

CIGRE — Novedades en Power Quality y EMC

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Artículos y comunicaciones de sesión



1. C4_11284 (2026) — Monitorización PQ con PMU en renovables (Brasil) · SC C4
2. B4_12298 (2026) — Transformador híbrido y PQ en distribución · SC B4
3. A3_12249 (2026) — LPIT para medida de power quality · SC A3
4. C4_10575 (2026) — PQ en transformadores inverter duty · SC C4
5. C4_10175 (2026) — Modernización de monitorización PQ en transporte (Rumanía) · SC C4
6. C6_11693 (2026) — FV distribuida para mejora de PQ · SC C6
7. C6_12626 (2026) — Armónicos de carga de VE en distribución · SC C6
8. A3-10727 (2024) — LPVT de banda ancha para PQ y transitorios · SC A3
9. C4-113 (2016) — Informe de situación JWG C4.24 sobre PQ y EMC · SC C4

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TB 987 (2026) — Compatibilidad electromagnética en sistemas modernos

- **SC C4 · WG C4.68**
- Aborda los problemas de EMC —interferencia intra-sistema e inter-sistema— que trae la transición energética
- Recoge el estado del arte, técnicas de supresión y normativa de referencia
- *e-cigre.org/publications/detail/987-electromagnetic-compatibility-issues-in-modern-and-future-power-systems.html*

TB 928 (2024) — Estabilidad multifrecuencia en sistemas basados en convertidores

- **SC C4 · WG C4.49**
- Nuevas inestabilidades oscilatorias e interacciones entre convertidores en redes dominadas por electrónica de potencia
- Unifica definiciones y métodos de análisis de estabilidad de pequeña señal, con sistemas de referencia (benchmarks)
- *e-cigre.org/publications/detail/928-multi-frequency-stability-of-converter-based-modern-power-systems.html*

TB 913 (2023) — Sobretensiones temporales por resonancias armónicas de bajo orden

- **SC C4 · WG C4.46**
- Fenómeno en auge por el aumento de cable subterráneo en el transporte, que desplaza las resonancias a órdenes bajos (2º/3º)
- Aporta métodos de evaluación, pautas de modelado y soluciones de mitigación
- *e-cigre.org/publications/detail/913-evaluation-of-temporary-overvoltages-in-power-systems-due-to-low-order-harmonic-resonances.html*

TB 980 (2026) — Limitaciones de equipos de AT ante sobretensiones temporales frecuentes

- **SC A1 · A2 · A3 · B1 · JWG A3/A2/A1/B1.44**
- Clasifica las situaciones de red que generan TOV de corta y larga duración, hoy ya observadas en redes reales
- Evalúa el envejecimiento del aislamiento y las limitaciones funcionales en interruptores, transformadores y cables
- *e-cigre.org/publications/detail/980-limitations-in-operation-of-high-voltage-equipment-resulting-of-frequent-temporary-overvoltages.html*

TB 976 (2025) — Respuesta en frecuencia de los sistemas de medida de tensión

- **SC A3 · WG A3.45**
- Caracteriza la respuesta en frecuencia de transformadores de tensión convencionales y de baja potencia (LPIT)
- Clave para seleccionar la tecnología de medida adecuada en aplicaciones de power quality
- *e-cigre.org/publications/detail/976-methods-for-identification-of-frequency-response-characteristic-of-voltage-measurement-systems.html*

C4_11284 (2026) — Monitorización de PQ con PMU en renovables (Brasil)

- **SC C4 · Session Materials · ONS Brasil / UFSC / UTFPR**
- Usa la infraestructura de sincrofasores (PMU) ya instalada para medir THD en tiempo real en plantas renovables
- Permite detectar tempranamente incumplimientos en el punto de conexión (PCC), reduciendo la necesidad de campañas de medida offline
- *e-cigre.org/publications/detail/c4-11284-2026-online-monitoring-of-power-quality-indicators-in-renewable-power-plants...html*

