

Study Committee D2
Information Systems, Cyber Security,
and Telecommunications
Annual Regular Meeting – 27 August 2026



CIGRE SC D2

Key Take Aways Paris 2026

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What is SC D2

INFORMATION SYSTEMS



Voorbeelden onderwerpen

- Artificial intelligence,
- Big data,
- Cloud computing,
- Server infrastructure,
- Edge computing

TELECOMMUNICATIONS



Voorbeelden onderwerpen

- Legacy systems,
- Packet-switched networks,
- Network management and automation,
- wireless and cellular technologies

CYBERSECURITY



Voorbeelden onderwerpen

- Cybersecurity standards and regulation,
- Cybersecurity architectures,
- Cybersecurity guidelines and controls

CIGRE Paris 2026

AT A GLANCE

PARIS 2026
TOGETHER
FOR A STRONGER
SUSTAINABLE GRID

PEOPLE | KNOWLEDGE | INNOVATION | A SUSTAINABLE TOMORROW



DATES

23 – 28
August 2026

Six days of global collaboration
and knowledge sharing



LOCATION

Palais des Congrès
Paris, France

In the heart of a global city



PARTICIPANTS

9,000 – 15,000

Global power industry
professionals, engineers and
decision-makers

From **100+** countries



TECHNICAL PROGRAM

800 – 900

peer-reviewed technical papers

30+ Study Committee sessions

160+ Working meetings



EXHIBITION

17,300 m²

exhibition area
across three levels



EXHIBITORS

300+

international exhibitors

Including a dedicated

Start-up Pavilion



Agenda

What is SC D2

Paris 2026 in Five Key Messages

Major Achievements

PS1. Digitalization & AI Trends

PS2. Cybersecurity Trends

PS3. Telecommunications Trends

New Working Groups and Future Topics

Personal Observations & Closing

What is SC D2

Scope of SC D2:

- Information Systems, Telecommunications & Cybersecurity for Power Systems.

Main focus areas:

- Information systems for utilities
- Telecommunications networks
- Operational technology (OT)
- Cybersecurity
- Digitalisation and AI
- Grid communications and resilience

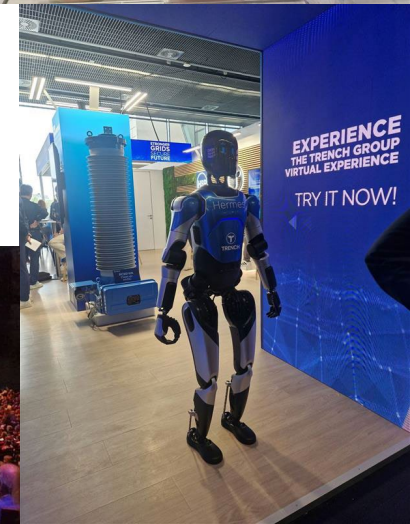
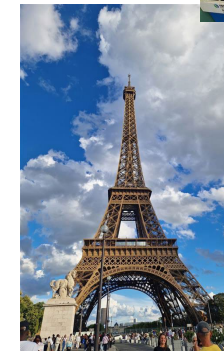
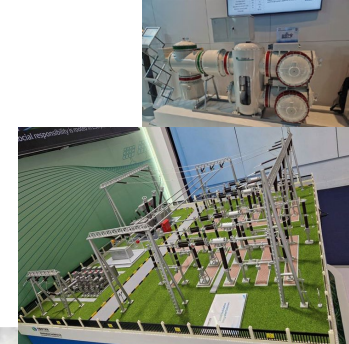
Why it matters:

- Reliable and secure digital infrastructure is becoming critical for the energy transition and increasing grid complexity.



Key takeaways from Paris

- AI is becoming mainstream in utilities
- Cybersecurity remains top priority
- Private LTE/5G adoption is accelerating
- Digital twins are moving into practice
- Quantum and cloud technologies are emerging





Achievements Since Last Meeting

Published Technical Brochures

- TB 990: Implementation of Security Operations Centers (SOC) in the Electric Power Industry as Part of the Situational Awareness System
- TB 996: Application of 5G Technology to Smart Grids
- TB 999: Lifelong Supervision and Management of Substations by Use of Sensors, Mobile Devices, Information and Communication Technologies
(*Joint WG with B3*)





Achievements Since Last Meeting

Publications

Topics published in:

- Future Connections Newsletter
- ELECTRA
- CIGRE Science & Engineering

Key themes:

