

CIGRE Next Generation Network Forum

Hanwen Zhang (NGN UK)



Date: 26 August 2026



Time: 11:00 – 14:00, Paris time



Location: Room 252AB



Duration: 3 hours

NGN Forum facilitator

Hanwen Zhang

CIGRE NGN UK

- Researcher working on DC systems and advanced DC conversion technologies at the University of Bath, UK.
- PhD in Energy Technology from Aalborg University, Denmark.
- CIGRE Experience
 - Student observer of CIGRE JWG C6/B4.37
 - 2024 CIGRE Denmark NGN Showcase Competition
 - CIGRE Paris 2024 and poster session
 - 2026 CIGRE NGN Forum Lead



Agenda



Session 1 (11:00 – 12:20)

- **Yousef Pipelzadeh (PSCAD) | 11:05 – 11:25**
Wide-area EMT Modelling of TSO Transmission Networks for Converter-Dominated Power Systems: Global Experience, Computational Advances, and Emerging Grid Challenges
- **Konstantin Papailiou (CIGRE President) | 11:25 – 11:35**
CIGRE leadership remarks : Quo vadis
- **Conor Mulholland and Aditie Garg (International NGN Chair and Vice-Chair) | 11:35 – 11:40**
International NGN activities and pathways
- **Pikria Elizarashvili (Chair) | 11:40 – 12:20**
NGN Forum Panel Discussion
Yousef Pipelzadeh, Konstantin Papailiou, Nenad Uzelac, Gen Li, Conor Mulholland and Aditie Garg

Session 2 (12:40 – 14:00)

- **Michael Heyeck (Vice-President Finance) | 12:40 – 12:50**
CIGRE leadership remarks
- **NGN Presentations | 12:50 – 13:30**
Representatives from Brazil, China, Denmark, Japan, South Africa, Sebia and the United States
- **NGN Panel Discussion | 13:30 – 13:45**
Pikria Elizarashvili (Chair) and NGN representatives
- **IEC Talk | 13:45 – 13:55**
Asmita Schoettli (IEC)
- **Closing Remarks | 13:55 – 14:00**
Hanwen Zhang

Wide-area EMT modelling and emerging challenges in converter-dominated power systems

Yousef Pipelzadeh

**Director of European Operations at
Manitoba Hydro International**





Wide-area EMT Modelling of TSO Transmission Networks for Converter-Dominated Power Systems:

Global Experience, Computational Advances, and Emerging Grid Challenges

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When the grid oscillates at 8 Hz

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Severe voltage disturbances on the GB transmission system — North of Scotland, 24 August 2021



THE EVENT

Severe voltage disturbances recorded on the 400 kV transmission system, centred in the North of Scotland.



THE SIGNATURE

Sustained voltage oscillations at ≈ 8 Hz, reaching ± 35 kV — roughly 9% of nominal voltage.

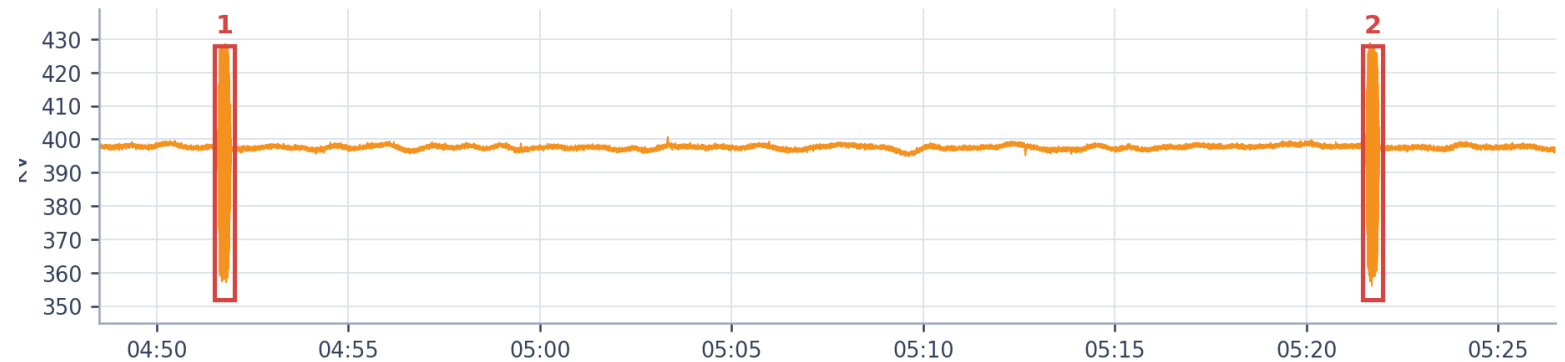


THE PATTERN

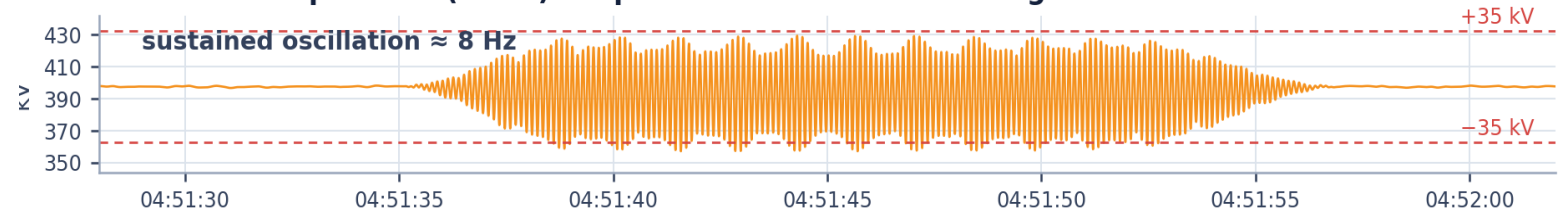
Two episodes of 20–25 seconds, ~ 30 minutes apart — a persistent interaction, not a one-off transient.

400 kV system voltage — key location, North of Scotland

24 August 2021



Disturbance episode 1 (zoom) — episode 2 shows the same signature



THE IMPLICATION

Events like this have made large-scale EMT modelling and studies essential.

01 Beyond RMS validity

≈ 8 Hz converter-control interactions sit outside phasor-domain assumptions — only EMT simulation reproduces this behaviour.

02 Wide-area, OEM-level detail

Root-cause and mitigation studies demand EMT models spanning wide network areas, with vendor control replicas.

03 From niche to mandate

Grid codes now require EMT model provision (GB GC0141) — wide-area EMT screening is core planning practice.



Recent Examples of Industry-Wide EMT Projects

Wide-area EMT models delivered with TSOs and system operators

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Example 1 National Grid — Transmission Owners' Tools for EMT Modelling



Example 2 Red Eléctrica — Grid-Forming VSC HVDC Operation in the Balearic Islands

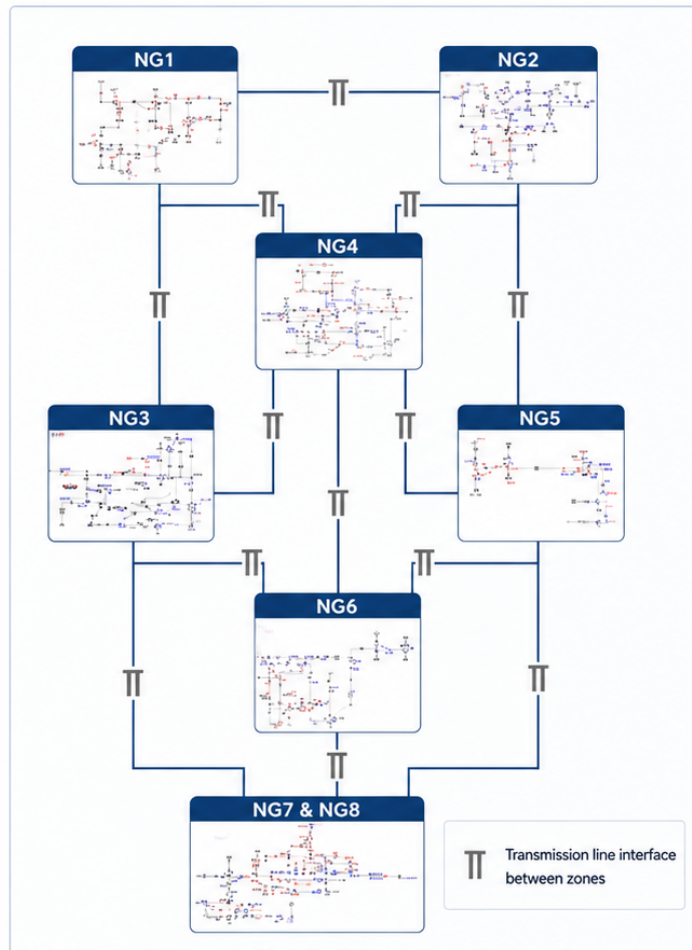
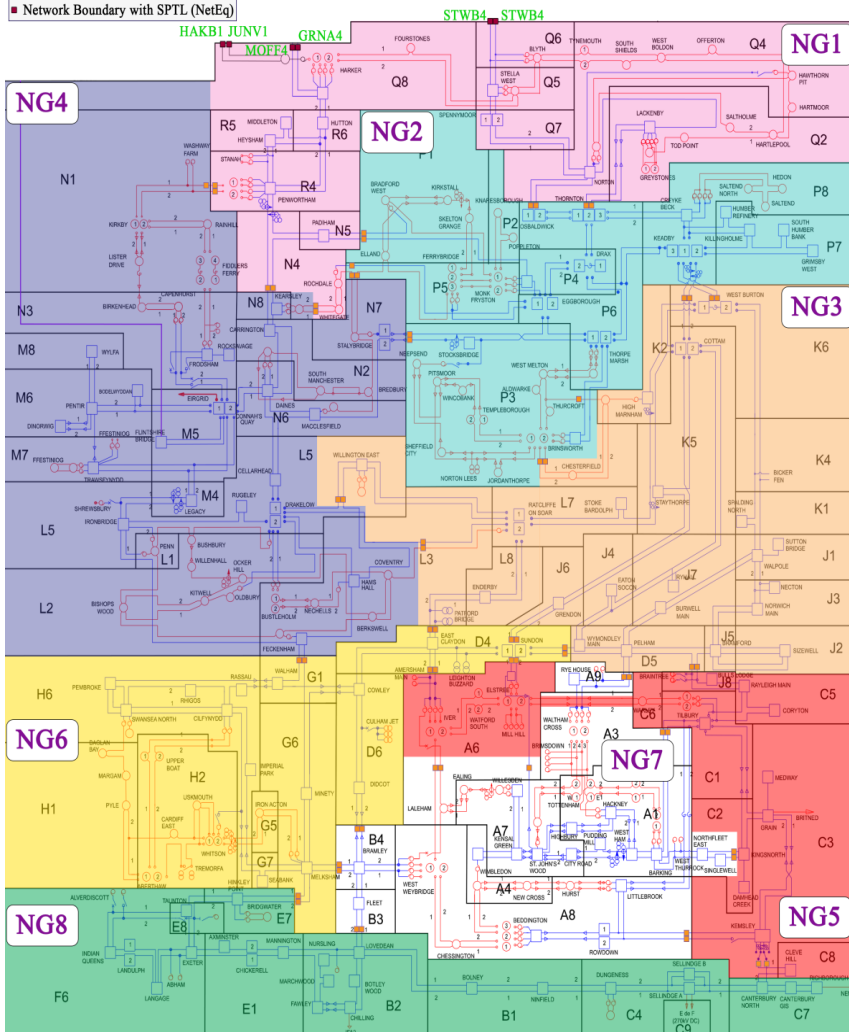


Example 3 Energinet — Danish Grid EMT System

Advanced Large Scale EMT Model of Great Britain System

Legend

- Electrical Network Interface
- Network Boundary with SPTL (NetEq)



Full National Grid segmented into 8 zones

National Grid EMT Model. All 8 zones are connected via PNI



Paris Session 2026
August 23 to 28
Palais des Congrès, Paris, France

11814

C4 Power System Technical Performance
PS1 - Power system stability aspects of decarbonisation of power systems and the road to net-zero

Advanced Large-Scale EMT Modelling for
the Scottish Transmission System – Capabilities & Experiences

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SUMMARY

This paper presents the development, validation, and operational deployment of a large-scale electromagnetic transient (EMT) model of the Scottish transmission system to support planning, operability, and Grid Code compliance studies under high inverter-based resource (IBR) penetration. The contributions of this work include: (i) scalable network partitioning and parallel execution strategies enabling 20s wide-area EMT simulations within planning timescales; (ii) robust integration of multiple vendor-specific EMT models using staged initialisation and multi-rate simulation; and (iii) application of the model to system-level stability, compliance, and impedance-based oscillation screening studies. Practical lessons learned from model conversion, validation, performance optimisation, and operational use are provided to support other transmission system operators developing network-scale EMT capability.

KEYWORDS

Inverter-Based Resources (IBRs); Electromagnetic Transient (EMT) Simulation; Scottish Transmission System; Transmission Owner Tools for EMT Modelling (TOTEM); Vendor Models; Parallel Processing; Future Grid; GB-wide EMT Studies.



Overview of the System

GB transmission network — from 30,000-bus RMS case to wide-area EMT model

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30,000-bus

PLANNING NETWORK

11–400 kV

VOLTAGE LEVELS

Distribution voltages through to the highest transmission voltages.

200 GENERATION ASSETS

200+ conventional generators and
40+ converter-connected devices.

60 MODEL SEGMENTS

The network case and the vendor models sit in separate project cases.



System Model Features and Capabilities

Tools and automation developed to support large-scale EMT studies

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Multi-time-step support

Incorporates vendor models with unique time steps.



Re-initialization

Automatic re-initialization of PSCAD from PSS®E for various dispatch conditions.



Contingency handling

Automated application of contingencies.



