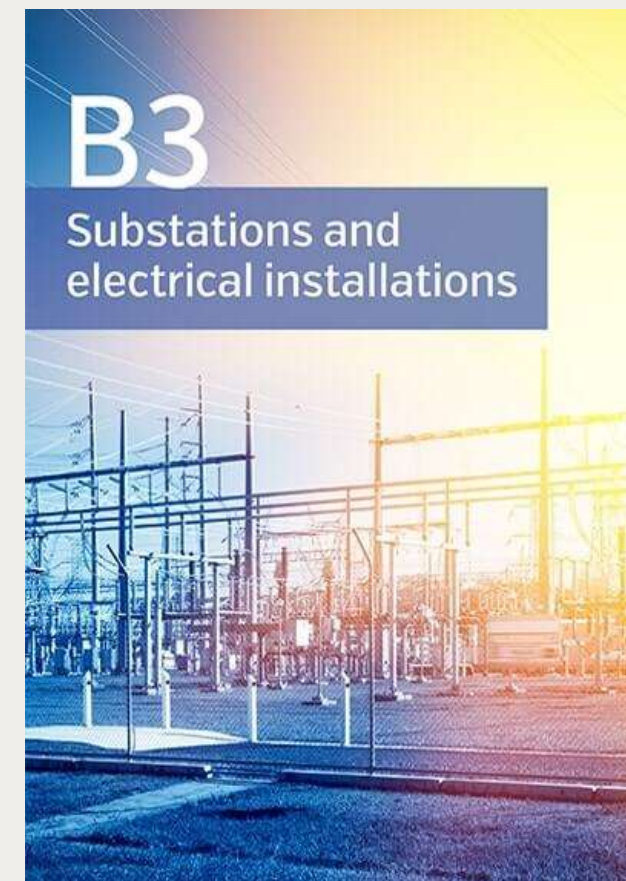
CHAIR Koji Kawakita

SEGRETARIO Samuel Nguefeu

MEMBERSHIP 24 Regular Members, 4 Regular Additional Members,
15 Observer Members + 4 Area Advisors

RAPPRESENTANTE ITALIANO Francesco Palone

11 WORKING GROUP attivi + 6 JWG



WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Technical Brochure
B3.41	Mobile Substations Incorporating HV GIS	Paul Fletcher	907
B3.49	Review of substation busbar components reliability	Milan Radosavljevic	930
B3. 50	Concepts for on-site HV testing of GIS	Mark Reuter	920
B3.52	Neutral Grounding Mode Selection and Fault Handling for Substation in Distribution Grid	Jinzhong Li	--
B3.53	Guidelines for Fire Risk Management in Substations	Shinki Noguchi	886
B3.54	Earthing System Test Methods	Stephen Palmer	--
B3.55	Design guideline for substations connecting battery energy storage	Suriya Prungkhwanmuang	869

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Technical Brochure
B3.56	Application of 3D technologies in substation engineering works	Philip Konig	
B3.57	Impact on Engineering and Lifetime Management of Outdoor HV GIS	Toshiyuki Saida	895
B3.58	Knowledge Transfer of Substation Engineering and Experiences	John Nixon	898
B3/A3.59	Guidelines for SF6 end-of-life treatment of T&D equipment in substations	Maik Hyrenbach	
B3/A3.60	User guide for non-SF6 gases and gas mixtures in Substations	Piet Knol	
B3.61	Risk and asset health-based decision making in existing substations	Jan Bednarik	

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Technical Brochure
B3/D2.62	Life-long Supervision and Management of Substations by use of Sensors, Mobile Devices, Information and Communication Technologies	Nocolaie Fantana	
B3/D1.63	Guideline for assessing the toxicity of used SF6 gas onsite and in the lab of T&D equipment above 1 kV in substations	Roland Kurte	
B3.64	Guidelines on optimizing seismic design of substations for power resiliency	Atsushi Eto	
B3.65	Guidelines for the selection and design of escape routes for substations rated above 1 kV ac and 1.5 kV dc	Espen Masvik	
Special project /Greenbook	SF6 Greenbok	Daniel Staiger	
B3.51	Service continuity guide for the maintenance, repair and extension of HV GIS	Mark Kuschel	870

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TB 907	B3.41	Mobile Substations Incorporating HV GIS	2023
TB 914	JWG B3/A3.59	Guidelines for SF6 end-of-life treatment of T&D equipment (>1 kV) in substations	2023
TB 920	B3.50	Concepts for on-site HV testing of GIS after installation, extension, retrofit or repair	2023
TB 898	B3.58	Knowledge transfer of substation engineering and experiences	2023
TB 895	B3.57	Impact on Engineering and Lifetime Management of Outdoor HV GIS	2023
TB 886	B3.53	Guidelines for Fire Risk Management in Substations	2022
TB 870	B3.51	Service Continuity Guide for HV GIS above 52 kV	2022
TB 869	B3.55	Design guideline for substations connecting battery energy storage solutions (BESS)	2022

TOR in discussione e recentemente approvati



[JWG B3_A3.67](#)_Operational safety of Medium Voltage GIS in case of abnormal leakage

[JWG B3_A2_A3_C3_D1.66](#)_Guidelines for life cycle assessment in substations considering the carbon footprint evaluation

[B3.69 - Experience of Offshore Substation \(OSS\) operation and maintenance](#)

SC B3 New WG B3.68 TOR 'Process Requirements for Commissioning and Inspecting Substations'

EVENTI COMITATO STUDIO B3

CIGRE Africa B3 seminar in Dar Es Salaam, Tanzania on 6th-8th March 2024



CIGRE PARIGI 2024- attività B3

Date	Description	Meeting	Room	Open
Sat 24 Aug	B3.AA3 – Discussion on future AA3 TOR topics (Air Insulated Substation)	Working Group	226, Level 2	No
	B3.54 – Earthing System Testing Methods - historic approaches, recent developments and recommended approaches	Working Group	TBA	No
Sun 25 Aug	B3.54 – Earthing System Testing Methods - historic approaches, recent developments and recommended approaches	Working Group	TBA	No
	Opening Ceremony – Keynote speaker Kelsuke SADAMORI, Director of Energy Markets and Security (IEA)	Opening	Grand Amphi	Yes
Monday 26 Aug	Opening Panel	Opening	Grand Amphi	Yes
	B3/A2/A3/D1 Joint Workshop: “Driving T&D substations and equipment towards ZERO emissions”	Workshop	Room Blue, Level 2	No
	B3.64 – Guidelines on Optimising Seismic Design of Substations for Power Resiliency	Working Group	133, Level 1	No
	B3/D1.63 – Guideline for assessing the toxicity of used SF₆ gas onsite and in the lab of T&D equipment above 1 kV in substations	Working Group	329, level 3	No
	Task Force – SC B3 Substation Training Course Project	Task Force	343, Level 3	No



CIGRE PARIGI 2024- attività B3



Tuesday 27 Aug	B3 Tutorial (B3/A3.59): “Guidelines to SF₆ end-of-life treatment of T&D equipment (> 1 kV) in substations”	SC B3 Tutorial	Room Maillot, Level 2	
	JWG B3/A2/A3/C3/D1.66 – Guidelines for Life Cycle Assessment in Substations considering the carbon footprint evaluation	Working Group	351, level 3	No
	B3/A3.67 – Pre-kick off meeting	Working Group	133, Level 1	No
	SC B3 – Poster session. Substations and electrical installations	SC B3 event	Hall Ternes	Yes
Wednesday 28 Aug 2024	SC B3 – Group Discussion Meeting: Substations and electrical installations	Discussion Meeting	Grand Amphi	Yes
Thursday 29 Aug	SC B3 – 61 st Annual Meeting	Regular SC meeting	353, level 3	No
	B3/A3.60 User guide for non-SF₆ gases and gas mixtures	Working Group	231-232	No
	Cocktail reception	All delegates	"Pavillons de Bercy"	Yes
Friday 30 Aug	B3.56 – Application of 3D Technologies in Substation Engineering Works	Working Group	339, level 3	No



Panel B3 Italia



Proposta per una giornata di studio per i temi più rilevanti in ambito B3 sul territorio Italiano.

Data provvisoria: **ottobre 2024**

Modalità: **ibrida** - Roma (Terna) / webmeeting

Ad esempio:

- **Avanzamento** delle attività B3
- Impatti del Regolamento (UE) 2024/573 (**direttiva F-gas**) sul design delle sottostazioni
- **D. lgs. 36/2023** - adozione del **BIM** per le sottostazioni, prassi ed avanzamento di DSO e TSO Italiani
- **Suggerimenti?**

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC B4 – DC systems and Power Electronics

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

ARMAN
DERVISKADIC

COMITATO DI STUDIO B4 DC Systems and Power Electronics



Sistemi HVDC ed elettronica di potenza per sistemi AC, anche per applicazioni di distribuzione, power quality, soluzioni per lo storage, ecc.

Il contributo del comitato di studio B4 per la transizione energetica:

- L'HVDC come abilitatore della transizione energetica
- Attività di standardizzazione/armonizzazione fondamentali per scalare la capacità di fornitura industriale.
- Attività di coordinato tra TSO/OEM ed armonizzazione dei segreti industriali
- Necessità di ampliare il coinvolgimento di esperti in ambito storage
- Necessità di avviamento di un nuovo WG e di ampliare il numero di esperti di Idrogeno – L'HVDC è l'interfaccia tra l'idrogeno e il sistema.

Advisory Group 01 : sviluppo di un piano strategico per definire il ruolo del B4 nella transizione energetica, incluso l'idrogeno e applicazioni MVDC e LVDC. Inoltre la definizione di nuove proposte di WG, in particolare sull'idrogeno e GFM.

HVDC green book : guida per i lettori che necessitano di una visione di alto livello della tecnologia e delle sue applicazioni - 18 capitoli



COMITATO DI STUDIO B4

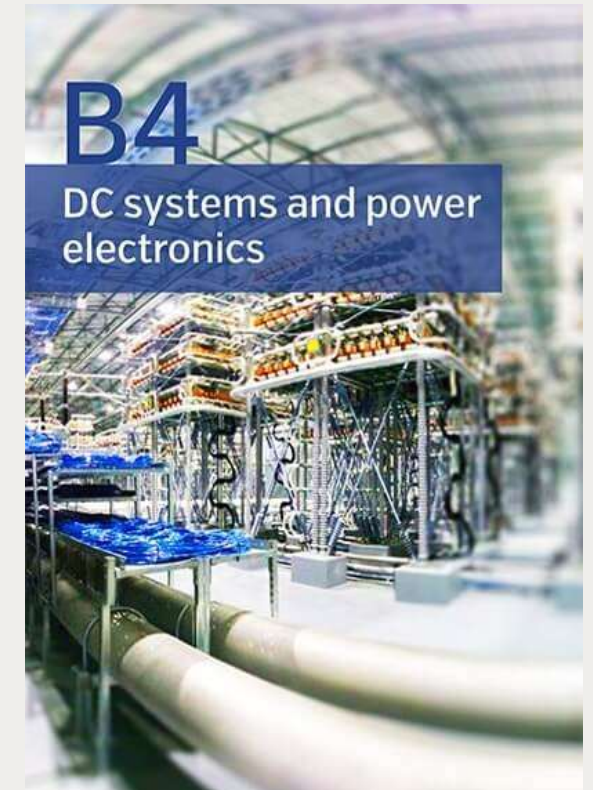
DC Systems and Power Electronics



Top 20 best sellers in 2022



	Réf	SC	Title	Downloads
# 1	880	B1	Power cable rating examples for calculation tool verification	1396
# 2	881	C4	Electromagnetic transient simulation models for large-scale system impact studies in power systems having a high penetration of inverter-connected generation	1269
# 3	861	A2/D1	Improvements to PD measurements for factory and site acceptance tests of power transformers	1204
# 4	871	A3	Current Interruption in SF6-free Switchgear	1152
# 5	863	C1/C6	Multi-energy System Interactions in Distribution Grids	1035
# 6	862	B1	Recommendations for mechanical testing of submarine cables for dynamic applications	1024
# 7	883	B1	Installation of Submarine Power Cables	984
# 8	869	B3	Design guideline for substations connecting battery energy storage solutions (BESS)	976
# 9	875	B4/C6	Medium Voltage DC Distribution Systems	961
# 10	858	B3	Asset health indices for equipment in existing substations	876
# 11	867	B4	Flexible AC Transmission Systems (FACTS) controllers' commissioning, compliance testing, and model validation tests	873
# 12	870	B3	Service Continuity Guide for HV GIS above 52 kV	830
# 13	857	A2	On-Site Assembly, On-Site Rebuild, and On-Site High Voltage Testing of Power Transformers	753
# 14	864	B4	Guide to Develop Real-Time Simulation Models for HVDC Operational Studies	727
# 15	873	A3/B4	Design, test and application of HVDC circuit breakers	674
# 16	851	C2/C4	Impact of High Penetration of Inverter-based Generation on System Inertia of networks	668
# 17	886	B3	Guidelines for Fire Risk Management in Substations	667
# 18	865	B2	Inspection and testing of tools, equipment and training for live-line work on overhead lines	661
# 19	885	A1/C4	Guide on the assessment, specification and design of synchronous condenser for power system with predominance of low or zero inertia generators	650
# 20	876	C3	Interactions between Electrical Infrastructure and Wildlife	628



STRUTTURA

CHAIR Joanne HU

SEGRETARIO Rebecca OSTASH

MEMBERSHIP 34 regular members
10 observers
1 NGN member
1 WiE member

RAPPRESENTANTE ITALIANO Arman Derviskadic

SEGRETARIO ITALIANO TBD

39 WORKING GROUP attivi di cui 08 JWG



WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
C4/B4.52	Guidelines for Sub-synchronous Oscillation Studies in Power Electronics Dominated Power Systems	Chandana Karawita		2024	TB 909
B4/B1/C4.73	Surge and extended overvoltage testing of HVDC cable systems	Markus Saltzer		2024	-
<u>TOR-WG B4.104</u>	HVDC Digital Twin – concepts and roadmap		2024		
<u>TOR-JWG B4_C4.103</u>	AC network equivalents for HVDC and FACTS project studies		2024		
<u>TOR-WG B4.102</u>	Technical requirements and scenario considerations on grid-forming capabilities of VSC-HVDC systems		2024		
<u>TOR-WG B4.99</u>	Design and construction of offshore voltage source converter (VSC) stations		2023		
<u>TOR-WG B4.101</u>	Industrial implementation and application of grid forming energy storage systems (GFM ESS)		2023		
<u>TOR-WG B4.100</u>	Dynamic active and reactive power supporting devices for VSC HVDC systems		2023		
<u>TOR-WG B4.98</u>	Design considerations in integration of DC systems to meshed DC-AC Transmission networks		2023		
<u>TOR-JWG C1_B4.49</u>	Offshore transmission planning		2023		
<u>TOR-JWG B4_C4.97</u>	Benchmarking of simulation Models for control interaction in meshed AC networks with multiple converters		2023		
<u>TOR JWG C4_A3_B2_B4.75</u>	Guide to procedures for the creation of contamination maps required for outdoor insulation coordination	Massimo Marzinotto	2023		
<u>TOR-WG B4.96</u>	HVDC connection of power system with high proportion of photovoltaic (PV) generation- rev1		2023		
<u>TOR-WG B4.95</u>	Developments in Power Semiconductor Technologies and Applications in HVDC-FACTS		2023		