B4_12298 (2026) — Transformador híbrido y calidad de suministro en distribución

- **SC B4 · Session Materials · Hitachi Energy / Enel**
- Prototipo de 250 kW instalado en Brindisi (Italia): combina transformador convencional con convertidores de potencia parcial
- Aporta estabilización de tensión, compensación de reactiva, equilibrado de fases y mitigación de armónicos
- *e-cigre.org/publications/detail/b4-12298-2026-advanced-management-and-power-quality-performance-of-hybrid-transformers...html*

A3_12249 (2026) — Transformadores de instrumentación de baja potencia para medida de PQ

- **SC A3 · Session Materials · Hitachi Energy / Electrosuisse**
- Revisa LPIT con interfaz digital (sampled values) como solución a la creciente demanda de medida de power quality
- Identifica carencias en las normas actuales y propone mejoras para su implantación en transporte
- *e-cigre.org/publications/detail/a3-12249-2026-low-power-intstrument-transformers-for-power-quality-metering.html*

C4_10575 (2026) — Problemas de PQ en transformadores inverter duty

- **SC C4 · Session Materials · VIT University (India)**
- Analiza fallos de transformadores IDT en plantas fotovoltaicas indias pese a cumplir la normativa IEEE
- Recomienda monitorización continua, gestión de PQ según IEC 63222 y análisis de causa raíz
- *e-cigre.org/publications/detail/c4-10575-2026-power-quality-issues-associated-with-inverter-duty-transformer.html*

C4_10175 (2026) — Modernización de la monitorización de PQ en transporte (Rumanía)

- **SC C4 · Session Materials · Transelectrica**
- Despliegue de analizadores Clase A en todas las subestaciones de AT, con captura de transitorios y clasificación automática de disturbios
- Mejora la visibilidad de red y la ciberresiliencia frente al gran volumen de datos diario
- *e-cigre.org/publications/detail/c4-10175-2026-news-regarding-the-electrical-power-quality-monitoring...html*

C6_11693 (2026) — Fotovoltaica distribuida para mejorar la PQ de la red

- **SC C6 · Session Materials · Saudi Electricity Co.**
- Control Q(U) de convertidores FV para regular la reactiva en función de la tensión
- Validado con DIgSiLENT en una red de 8 barras MT / 19 BT: mejora pérdidas y regulación de tensión
- *e-cigre.org/publications/detail/c6-11693-2026-photovoltaic-renewable-energy-systems-for-power-quality-improvement...html*

C6_12626 (2026) — Emisión armónica de la recarga de vehículo eléctrico

- **SC C6 · Session Materials · VTT Finlandia**
- Medidas de laboratorio en cargadores DC de 20 kW + simulación de un feeder de distribución finlandés
- THDi del 6-12% y THDv <8% (EN 50160); hasta 6 cargadores simultáneos sin superar los límites armónicos
- *e-cigre.org/publications/detail/c6-12626-2026-assessment-of-harmonic-emission-from-electric-vehicle-charging...html*

A3-10727 (2024) — Transformadores de tensión de baja potencia y banda ancha para PQ

- **SC A3 · Session Materials · M. Stoeckli et al.**
- Divisores CR/RC de baja potencia para medida de power quality y monitorización de transitorios rápidos en subestaciones MT/AT
- Experiencia de instalaciones de campo (ficha con acceso restringido a delegados de la Session)
- *e-cigre.org/publications/detail/a3-10727-2024-high-bandwidth-low-power-voltage-transformers...html*

C4-113 (2016) — Informe de situación del JWG C4.24 sobre PQ y EMC

- **SC C4 · Session Materials · Zavoda, Bollen, Rönnberg et al.**
- Informe de situación presentado en la Session 2016, precursor del posterior TB 719 (2018) sobre PQ y EMC en redes futuras
- Antecedente histórico útil para entender la evolución del tema en CIGRE
- *e-cigre.org/publications/detail/c4-113-2016-power-quality-and-emc-issues-associated-with-future-electricity-networks...html*