Post-processing

Evaluation of simulation results for detailed insight.



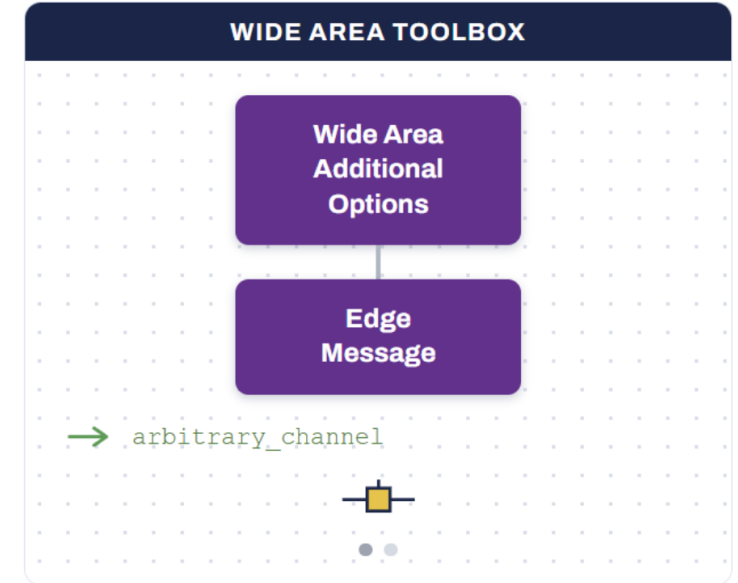
Automated reporting

Full impact assessment with automated report generation.



Simulation speed

A 30-second network simulation runs in approximately **10 minutes** (V5.1).



KEY POINTS

- Built-in capabilities reduce manual effort and improve study efficiency.
- Supports repeatable, well-documented simulation studies.
- Compatible with the PSCAD V5 (PNI) platform.



Steady-State Validation Results

Power flow & short-circuit comparison — PSCAD™/EMTDC™ vs. PowerFactory

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POWER FLOW COMPARISON

Active & reactive power at 400 kV (at POI)

Branch	Voltage level (kV)	Active Power (MW)		Reactive Power (MVar)	
		PowerFactory	PSCAD	PowerFactory	PSCAD
Branch A	400	222	224	-200	-198
Branch B	400	1317	1321	44	47
Branch C	400	483	481	-7	-8
Branch D	400	-330	-331	48	48



POWER FLOW GOOD AGREEMENT

Max. active-power difference **4 MW (0.3%)**

Max. reactive-power difference **2 MVar (1.0%)**



SHORT-CIRCUIT COMPARISON

3-phase fault current (symmetrical RMS)

Zone	Location	Voltage level (kV)	Short-Circuit Current (kA)			
			PSCAD	PowerFactory	Diff. (kA)	Diff. (%)
NG1	Station A	400	24.0	24.6	0.6	2.4%
	Station B	400	19.9	20.2	0.3	1.5%
	Station C	400	23.6	23.8	0.2	0.8%
	Station D	400	31.8	31.8	0.0	0.0%
NG2	Station E	400	31.0	30.8	0.2	0.6%
	Station F	400	39.2	40.2	1.0	2.5%
	Station G	400	23.5	24.3	0.8	3.3%



SHORT CIRCUIT GOOD AGREEMENT

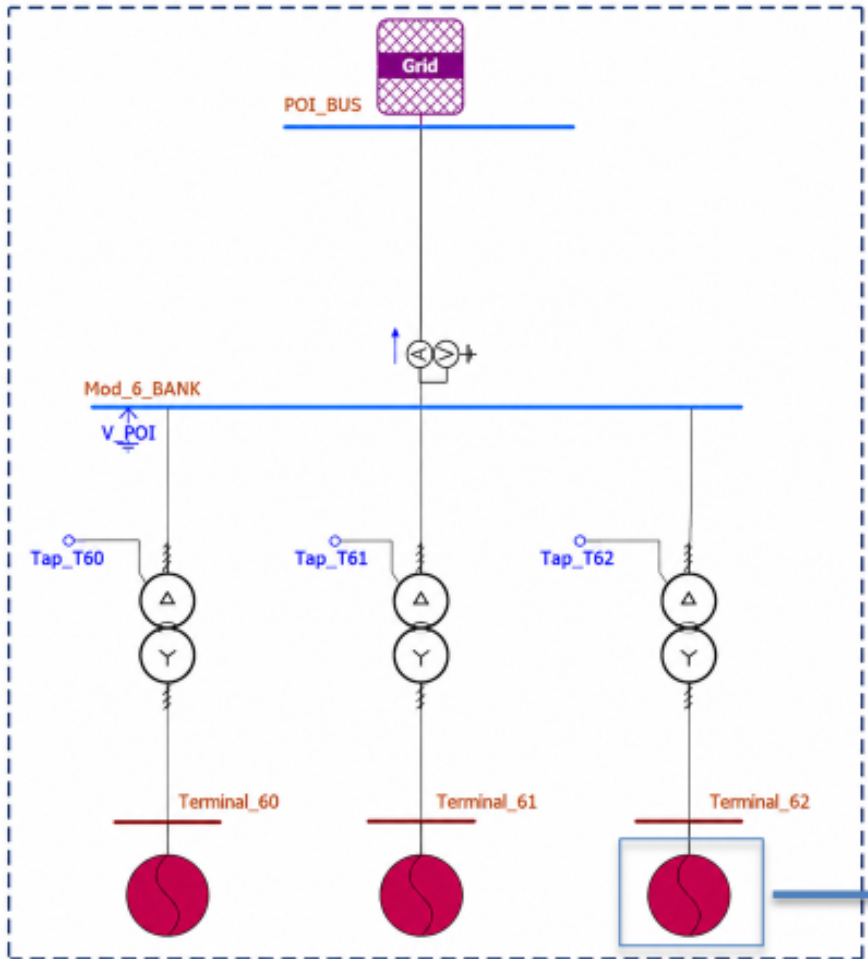
Max. current difference **1.0 kA (3.3%)**

All differences within **±3.5%**



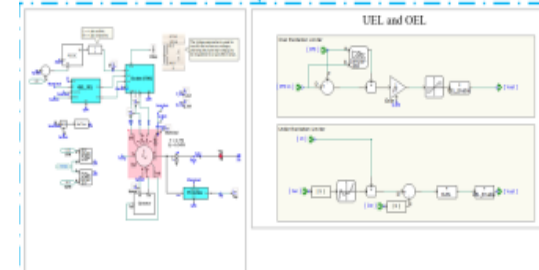
These results confirm the accuracy of the network-data conversion and model representation in PSCAD™/EMTDC™, giving confidence in the subsequent dynamic studies performed on the full EMT model.

PLANT SINGLE-LINE DIAGRAM — PSCAD

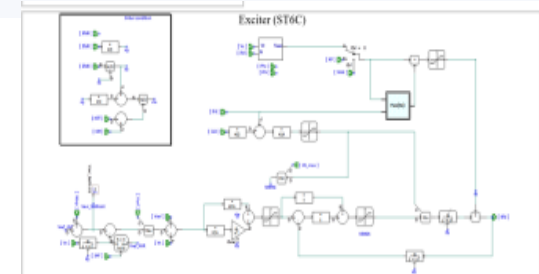


Three machine banks behind unit transformers, connected at **POI_BUS**

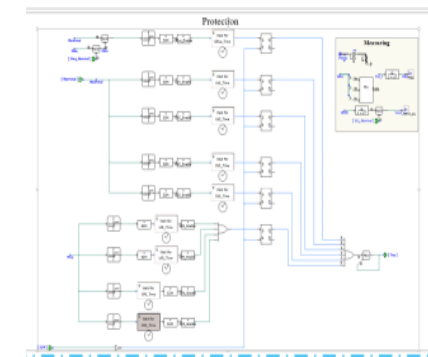
1 · UEL AND OEL



2 · EXCITER



3 · PROTECTION & MEASURING





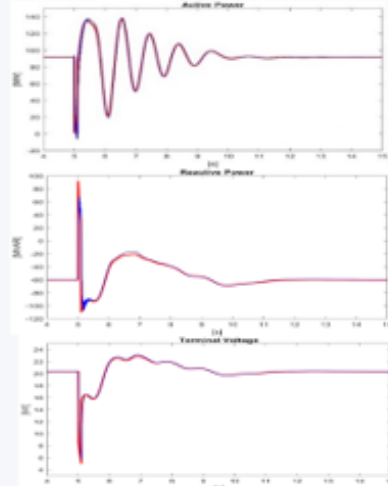
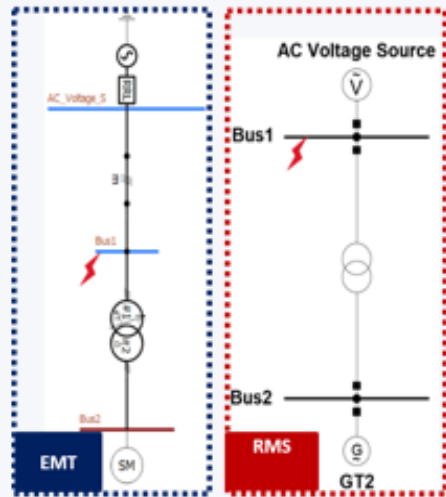
Dynamic Plant Model Benchmarking

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SMIB tests for fault and governor response, supported by field measurement validation

1 Controlled SMIB validation

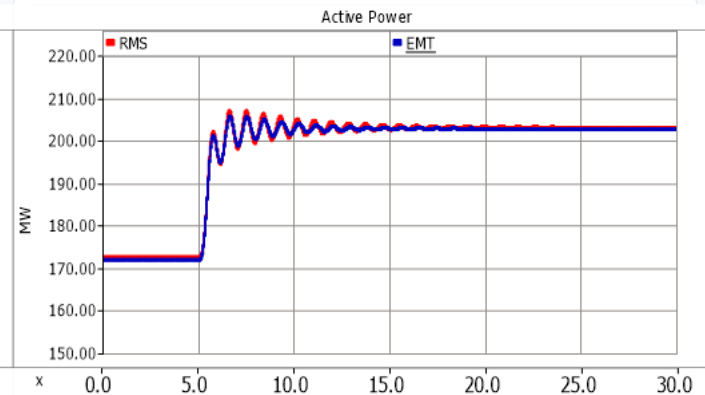
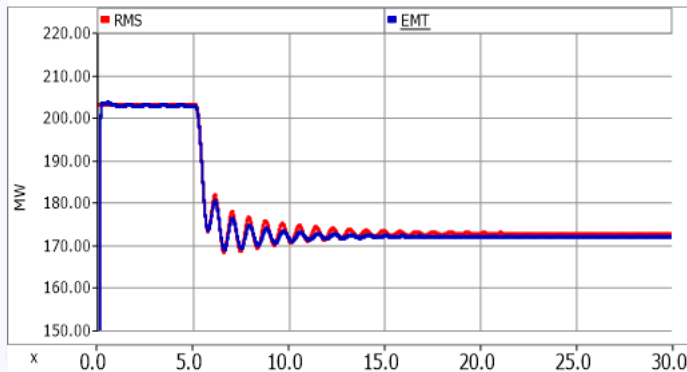


Fault test

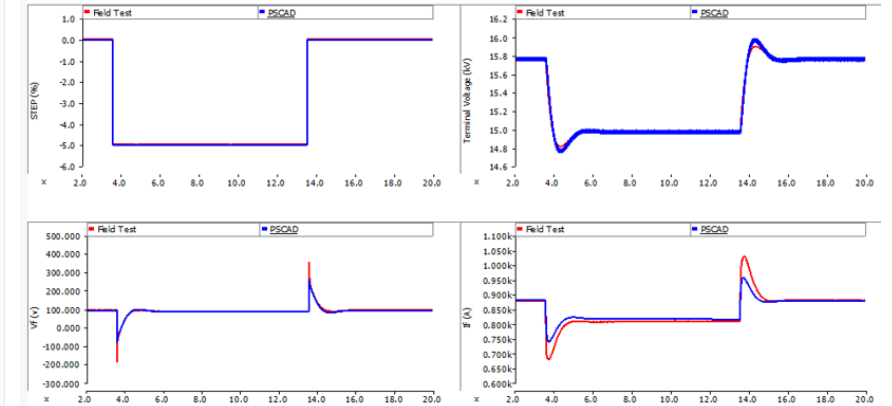
Three-phase solid fault at PoC validates **AVR, PSS, UEL and OEL**.

RMS vs EMT comparison

± 0.1 pu P_{ref} step change validates GOV active-power response



2 Field measurement validation



Field test traces vs PSCAD response

Confirms plant-level voltage, current and control behaviour under measured disturbances.

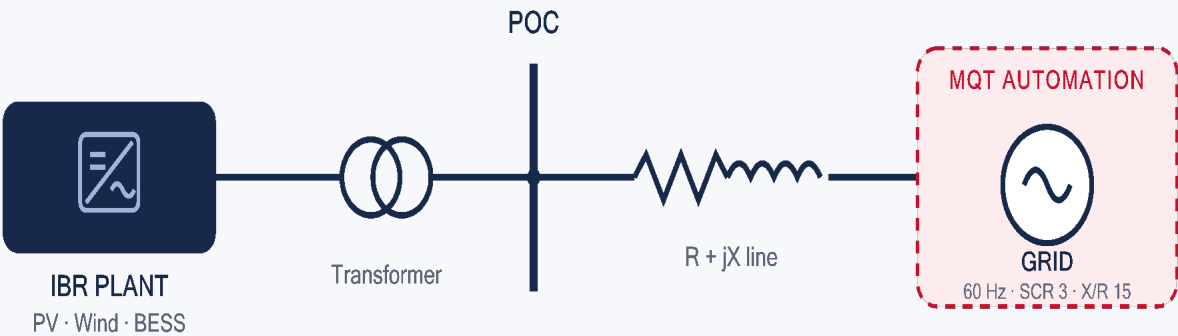
Prove each generator and controller model behaves consistently with RMS and measured data **before integration into the wide-area EMT system model.**



Automated Model Quality and Dynamic Response Testing

SMIB grid

MQT automation drives the grid source through the full disturbance sweep at the POC.