PUBBLICAZIONI 2022-2024



DOCUMENTO	Titolo
CIGRE SCIENCE AND ENGINEERING	Case study of dc-MMC interconnecting two HVDC lines with different grid topologies (CSE024)
	Hybrid HVDC Transmission System Using Grid Forming Converters to Supply Energy to Rural Areas (CSE026)
	A Novel Offshore Grid Forming Control Concept for Parallel MMC VSC HVDC Bipoles (CSE026)
	A Robust Energy Storage System Manager with Power Flow Controller for Maintaining Transient Stability in Power Plant Rely On Wind and Solar
	Interest of a power flow controller for some upgrading scenarios in HVDC systems
	The use of a power flow controller to optimise current sharing in parallel HVDC cable connections
	Small-Signal Analysis Benchmarking of Three Control Algorithms for Grid-Forming Inverters
	Real-Time Digital Twins of Multi-terminal HVDC Power Systems
Future Connection	Power-flow for archipelago-based multi-terminal HVDC grids
	Development of Grid Forming Converters for Secure and Reliable Operation of Future Electricity Systems (FC Edition 10)
Electra	HVDC Technology for Renewable Energy Dominated Power Systems
	A three-terminal LCC-HVDC network upgraded from a point-to-point link in China

Attività per nuovi argomenti promossi dal CIGRE

Hydrogen	DC power suppliers and rectifiers for Hydrogen production
Storage	Inverter based storage
Wind and Solar	Inverter technologies, topologies and hardware
Grids and microgrid integration	DC systems and PE devices provide the technologies for the grids and microgrid integration
Consumers, prosumers and EVs	VSC DC system and PE devices provide better control of voltage, frequency and power quality as well as fault ride-through performance in an increasing penetration of renewable energy network
Sustainability & Climate Change	DC technologies provide more flexibility, efficiency and resiliency for green energy transmission
Sector integration	DC Technologies enable inter-regional/country/continental energy trade market which directly affects the sector integration
Digitalization	Digitalization of DC systems and PE devices enable the faster implementation of new transmission and distribution systems as well as more efficient/reliable system operation

EVENTI COMITATO STUDIO B4

- 2024 Cigre Session → Paris, France, August 25 – 30 2024

Activities	Date	Time
Tutorial	Monday, 26-Aug-2024	14:00-15:50
SC Meeting	Tuesday, 27-Aug-2024	8:30-17:30
Workshop	Wednesday, 28-Aug-2024	8:30-12:00
Paper Poster Session	Wednesday, 28-Aug-2024	14:30-18:00
Group discussion meeting	Thursday, 29-Aug-2024	8:45-18:00

- 2025 CIGRE Symposium → Trondheim, Norway, May 12 – 15 2025 (10 Study Committees)

B4 : Newsletter – June 24

Italian energy backbone

Fata S.p.A / Siemens Energy selected for Adriatic Link project

In a press release [26], Fata S.p.A. announced that it will supply turnkey converter stations in consortium with Siemens Energy for the Adriatic Link interconnection project, which will link the Italian regions of Marche and Abruzzo.

According to the company, Fata will be responsible for the civil works, the supply and installation of the electromechanical and auxiliary systems, as well as start-up assistance, for a total value of around €163 million [26].



Figure 6 : Adriatic Link cable route.
Credit: Terna S.p.A. [27]

Hitachi Energy to Build Multi-Terminal HVDC Link Connecting Italy, Corsica, and Sardinia

EDF and Terna select Hitachi Energy for Sa.Co.I.3 project

Hitachi Energy has been selected by EDF and Terna to deliver an HVDC interconnector, Sa.Co.I.3, to connect mainland Italy with the islands of Corsica and Sardinia.

This project will replace and upgrade the existing infrastructure with a 200 kV bipolar HVDC multi-terminal system, increasing capacity to 400 MW. The submarine cables will span a total length of 120 km between Italy and Corsica, alongside 20 km of underground cables. The Project will also include the construction of two new converter stations adjacent to the existing ones. Recognised as a Project of Common Interest (PCI) by the EU, it aims to enhance the efficiency, reliability, and sustainability of the region's power system. The project is set for completion in 2029, with Hitachi collaborating with Pellegrini and Razel-Bec for the civil and installation works.



Figure 8 Sa.CO.I.3 project map.
Credit: Hitachi Energy

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC B5 – Protezione e Automazione

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

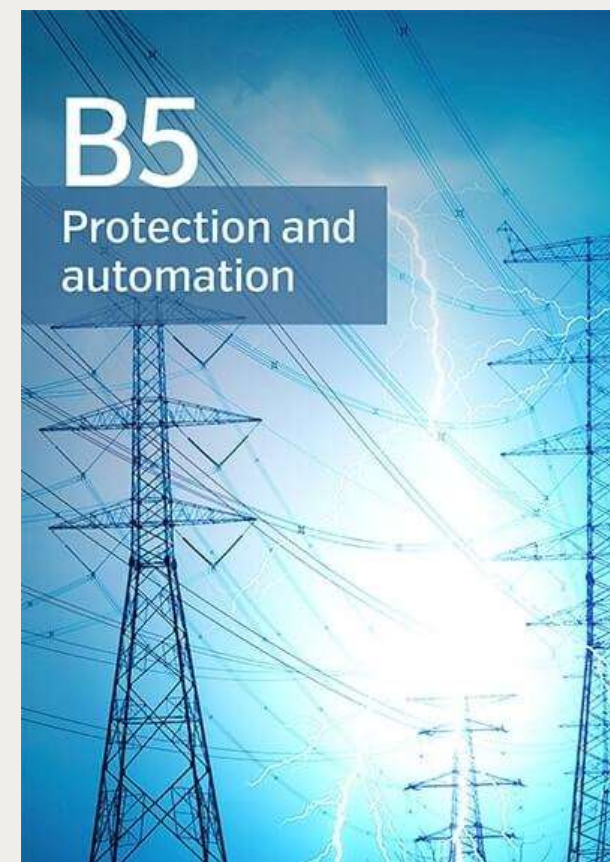
EMILIANO CASALE

DAVIDE BAVASTRO

COMITATO DI STUDIO B5 Protezione e Automazione

Il comitato di studio B5 si occupa di sistemi di Protezione e Automazione (Controllo, Monitoraggio e Metering) e si propone di coprire l'intero sistema elettrico, dal sistema di trasmissione al sistema di distribuzione, includendo gli impianti di produzione e sistemi HVDC.

Rientrano nel campo d'interesse del comitato B5 tutte le fasi del ciclo di vita dei Sistemi di Protezione e Automazione: dalla concezione alla ricerca, allo sviluppo, progettazione, produzione, modalità di prova, installazione, funzionamento, manutenzione e al fine vita.

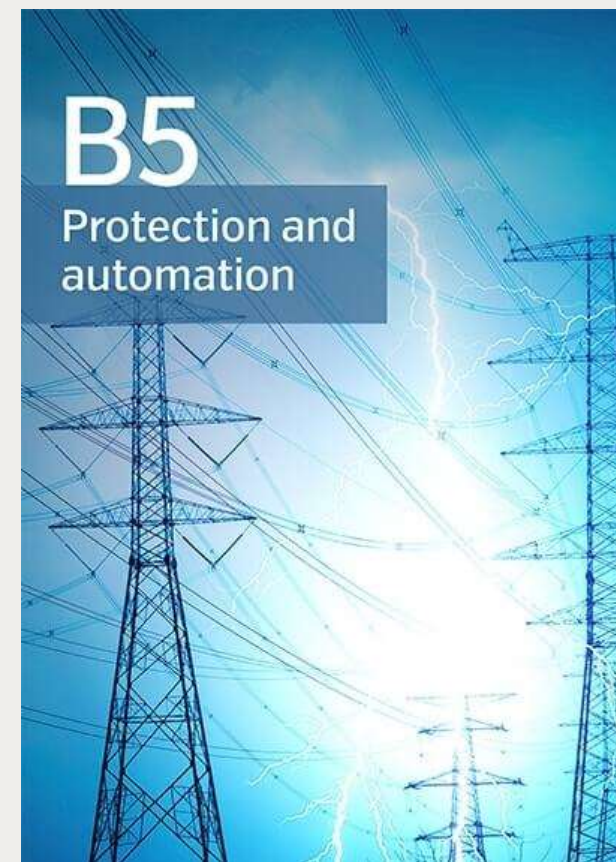


STRUTTURA

CHAIR	Rannveig S. J. Løken (NO)
SEGRETARIO	Richard Adams (UK)
MEMBERSHIP	24 regular members
	5 additional members (distribution)
	12 observers

RAPPRESENTANTE ITALIANO Emiliano Casale

- TG51 Substation Automation and Remote Control Volker Leitloff (FR)
- TG52 Protection and Monitoring Cédric Moors (BE)
- TG53 New network requirements Nirmal Nair (NZ)



STRUTTURA FUTURA

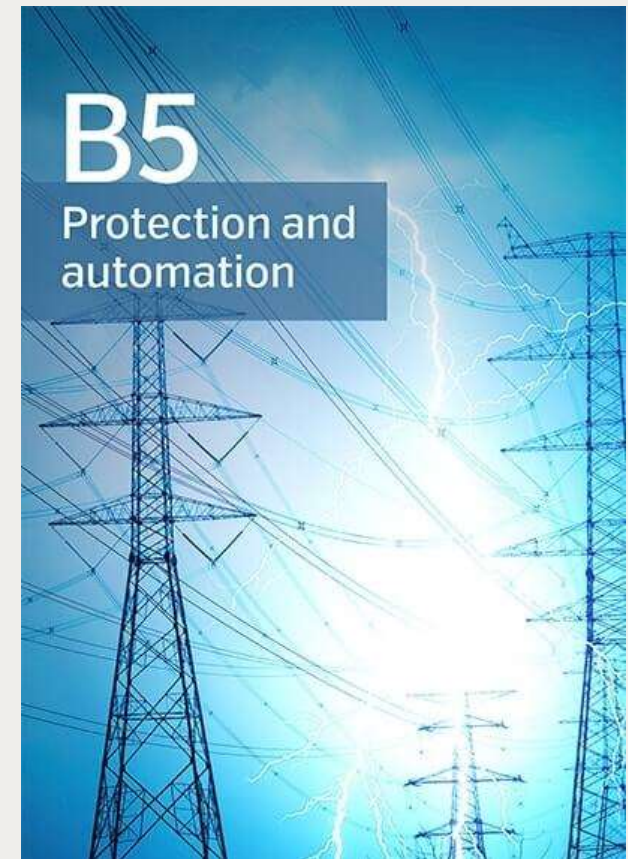
CHAIR **Volker Leitloff (FR)**

SEGRETARIO **Peter Bishop (NZ)**

MEMBERSHIP 24 regular members
5 additional members (distribution)
12 observers

RAPPRESENTANTE ITALIANO **Davide Bavastro**

- TG51 Substation Automation and Remote Control Volker Leitloff (FR)
- TG52 Protection and Monitoring Cédric Moors (BE)
- TG53 New network requirements Nirmal Nair (NZ)



WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B5.51	Methods & Application of Remotely Accessed Information for SAS Maintenance and Operation	Li Li (CN)	2013		
B5.55	Application of Travelling Wave Technology for Protection and Automation	Armando Guzman (CA)	2015		
B5.56	Optimization of Protection Automation and Control Systems	Peter Kreutzer (CH)	2015		
B5.57	New challenges for frequency protection	Vladimir Terzija (GB)	2016		
B5.58	Faster protection and network automation systems: implications and requirements	Andrei Podshivalin (RU)	2016		
B5.59	Requirements for Near-Process Intelligent Electronic Devices	Xu Lei (CN)	2016		

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B5/C4.61	Impact of Low Inertia Network on Protection and Control	Ray Zhang (GB)	2017		
B5.63	Protection, Automation and Control System Asset Management	Massimo Petrini (IT)	2017		
B5.64	Time in Communication Networks, Protection and Control Applications – Time Sources and Distribution Methods	Iony Patriota de Siqueira (BR)	2017		
B5.65	Enhancing Protection System Performance by Optimising the Response of Inverter-Based Sources	Dr Farfilho (BR)	2018		
B5.68	Optimisation of the IEC 61850 Protection, Automation and Control Systems (PACS) engineering process and tools	Camille Bloch	2019		
B5.69	Experience gained and Recommendations for Implementation of Process Bus in Protection, Automation and Control Systems (PACS)	Alex Apostolov (US)	2019		

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B5.70	Reliability of Protection Automation and Control System (PACS) of power systems – Evaluation Methods and Comparison of Architectures	Alexander Voloshin (RU)	2019		
B5.71	Protection, Automation and Control Systems Communication Requirements for Inter-Substation and Wide Area Applications	Cedric Moors (BE)	2020		
B5.72	Modelling, Assessment, and Mitigation of Protection Performance Issues caused by power plants during Dynamic Grid Events	Sean McGuinness (IE)	2020		
B5.73	Experiences and future trends related to functional integration	Bruno André (SE)	2020		
B5.74	Busbar Protection Considerations When Using IEC 61850 Process Bus	Pablo H. Flores (BR)	2021		
B5.75	Documentation and Version Handling Related to Protection, Automation and Control functions	Sushama Khot (CA)	2021		

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B5.76	Architecture, Standards and Specification for metering system in a Digital Substation and Protection, Automation and Control (PACS) Environment	Ross Marcenko (CH)	2021		
B5.77	Requirements for Information Technologies (IT) and Operational Technology (OT) management of Protection, Automation and Control Systems (PACS)	Emiliano Casale (IT)	2022		
B5.78	New requirements of network protection and control for renewable energy integration	Nirmal Nair (NZ)	2022		
B5/C4.79	Protection Roadmap for Low Inertia and Low Fault Current Networks	Alexander Tsylin (DL)	2022		
B5.81	Obsolescence Management for Protection, Automation and Control Systems	John Wright (GB)	2023		
B5.82	Education, Qualification and Continuing Professional Development of Engineers in Protection, Automation and Control	Mladen Kezunovic (US)	2023		

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B5.83	Protection for modern distribution systems	Tang Yi (CN)	2023		
B5.84	Recommendations and constraints for development and interfacing of virtual Intelligent Electronic Device implemented in Protection, Automation and Control Systems	David Macdonald (GB)	2024		
B5.85	Protection, Control and Supervision principles of “Grid Stabilizing Generation”	Andreas Gehm (DE)	2024		

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
B5/D2.67	Time in Protection Applications – Time Sources and Distribution Methods	Yubo Yuan (B5) (CN)	2018	2022	884
B5.60	Protection, Automation and Control Architectures with Functionality Independent of Hardware	Thomas Rudolph (DE)	2017	2023	891
B5.48	Protection for developing network with limited fault current capability of generation	Tianshu Bi (CN)	2012	2023	896
B5.64	Methods for specification of functional requirements of protection, automation, and control.	Iony Patriota de Siqueira (BR)	2017	2024	926