Draft TBs Recently Reviewed by SC C4

- **JWG C4.42/CIRED** — Continuous assessment of low-order harmonic emissions from customer installations
- **WG C4.43** — Lightning problems and lightning risk management for nuclear power plants
- **WG C4.47** — Power System Resilience
- **WG C4.55** — EMC-related very-fast transients in gas-insulated substations
- **WG C4.59** — Real-time Lightning Protection of the Electricity Supply Systems of the Future
- **JWG B1/C4.69** — Recommendations for the insulation coordination on AC cable systems
- **JWG B5/C4.61** — Impact of Low Inertia Network on Protection and Control

Grupos de Trabajo Activos



TBs expected for review soon

WG/JWG	Title	Expected submission
C4.44	EMC for Large Photovoltaic Systems	September 2026
C4.54	Protection of high voltage power network control electronics from the High-altitude Electromagnetic pulse (HEMP)	December 2026
C4.57	Guidelines for the Estimation of Overhead Distribution Line Lightning Performance and its Application to Lightning Protection Design	September 2026
C4.60	Generic EMT-Type Modelling of Inverter-Based Resources for Long Term Planning Studies	September 2026
C4.63	Harmonic power quality standards and compliance verification	December 2026
C4.65	Specification, Validation and Application of Harmonic Models of Inverter Based Resources	January 2027
C4.66	New concept for analysis of multiphase back-flashover phenomena of transmission lines due to lightning	September 2026
C4.67	Lightning Protection of Hybrid Overhead Lines	December 2026
C4.69	Qualifying the lightning response of tower-footing electrodes of transmission lines: methods of measurement	September 2026
C4.70	Application of space-based lightning detection in power systems	September 2026
C4.71	Small signal stability analysis in IBR dominated power system	December 2026
C4.74	Accurate Line and Cable Models for Steady-State and Transient Studies	January 2027
C4/A3/B2/B4.75	Guide to procedures for the creation of contamination maps required for outdoor insulation coordination	December 2026
B4/C4.93	Development of Grid Forming Converters for Secure and Reliable Operation of Future Electricity Systems	October 2026

Abrir en una ventana nueva

Grupos de Trabajo Activos



WG #	Title	Convener	Dates (Creation - Disbanding)	WG Reports
WG C4.74	Accurate Line and Cable Models for Steady-State and Transient Studies	H. Xue (China)	2023 - 2027	2025
WG C4.76	Overvoltage Protection in Switching Inductive Devices with Vacuum Circuit Breaker	Q. Yang (China)	2023 - 2026	2025
WG C4.77	Best practices for individual and collective conformity assessment of inverter-based resources during their lifetime	B. Badrzadeh (Australia)	2024 - 2028	2025
WG C4.81	Best practice modelling and study methods for large inverter-based loads for connection, planning and operation	B. Badrzadeh (Australia)	2026 - 2030	
JWG C4/A3/B2/B4.75	Guide to procedures for the creation of contamination maps required for outdoor insulation coordination	M. Marzinotto (Italy)	2023 - 2026	2025
JWG C4/D2.80	Quantum Information Science and Technology (QIST) for Reliable and Secure Power Systems	Y. Zhou (USA)	2026 - 2029	
B4/C4.103	AC Network Equivalents for HVDC and FACTS Project Studies	H. Suriyaarachchi (Canada)	2024 - 2027	2025
JWG A2/C4/D1.77	Design of transformers for very fast overvoltages	B. Jurisic (Croatia)	2025 - 2028	2025
JWG C4/B1/B2/B4.78	Interference effects between HVDC circuits and nearby metallic infrastructure	M. Nahzemi (Germany)	2025 - 2029	
JWG C4/A3.79	Temporary overvoltage protection technologies for high-voltage transmission systems with large-scale renewable energy bases	J. He (China)	2025 - 2029	
JWG A3/A2/B3/B4/C4.53	Inductive load switching in transmission and distribution systems	C. Heinrich (Germany)	2025 - 2029	
JWG B4/C4.100	Guide for Electromagnetic Transient Studies of VSC-HVDC connected offshore or onshore islanded wind farm	P. Rault (France)	2025 - 2029	
JWG C4/B4.82	Impedance-based Stability Assessment of Modern Power Systems	N. Modi (Australia)	2026 - 2029	