Sweep:

3φ & unbalanced faults

Voltage steps

Frequency ramps 4 Hz/s

SCR / X/R sweeps

phase jump

Automated test suite

Cases are built from one base case, run in parallel and exported.

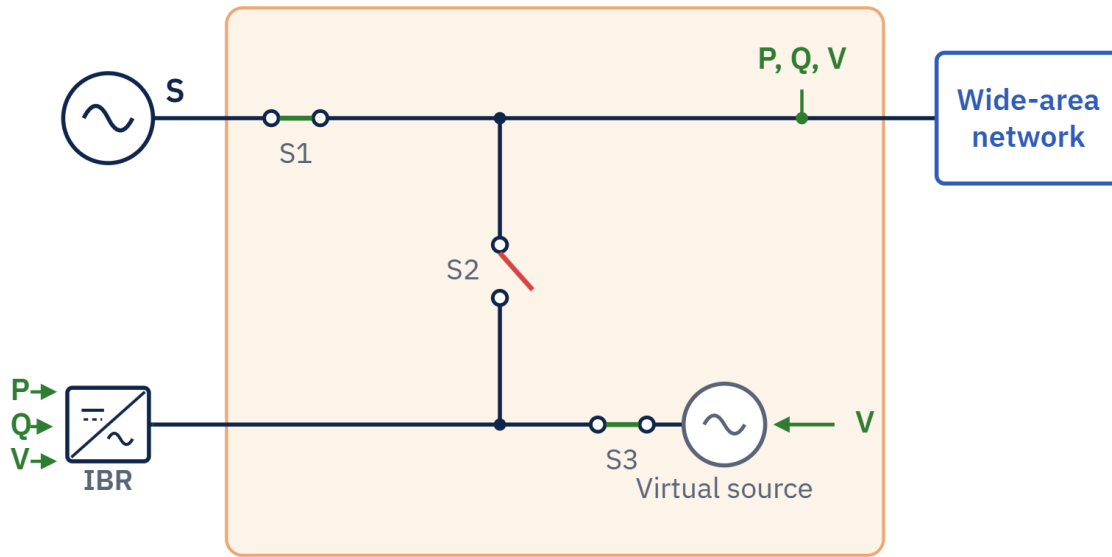
```
# DMAT — run full MQDRT suite
for test in suite: # 34 tests
    case =build(base, test)
    run_parallel(case) # PSCAD ×N
    export(case, ["csv","pkl"])
```

TEST QUEUE		27 / 34 complete
T09	Voltage step	✓ passed
T17	Frequency response	✓ passed
T21	Power set-point step	✓ passed
T23	3φ fault ride-through	● running
T31	LV current injection	○ queued

STAGE 1 · INITIALISATION

$t < T_{\text{integration}}$

VENDOR-SPECIFIC MODEL

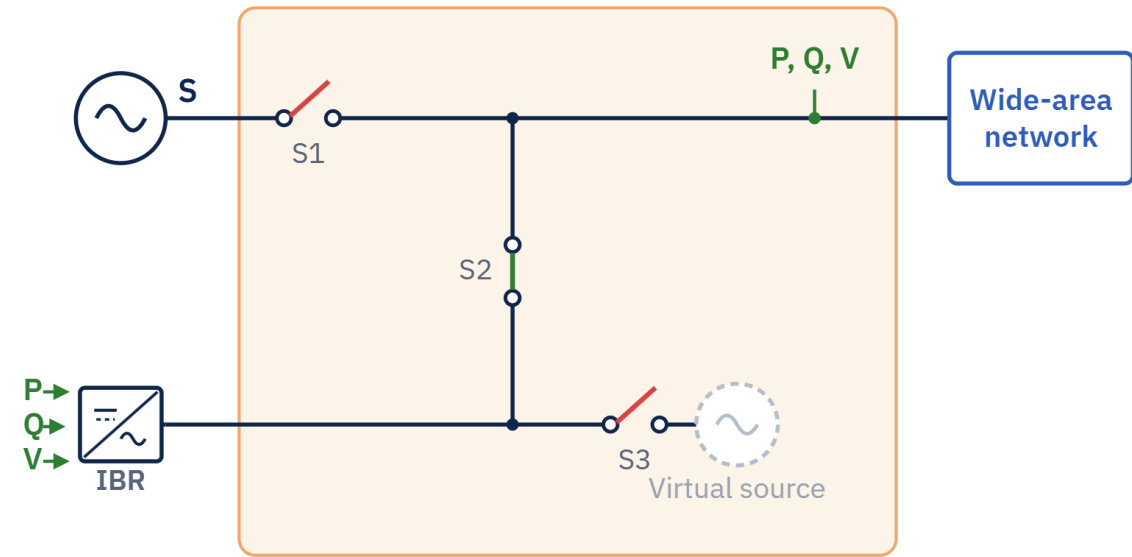


Vendor model initialises against a **virtual source** while the system source supplies the network.

STAGE 2 · INTEGRATION

$t \geq T_{\text{integration}}$

VENDOR-SPECIFIC MODEL



Switches swap at the integration time — the **vendor model takes over** supplying the network.



Boundary Selection & Reduction

Two analytical methods for a defensible EMT study boundary

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1. Voltage-dip screening

Apply a three-phase fault at the point of interconnection (POI) and compute residual voltages across the network. Buses whose residual voltage falls below the threshold — typically **0.90 p.u.** — define the radial extent of the EMT study area: an analytically derived boundary for fault-ride-through and protection screening.

2. Harmonic impedance reduction

Starting from the POI, expand the retained network level by level, re-scanning the harmonic impedance against the full-network reference at each step. The automation stops once the reduced scan meets the prescribed **impedance-fidelity criterion** — the smallest study area that preserves the frequency-dependent behaviour seen at the POI.

The study boundary is set by measurable, repeatable evidence — not engineering judgement



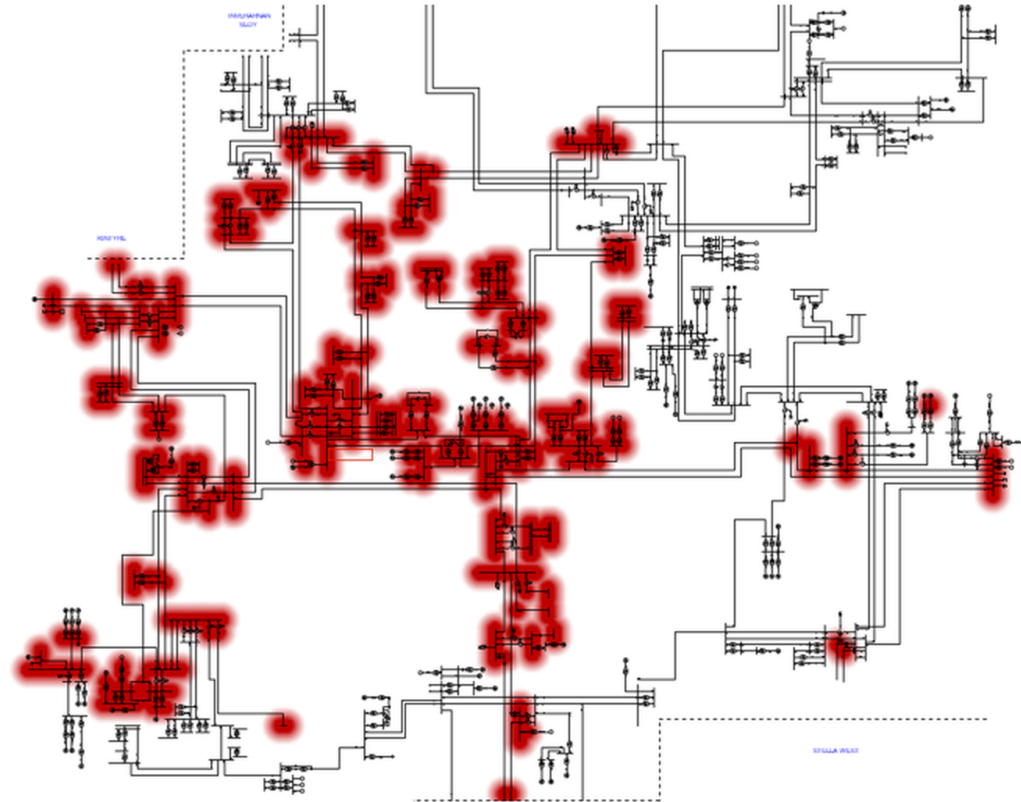
Boundary Selection & Reduction

Based on voltage-dip screening

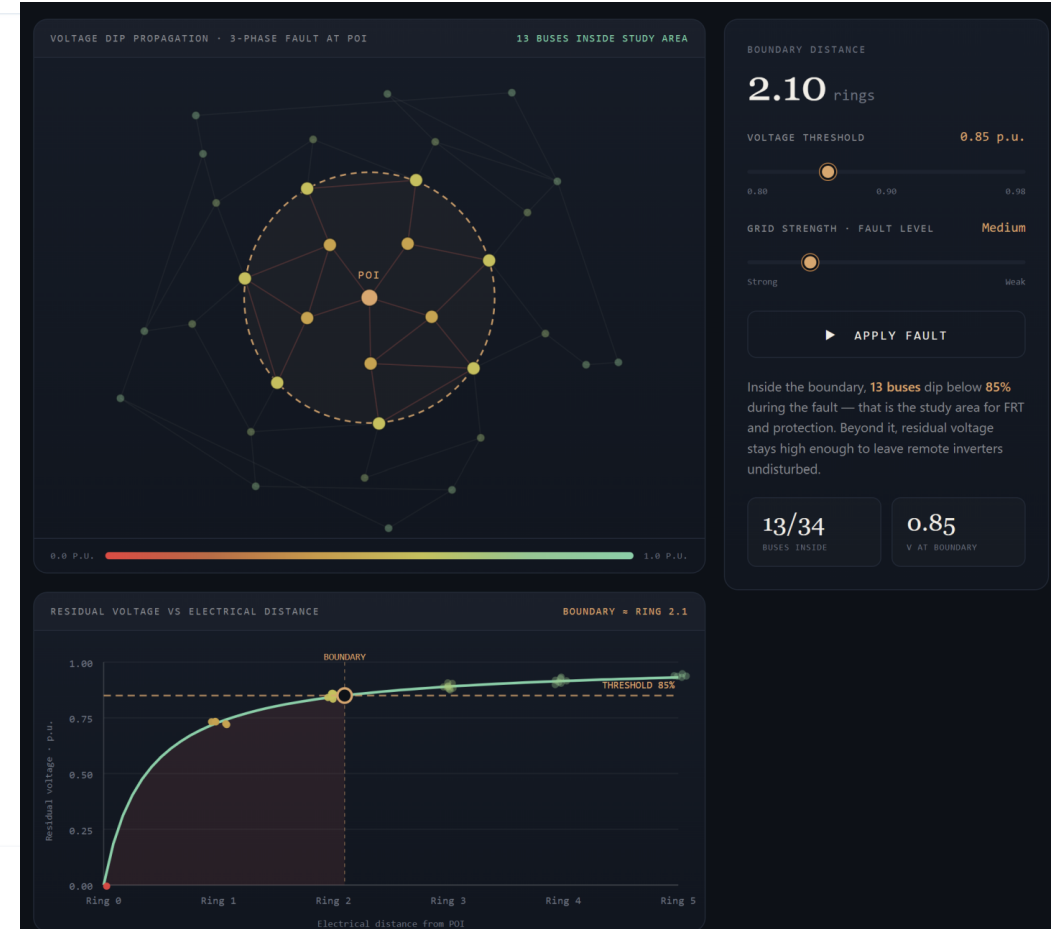
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Output of the voltage-dip script: the red heatmap highlights buses whose residual voltage falls below the chosen threshold — these define the radial extent of the EMT study area.