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TECHNICAL BROCHURE 884	JWG B5/D2.67	Time in Communication Networks, Protection and Control Applications – Time Sources and Distribution Methods	2022
TECHNICAL BROCHURE 891	B5.60	Protection, Automation and Control Architectures with Functionality Independent of Hardware	2023
TECHNICAL BROCHURE 896	B5.48	Protection for developing network with limited fault current capability of generation	2024
TECHNICAL BROCHURE 926	B5.64	Methods for specification of functional requirements of protection, automation, and control.	2024

TOR in discussione



WG selezionato durante il Colloquium del 2023 tenutosi in concomitanza con il symposium di Cairns (AU):

PACS interfaced asset management and condition monitoring using innovative technologies

EVENTI COMITATO STUDIO B5

Session 2024: 25 – 30 Agosto, Parigi, Francia

PS1: Practical experiences and new developments of **process bus**

PS2: Acceptance, commissioning, and field testing for protection, automation and control systems



2024 Paris Session

10367
B5 Protection and automation
PS1 Practical experiences and new developments of process bus

Interoperability of protection devices among a multi-vendor IEC 61850 process bus system

Emiliano CASALE* Terna Rete Italia Italy emiliano.casale@terna.it	Marco VALENTE Terna Rete Italia Italy marco.valente@terna.it	Gianluigi GEMELLI Terna Rete Italia Italy gianluigi.gemelli@terna.it	Luca VAROTTO Terna Rete Italia Italy luca.varotto@terna.it
Bruno CERESOLI CESI Italy bruno.ceresoli@cesi.it	Riccardo Maria SERESINI CESI - KEMA Labs Italy riccardo.seresini@kema.com	Francesco Selvino MAESTRI CESI Italy francesco.maestri@cesi.it	



2024 Paris Session

10368
B5 Protection and automation
PS2 Acceptance, commissioning, and field testing for protection, automation and control systems

SAS2021 Project: benefits of standardization on acceptance, commissioning, and field testing during the whole PACS lifecycle

Alessio TESTARELLA* Terna Rete Italia Italy alessio.testarella@terna.it	Davide BAVASTRO Terna Rete Italia Italy davide.bavastro@terna.it	Daniela PELLEGRINO Terna Rete Italia Italy daniela.pellegrino@terna.it
Emiliano CASALE Terna Rete Italia Italy emiliano.casale@terna.it	Roberto CANTONI Terna Rete Italia Italy roberto.cantoni@terna.it	Luca VAROTTO Terna Rete Italia Italy luca.varotto@terna.it

EVENTI COMITATO STUDIO B5

Symposium 2025: 12-15 Maggio Trondheim, Norvegia

[\(https://cigrenrccsymposium2025.com/\)](https://cigrenrccsymposium2025.com/)

PS1: Integration of renewable energy resources to the grid

PS2: Technologies supporting the power grid for energy transition to carbon neutral energy production

EVENTI COMITATO STUDIO B5

Colloquium 2025: 30 Giugno, 6 Luglio, Osaka, Giappone

[\(https://www.cigre2025osaka.jp/\)](https://www.cigre2025osaka.jp/)

PS1: Interoperability of IEDs of different manufacturers and technologies integrated in one PACS

PS2: PACS Life Cycle Performance and **Longevity**

PS3: Experiences and possibilities on **revised principles and policies** related to modern protection IEDs

Comitato Nazionale Italiano CIGRE Consiglio Tecnico C1 – Power system development and economics

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

Chiara Vergine

COMITATO DI STUDIO C1

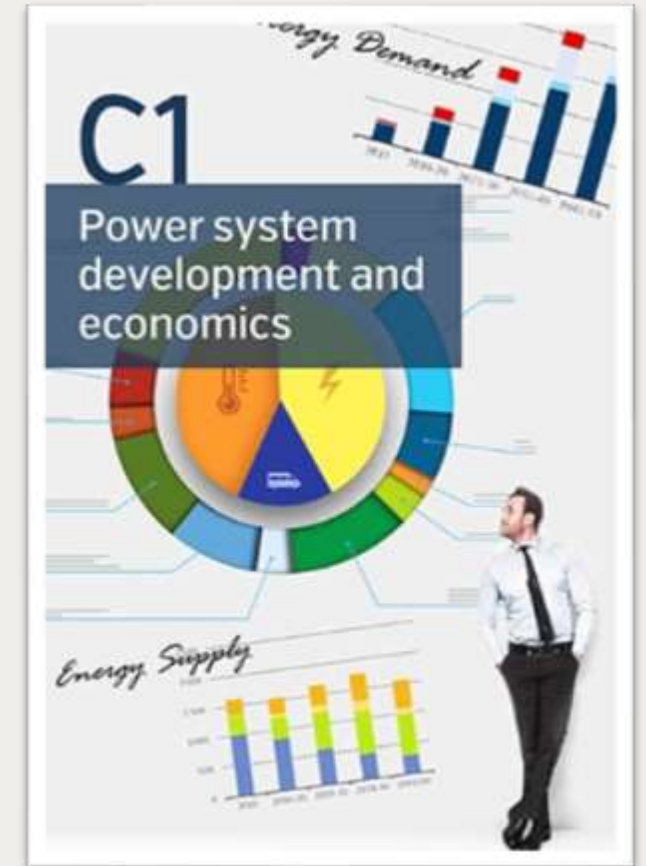
Power system development and economics



To support energy system planners, asset managers and decision makers worldwide in anticipating and successfully managing the system changes raised by Energy Transition. To address emerging needs, seize opportunities and tackle growing uncertainties, while respecting multiple constraints: **security of operations, adequacy, resilience, affordability and sustainability.**

To facilitate and promote the progress of engineering and planning methods, to share state-of-the-art, best practices and recommendations.

To elaborate scenarios and investment economics, identify mega trends and game changers, develop approaches for energy sectors integration and hydrogen economy deployment. To improve planning criteria and methodologies, in particular analysis of projects' costs, benefits & risks, to modernize asset management strategies. To introduce in system development processes all flexibility means, all forms of storage (short and long term) and the new active role of end users / demand management; to leverage on Digitalization, on results of innovation in technology and in processes, to strengthen stakeholders' involvement for the realization of the planned infrastructures, to support evolution of environmental and regulatory frameworks.



STRUTTURA

CHAIR Antonio Iliceto

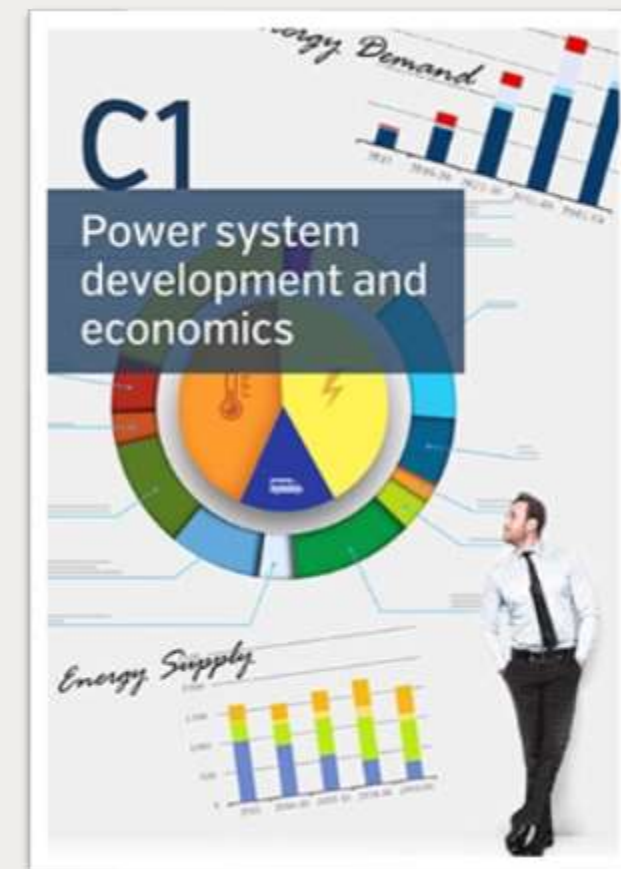
SEGRETARIO Peter Roddy

MEMBERSHIP 59 regular members (50 countries and all continents)

RAPPRESENTANTE ITALIANO Chiara Vergine

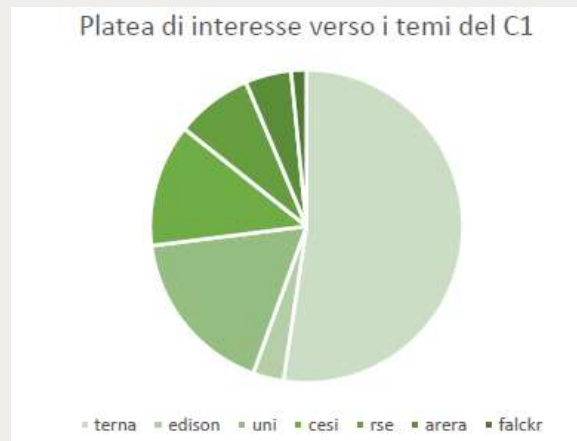
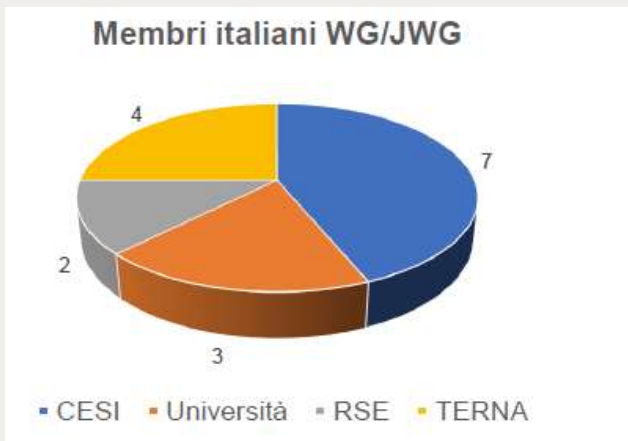
SEGRETARIO ITALIANO Carmelo Mosca

10 WORKING GROUP attivi + 4 JWG



STRUTTURA

- 16 membri italiani impegnati nei Working Groups
- 2 convenorship italiane(WG C1.33 e WG C1.45)
- Circa 60 “simpatizzanti” ai temi del comitatoC1



La comunità elettrica italiana è composta da una serie di attori che operano in modo coordinato per garantire la sicurezza e l'efficienza del sistema elettrico. La comunità elettrica italiana è composta da una serie di attori che operano in modo coordinato per garantire la sicurezza e l'efficienza del sistema elettrico.

La comunità elettrica italiana è composta da una serie di attori che operano in modo coordinato per garantire la sicurezza e l'efficienza del sistema elettrico. La comunità elettrica italiana è composta da una serie di attori che operano in modo coordinato per garantire la sicurezza e l'efficienza del sistema elettrico.

WORKING GROUP E JOINT WORKING GROUPS



WG	WG Name	Convenor
C1.23	Transmission investment decision points and trees	R. Marais
C1.33	Interface and allocation Issues in multi-party and/or cross-jurisdiction power infrastructures projects (To be confirmed)	
C1/C4.36	Review of the metropolitan area power system development trends taking into account new generation, grid and information technologies	V. de Simoes & S. Utts
C1/C6/Cired.37	Optimal transmission and distribution investment decisions under growing uncertainty	J-C Araneda
C1/C6.42	Planning tools and methods for systems facing high levels of distributed energy resources	C. Higgins
C1.44	Global interconnected and sustainable electricity system: Effects of storage, demand response and trading rules	G. Sanchis

WORKING GROUP E JOINT WORKING GROUPS



WG	WG Name	Convenor
C1.45	Harmonised metrics and consistent methodology for benefits assessment in Cost- Benefit Analysis of electric interconnection projects	P. Vicini
C1/C4.46	Optimising power system resilience in future grid design	C. Schaefer
C1.47	Energy Sectors Integration and impact on power grids	N. Zhang
C1.48	Role of green hydrogen in energy transition: opportunities and challenges from technical and economic perspectives	A. Oudalov
C1-C4.49	Off Shore Transmission planning	Coernelis Plet
C5-C1.35	Hydrogen certification	A. Oudalov

WORKING GROUP E JOINT WORKING GROUPS



WG	WG Name	Convenor
C5-C1-36	Hydrogen regulation and market	Dejan
C6-C1.82	Electric mobility energy supply	Maria Mele





TOR in discussione



☐ Offshore Transmission Planning (C1.49)

Convenor: Cornelis Plet (NL)



D. Negri M. Migliori

☐ Reserves Assessment

Convenor: ...



B. D'Elia, D. Cabras

☐ Global Grids (C1.50)

Convenor: Nicolas Chamollet (FR)

☐ Storage (C1.51)

Convenor: Jeff Palermo (US)

☐ Virtual Power Plants

Convenor: Prof. Qixin Chen (CH)

☐ Demand Forecasting

Convenor: Jana Breedts (SA)

Cairns 2023 – Programmed activities

- **Technical**
 - All Tutorial
 - 5 workshops
 - IC and WG meetings
 - Technical tours on Friday
 - Night and WG meetings
- **Opening Speakers**



David Shanley
Chair, British Chemical Engineering Society (BChES)



Adam Hildreton
Chair, Institution of Chemical Engineers (IChemE)

- **Social**
 - Reception on the Monday evening
 - Women in Design breakfast on Tuesday
 - MGN Networking and Happy Hour Session on Tuesday 5.30pm
 - Science on Wednesday evening in the stadium
- **Accommodation**
 - Arrangements with local hotels shown on the website
 - 30 rooms reserved for IC, SC and ABC at the Pullman hotel

- Paris Session 2024 25- 30 Agosto 2024



Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC C2 – Power System Operation & Control

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

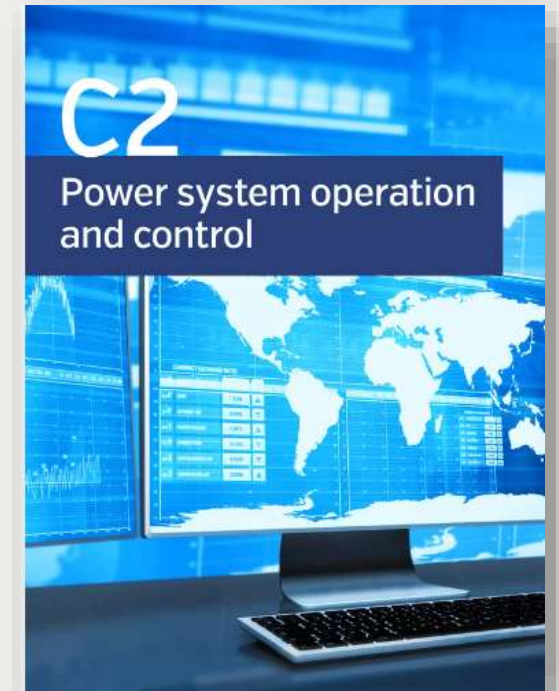
GIORGIO GIANNUZZI

COMITATO DI STUDIO C2

Power System Operation & Control



1. To facilitate and promote knowledge dissemination and worldwide collaboration in the field of system operation and control, providing adequate conditions for progress of engineering.
2. To facilitate unbiased technical information exchange, integrating solutions and recommendations for system operations issues and problems. These first two points are achieved among others by the publication of Technical Brochures and papers, delivering tutorials, and participating in conferences, symposia and colloquia.
3. To prepare for the foreseen future challenges by integrating and consolidating available knowledge and taking into account the usage of new and proven technologies. For example, the joint effort of several Study Committees in establishing Joint Working Groups, where different expertise and knowledge is combined, as well as in writing multi-disciplinary Reference Papers.
4. To engage and encourage young members to increase their involvement in the SC activities. By integrating them into Working Groups, a bridge between the young experts and experienced members can be built. SC C2 aims to connect, when possible, a young member to a mentor from the same SC and NC. This gives the opportunity to support the young member's development in a supervised way.