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Grupos de Trabajo Finalizados



These WGs have closed or been disbanded

WG #	Title	Convener	Published Technical Brochure	TB Publication Date
WG C4.51	Connection of Railway Traction Systems to Power Networks	D. Vujatovic (UK)	No Published Technical Brochure	n/a
WG C4.36	Winter Lightning – Parameters and Engineering Consequences for Wind Turbines	M. Ishii (Japan) - bio	No Published Technical Brochure	n/a
WG C4.50	Evaluation of Transient Performance of Grounding Systems in Substations and Its Impact on Primary and Secondary Systems	B. Zhang (China)	No Published Technical Brochure	n/a
WG C4.64	Application of Real-Time Digital Simulation in Power Systems	C. Fang (Canada)	No Published Technical Brochure	n/a
WG C4.68	Electromagnetic Compatibility (EMC) issues in modern and future power systems	P.E. Munhoz Rojas (Brazil)	TB 987: Electromagnetic Compatibility Issues in Modern and Future Power Systems	June 2026
JWG C4/C2.62/IEEE	Review of Advancements in Synchrophasor Measurement Applications	A. Rajapakse (Canada)	TB 975: Review of Advancements in Synchrophasor Measurement Applications	November 2025
WG C4.61	Lightning transient sensing, monitoring and application in electric power systems	J. He (China)	TB 955: Lightning Transient Sensing, Monitoring and Application in Electric Power Systems	January 2025
JWG C4/C2.58/IEEE	Evaluation of Voltage Stability Assessment Methodologies in Transmission Systems	U. Annakkage (Canada)	TB 943: Evaluation of Voltage Stability Assessment Methodologies in Modern Power Systems with High Penetration of Inverter-Based Resources	November 2024
JWG C1/C4.36	Review of Large City & Metropolitan Area power system development trends taking into account new generation, grid and information technologies.	V. Jesus (Brazil) S. Utts (Russia)	TB 922: Review of Large City & Metropolitan Area power system development trends taking into account new generation, grid and information technologies.	October 2024
WG C4.49	Multi-frequency stability of converter-based modern power systems	Ł. Kocewiak (Denmark)	TB 928: Multi-frequency stability of converter-based modern power systems	March 2024
JWG C4/A3.53	Application Effects of Low-Residual-Voltage Surge Arresters in Suppressing Overvoltages in UHV AC Systems	J. He (China)	Applying Low-Residual-Voltage Surge Arresters to Suppress Overvoltages in UHV AC Systems	December 2023
JWG C4/B4.52	Guidelines for Sub-synchronous Oscillation Studies in Power Electronics Dominated Power Systems	C. Karawita (Canada)	Guidelines for Subsynchronous Oscillation Studies in Power Electronics Dominated Power Systems	2023
WG C4.46	Evaluation of Temporary Overvoltages in Power Systems due to Low Order Harmonic Resonances	F. F. da Silva (Denmark)	Evaluation of Temporary Overvoltages in Power Systems due to Low Order Harmonic Resonances	August 2023
JWG A2/C4.52	High-frequency transformer and reactor models for network studies	B. Gustavsen (Norway)	TB 900: High-Frequency Transformer and Reactor Models for Network Studies - Part A: White-Box Models TB 901: High-Frequency Transformer and Reactor Models for Network Studies - Part B: Black-Box Models TB 902: High-Frequency Transformer and Reactor Models for Network Studies - Part C: Grey Box Models TB 903: High-Frequency Transformer and Reactor Models for Network Studies - Part D: Model interfacing and specifications TB 904: High-Frequency Transformer and Reactor Models for Network Studies - Part E: Measurements and transformer design details	2023
WG C4.56	Electromagnetic transient simulation models for large-scale system impact studies in power systems having a high penetration of inverter connected generation	B. Badrzadeh (Australia)	TB 881: Electromagnetic transient simulation models for large-scale system impact studies in power systems having a high penetration of inverter-connected generation	September 2022
JWG A1/C4.66	Guide on the Assessment, Specification and Design of Synchronous Condensers for Power Systems with Predominance of Low or Zero Inertia Generators	D. K. Chaturvedi (India)	TB 885: Guide on the Assessment, Specification, and Design of Synchronous Condenser for Power System with Predominance of Low or Zero Inertia Generators	November 2022
WG C4.48	Overvoltage Withstand Characteristics of Power System Equipment 35-1200 kV	I. Dudurych (Ireland)	No Published Technical Brochure	n/a
WG C4.39	Effectiveness of line surge arresters for lightning protection of overhead transmission lines	K. Tsuge (Japan)	TB 855: Effectiveness of line surge arresters for lightning protection of overhead transmission lines	December 2021
JWG C2/C4.41	Impact of high penetration of inverter-based generation on system inertia of networks	M. Rampokanyo (South Africa)	TB 851: Impact of High Penetration of Inverter-based Generation on System Inertia of networks	October 2021
WG C4.23	Guide to Procedures for Estimating the Lightning Performance of Transmission Lines	C. Engelbrecht (Netherlands)	TB 839: Guide to Procedures for Estimating the Lightning Performance of Transmission Lines by WG C4.23 (+ TB 063)	June 2021