Critical study area identified via voltage-dip heatmap



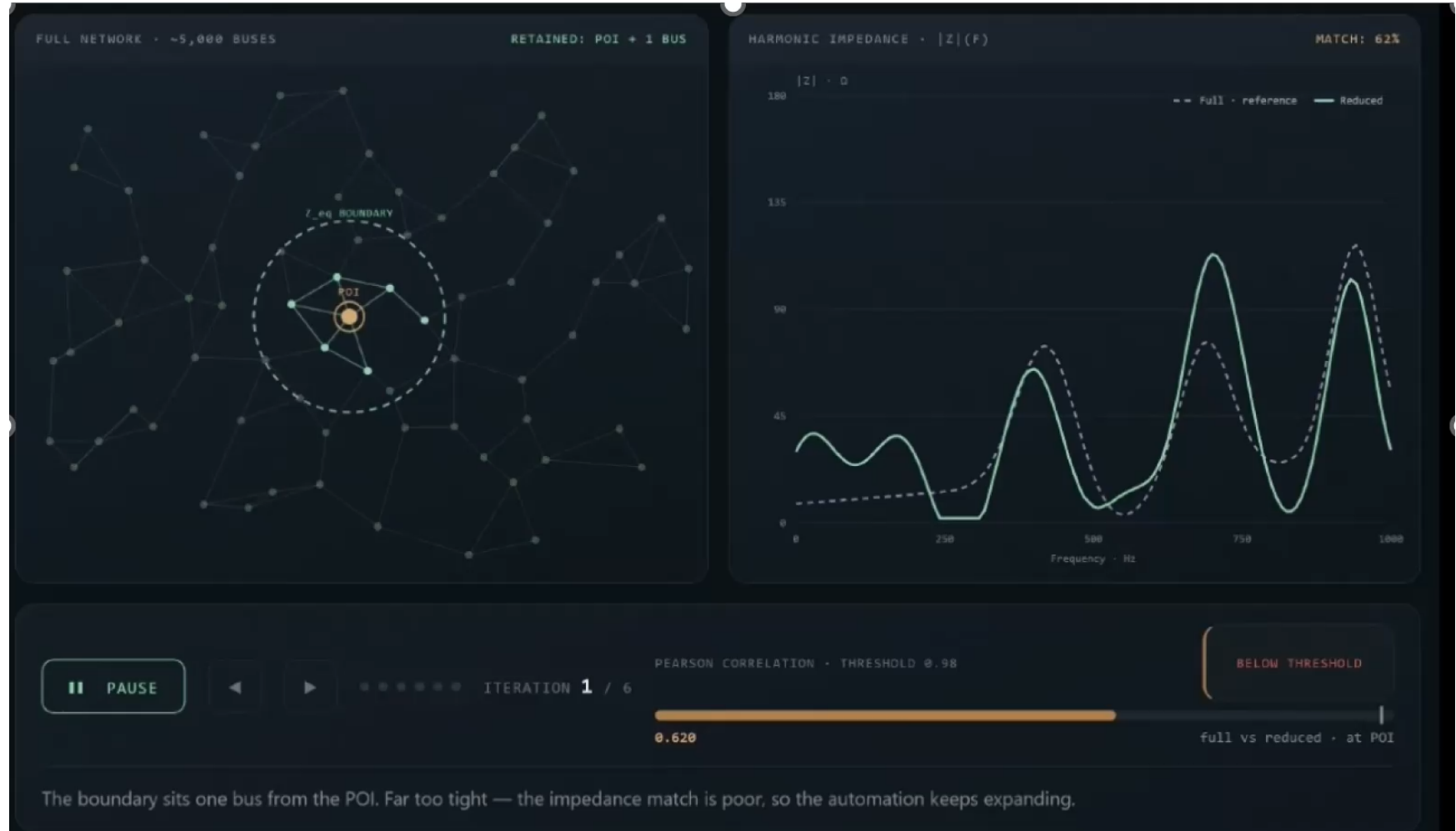
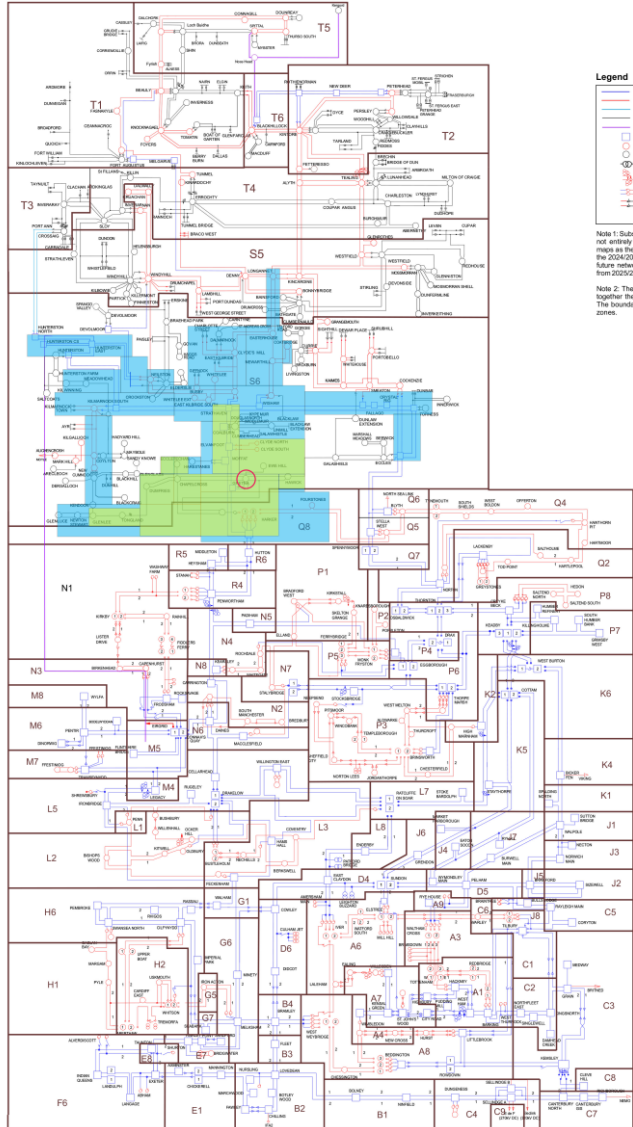


Boundary Selection & Reduction

Harmonic Impedance Reduction

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With a significant number of HVDC links and offshore wind farms

16 Network zones

England & Wales EMT network model, partitioned for parallel solution.

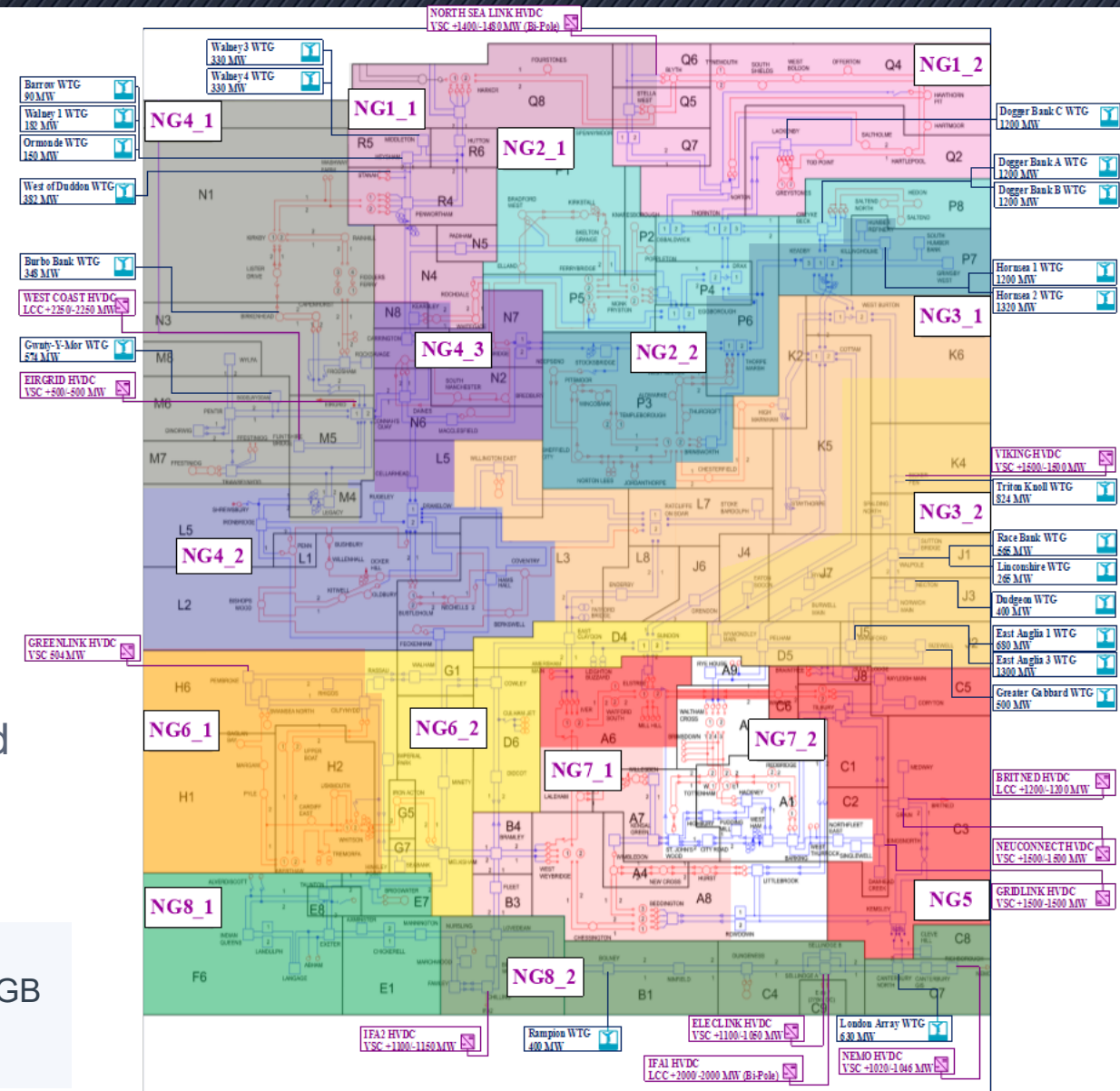
12 HVDC links — interconnectors & embedded schemes

Both LCC and MMC technology, including offshore HVDC-connected wind farms. Average and detailed models; time-steps set per NESO requirements.

28 Offshore wind farms — mostly AC-connected

A subset DC-connected via HVDC schemes, with STATCOMs at key nodes.

Dynamic models developed to **NESO requirements** and tested against GB Grid Code stability, FRT and dynamic-performance criteria.



- **Cores:** one physical core per zone; hyper-threading off.
- **Machine:** a 64-core, 256 GB workstation — a single machine beats clusters.
- **Scale-up:** RDMA interconnects only for very large (>64-network) cases.

HPC GUIDANCE

- At least **64 physical cores**
- Disable **SMT / hyper-threading**
- High-bandwidth **memory & disk I/O**

AMD RYZEN™ THREADRIPPER™ PRO 9995WX		
	PROCESSOR	AMD Ryzen™ Threadripper™ PRO 9995WX
	CORES / THREADS	96 Cores (Threads 192)
	PROCESSOR STATUS	ON
	BASE CLOCK	2.5 GHz
	MAX BOOST CLOCK	Up to 5.1 GHz
	L3 CACHE	384MB
	TDP	350W
96 96 CORES 192 THREADS UP TO 5.1 GHz 384MB L3 CACHE 350W TDP		



HPC Guidance:

- at least ≥ 64 physical cores
- Disable SMT/hyper-threading
- High-bandwidth memory & disk I/O



Full 16-Zone Grid with All IBRs

Initial Runtime

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- 16-zone “30,000 bus original power factory model” of **National Grid EMT** model with all **12 HVDC links** + **28 offshore wind farms** integrated. Total of **56 PSCAD Project cases**.
- TSO target runtime for practical wide-area EMT studies: **≈ 20 minutes** .

Actual runtime: 16-zone + all-IBR runtime

PSCAD V5.0.2

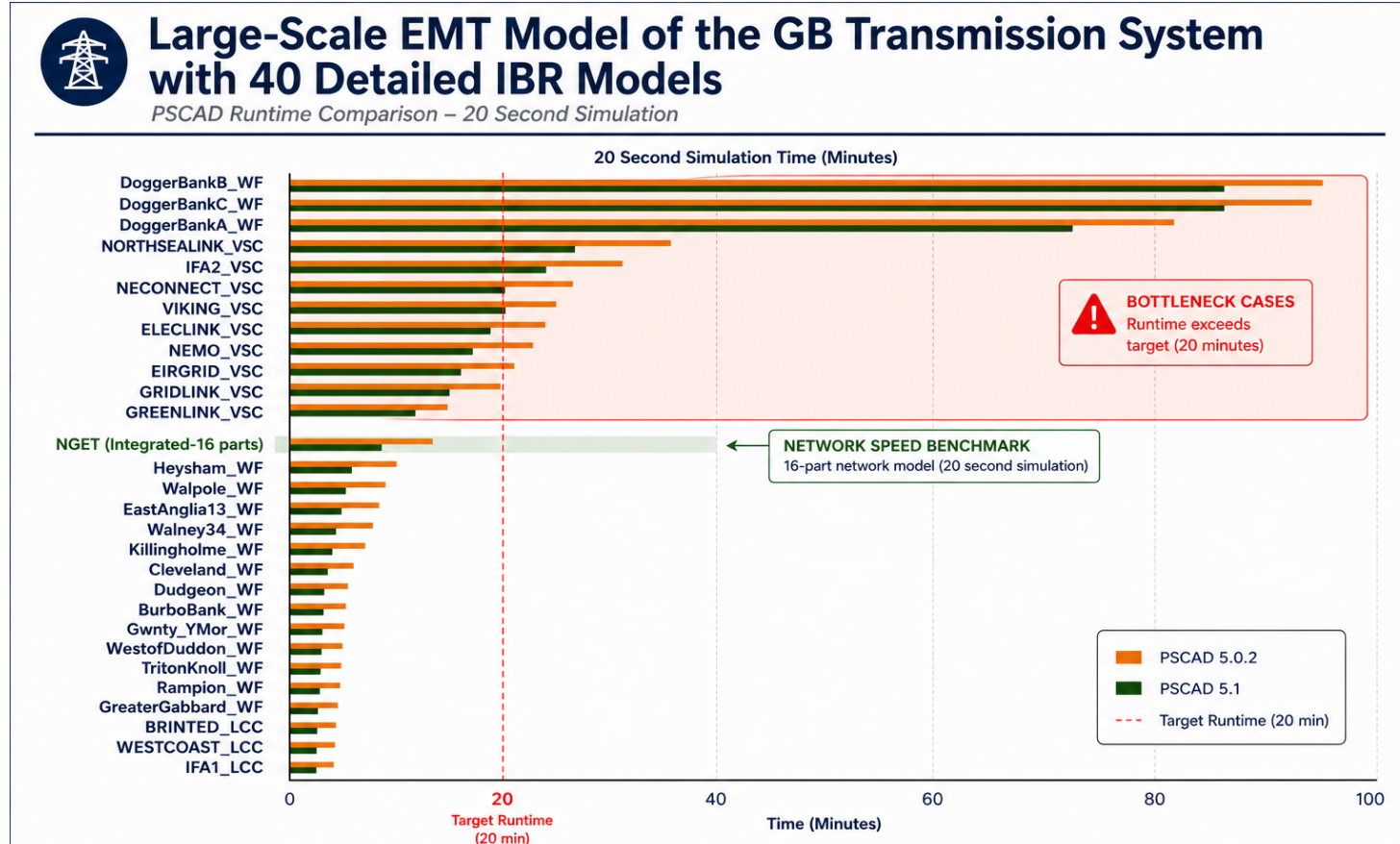
~1 h 32 min

PSCAD V5.1

~1 h 07 min

⚠ BOTTLENECK

HVDC-connected offshore wind farms and several VSC-HVDC links are the slowest models — driven by **10 μ s time-steps** and detailed switching control.