Geographical distribution of SC C2 members



Circa 195 experts da 42 paesi sono coinvolti nelle attività del SC C2

STRUTTURA

CHAIR Jayme Machado

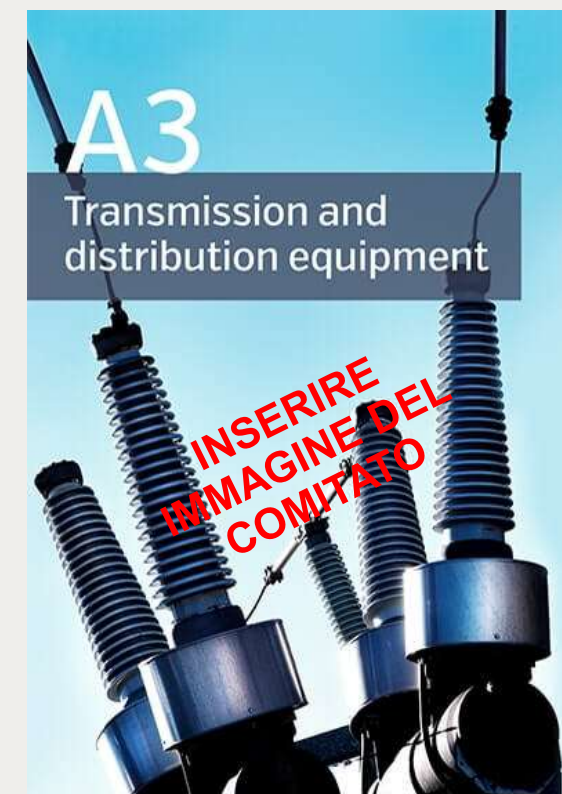
SEGRETARIO Flávio Rodrigo de Miranda Alves

MEMBERSHIP 27 regular members e 12 observers

RAPPRESENTANTE ITALIANO Giorgio Maria Giannuzzi

SEGRETARIO ITALIANO Diego Cirio

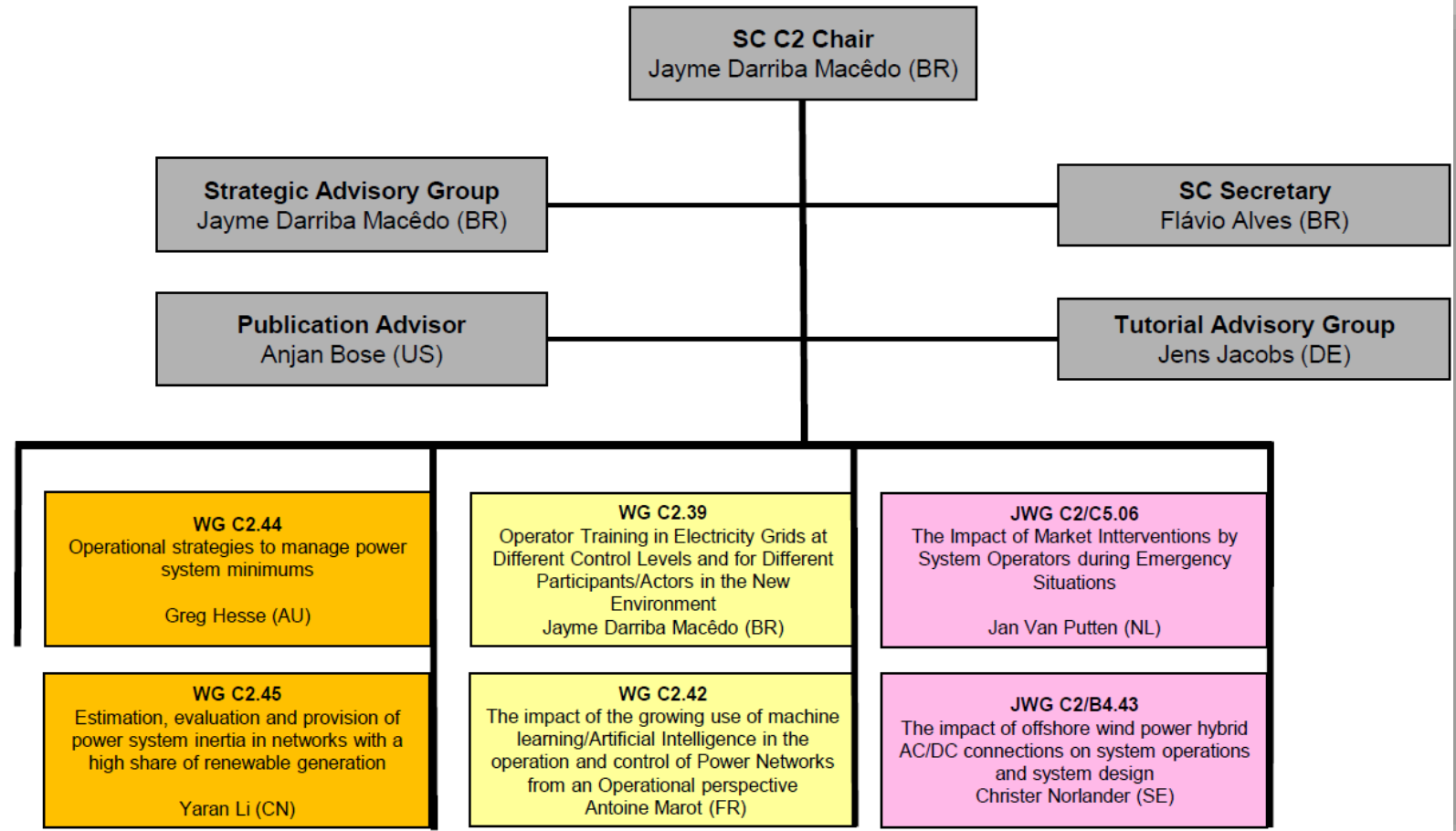
7 WORKING GROUPS attivi + 2 JOINT WG + 3 Advisory groups



WORKING GROUP E JOINT WORKING GROUPS



- Real time System Operation and Control
- System Operational Planning and Performance Analysis
- Control Centre Infrastructure and Human Resources for System Operation
- Joint Working Groups



WORKING GROUP E JOINT WORKING GROUPS



Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
C2/B5.46-System Integrity Protection Schemes and the (N-1) criteria	Emil Hillberg (SE)	2024		
C2.44-Operational strategies to manage power system minimums	Greg Hesse (AU)	2023		
C2.45-Estimation, evaluation and provision of power system inertia in networks with a high share of renewable generation	YaranLi (CN)	2023		
D2/C2.48-Enhanced Information and Data Exchange to Enable Future TSO-DSO Coordination and Interoperability	Gareth Taylor (UK)	2018	2024	Y
C2,39-Operator Training in Electricity Grids at Different Control Levels and for Different Participants/Actors in the New Environment	Jayme Darriba Macêdo (BR)	2018	2024	Y
C2.42-The impact of the growing use of machine learning/Artificial Intelligence in the operation and control of Power Networks from an Operational perspective	Antoine Marot (FR)	2021		
C2/C5.06-The Impact of Market Interventionsby System Operators during Emergency Situations	Jan Van Putten(NL)	2021	2024	to be published soon
C2/B4.43-The impact of offshore wind power hybrid AC/DC connections on system operations and system design	Christer Norlander (SE)	2022		
C2.18-Wide Area Monitoring Protection and Control Systems – Decision Support for System Operation	Walter Sattinger (CH)	2020	2024	Y
C2.26-Power System Restoration accounting for a rapidly changing power for a rapidly changing power system and generation mix	Babak Badrzadeh	2019	2024	Y

PUBBLICAZIONI 2022-2024



DOCUMENT	WG/JWG	Title	Year of publication
TB 936	D2/C2.48	Enhanced Information and Data Exchange to Enable Future TSO-DSO Coordination and Interoperability	2024
TB 925	C2.39	Operator training in electricity grids at different control levels and for different participants, actors in the new environment	2024
TB 917	C2.18	Wide Area Monitoring Protection and Control Systems – Decision Support for System Operators	2023
TB 911	C2.26	Power system restoration accounting for a rapidly changing power system and generation mix	2023

TOR in discussione



- System Operational Resilience Indexes **WG**
- Digitalization **WG**
- System Operation & Cybersecurity JWG
- Influence of Changing Climate Policies on System Operation JWG
- System Integrity Protection Schemes JWG
- Changes in Control Centers due to technology changes and new functionalities available in Distribution Management Systems JWG

EVENTI COMITATO STUDIO C2



- Throndeim international symposium 12-15 May 2025
- Montreal international symposium september 2025
- Jerusalem international symposium 2027
- West Africa international symposium 2027
- Session 2024 Paris:
 - Large Disturbances (26th2024–14:00 ~ 18:00 Grand Amphitheatre)
 - C2.18 - Wide Area Monitoring Protection and Control Systems–Decision Support for System Operators Tuesday, August 27th2024–16:10 ~ 18:00 Salle Maillot
- Cairns Symposium september 2023

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC C3 – Environmental Performances

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

NICOLETTA RIVABENE

COMITATO DI STUDIO C3

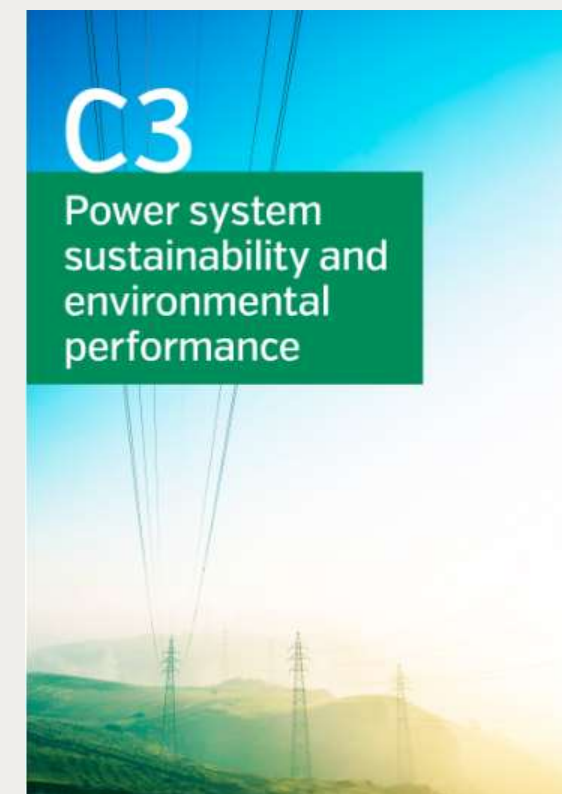
Power System sustainability and Environmental Performances



La missione di SC C3 è facilitare e promuovere i principi dello sviluppo sostenibile nel campo delle prestazioni dei sistemi energetici identificando le migliori pratiche e sviluppando raccomandazioni in linea con le migliori pratiche globali

Ambito:

- **interazioni tra gli ambienti naturali e sociali e il sistema elettrico end-to-end**
- **impatti ambientali e sociali (uso del territorio biodiversità; gas serra, inquinamento aria, suolo e acqua; consumo di risorse naturali; produzione di rifiuti; campi elettromagnetici; rumore e paesaggio)**
- **Attenzione agli stakeholder (att. comunità locali)**
- **ruolo del sistema energetico in relazione agli Obiettivi di sviluppo sostenibile (SDG) delle Nazioni Unite**



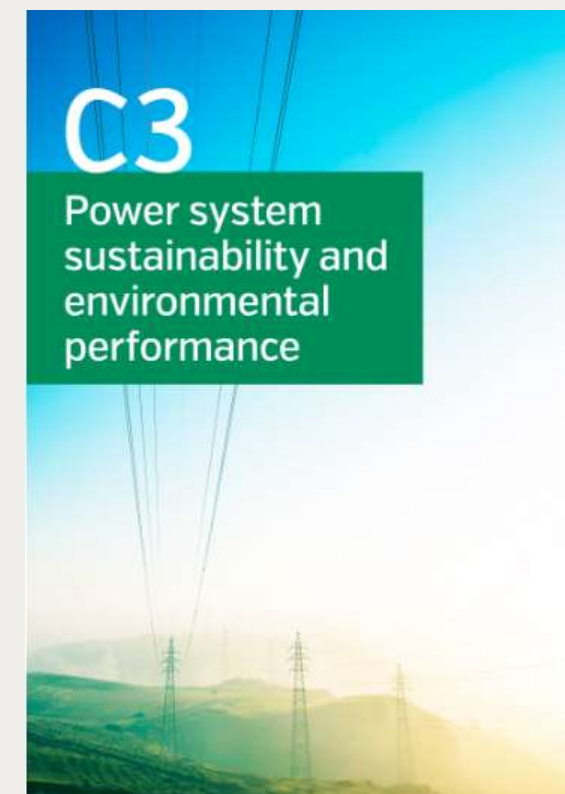
STRUTTURA

- CHAIR: Mercedes VAZQUEZ (mmvazquez@ree.es)
- SEGRETARIO Angel SALINAS (asalinas@ree.es)

RAPPRESENTANTE ITALIANO Nicoletta Rivabene

SEGRETARIO ITALIANO Michele De Nigris

7 WORKING GROUP attivi + 4 JWG



WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
C3.25	Eco-design methods for the power system TSOs/DSOs	Michael GATZSCHE (Switzerland)	Nuovo		
C3.22	Vegetation management in substations				Agosto 2024
C3.20	Sustainable Development Goals in the Electric Power Sector				Agosto 2024 (?)
C3.09	Sustainable corridor management				Entro 2024
JWG B3_A2_A3_C3_D1.66	Guidelines for life cycle assessment in substations considering the carbon footprint evaluation				
JWG B1/C3 85	Environmental impact of decommissioning of underground and submarine cables	Kieron Leeburn (ZA) Terna (?)		2024	
WG C3.15	Best environmental and socioeconomic practices for improving public acceptance of high voltage substations	Joris Den Breejen			Tutorial 2024 Parigi