Paris 2028 Temas Preferentes

DRAFT

PS1 : Grid Stability in the Age of Power Electronics

- **Power system modelling and validation**: event reproduction; RMS, EMT and hybrid simulations; model interoperability; impedance-based methods; AI-assisted modelling.
- **System strength and stability assessment**: screening methods, oscillation analysis, converter interactions, grid-forming converters, and wide-area monitoring.
- **Converter-dominated power systems and large inverter-based loads**: grid connection, modelling and assessment, interoperability, protection impact, testing, commissioning and operational experience.

PS2 : Power Quality and Electromagnetic Compatibility in the Electrified Future

- **Power quality impacts of large inverter-based loads**: data centres, hydrogen production, EV charging infrastructure, rapidly varying and converter-dominated loads.
- **Emission assessment and compliance**: harmonics, supraharmonics, emission allocation, uncertainty assessment, advanced measurement, simulation and AI-based analysis.
- **EMC, EMI and equipment performance**: non-standard waveforms, equipment stress, ageing and network interactions.

PS 3: Insulation Co-ordination, Lightning and High-Frequency Transients

- **Insulation co-ordination for modern power systems**: impacts of new switching technologies and non-standard waveforms, including novel surge-protection solutions.
- **Measurement, modelling and simulation of high-frequency transients and advanced substation technologies**: impulse-strength characteristics of alternative insulating gases, VFTO, modelling and simulation of modern substations.
- **Lightning performance and infrastructure interactions**: characterisation of lightning events, soil partial discharge and fire ignition, AC/DC interference and interactions with existing infrastructure.

Programa Técnico. Group Discussion Meeting

- Hay una **GDM** por comité
- Se plantean unos **Preferential Subjects** y el objetivo es generar debate y ponernos al día de lo que está sucediendo en torno a esos PS, basado en los Papers presentados

Within the above scope, SC C4 has selected **126 papers** aligning with the three Preferential Subjects (PS) for the 2026 CIGRE Session:

- **PS1:** Power system stability aspects of decarbonisation of power systems and the road to net-zero (77 papers).
- **PS2:** Power quality (PQ) and electromagnetic compatibility/interference (EMC/EMI) aspects of decarbonisation of power systems and the road to net-zero (30 papers).
- **PS3:** Insulation co-ordination and lightning research: paving the way to net-zero in decarbonised power systems (19 papers).

¿Cuál es el proceso de los Papers?



Los **Special Reporters** coordinan los comentarios de los revisores de los papers.

Los **Special Reporters** elaboran un **Special Report** que resume y clasifica los papers y plantea preguntas a la comunidad.

Los **Special Reporters** revisan las **Contribuciones**, organizan la GDM y la moderan


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