Final Runtime Improvement Summary

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56 PSCAD cases (16 Network zones + 40 IBRs) run in parallel — one per physical core



BASELINE

with all IBRs (no sectionalisation)

~92 min

56 PSCAD cases (16 Network + 40 IBRs)



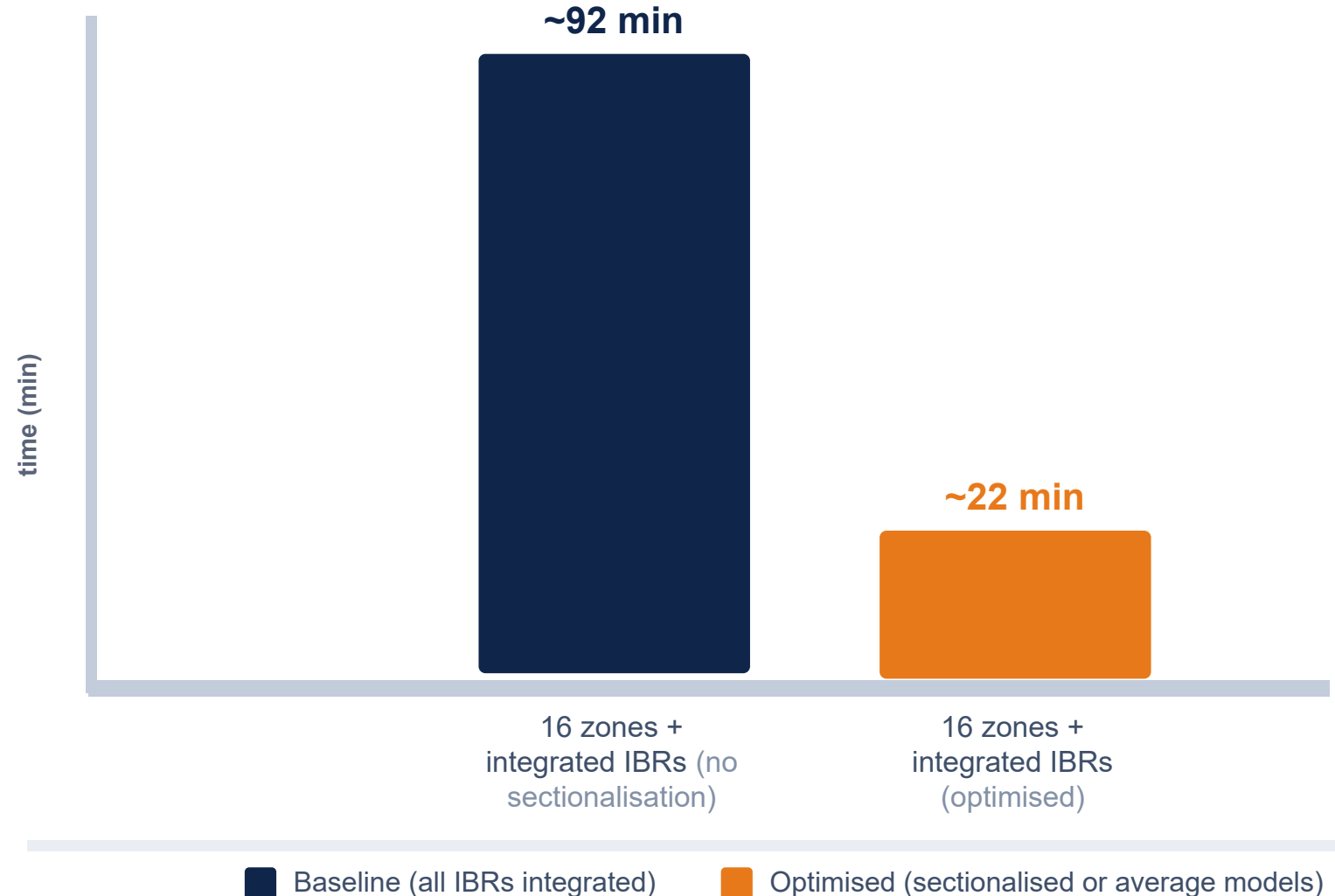
OPTIMISED CASE

slow IBRs **sectionalised**, or switched to **average** (non-switching) models

~22 min

full 16-zone grid, slow offshore HVDC connected windfarm was segmented

Total Runtime Comparison — 20 s simulation





Grid Connection Simulation Tool (Grid Connect X) pscad.com

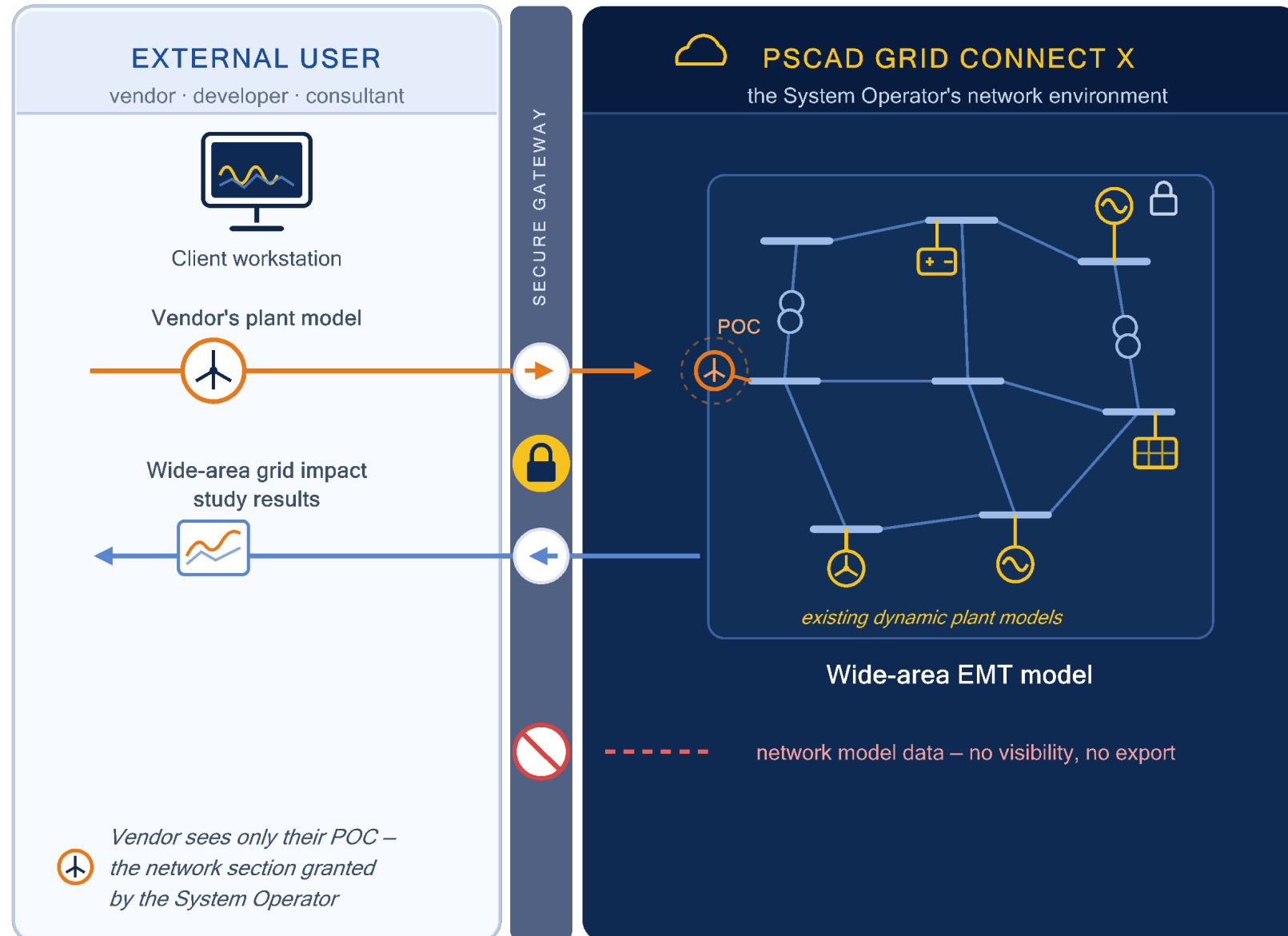
Full grid impact studies without visibility of confidential network data

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- Sharing EMT models is constrained by **confidentiality** — a shareable version is hard to produce, even though the Grid Code requires one.
- The cloud-based tool lets external users run **EMT studies over a WAN** without accessing confidential network data.
- External users **execute cases and save wide-area study results** — no visibility or export of the wider-network model.

ONE-WAY ACCESS

Third-party vendors connect and run full grid impact studies — the wide-area model never leaves the cloud.





RMS-EMT Co-Simulation

Coupled phasor-domain and electromagnetic-transient simulation

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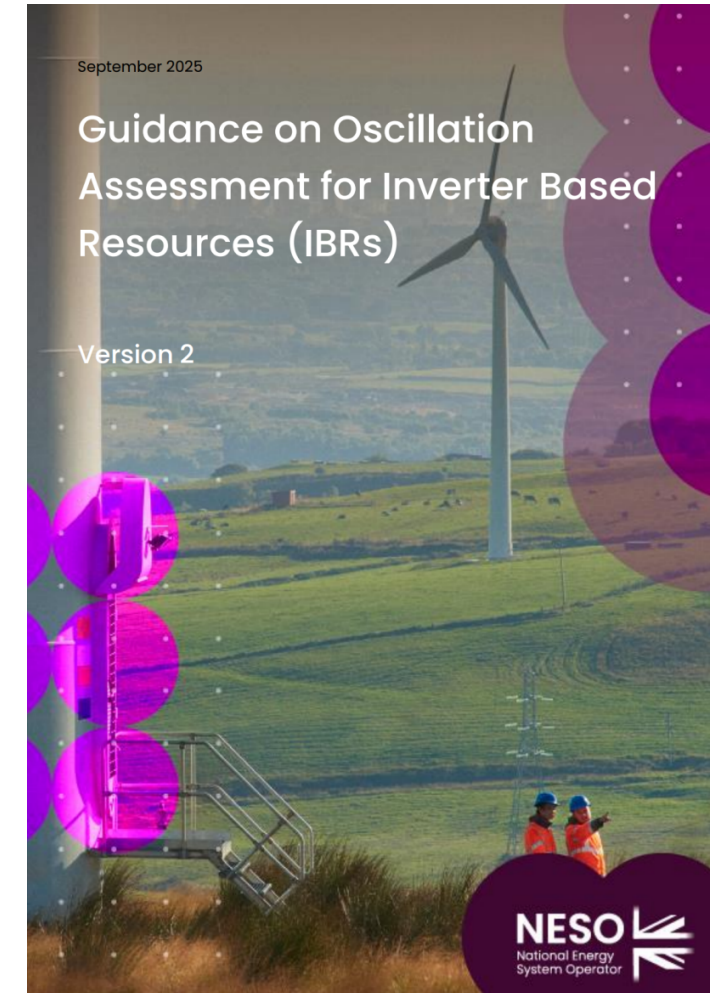


Example shown: point-to-point HVDC in EMT detail — the same interface embeds any subsystem: wind farms, FACTS, multi-terminal DC.

- Increasing penetration of inverter-based resources is creating **new oscillatory-stability challenges** for transmission system operators.
- Oscillation assessments are increasingly **required as part of the grid-connection process**.
- NESO's 2025 guidance **formalises the assessment approach in Great Britain** and may provide a reference for other system operators.



Dynamic frequency scanning supports early identification of poorly damped modes and potential control interactions.



IBR-rich grid

high penetration of inverter-based resources



Oscillation risk

control interactions & sub-synchronous oscillations



Small-signal study

impedance-based stability screening

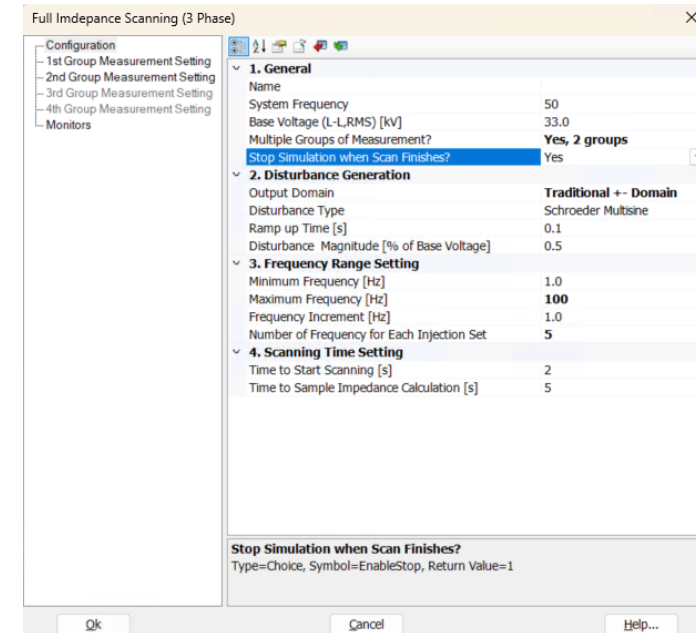


Dynamic Frequency Scan

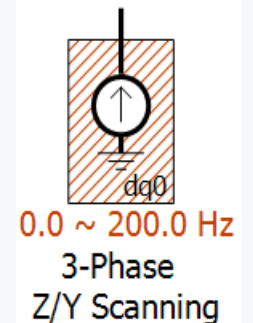
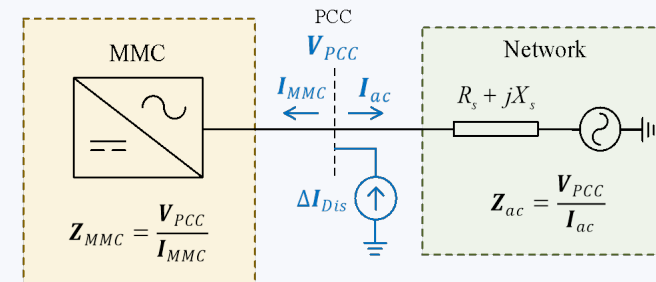
built-in PSCAD tool · Z/Y scanning at the PCC

VALUE

A quantifiable measure of oscillatory stability margins for TSOs in IBR-rich grids.