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
C3.14	Impact of environmental liability on transmission and distribution activities	Vincent Du Four (BE)		chiuso	no
C3.01	EMF and Human Health	Michel Plante (CA)			Articoli per Parigi (?)
WG C3.17	Interaction between wildlife and emerging renewable energy sources and submarine cable				?
JWG C3_B2.24	Methods of reducing electrocution of birds from power lines				
JWG A2_C3.70	Sustainable corridor management				
WG B2_95	Climate change impacts on the design standards for overhead lines	No Partecipazione C3, varrebbe la pena insistere			

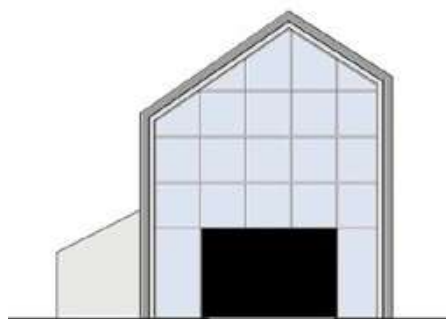
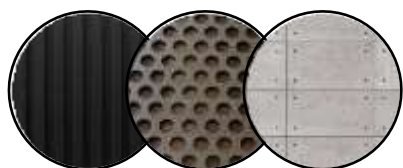
PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TECHNICAL BROCHURES	WG C3.16	Interactions between Electrical Infrastructure and Wildlife	2022
PS2	10390 C3	Biodiversity and the supply of electricity, renewables-based or not: risks, challenges, solutions and opportunities	2022
C3-11086_2022		Corona effect measurement in lines with innovation projects in REP	2022
Attese molte pubblicazioni a Parigi			

EVENTI COMITATO STUDIO C3

- CIGRE 2023 Sendai Colloquium, Japan
- CIGRE Paris Session, Agosto 2024





Analisi Territoriali e Presidi Tematici

L'Unità di Archeologia di Terna



Organizzazione

Michela Frapporti

Elena Vattimo - Fabiana Macerola - Simona Consigli -
Simone Vitale - **Maria Elena Calabria** - Matteo Cantisani

*Presidio delle attività di archeologia delle opere di sviluppo
nella progettazione autorizzativa e supporto verso le aree di
realizzazione*



Analisi Territoriali e Presidi Tematici

L'archeologia preventiva come elemento chiave per la progettazione e l'accettazione sociale

1 *Strategia progettuale che combini 4 strumenti attivi (fase ANTE)*



Soluzione tecnica-progettuale



Impatto ambientale



Archeologia preventiva *(gestione del rischio)*



Accettazione sociale e autorizzazione

2 *Valorizzazione dei contesti archeologici messi in luce (fase POST)*

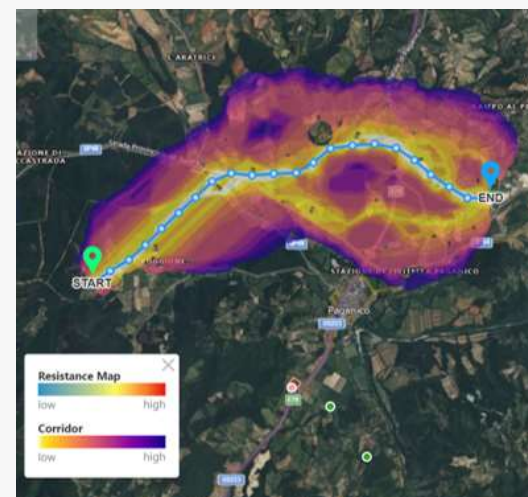
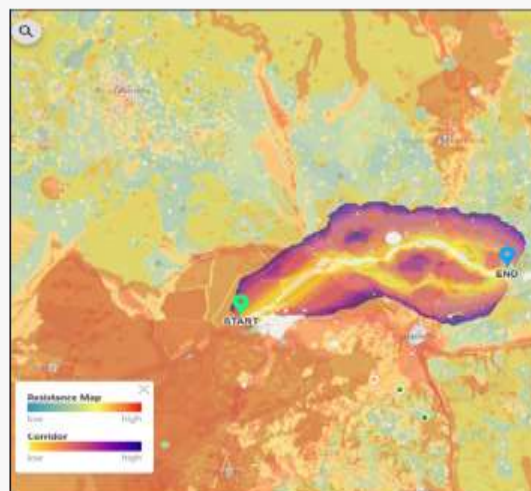
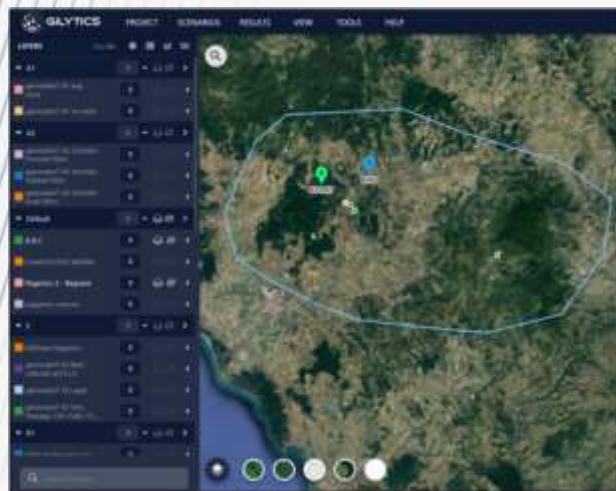
- Ogni strumento incide sugli altri, ma l'archeologia è quello potenzialmente più impattante per alcune tipologie di opere
- Interviene in ogni FASE PROGETTUALE, ma può incidere in positivo anche nella fase POST-OPERAM

Analisi Territoriali e Presidi Tematici

L'Unità di Analisi Territoriali e GIS e nuovi strumenti per la localizzazione delle opere



Terna sta sperimentando un nuovo strumento sviluppato da Gilytics denominato Pathfinder, per la localizzazione delle opere lineari e puntuali.



3D Model



Indicatori



Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC C4 – Power System Technical Performance

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

COSIMO PISANI

COMITATO DI STUDIO C4

- Implementazione di strumenti, modelli avanzati e di metodi di analisi innovativi finalizzati all'identificazione delle necessità e delle criticità dei sistemi elettrici di potenza;
- Promozione dell'integrazione delle tecnologie di produzione dell'energia e delle soluzioni di stoccaggio dell'energia;
- Sviluppo di una modellistica accurata dei sistemi di controllo delle tecnologie emergenti e studio delle problematiche connesse (es. converter driven stability);
- Analisi e modellazione robusta della domanda di energia elettrica con l'obiettivo di fattorizzarne l'evoluzione temporale nella definizione degli scenari energetici.



STRUTTURA

CHAIR MARTA VAL ESCUDERO

SEGRETARIO GENEVIEVE LIETZ

MEMBERSHIP 24 regular members

RAPPRESENTANTE ITALIANO COSIMO PISANI

SEGRETARIO ITALIANO FABIO TOSSANI



WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure	
C4.36	Winter Lightning – Parameters and Engineering Consequences for Wind Turbines	M. Ishii (Japan)	2014	2017	2023	●
C4.42 CIRED	Continuous assessment of low-order harmonic emissions from customer installations	I. Papič (<u>Slovenia</u>)	2015	2018	2023	●
C4.43	Lightning problems and lightning risk management for nuclear power plants	S. Takatoshi (Japan)	2017	2020	2023	●
C4.47	Power System Resilience (PSR WG)	M. Panteli (Cyprus)	2017	2020	2023	●
C4.55	EMC related very-fast transients in gas-insulated substations - EMC interferences, measured characteristics, modelling and simulations	A. Ametani (Japan)	2019	2022	2023	●
C4.57	Guidelines for the Estimation of Overhead Distribution Line Lightning Performance and its Application to Lightning Protection Design Scope	K. Michishita (Japan)	2019	2022	2023	●

WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure	
C4.59	Real-time Lightning Protection of the Electricity Supply Systems of the Future	C. Tong (China)	2019	2022	2023	●
C4.61	Lightning transient sensing, monitoring and application in electric power systems	J. He (China)	2021	2023	2023	●
C4.67	Lightning Protection of Hybrid Overhead Lines	A. Piantini (Brazil)	2022	2025	2023	●
B4/B1/C4.73	Surge and extended overvoltage testing of HVDC Cable Systems	M.Saltzer (Sweden)	2016	2017	2022	●
C1/C4.46	Optimising power system resilience in future grid design	Christian Schaefer (Australia)	2021	2022	2022	●

PUBBLICAZIONI 2022-2024



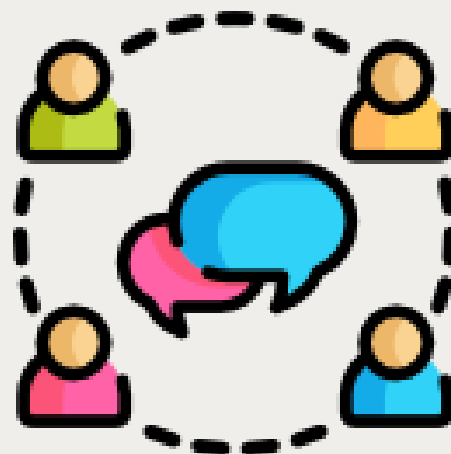
DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TB 928	C4.49	Multi-frequency stability of converter-based modern power systems	2024
TB 922	C1/C4.36	Review of Large City & Metropolitan Area power system development trends taking into account new generation, grid and information technologies	2024
TB 921	C4/A3.53	Applying Low-Residual-Voltage Surge Arresters to Suppress Overvoltages in UHV AC Systems	2023
TB 913	C4.46	Evaluation of Temporary Overvoltages in Power Systems due to Low Order Harmonic Resonances	2023
TB 909	C4/B4.52	Guidelines for Subsynchronous Oscillation Studies in Power Electronics Dominated Power Systems	2023
TB 904	A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part E: Measurements and transformer design details	2023

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
TB 903	A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part D: Model interfacing and specifications	2023
TB 902	A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part C: Grey Box Models	2023
TB 901	A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part B: Black-Box Models	2023
TB 900	A2/C4.52	High-Frequency Transformer and Reactor Models for Network Studies - Part A: White-Box Models	2023
TB 885	A1/C4.66	Guide on the assessment, specification and design of synchronous condenser for power system with predominance of low or zero inertia generators	2022
TB 881	C4.56	Electromagnetic transient simulation models for large-scale system impact studies in power systems having a high penetration of inverter-connected	2022

ToR IN DISCUSSIONE



Attualmente non è presente nessun «Terms of Reference» in discussione.

EVENTI COMITATO STUDIO C4

16 Luglio 2024

«Operator training in electricity grids at different control levels and for different participants, actors in the new environment»

8-10 Ottobre 2024

CIGRE Romania
International Regional South-East European Conference 2024 – RSEEC 2024 Next Generation Network (7th edition)

7-8 Novembre 2024

CIREC Chicago Workshop 2024
«Resilience of Electric Distribution Systems»

11-14 Novembre 2024

CIGRE US
The Grid of the Future

12-15 Maggio 2025

CIGRE Norway
«Changes needed in the power system for the Energy Transition»

25-30 Agosto 2024

CIGRE Paris Session

28-31 Ottobre 2024

CIGRE Canada
Conference & Exhibition

11-13 Novembre 2024

GCC Power 2024
Conference & Exhibition

24-26 Novembre 2024

SMART GRIDS Europe 2024
«The Premier Forum for Power Infrastructure and Smart Grid Technologies»

da confermare
CIGRE Canada
Canadian National Committee

PARIS SESSION 2024



Alcune statistiche in calce:

- Un totale di 1253 full paper sottomessi al Central Office di cui 1175 (94%) accettati.
- Un totale di 102 full paper sottomessi SC C4 di cui 81 (79%) accettati

I topic di maggiore rilievo in ambito SC C4 sono:

- PS1: Power System Dynamics: 54 submissions, 41 accepted, 13 rejected.
- PS2: Power Quality and EMC/EMI: 23 submissions, 19 accepted, 3 rejected, 1 withdrawn.
- PS3: Lightning/Insulation Co-Ordination: 25 submissions, 21 accepted, 4 rejected.

76 esperti hanno partecipato nel processo di revisione dei full paper SC C4

EVENTI COMITATO STUDIO C4



- **Webinar:** «Operator training in electricity grids at different control levels and for different participants, actors in the new environment», 16 Luglio 2024
- **Session 2024:** CIGRE Paris Session, 25-30 Agosto 2024
- **Conference:** International Regional South-East European Conference 2024 – RSEEC 2024 Next Generation Network (7th edition) - CIGRE Romania 8-10 Ottobre 2024
- **Conference:** 2024 CIGRE Canada Conference & Exhibition, 28-31 Ottobre 2024
- **Workshop:** CIRED Chicago Workshop 2024, “Resilience of Electric Distribution Systems”, 7-8 Novembre 2024
- **Conference:** GCC Power 2024 Conference & Exhibition, 11-13 Novembre 2024
- **Symposium:** The Grid of the Future – CIGRE US, 11-14 Novembre 2024
- **Conference:** SMART GRIDS Europe 2024, “The Premier Forum for Power Infrastructure and Smart Grid Technologies”, 24-26 Novembre 2024
- **Symposium:** CIGRE Symposium 2025 – CIGRE Norway, “Changes needed in the power system for the Energy Transition”, 12-15 Maggio 2025
- **Symposium:** CIGRE Symposium 2025 – CIGRE Canadian National Committee, date da confermare.

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC C5

Assemblea Soci del 16 Luglio 2024



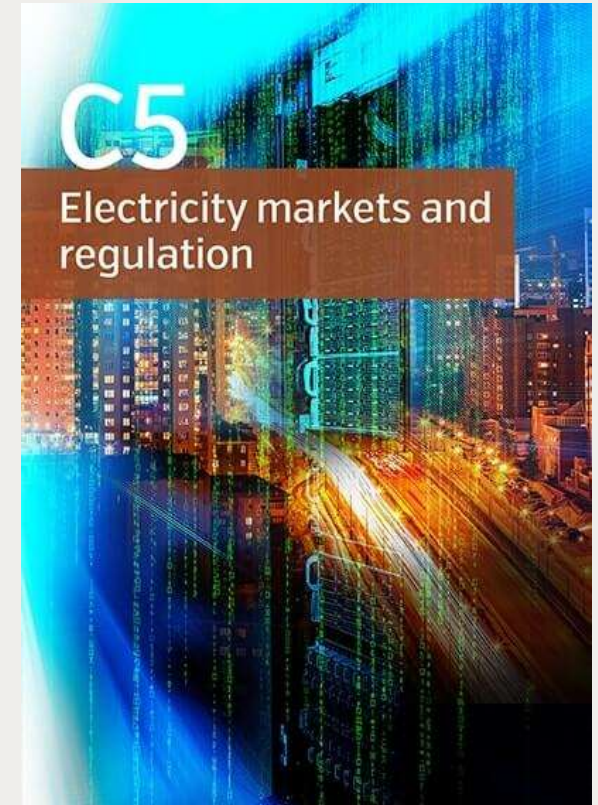
cigre

For power system expertise

SIMONA CIANCIO

COMITATO DI STUDIO C5: Mission

Study Committee C5 bridges the gap between engineering, economics and regulation. It analyses the impacts of different approaches to markets, regulation and differing market structures (Institutions, participants and stakeholders) on the planning, operation and regulation of electric power systems. Examining the role of competition and regulation in the electricity industry is important for the orderly transition of the power system as well as improvements to its end-to-end efficiency.