- Cybersecurity regulation
- DER integration challenges
- Telecommunications innovation

- D2 published one article in “[Future Connections Newsletter](#)”:
 - #20 – January: “2025 CIGRE SC D2 International Roundtable on Optical and Wireless for Power Utilities”,
 - #21 – May: “[Regulating Cybersecurity for Electric Power Systems: Preliminary Findings from CIGRE WG D2.54](#)”
- Publication of articles in ELECTRA
 - #346 - June: “[Resilience at the Edge: DER Integration Challenges for Information Systems, Telecommunications, and Cybersecurity](#)”.
 - #347 - August: “[Regulating Cybersecurity for Electric Power Systems: Preliminary Findings from CIGRE WG D2.54](#)”.
- Publication of articles in CIGRE Science & Engineering (CSE)
 - #41 - June: “[Resilience at the Edge: DER Integration Challenges for Information Systems, Telecommunications, and Cybersecurity](#)”.

Working Groups Progress

Active Portfolio

- SC D2 continues to run a large number of working groups covering:
 - Cybersecurity
 - AI applications
 - Telecommunications
 - Information systems
 - Operational
 - Technology
 - Digital substations
- Strong pipeline of deliverables through 2027-2029.

WG	Title	Convener
JWG B2/D2.72	Condition Monitoring and Remote Sensing of Overhead Lines	Y. CHEN (CN) A. KULKARNI (GB)
WG D2.49	Augmented reality to support EPU's operation and maintenance	C. VILLASANTI (PY)
WG D2.52	AI Application and Technology on Power Industry	KUN LUN GAO (CN)
WG D2.53	Technology and Applications of Internet of Things in Power Systems	ZHENG YUN SUN (CN)
WG D2.54	Regulatory approaches to enhance EPU's cybersecurity frameworks	E. RAGAZZI (IT) U. FINARDI (IT)
WG D2.56	Interdependence and Security of Cyber-Physical Power System	QINGLAI GUO (CN)
WG A2/U2.55	Transformer Digital Twin – concept and future perspectives	P. PICHER (CA)
WG D2.57	CIM (Common Information Model) Methodology	R. BOGOMOLOV (RU)
WG D2.58	Monitoring, Maintenance and Control of Packet Networks & Services – From Situational Awareness to Network Control	B. SHEZI (ZA)
WG D2.59	Intelligent Computing for Power Industry	KUN LUN GAO (CN)
WG D2.60	Consumer-side Digital Models and Twins Application	Jose Ruiz (US)
WG D2.61	High Voltage Power Line Carrier Communications Current State and Future Application	Anton MERKULOV (KZ)
WG D2.62	Efficient spectrum allocation and utilisation for electric power industry private communication networks	David SUN (CN)
WG D2.63	Inter-Control Center Communications Protocol (ICCP) Security and Resilience for Grid Reliability	Junho HONG (US)
JWG A3/D2.52	Application of Digital Twin in Switchgear	Javier MANTILLA (CH)
WG D2.64	Application of AI in Cybersecurity Defence of Power Systems	Zhu CHAOYANG (CN)
WG D2.65	Optical Transport Communication Networks for Electric Power Utilities	Geng ZHANG (CN)
WG D2.66	Low Voltage Power Line Carrier Communications Application	Thuthukani BIYELA (ZA)
WG D2.67	Application of Digital Twin in Switchgear	Tianjiao PU (CN)
WG D2.68	Enhancing Access Management Cybersecurity in Power Utilities	Alan Soares (US)
WG D2.69	Strategies for Secure Identity and Access Management in Power OT Environments	TED
WG D2.70	Technologies and Practices of Enhanced IPv6 Packet Networks for the Smart Grid	David SUN (CN)
JWG C1/D2.56	Electrical-Cyber Integration to meet Net Zero Goal by support of Cloud Infrastructure	Keichiro Yamaki (JP)

Newly Approved and Emerging WGs

For power system expertise

Working Group – From ideas to impact



Global experts
for a sustainable
energy future

- **WG D2.66 — LV Power Line Carrier Communications** (Convener: Thuthukani Biyela, ZA)
- **WG D2.67 — Power Embodied Intelligence** (Convener: Tianjiao Pu, CN)
- **WG D2.68 — Access Management Cybersecurity** (Convener: Alan Soares, US)
- **WG D2.70 — Enhanced IPv6 Packet Networks** (Convener: Fuyou Sun, CN)
- **JWG C1/D2.56 — Electrical-Cyber Integration / Cloud** (Convener: Koichiro Yamaki, JP)
- **JWG C4/D2.80 — Quantum Information Science** (Convener: Zhou Yifan, US)
- **JWG A3/B3/D2/IEEE-PES.54 — Circuit-breaker testing database** (Convener: Andreas Nenning, AT)
- **WG D2.69 (Secure IAM in Power OT) remains at proposal stage — ToR not yet established**