Impedance scan at the PCC



Sweep 0 – 500 Hz

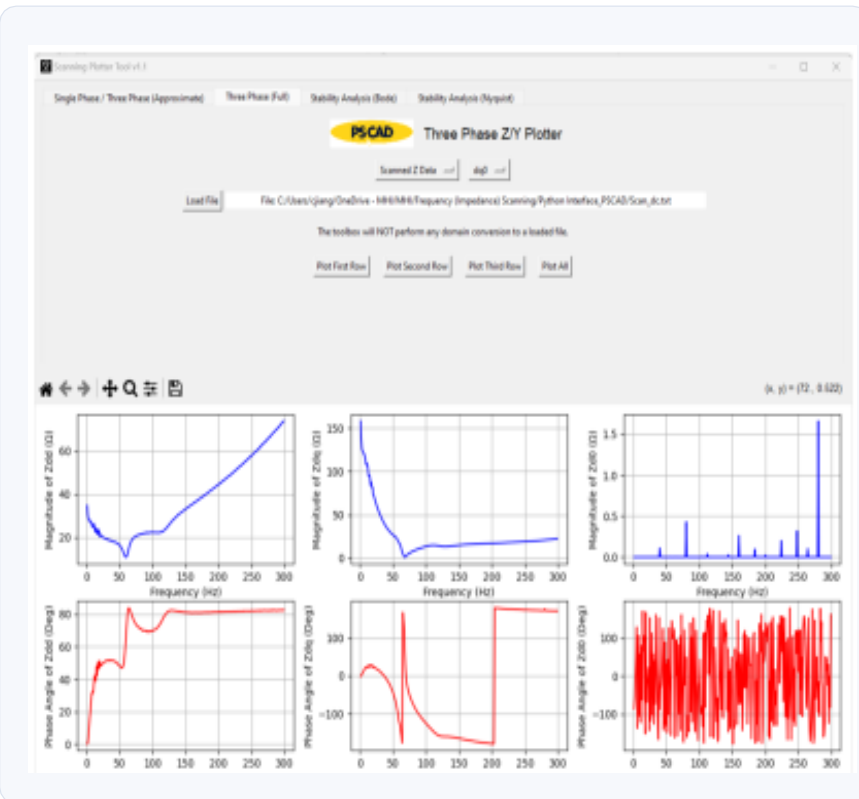
3-phase Z / Y scanning

dq0 & sequence domains

Schroeder multisine disturbance

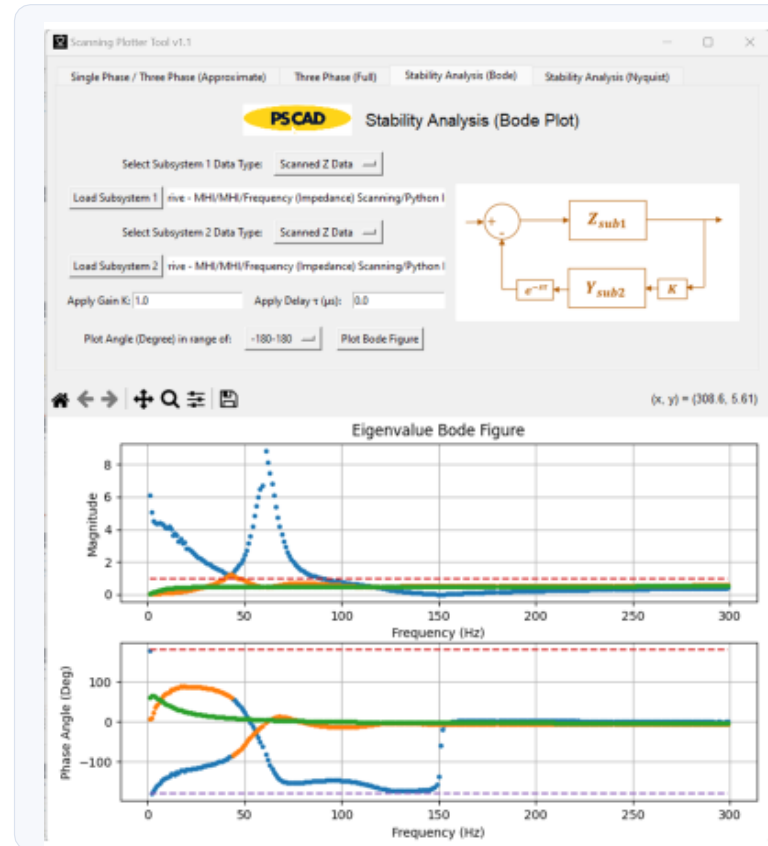
1 Impedance vs Frequency

Detect negative-impedance regions across the scanned range.



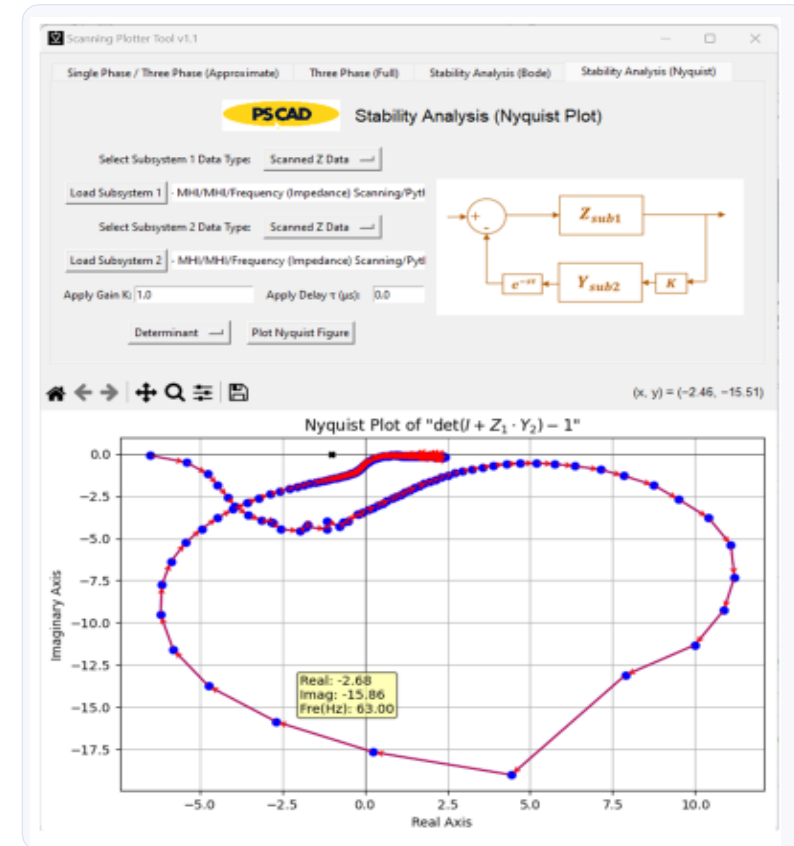
2 Bode Plots

Evaluate gain and phase margins for IBR interconnections.

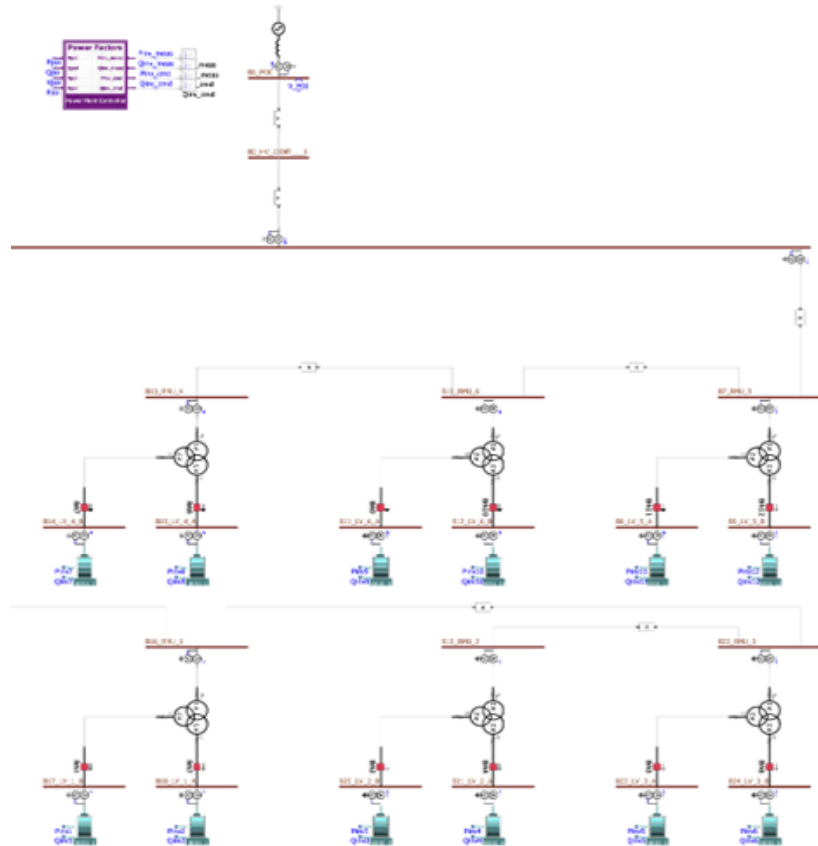


3 Nyquist Plots

Predict stability from encirclement of $-1 + j0$.



PSCAD MODEL (SLD)

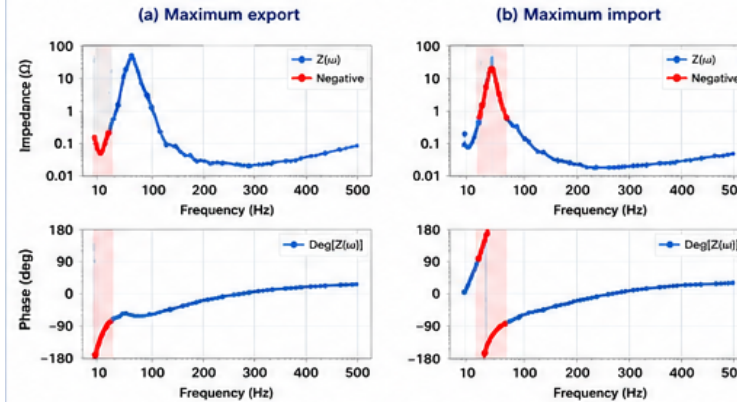


40 MW OEM BESS plant model with PPC

Original PSCAD SLD retained

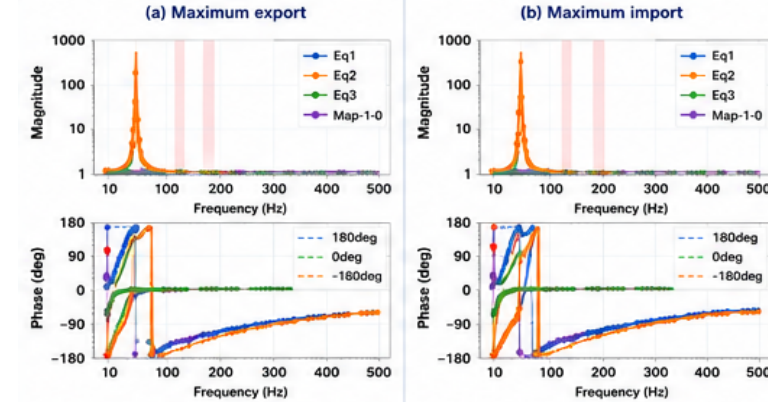
FREQUENCY SCANNING ASSESSMENT OUTPUTS

1. PLANT-SIDE d-AXIS IMPEDANCE



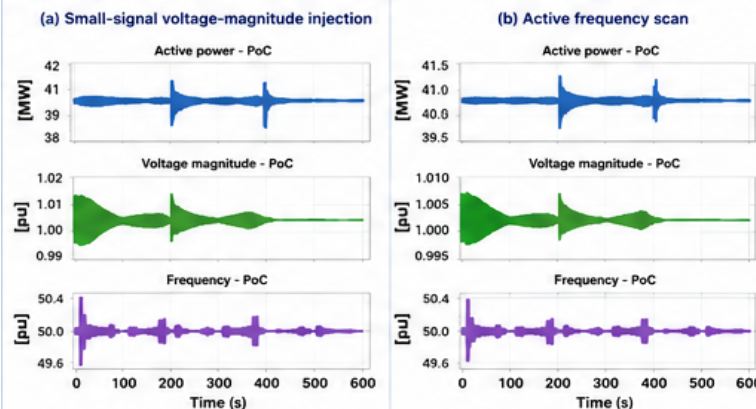
Red markers indicate frequency ranges where the real part of impedance is negative.