STRUTTURA

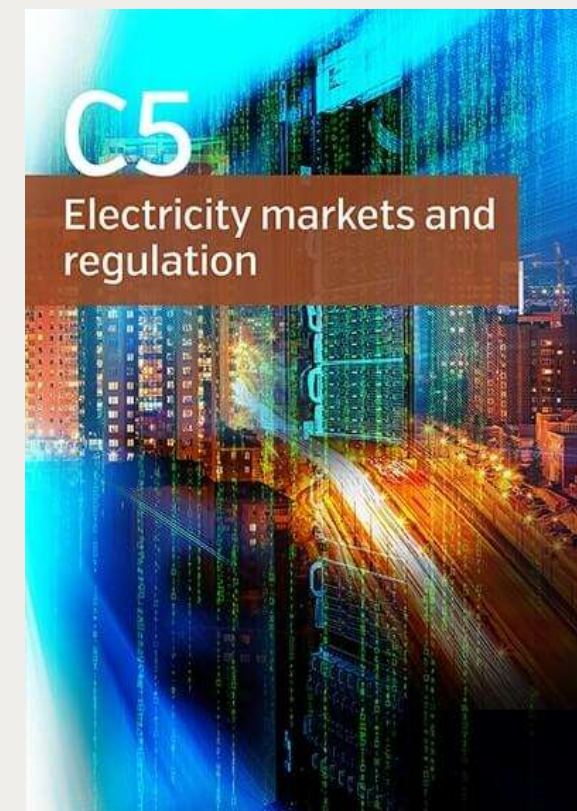
CHAIR Alex CRUICKSHANK

SEGRETARIO Yannick PHULPIN

RAPPRESENTANTE ITALIANO Simona Ciano

SEGRETARIO ITALIANO Marzia Germini

4 WORKING GROUP + 2 JWG



WORKING GROUP E JOINT WORKING GROUPS



ACTIVE WG	Titolo	Convenor
WG C5-31	Wholesale and Retail Electricity Cost Impact of Flexible Demand Response	A. Chuang
WG C5-34	Summary of Current Uses of Electric Vehicle Charge/Discharge Flexibility in wholesale energy markets and reliable grid operations	Jessica Harrison
WG C5-37	Regulatory framework on modernization and extension of useful life of transmission & distribution assets	J. Mello
WG C5-36	Certification of the electricity used to produce hydrogen	R. Gedra
JWG C5C6-29	New Energy Markets, Local Energy Community	A. Venkateswaran
WG C5C1-35	Integration of hydrogen in electricity markets and sector regulation	Tongkom Piyateravong

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicaz.
Technical Brochures	C5.32	Carbon Pricing in Wholesale Electricity Markets	2023
Technical Brochures	C5.33	Trading Electricity with Blockchain Systems	2023
Technical Brochures	C5.28	Energy Price Formation in Wholesale Electricity Markets	2022
Technical Brochures	C5.26	Auction Markets and Other Procurement Mechanisms for Demand Response Services	2022

EVENTI COMITATO STUDIO C5



Paris Session 2024

For the 2024 Session, a total of 57 papers were selected based on the three Preferential Subjects (PS):

PS 1: Characteristics of a resilient market and its regulatory regime

- *Responds to dynamic changes in the market environment and able to withstand external shocks.*
- *What markets and regulations have proven resilient so far and are still efficient and successful.*
- *Governance and institutional arrangements that assist resilience: who makes the decisions and takes the risks.*

PS 2: Preparing for the future with moving targets

- *Innovative approaches to markets and regulation to achieve climate and energy policy targets.*
- *The design and structure of electricity markets to support capital-intensive, climate neutral investments..*
- *Market and regulatory arrangements for supply, demand and storage that function across transmission, distribution and behind the meter resources.*

PS 3: Emerging markets and forms of markets

- *Markets and regulations addressing the attributes of electricity that customers are seeking from the industry.*
- *Market-based approaches to integrate community and distributed resources.*
- *New market approaches to overcome the barriers and limitations on current market designs*

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC C6 – Active distribution systems and distributed energy resources

Assemblea Soci del 16 Luglio 2024



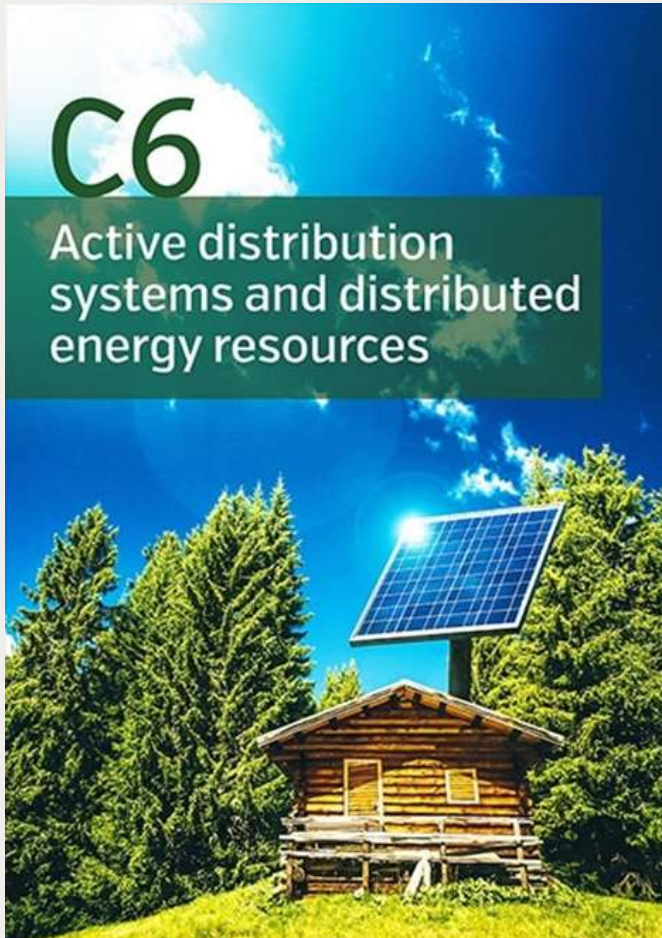
cigre

For power system expertise

SIMONE FERRERO

C6 STUDY COMMITTEE

Active distribution systems and distributed energy resources



Mission

- Assessment of the technical impacts resulting from a more widespread adoption of DER applications on planning and operation and on approaches
- Assessment of enabling technologies and innovative solutions for DER integration in active distribution systems

Key contact



Chair
Kurt DEDEKIND
DedekiVK@eskom.co.za



Secretary
Evert DE HAAN
evert.de.haan@alliander.com



Communications Officer
Harry EVANS
Harry.Evans@ghd.com

Italian representatives



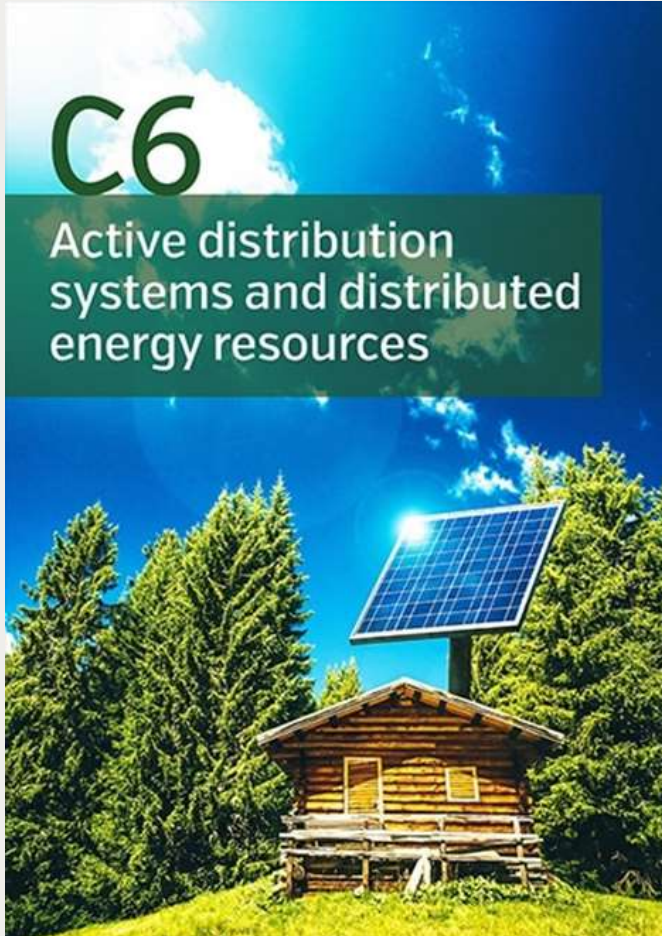
Member
Marco DI CLERICO
marco.diclerico@e-distribuzione



Secretary
Simone FERRERO
simone.ferrero@e-distribuzione.com

C6 STUDY COMMITTEE

Active distribution systems and distributed energy resources



Additional specific areas of attention

- **Enabling technologies for renewable and distributed energy resource integration and application:** active network management, microgrids, virtual power plants, distribution management systems (DMS, ADMS, DERMS), DER monitoring and control, aggregation systems and platforms, block-chain applications
- **Innovative solutions for DER and distribution technology deployment:** smart inverters and power electronic interfaces, interconnection and integration requirements, MV/LV DC supply systems, distribution system modernization
- **Storage technologies:** deployment of various storage technologies such as electrochemical electric battery energy storage systems, flywheels, flow batteries, and new storage
- **Multi-energy solutions** (including thermal storage), **Power2X applications** (including power to heat, power to gas), **electric vehicles**.
- **New approaches to configure new distribution systems for enhanced reliability and resilience:** islandable grid connected microgrids, power exchange between microgrids.
- **New approaches to determine the impact and plan and operate distribution systems in the context of a wide deployment of DER,** including the analysis of hosting capacity and protection
- **Consumer integration and empowerment:** demand side integration and participation, demand response, load management, smart load, new customer sectors such as electric vehicles, smart home and smart meter applications with impact on distribution systems.
- **Smart cities:** integrated distribution system technologies, power, control, and information and communication technology deployment for flexibility, integration of multi-energy systems.
- **Rural Electrification:** islanded power systems and individual customer off-grid systems, new solutions, weak grid connected systems

C6 STUDY COMMITTEE WORKING GROUP E JOINT WORKING GROUPS



WG	Titolo	Convenor	Anno apertura	Stato	Commenti
C6.35	Distributed energy resources aggregation platforms for the provision of flexibility services	Alexandre Oudalov	2018	60%	No update received
C6.39	Distribution Customer Empowerment	Michael Ross	2018	<10%	Call for additional participants
C6.40	Electric Vehicles as Distributed Energy Resource (DER) systems	Joao Lopes	2019	95%	Draft TB reviewed and awaiting final edits
C6.42	Electric Transportation Energy Supply Systems	Maurizio Albano	2020	<10%	Call for additional participants
C6.44	Nodal Value of Distributed Renewable Energy Generation	Kilian Reiche	2020	50-80%	Work progressing
C6.45	The Impact of DER on the Resilience of Distribution Networks	Nasser Usman	2022	<10%	Call for additional participants
C6.46	Energy Efficiency in Distribution systems	Aradhna Pandarum	2023	<10%	Work progressing
C6.47	DSO-customer interfaces for efficient system operation	Daniel Eghbal	2023	<10%	Work progressing
JWG C1/C6.42	Planning tools and methods for systems facing high levels of distributed energy resources	C6 liaison Alexandre Aoki	2020	-	No update receive
JWG C5.31	Wholesale and Retail Cost Impact of Flexible Demand Response	C6 liaison Alex Baitch	2019	-	No update receive
JWG C5/C6.29	New Electricity Markets, Local Energy Communities	C6 liaison to be assigned	2018	-	No update receive
JWG C6/C2.34	Flexibility provision from distributed energy resources	Pierluigi Mancarella	2018	-	No update receive

C6 STUDY COMMITTEE

PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicazione
Technical Brochures - 863	JWG C6/C1.3	Multi-energy System Interactions in Distribution Grids	2022
Technical Brochures - 875	JWG C6/B4.37	Medium Voltage DC Distribution Systems	2022
Technical Brochures - 906	WG C6.36	Distributed Energy Resource Benchmark Models for Quasi-Static Time-Series Power Flow Simulations	2023
Technical Brochures - 923	JWG C1/C6.37/CIREN	Optimal transmission and distribution investment decisions under increasing energy scenario uncertainty	2024
Technical Brochures - 929	JWG D2/C6.47	Advanced Consumer Side Energy Resource Management Systems	2024
Technical Brochures - 932	WG C6.43	Aggregation of Battery Energy Storage and Distributed Energy Resources	2024

C6 STUDY COMMITTEE NEW CIGRE WG OF INTEREST



- Febbraio 2024 - New CIGRE **WG - C1.52** - Virtual Power Plants: Role and deployment in large power systems' operation and planning
- Gennaio 2024 - New CIGRE **WG - C1.50** - Global sustainable energy system coupling electricity and hydrogen
- Dicembre 2023 - New CIGRE **WG - C1.51** - The potential roles of energy storage in electric power systems
- Novembre 2023 - New CIGRE **WG B4.101** - Industrial Implementation and Application of Grid Forming Energy Storage Systems
- Ottobre 2023 - New CIGRE **WG C2.45** - Estimation, evaluation and provision of power system inertia in networks with a high share of renewable generation

C6 STUDY COMMITTEE PARIS 2024 SESSION



C6

Active distribution systems and distributed energy resources



PS1: Flexibility management in distribution networks

- › Energy storage systems with the associated provision of their grid services to distribution and upstream networks.
- › Evolving planning and operational objectives and criteria with increased electrification, with changes in technology enabling end-to-end system operations.
- › Electric vehicle integration and impacts.

PS2: Power electronic based solutions for smart distribution systems

- › Evaluating and quantifying the added value of smart inverter and convertor functions and their integration into Distribution Networks.
- › Case studies of DC and DC / AC hybrid grid solutions for the future.
- › Provision of ancillary services for distribution and upstream networks.

PS3: Rural, islanded and industrial electrification standards, practices and technology options

- › Applications highlighting the interface between technical and non-technical aspects for rural electrification.
- › Off-grid and island DER applications including appropriate resilience measures.
- › Microgrid and multi-microgrid installations.

Comitato Nazionale Italiano CIGRE

Consiglio Tecnico

SC D1 – MATERIALS AND EMERGING
TEST TECHNIQUES

Assemblea Soci del 16 Luglio 2024



cigre

For power system expertise

FABIO SCATIGGIO

STRUTTURA

CHAIR

Simon Sutton (UK)



SEGRETARIO

Gordon Wilson (UK)



MEMBERSHIP

24+5 regular members and 11 observer members

RAPPRESENTANTE ITALIANO

Fabio Scatiggio



SEGRETARIO ITALIANO

Luigi Calcara

13 WORKING GROUP attivi + 12 JWG



STUDY COMMITTEE D1



Scope of Work & Activities

The scope of Study Committee D1 covers **new and existing materials** for electrotechnology, **diagnostic techniques** and related knowledge rules, as well as **emerging test techniques** with expected impact on power systems in the medium to long term.