TOGETHER
FOR TOMORROW



Workshop Highlights

- What utilities worldwide are discussing:
- Grid modernization
- Telecom migration to IP
- Cloud versus on-premise architectures
- Practical AI applications
- Cybersecurity risks
- IT/OT integration
- Workforce and skills shortages
- Cost and investment challenges



Common observation: regardless of geography, utilities face remarkably similar challenges.

CIGRE Symposium Heidelberg

28 to 29 April 2027

- No SC D2 regular meeting will be held in this event. The call for papers is open until November 02, 2026.
- SC D2 is contributing by reviewing the papers and will offer a workshop/tutorial during the event.

The preferential subjects related to SC D2 are:

PS1 - One Grid:

- Protection, Automation and Control for High Penetration of Distributed Energy Resources

PS2 - Grid Equipment:

- Substations as Hubs for Power and Information between Transmission and Distribution
- Evolutions of Asset Management, Monitoring and Environmental Requirements

PS3 - System Management:

- Interfaces, Data Models and Communication Network Architecture
- Physical Resilience and Cybersecurity

CIGRE International Symposium Bangkok

08 to 12 November 2027

- SC D2 is the technical co-chair of this event, and the regular meeting will take place there. The call for papers is open until January 11, 2027.

The preferential subjects are:

- **PS1 - Renewable Energy Integration, Storage and Cross-border interconnections**
 - Grid operational codes, TSO–DSO coordination, big-data based forecasting for congestion management and situational awareness. Enhanced techniques for TSO-DSO co-simulation and data exchange
- **PS2- Digitalization and Smart Monitoring for the Enhancement of Power Systems**
 - Application of Artificial Intelligence and Machine Learning (AI/ML) and advanced data analytics for transmission and distribution online monitoring, predictive maintenance, fault detection, power quality and power system stability

CIGRE International Symposium Bangkok

08 to 12 November 2027

- **PS2- Digitalization and Smart Monitoring for the Enhancement of Power Systems**
 - Cybersecurity and communication technologies for secure and reliable operation of transmission and distribution grids
 - Smart substations and advanced electrical installations for digitalized grid operation
 - Innovative asset management and diagnostics, including Building Information Modeling (BIM), drone inspection, and Internet of Things (IoT) sensors, to extend the life cycle of transmission and distribution equipment
- **PS3 - Grid Infrastructure for Future Energy Transition and Decarbonization**
 - Asset management strategies under high renewable penetration, including inspection, predictive maintenance, refurbishment planning, climate stress and aging infrastructure – balancing reliability, cost, and sustainability



PS1 – DATA, AI, DECISION SUPPORT & GRID COMPLEXITY

- ☐ **TA01** AI/ML for power-system decision support
- ☐ **TA02** Smart grid, distribution automation and DER integration
- ☐ **TA03** Predictive maintenance and asset diagnostics
- ☐ **TA04** Load, generation and renewable forecasting
- ☐ **TA05** Flexibility, grid optimization and power-system planning
- ☐ **TA06** LLM, NLP and document automation
- ☐ **TA07** Renewable, BESS, EV and energy-transition applications
- ☐ **TA08** Telecom management, OSS/BSS, NMS and OT operations
- ☐ **TA09** Data quality, validation and anomaly detection
- ☐ **TA10** Data governance, historians and information management
- ☐ **TA11** Knowledge graphs, CIM and semantic interoperability
- ☐ **TA12** PMU, synchrophasor, WAMS and oscillation monitoring
- ☐ **TA13** Digital twins and digital models
- ☐ **TA14** Cloud, HCI, virtualization and microservices for OT