2. EIGENVALUE BODE PLOTS ($Lg(\omega)$)



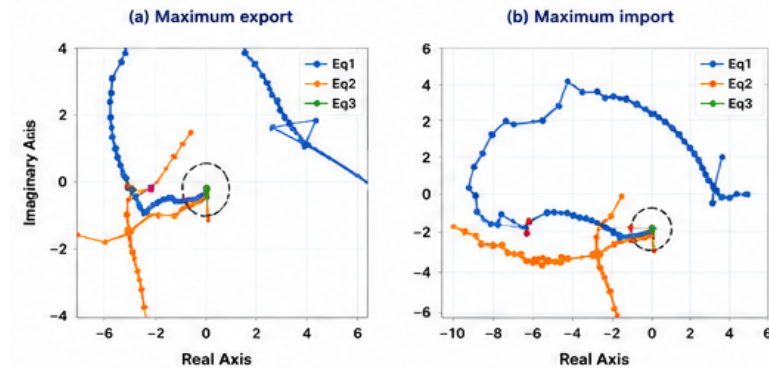
Eigenvalue Bode plots of the plant-grid minor-loop gain.

3. TIME-DOMAIN RESPONSE AT MAXIMUM EXPORT



Representative time-domain responses during small-signal injection and frequency scan.

4. EIGENVALUE NYQUIST TRAJECTORIES ($Lg(\omega)$)



Dashed circle highlights the neighbourhood of the critical point $(-1, j0)$.



Indicators remain outside the critical region



No interaction with torsional modes in the scanned range



Low SSI risk for studied operating conditions

AI COMPUTE LOAD UP TO 70% OF RATING



TURBINE-GENERATOR SHAFT



WHERE THEY ARE GOING

Right next to power stations

Data centres connect where the grid is strong — which is exactly where the big machines already sit.

WHAT IS AT STAKE

A large share of UK nuclear

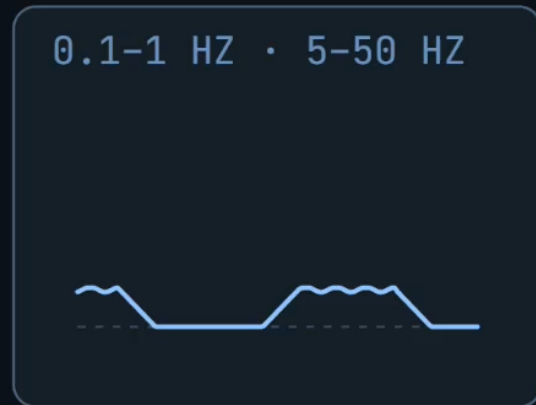
Large nuclear and thermal machines run for decades — and shaft life, once spent, cannot be put back.

WHY IT GOES UNNOTICED

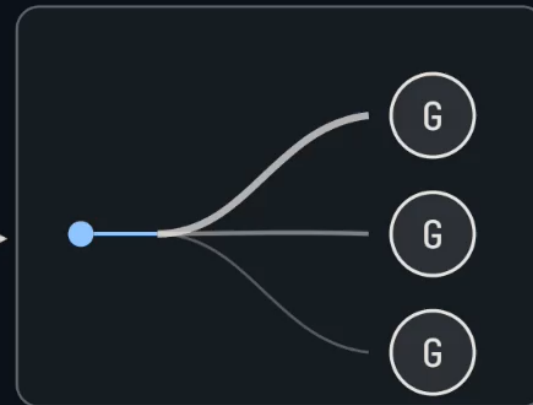
Nothing measures it today

Fatigue life is spent quietly. It surfaces years later as an inspection finding, not as an alarm.

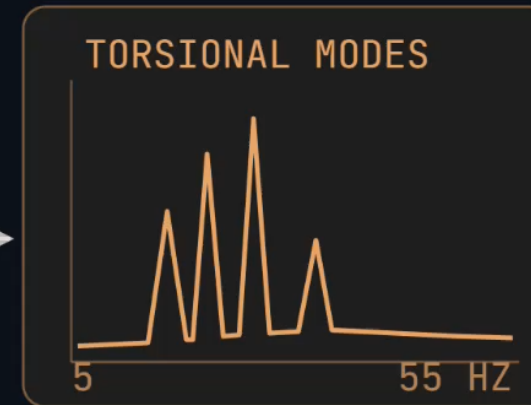
1 • LOAD SWINGS



2 • EACH MACHINE TAKES A SHARE SHARES SUM TO 1



3 • MAGNIFIED AT RESONANCE



4 • SHAFT STRESS



A DATA CENTRE PULSES

SHARED BETWEEN MACHINES

RESONANCE MAGNIFIES IT

THE SHAFT FEELS IT

SIZE OF THE LOAD SWING

14%

Past a certain swing the stress crosses the safe limit and the shaft starts consuming fatigue life.
Finding where that limit sits, for a real machine on a real network, is the work.

Shaft life intact



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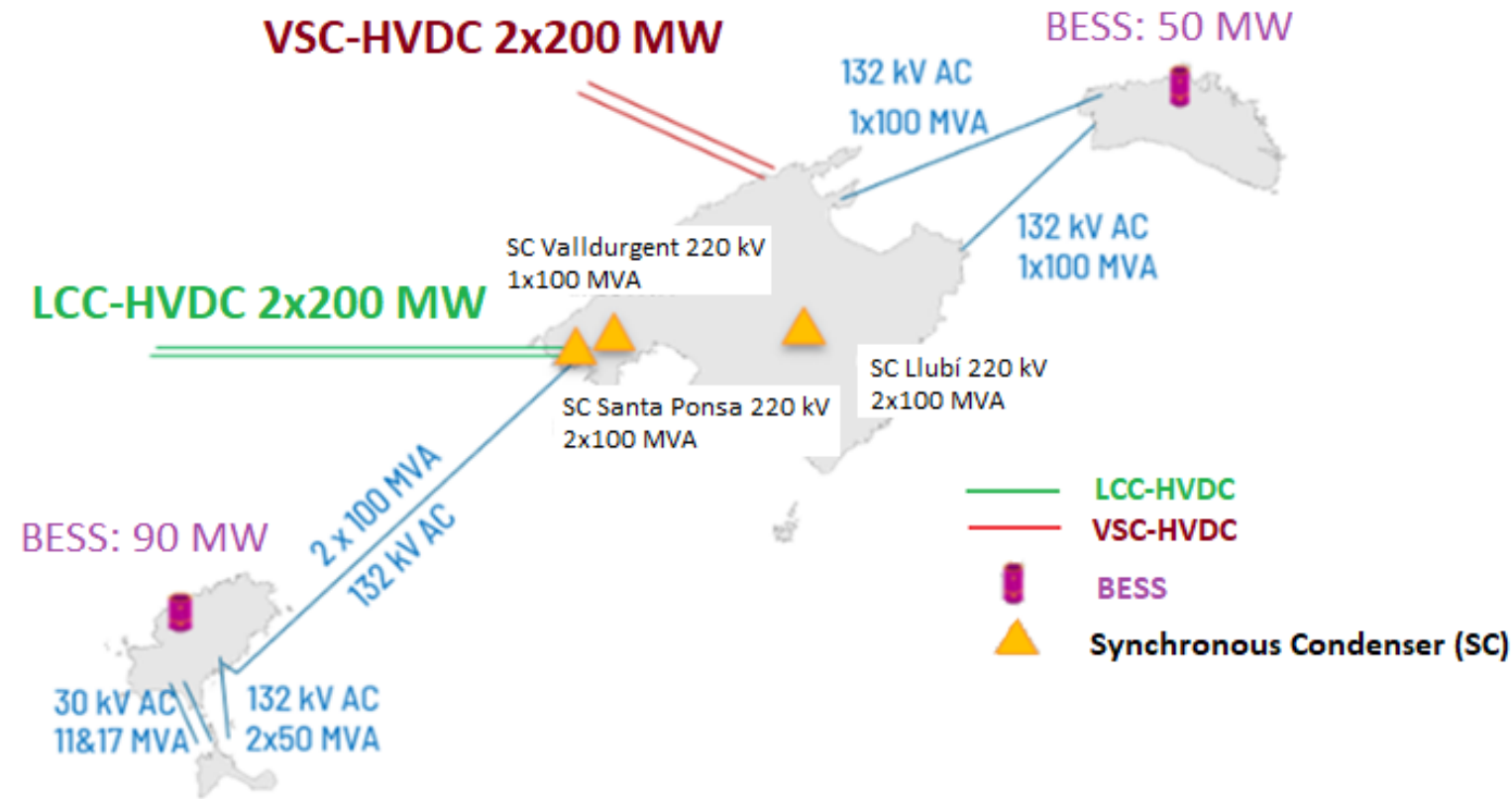
Macarena MARTÍN
Red Eléctrica – Redeia
Spain
macarena.martin@ree.es

SUMMARY

The Balearic Islands are striving to achieve 100% renewable energy, which poses new challenges in operating the power system securely and reliably. With a higher integration of inverter-based resources (IBRs) and a reduced presence of conventional synchronous generators, the system strength, particularly short circuit levels, becomes weaker and more susceptible to disturbances; and the total inertia of the system becomes lower. Technology enablers are planned to achieve energy transition in the Balearic power system: a new 2x200 MW VSC-HVDC link (bipole with metallic return), Synchronous Compensators (SC) and Battery Energy Storage Systems (BESS), as fully-integrated network components. Detailed ElectroMagnetic Transient (EMT) simulation studies may be needed to analyse stability of the system, due to the high amounts of power-electronics devices in the system. This paper describes the implementation of an EMT model of the Balearic power system.

KEYWORDS

Electromagnetic transient (EMT), Root-Mean-Square (RMS) simulation, power system stability, HVDC, voltage source converter (VSC), inverter-based resources (IBR), High Performance Computing (HPC), renewable energy, grid-forming.

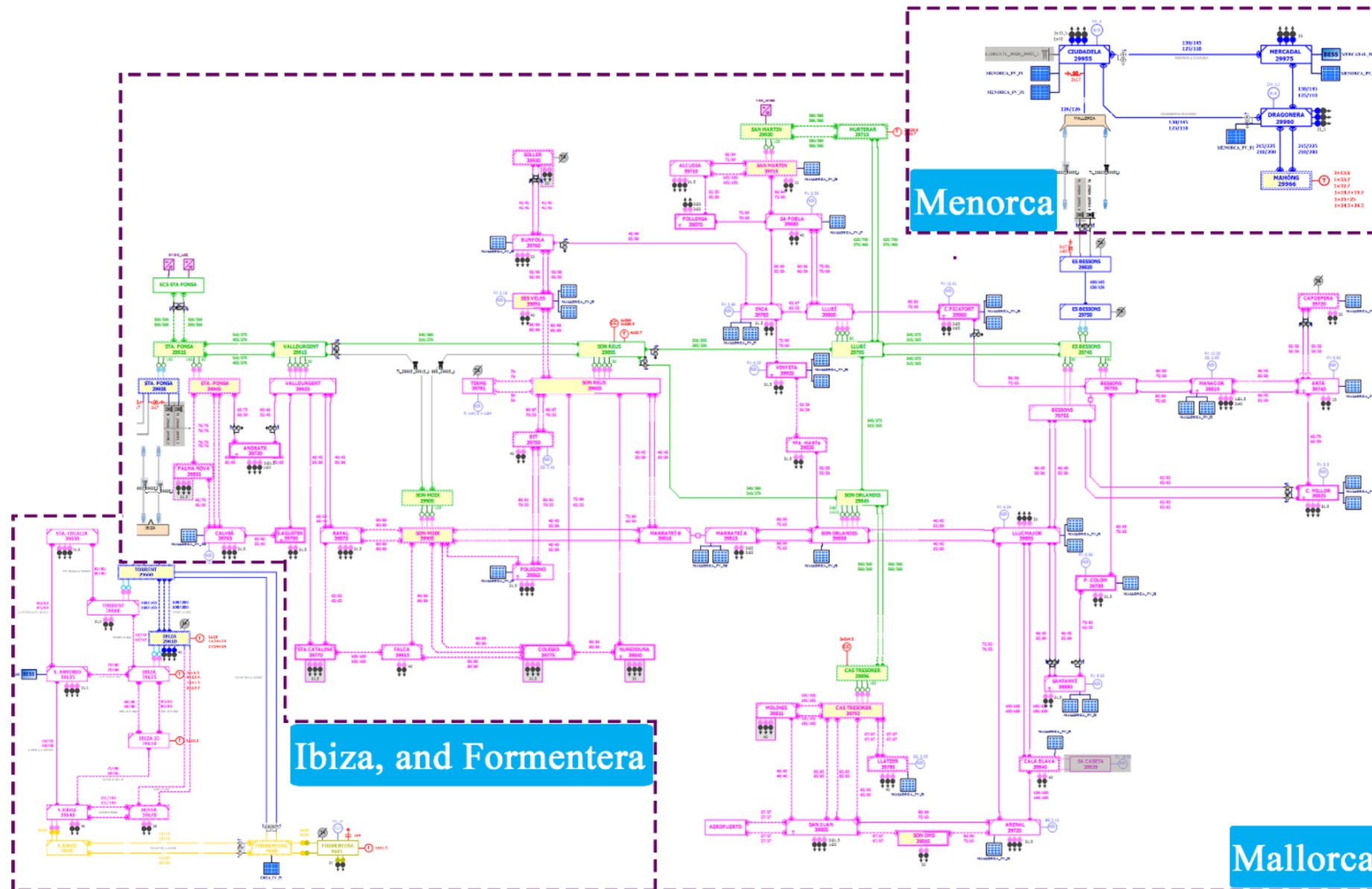


New 2x200 MW VSC-HVDC link

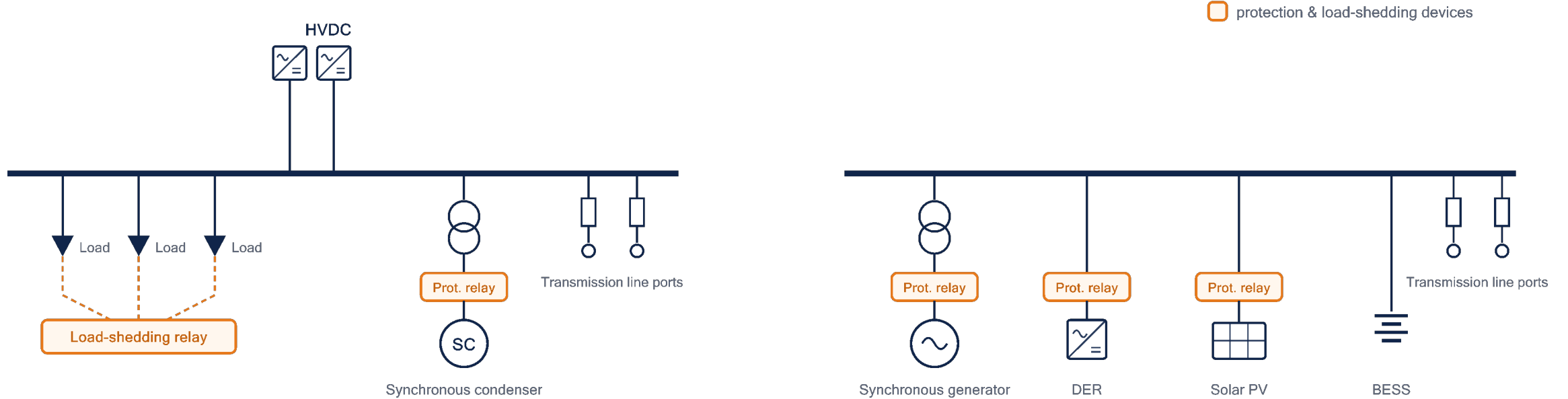
Synchronous condensers

BESS 90 + 50 MW

Fully integrated in EMT



Island grid with a significant share of inverter-based resources



Typical substation layouts — synchronous machines, DER, solar PV, BESS, with protection relays and load shedding represented