Principal areas of interest

- Insulating gases and gaseous insulation systems.
- Liquid and liquid impregnated insulation systems.
- Solid materials.
- High voltage and high current testing and diagnosis.

STUDY COMMITTEE D1



Current activities

- Characterization of materials and electrical insulation systems (EIS).
- Study of emerging test and diagnosis techniques for HVDC.
- Development of diagnostic tools and related knowledge rules.

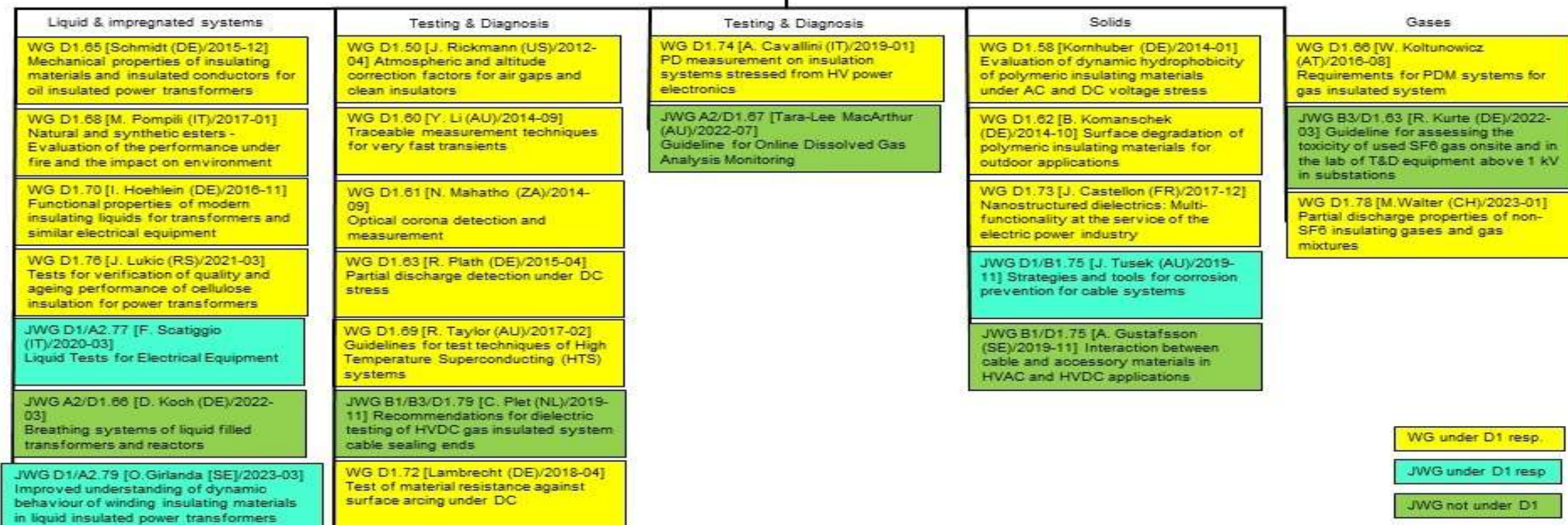
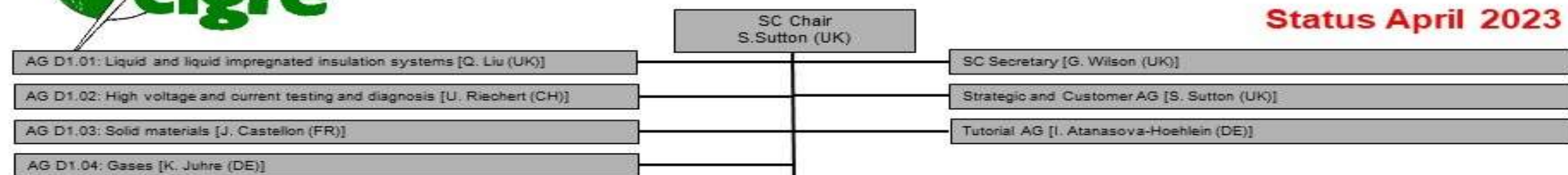
Other specific interests

- Give guidance in the performance and use of materials in electrical insulation systems.
- Dissemination of knowledge, e.g. by tutorials



Study Committee D1 – Organisation

Status April 2023



CIGRE Study Committee D1 – Organisation

WORKING GROUP E JOINT WORKING GROUPS 1/5



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
JWG B3/A2/A3/D1.66	Guidelines for Life Cycle Assessment in Substations considering the carbon footprint evaluation	Akhshaia Prabkar	2024		
JWG A2/D1.72	Retrofill of Mineral Oil in Transformers – Motivations, Considerations and Guidance	Roberto Asano	2023		
JWG A2/D1.71	Modern Insulating Liquids Qualification for OLTC, Bushings and other accessories	Lard Liden	2023		
WG D1.82	Methods and common data file format for Time-Domain Reflectometry	Andrew Barclay	2023		
JWG D1/A2.80	Functional properties of non-metallic solid materials for liquid filled transformers and reactors and their compatibility with insulating liquids	Dejan Vukovic	2023		
JWG D1/A2.79	Improved understanding of dynamic behaviour of winding insulating materials in liquid insulated power transformers	Orlando Girlanda	2023		

WORKING GROUP E JOINT WORKING GROUPS 2/5



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
JWG A2/D1.67	Guideline for online dissolved gas analysis monitoring	Tara-Lee Mc Arthur Khayakazi Dioka	2022		
JWG B3/D1.63	Guideline for assessing the toxicity of used SF6 gas onsite and in the lab of T&D equipment above 1 kV in substation	Roland Kurte	2022		
JWG A2/D1.66	Breathing systems of liquid filled transformers and reactors	Danile Kock	2022		
WG D1.76	Tests for verification of quality and ageing performance of cellulose insulation for power transformers	Jelena Lukic	2021		
JWG D1/A2.77	Liquid Tests for Electrical Equipment	Fabio Scatiggio	2020		
JWG D1/B1.65	Strategies and tools for corrosion prevention for cable systems	Joe Tusek	2020		

WORKING GROUP E JOINT WORKING GROUPS 3/5



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
JWG B1/B3/D1.79	Recommendations for dielectric testing of HVDC gas insulated system cable sealing ends	Cornelis Plet	2019		
JWG B1/D1.75	Interaction between cable and accessory materials in HVAC and HVDC applications	Anders Gustavsson	2019		
WG D1.74	PD measurement on insulation systems stressed from HV power electronics	Andrea Cavallini	2019		
WG D1.72	Test of material resistance against surface arcing under DC	Jens Lambrecht	2018		
WG D1.73	Nanostructured dielectrics: Multi-functionality at the service of the electric power industry	Jerome Castellon	2017		
WG D1.69	Guidelines for test techniques of High Temperature Superconducting (HTS) systems	Richard Taylor	2017		

WORKING GROUP E JOINT WORKING GROUPS 4/5

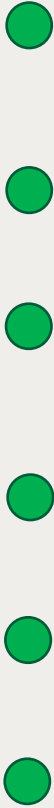


WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG D1.68	Natural and synthetic esters - Evaluation of the performance under fire and the impact on environment	Massimo Pompili	2017		
WG D1.70	Functional Properties of modern insulating liquids	Ivanka Atanasova H.	2016	2024	827
WG D1.66	Requirements for partial discharge monitoring systems for gas insulated systems	Wojciech Koltunowic	2016	2024	833
WG D1.63	Partial Discharge Detection under DC voltage stress	Ronald Plath	2015		
WG D1.61	Optical corona detection and measurement	Nishal Mahato	2014		
WG D1.60	Traceable measurement techniques for very fast transients	Yi Li	2014		

WORKING GROUP E JOINT WORKING GROUPS 5/5



WG	Titolo	Convenor	Anno apertura	Anno chiusura	Technical Brochure
WG D1.62	Surface degradation of polymeric insulating materials	Bernard Komanshek	2014		
WG D1.50	Atmospheric and altitude correction factors for air gaps and clean insulators	Johannes Rikmann	2012	2023	888



PUBBLICAZIONI 2022-2024



DOCUMENTO	WG/JWG	Titolo	Anno pubblicazione
888	WG D1.50	Atmospheric and altitude correction factors for air gaps and clean insulators	2023-03
894	WG D1.54	Basic principles and practical methods to measure the AC and DC resistance of conductors of power cables	2023-038
827	WG D1.70	New Laboratory Methodologies for Investigating Liquids, Further Developments in Key Functional Properties	2024-05
933	WG D1.66	Requirements and application of UHF PD systems for gas insulated systems	2024-05
856	WG D1.70 TF3	Dielectric performance of insulating liquids for transformers	2021-12
850	JWG D1/B1.49	Harmonised test for the measurement of residual methane in insulating materials	2021-10
849	WG D1.67	Electric performance of new non- SF6 gases and gas mixtures for gas-insulated systems	2021-10

Liaison



- CIGRE SC A1
- CIGRE SC A2
- CIGRE SC A3
- CIGRE SC B1
- CIGRE SC B2
- CIGRE SC B3
- IEC TC2, TC 10, TC 14, TC 36, TC 42, TC 90, TC 99, TC 112

TOR in discussion



- Production of Carbon Monoxide from insulating liquids rather than degradation of solid insulation, and its impact on fault diagnosis
- Silver Corrosion on OLTC filled with synthetic esters
- Insulation Materials in the context of sustainability and safety issues

EVENTI COMITATO STUDIO D1

- Last Annual General Meeting : 2023 Cairns (AU)
- Symposia and Colloquia 2025: Seul (NK), Trondheim (NO), Montreal (CA)?
- Discussion Meeting Paris 2024: 27 Agosto
- SC Meeting Paris 2024: 28 Agosto
- Poster Session Paris 2024: 26 Agosto (mattino)

CIGRÉ Study Committee D2 **Information SystemsTelecommunications and** **Cybersecurity**

REPORT ANNUALE COMITATO DI STUDIO D2

Roma, 16 Luglio 2024



SC D2 ToC

- Membri
- Scopo
- Organizzazione
- WG attivi
- TB 2022-2024
- CIGRE Session 2024
- CIGRE Symposium 2025
- Sito web



Membri



Study Committee D2 Members 2022-2024

Chairperson



Victor
TAN
Australia

Secretary



Joël
NOUARD
France

Regular Members

											
Herwig KLIMA Austria	Louise WATTS Australia	Johan MARICQ Belgium	Rodrigo LEAL Brazil	Gérard-Philippe MBOUYAP Canada	Ramon BAECHLI Switzerland	Kunlun CAO China	Bruno PERALTA Spain	Antti VIRO Finland	Vitor MENEGUIM France	Thomas CHARTON U.K.	Robert GROARKE Ireland

WG D2.52 / D2.55

											
Debasis DE India	Siamak KHALAJ Iran	Yuri RASSEGIA Italy	Tatsuhiko TABE Japan	Seok-Chan LEE Korea	Lars SILSET Norway	Jan PIOTROWSKI Poland	Jasmina MANDIC Serbia	Fedor NERSHA Russia	Peter CEPERIN Slovenia	Chen-Ching LIU U.S.	Thuthukani BIYELE South Africa

Additional Regular

		
Bader AL-MAMARI Arab States of the Gulf	Chaoyang ZHU China	Georgios TSIROPOULOS Greece

	
Valentin OPINCARI Romania	Alexandra KHALYASMAA Russia

Working Bodies' Conveners + SAG members

								
Alexandre PINHEL Brazil WG D2.44	Alexey A. NERBERA Russia D2/C6.47	Gareth TAYLOR U.K. D2/C2.48	Elena RAGAZZI Italy WG D2.54	Bruce LARGE Australia WG D2.51	Zhengyun SUN China WG D2.53	Qinglai GUO China WG D2.56	Roman BOGOMOLOV Russia WG D2.57	Bangini SHEZI South Africa WG D2.58

							
Ugo FINARDI Italy WG D2.54	Akshat KULKARNI U.K. B2/D2.72	Patrick PICHER Canada A2/D2.65	Nicola FANTANA Germany B3/D2.62	Olga V. SINENKO Russia SAG	Mauricio ARAUJO Brazil AG D2.01	Giovanna DONDOSSOLA Italy AG D2.02	Zwelandile MBEBE South Africa AG D2.03

Observer Members

					
Ali Al RAHMA Arab States of the Gulf	Jerson REYES Chile	Diego ZULUAGA Colombia	Tomas KLOUCHEK Czech Republic	Emmanouil KALFAKIDOU Greece	Amir ALAMI Jordan

					
Alfredo ESPINOZA Mexico	Amadou LOUH Netherlands	Abhinav CHOPRA New Zealand	Carolina VILLASANTI Paraguay WG D2.49	Ion NEDELCU Romania	Ponpang CHIEWCHARAT Thailand

Scopo

1. SC D2 ha come missione quella di facilitare e promuovere il progresso dell'ingegneria dei sistemi di informazione e telecomunicazione per le infrastrutture di energia elettrica, nonché lo scambio internazionale di informazioni e conoscenze in tali campi. Aggiungere valore a queste informazioni e conoscenze attraverso la sintesi delle pratiche all'avanguardia e lo sviluppo di raccomandazioni, rendere consapevoli i manager, i decisori e i regolatori (tra gli altri stakeholder) del settore EPI (Electric Power Industries) delle sue attività.
2. Specifica, progettazione, ingegneria, installazione, messa in servizio, prestazioni, funzionamento, manutenzione e gestione di
 - ICT applicata alle reti digitali dal AAT alla distribuzione (smart meter, IoT, big data, EMS, ecc...)
 - Soluzioni di comunicazione per lo scambio di informazioni nella fornitura intelligente di energia elettrica
 - Interoperabilità e scambio di dati (formato file, frequenza, ecc.) tra operatori di rete, attori del mercato, impianti off-grid
 - Problemi di sicurezza informatica dalle apparecchiature in campo all' IT aziendale (vincoli di governance, progettazione del sistema, implementazione, test, funzionamento e manutenzione...)
 - Tecnologie e architetture per garantire la continuità aziendale e il disaster recovery
 - Sistemi IT a supporto del processo decisionale nell'Asset Management
3. Supporto tecnico alle attività degli organismi di standardizzazione internazionali correlati al suo ambito
4. Monitoraggio delle tecnologie emergenti per valutare il loro possibile impatto sull'EPI. Organizzazione e realizzazione di studi sulle problematiche rilevanti. Attenzione alle esigenze attuali e future delle reti, dei clienti e degli attori dell'EPI nei settori di sua competenza