PS2 – CYBERSECURITY IN ENERGY APPLICATIONS

- ☐ **TA15** OT cybersecurity architecture and grid cyber resilience
- ☐ **TA16** Protection automation, PAC/PACS and relay engineering
- ☐ **TA17** Digital substations, process bus and sampled values
- ☐ **TA18** SCADA, EMS, ADMS and control-centre architectures
- ☐ **TA19** Cyberattack modelling, ICS kill chain and stress testing
- ☐ **TA20** IEC 62443, IEC 62351 and cybersecurity standards
- ☐ **TA21** IDS/IPS, SIEM, SOC and cyber incident response
- ☐ **TA22** Wide-area protection, SPS/RAS and WAMPAC
- ☐ **TA23** Cyber vulnerability, risk assessment and compliance
- ☐ **TA24** Cryptography, quantum-safe security and secure channels
- ☐ **TA25** IT/OT convergence, Purdue, Zero Trust and segmentation

PS3 – TELECOMMUNICATIONS FOR DECARBONISATION & DIGITALISATION

- ☐ **TA26** IP/MPLS, MPLS-TP, SRv6 and packet transport
- ☐ **TA27** IEC 61850 and substation automation systems
- ☐ **TA28** IoT, sensors, edge devices and remote monitoring
- ☐ **TA29** Line differential, distance protection and teleprotection
- ☐ **TA30** Wireless utility communications: private LTE, 5G and Wi-Fi
- ☐ **TA31** Legacy TDM/SDH/PDH migration and service emulation
- ☐ **TA32** QoS, latency, traffic engineering and network performance
- ☐ **TA33** Optical, microwave, PLC and hybrid communications
- ☐ **TA34** GOOSE, R-GOOSE and IEC 61850-90-5 messaging
- ☐ **TA35** Functional safety, field deployment and operational experience
- ☐ **TA36** IEC 60870-5-104, DNP3 and industrial protocol integration
- ☐ **TA37** Time synchronization, PTP and clocking

PS1: Digitalisation, AI and Business Applications

33 papers, 25 questions,
22 contributions

- Data quality is becoming as important as physical infrastructure.
- AI is moving from experimentation to operational support:
 - Predictive maintenance
 - Forecasting
 - Grid monitoring
 - Decision support
- Digital twins, governed network models and integrated IT/OT platforms are becoming essential for managing grid complexity.
- Human oversight remains critical:
 - AI must be explainable
 - Results must be validated
 - Utilities must avoid automation bias

The value is no longer in collecting data, but in turning trusted data into actionable decisions.

PS2: Cybersecurity & Grid Resilience

Cybersecurity by Design

28 papers, 24 questions,
18 contributions

- Cybersecurity is now a core engineering requirement, not just an IT topic.
- Utilities are moving from isolated controls to:
 - Defence-in-depth
 - Zero Trust principles
 - IT/OT integration
 - Continuous monitoring
- Security must preserve:
 - Availability
 - Deterministic performance
 - Operational reliability
- AI, Digital Twins and Quantum-Safe technologies are emerging, but fundamentals remain key:
 - Segmentation
 - Hardening
 - Standards-based architecture

Cyber resilience depends on secure-by-design architectures combined with continuous monitoring and operational awareness.

PS3: Telecommunications

Communications Enabling the Energy Transition

45 papers, 23 questions,
32 contributions

- Utilities are migrating from legacy TDM networks to packet-based IP/MPLS networks.
- Mission-critical services require:
 - **Ultra-low latency**
 - **High availability**
 - **Accurate time synchronisation**
- No single communication technology is sufficient:
 - Fibre
 - Microwave
 - Private 5G
 - Wi-Fi must work together.
- Telecommunications are becoming strategic infrastructure for digital grids.

Reliable communications are becoming just as critical as electricity infrastructure itself.

Preferential Subjects

- The future grid is more intelligent, more connected, more autonomous and more secure.
- **Overall D2 message: Secure • Connected • Intelligent Power Systems**

PS	Theme	Message
PS1	Data & AI	From data to decisions; AI is becoming operational
PS2	Cybersecurity	Secure by design; Cybersecurity is becoming foundational
PS3	Telecommunications	Connected for the energy transition; Telecommunications are becoming software-defined and IP-based

Intelligent

Secure

Connected

My Personal Reflection

AI	Cybersecurity
Becoming Operational	Becoming Foundational
From pilots to real-world utility applications	Security by design across the digital grid

Telecommunications	Utilities Worldwide
Strategic Infrastructure	Shared Challenges
Enabling the energy transition	Digitalisation, cybersecurity and grid complexity



Final Reflection: The future grid is not only becoming more electrified. It is becoming more digital, more connected and more intelligent.

Questions?

CIGRE Paris 2026

Study Committee D2

Information Systems, Telecommunications & Cybersecurity



Data & AI



Cybersecurity



Telecommunications