Scopo - Cybersecurity

1. Standard di sicurezza informatica
 - applicazione di standard quali IEC 62443 e IEC 62351
 - linee guida
2. Aspetti regolatori
3. Operatività
 - Infrastrutture di gestione delle chiavi pubbliche
 - Infrastrutture di monitoraggio, situational awareness
 - Rilevamento, mitigazione e ripristino di anomalie da attacchi informatici, anomaly detection basata su tecniche e algoritmi di intelligenza artificiale
4. Sicurezza informatica delle comunicazioni tra TSO, DSO, attori del mercato, operatori delle infrastrutture di ricarica dei veicoli elettrici, impianti di generazione, sistemi di accumulo
5. Certificazioni di cybersecurity di processi e prodotti, sicurezza della catena di fornitura



Organizzazione

Chair : Victor Tan (AU)



Secretary : Joël Nouard (FR)



Advisory Groups

Ref	Title	Convener
AGD2.01	Core business information systems and services	Marcelo Costa de Araujo (BR) marcelo.araujo@eletronorte.gov.br
AGD2.02	Cybersecurity	Giovanna Dondossola (IT) giovanna.dondossola@rse-web.it
AGD2.03	Telecommunication networks, services and technology	Zwelandile Mbebe (ZA) mbebez@eskom.co.za

WORKING GROUPS



WG	Title	Convenor	Supervising AG
WG D2.44	Usage of public or private wireless communication infrastructures for monitoring and maintenance of grid assets and facilities	A. PINHEL (BR)	AGD2.03
JWG D2/C6.47	Advanced consumer side energy resource management systems	A.A. NEBERA (RU)	AGD2.01
JWG D2/C2.48	Enhanced information and data exchange to enable future transmission and distribution interoperability	G. TAYLOR (GB)	AGD2.01
JWG B2/D2.72	Condition Monitoring and Remote Sensing of Overhead Lines	Y. CHEN (CN) A. KULKARNI (GB)	AGD2.01
WG D2.49	Augmented reality to support EPU's operation and maintenance	C. VILLASANTI (PY)	AGD2.01
WG D2.51	Implementation of Security Operations Centers (SOC) in Electric Power Industry as Part of Situational Awareness System	Br. LARGE (AU)	AGD2.02
WG D2.52	AI Application and Technology on Power Industry	KUN LUN GAO (CN)	AGD2.01
WG D2.53	Technology and Applications of Internet of Things in Power Systems	ZHENGYUN SUN (CN)	AGD2.01
WG D2.54	Regulatory approaches to enhance EPU's cybersecurity frameworks	E. RAGAZZI (IT) U. FINARDI (IT)	AGD2.02
WG D2.55	Application of 5G Technology to Smart Grids	KUN LUN GAO (CN)	AGD2.03
WG D2.56	Interdependence and Security of Cyber-Physical Power System	QINGLAI GUO (CN)	AGD2.01
WG A2/D2.65	Transformer Digital Twin – concept and future perspectives	P. PICHER (CA)	AGD2.01
WG B3/D2.62	Life-long Supervision and Management of Substations by use of Sensors, Mobile Devices, Information and Communication Technologies	N. FANTANA (DE)	AGD2.01
WG D2.57	CIM (Common Information Model) Methodology	R. BOGOMOLOV (RU)	AGD2.01
WG D2.58	Monitoring, Maintenance and Control of Packet Networks & Services – From Situational Awareness to Network Control	B. SHEZI (ZA)	AGD2.03



WG D2.54 Scope

1. Identify, compare, and evaluate emerging laws and regulations applicable to cybersecurity risk assessment
2. Survey Operators and Regulators to determine changes needed to address the rapidly evolving threat landscape
3. Identify opportunities to improve Operator response and provide a basis to recover the cost by rate adjustments
4. TB under preparation including a series of National/State case studies on the specific features of cybersecurity



Technical Brochure 2022-2024



TECHNICAL BROCHURES

Advanced Consumer Side Energy Resource Management Systems

Published in 2024



TECHNICAL BROCHURES

Impact of governance regulations and constraints on EPU sensitive data distribution and location of data storage

Published in 2023



TECHNICAL BROCHURES

Time in Communication Networks, Protection and Control Applications – Time Sources and Distribution Methods

Published in 2022



TECHNICAL BROCHURES

Enabling software defined networking for electric power utilities

Published in 2022



Paris Session 2024 | Session CIGRE



Paris
Session 2024



[The Session](#) ▾

[Attend](#) ▾

[Programme](#) ▾

[Newsroom](#) ▾

[Technical exhibition](#)

[Registration](#)

Paris Session 2024

August 25 to 30, 2024

Palais des Congrès, Paris, France

Welcome to the leading global event for power system expertise. Be a part of the world's foremost knowledge development programme.

[→ LEARN MORE](#)



General programme | Session CIGRE

Tuesday 27 August

14:00 to 16:00

WORKSHOPS

Consumer-Side Energy Resource Management - Market, Control and Information Systems Perspectives

Delegates

Thursday 29 August

08:30 to 10:20

TUTORIALS

5G Application for Power Utilities

Kunlun Gao

Delegates

14:30 to 18:00

POSTER SESSIONS

SC D2 Poster Session - Information systems telecommunications and cybersecurity

Delegates

Friday 30 August

08:45 to 18:00

GROUP DISCUSSION MEETINGS

SC D2 Group Discussion Meeting - Information systems telecommunications and cybersecurity

Delegates



CIGRE Sessione 2024 – D2 Preferential Subjects

1. PS1 - IT/OT SOLUTIONS TO IMPROVE THE EFFICIENCY AND RESILIENCE OF ELECTRIC POWER SYSTEMS
1. PS2 - CYBERSECURITY IN EMERGING APPLICATION DOMAINS AND TECHNOLOGIES FOR SECURING ENERGY ORGANISATIONS
2. PS3 - MEETING THE CHALLENGES OF ENERGY TRANSITION WITH RELIABLE, SCALABLE, AND EFFICIENT TELECOMMUNICATIONS NETWORKS



CIGRE Sessione 2024 – D2 papers

1. 50 papers were accepted
 - PS1: 40 papers
 - PS2: 13 papers
 - PS3: 23 papers
2. Papers from Italy



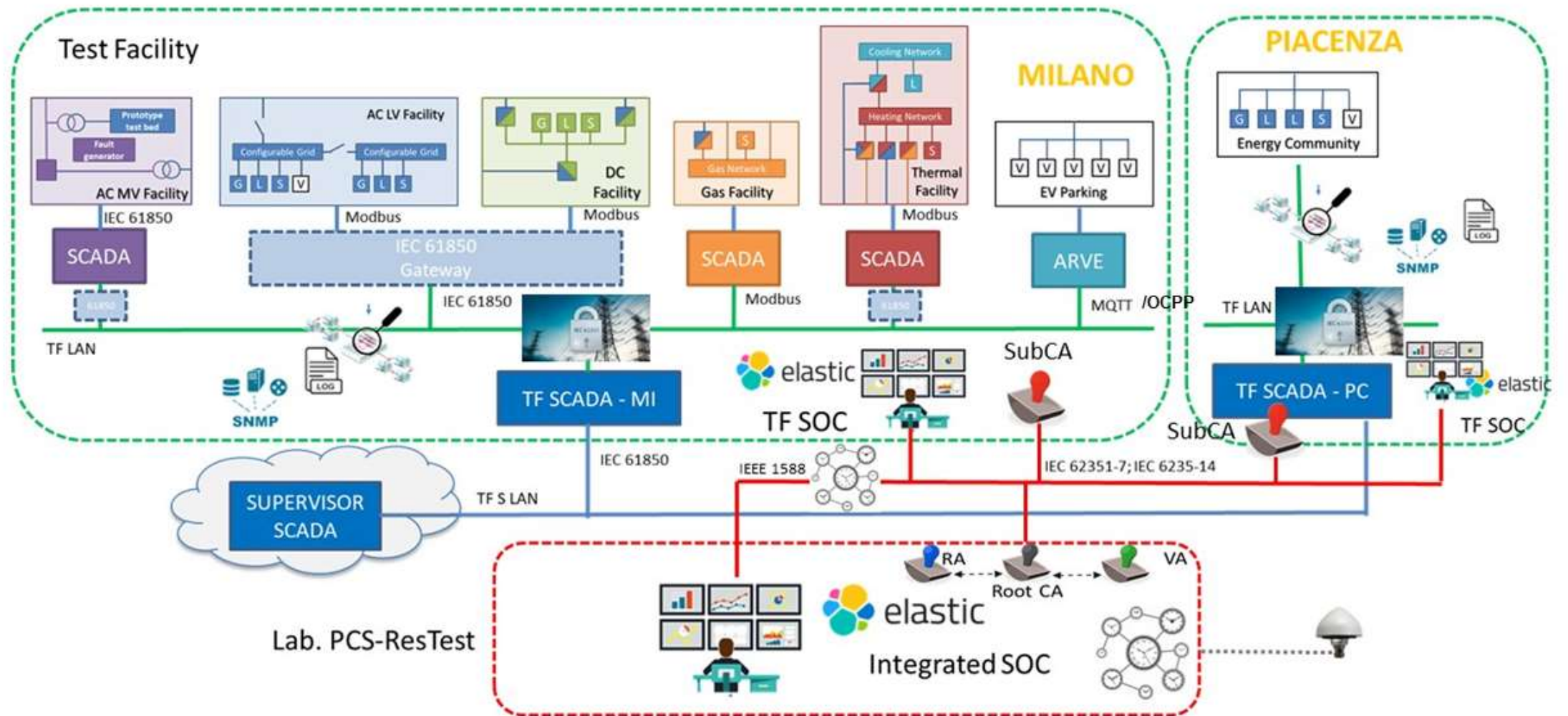
paperID	title	sa_country	topics	authors	organisations
10397	The journey of digitalization: how Smart Digital Substations can drive the Industrial Internet of Things revolution	Italy	D2 PS1 - IT/OT Solutions to improve the Efficiency and Resilience of Electric Power Systems	PEDRETTI, Alessandro	Hitachi Energy, Italy
10398	Digital twin for asset management of electric power systems based on IEC CIM and BIM integration	Italy	D2 PS1 - IT/OT Solutions to improve the Efficiency and Resilience of Electric Power Systems	BIONDA, Enea	RSE, Italy
10399	Market driven architecture for remote monitoring of HV assets	Italy	D2 PS1 - IT/OT Solutions to improve the Efficiency and Resilience of Electric Power Systems	SCARPACI, Sebastiano	HITACHY ENERGY, Italy
10400	Orchestrated ICT architecture for grid monitoring of distribution power grid	Italy	D2 PS1 - IT/OT Solutions to improve the Efficiency and Resilience of Electric Power Systems	TERRUGGIA, Roberta	RSE, Italy
10401	Cybersecurity In the Loop for multi energy infrastructures	Italy	D2 PS2 - Cybersecurity in Emerging Application Domains and Technologies for Securing Energy Organisations	DONDOSSOLA, Giovanna	RSE, Italy

CIGRE Sessione 2024 – PS2 papers



paperID	title	sa_country	topic
11228	Implementing a Protection Management System in AWS Cloud: Strict Cyber Security Standards & Rules and experience of system in Production	Peru	D2 PS2
10401	Cybersecurity In the Loop for multi energy infrastructures	Italy	D2 PS2
10656	The Elektrilevi's Advanced Remote Engineering Platform	Canada	D2 PS2
11204	Lessons Learned from Infrastructure Attacks on Substations A Lens on North and South America.	Colombia	D2 PS2
11780	Evaluation of the Maturity of Cybersecurity in the Colombian Power System	Colombia	D2 PS2
10770	Performing Risk Assessments of EV Charging Systems	Bosnia and Herzegovina	D2 PS2
11206	The Role of SDN Paradigm in Communication Systems for Digital Electrical Substations	Colombia	D2 PS2
11291	Implementation of Cyber Security in IEC 61850 based Substation Automation System – Experiences, Challenges and Enhancement in Prevailing Practices	India	D2 PS2
11296	Cyber Security Assesment of Digital Substation using Petri Nets	India	D2 PS2
11312	Hardened (Air-gapped) IT-OT Interconnection – A Case study on Proof of Concept in Context of Power System Operation	India	D2 PS2
11782	Analysis of High-Impact Scenarios for Cybersecurity in the Colombian Power System	Colombia	D2 PS2
11839	Enhancing Cybersecurity in Critical Infrastructure: Leveraging Next Generation Firewalls (NGFW) for Robust Protection in OT and Substation Environments	South Africa	D2 PS2
11205	A Strategy for Cyber Risk Mitigation in Smart Grids Through Traffic Management	Colombia	D2 PS2

Paper 10401: Cybersecurity In the Loop for multienergy infrastructures



CIGRE > CIGRE Symposia > Trondheim Symposium 2025

SYMPOSIUM THEME

PS1: Integration of renewable energy resources to the grid

- Environmentally friendly power grid and its equipment
- New applications and technologies applied to AC and DC onshore and offshore grid
- AC and DC onshore and offshore grid
- AC grid development, protection of the future meshed AC and DC system
- Sector integration including hydrogen, EV, energy hubs, DER
- Services/operation applied to AC and DC onshore and offshore grid
- Monitoring the system applied to AC and DC onshore and offshore grid
- Maintenance and Services applied to AC and DC onshore and offshore grid

PS2: Technologies supporting the power grid for energy transition to carbon neutral energy production

- Requirements for power grid and its equipment
- Inverter based control interacting with existing system and Converter stability issues (resonance stability, converter driven stability)
- Coordination between AC and DC networks
- Grid forming
- Multivendor interoperability
- New modelling tools
- Planning and operation of lower inertia system
- System analysis (technical)
- Black start and resilience aspects including DER integration
- Optimize and increase the capacity of the energy transmission network
- Reliability and security – critical infrastructure

SYMPOSIUM VENUE

Trondheim is the 3rd largest city of Norway. The university NTNU together with the SINTEF research institute leads the world in many technology-based research areas. Nidaros Cathedral is one of Trondheim's most famous tourist attractions and is worth a visit.

The venue for the Symposium will be Clarion Hotel Trondheim. 19 meeting rooms - with a capacity of 1800 participants for the largest one – make Clarion Hotel one of Scandinavia's largest convention centers. Discover the view on the fjord, enjoy the modern Nordic design and the vibrant atmosphere.



SUBMISSION OF SYNOPSES

Participants wishing to present and publish papers should submit synopses by following the instructions on <https://cigrenrccsymposium2025.com/>, where the synopses and paper templates are also available. All synopses, papers, and presentations must be in English. Please note that at least one author should present the paper at the symposium.



SC D2 sito web

- <https://d2.cigre.org>

[Contact us](#)[Quick Links](#)[Search](#)

[About SC D2](#)[Technical activities](#)[Events](#)[Publications](#)[Contact us](#)

Welcome to the SC D2

Information Systems and Telecommunication



About SC D2

Scope of work
Membership
Structure

Technical activities

Working Groups
Strategic plan
Annual reports

Events

Webinars
Sessions
Cigre Events

Publications

Technical Brochures
Green Book
Electra
Events' proceedings

[Connect with CIGRE](#)

[Contact us](#)

Quick Links

[CIGRE KIMS](#)
[SC D2](#)



cigre.italy@rse-web.it



cigre

For power system expertise