MODEL FIDELITY IS CRITICAL

For islands and weak grids, wide-area EMT models must include **load shedding, generator protection and the full inverter fleet**. At this level of detail, the Balearic model closely reproduced real system incidents — including islanding events.

System-Level EMT Studies of Danish System

Automated PDT-to-EMT study environment for the Danish transmission system



2024 Paris Session

11639

C4 Power System Technical Performance
PS1 - Power System Dynamic Analysis in the Energy Transition:
Challenges, Opportunities and Advances

Enabling System-Level EMT Studies of Danish Power Systems

Yicheng LIAO*

Liang LU

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Canada

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SUMMARY

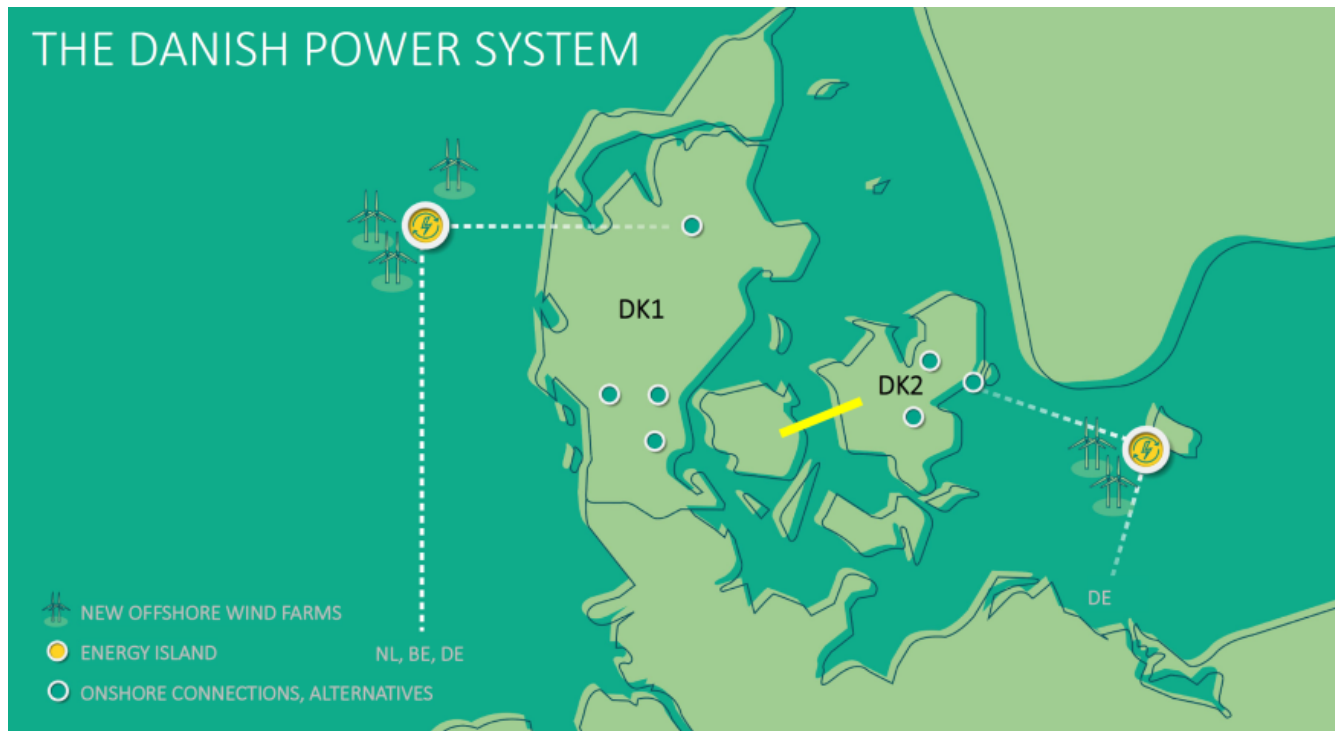
The need of performing EMT studies has been significantly increased for power system stability assessment, as more power electronics interfaced devices are integrated to the power system along the green transition. To handle future system stability challenges, the Danish TSO has developed its Electromagnetic Transient (EMT) power system network to enable system-level EMT studies since 2021. The developed approach includes an automated data conversion process from a Phasor-Domain Transient (PDT) study environment to an EMT study environment and an automated EMT simulation process, such that it maintains the advantage of using the existing PDT tool for data management and the advantage of integrating vendor-specific models in an EMT tool for studies. Some system-level study functions have also been developed in the EMT tool to ease the studies.

Through a few years of development efforts and study experiences, the EMT study environment has been verified against a power system incident in 2020 and been used for a reinvestment study in 2028, based on the eastern part of the Danish transmission system (DK2). The DK2 2020 incident study reveals that the EMT studies can provide more accurate response to predict the cascade system events in extreme grid conditions while the PDT studies cannot, and the DK2 2028 reinvestment study reveals that EMT studies can predict additional converter-driven oscillation and stability issues in weak grid scenarios. The EMT study environment has thus been foreseen to provide an invaluable platform to future power system stability analysis and management.

At the end, several development challenges and prospects have been discussed, and the potential applications of system-level EMT studies from a TSO perspective have been recommended.

KEYWORDS

Green transition, power electronics, electromagnetic transient (EMT) study, phasor-domain transient (PDT) study, transmission power system, stability



System-level EMT since 2021

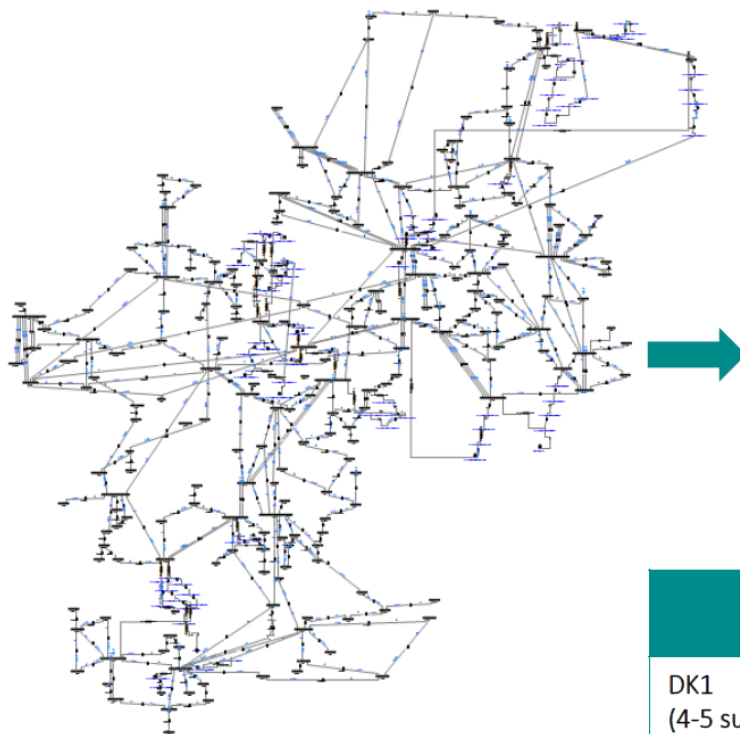
Automated PDT → EMT conversion

Verified against 2020 incident

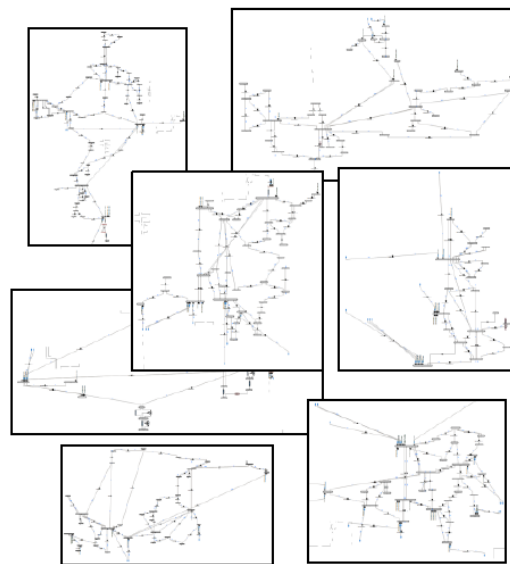
DK2 2028 reinvestment study

Work based on collaboration with **Energinet** — acknowledgment of joint efforts with the Danish TSO.

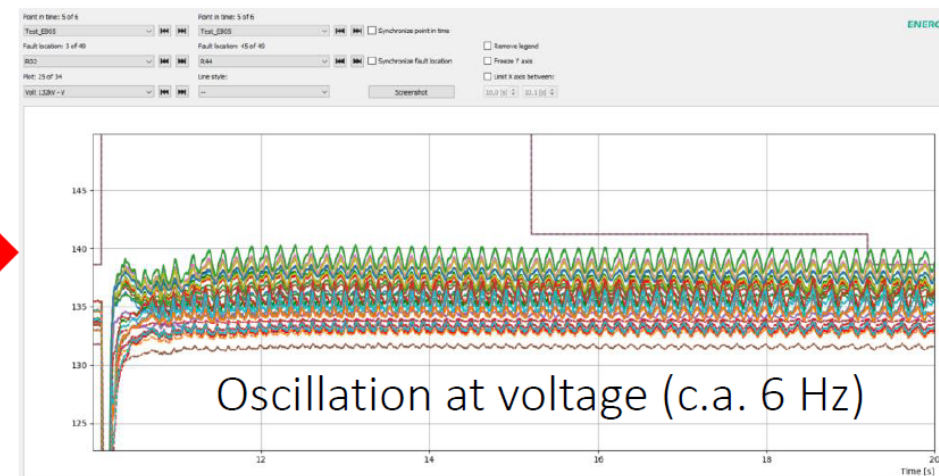
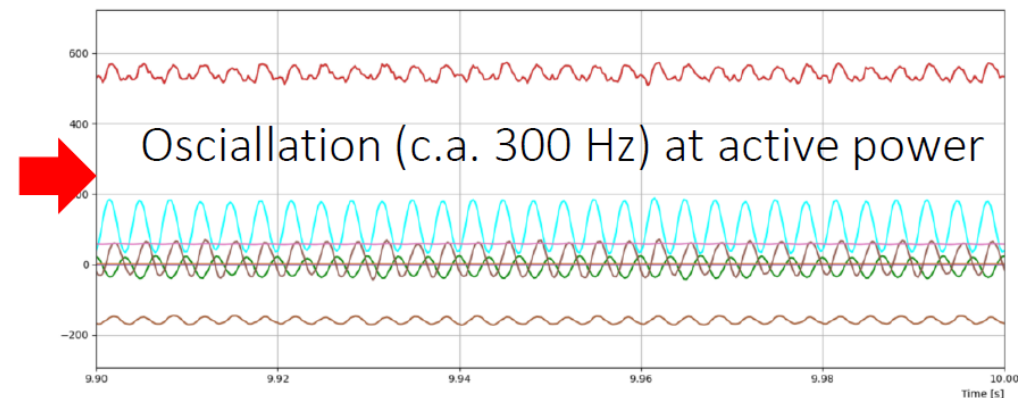
DK1 and DK2



Example : DK2 system level EMT model



	Vendor models	Total PNI simulation	Simulation time (10sec)
DK1 (4-5 subnet)	40 ea	45 PNI	16 min
DK2 (7 subnet)	40-50 ea	47 - 57PNI	17 min



Example : Technical challenges (oscillation) observed in one of System EMT simulations in DK2



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Powered by Manitoba Hydro International Ltd.

CIGRE NGN Forum

Quo vadis

Konstantin Papailiou
CIGRE President

2026 CIGRE Paris Session



CIGRE NGN Forum

Conor Mulholland

Chair of CIGRE NGN

2026 CIGRE Paris Session



CIGRE NGN Forum

Aditie Garg

Vice Chair of CIGRE NGN

2026 CIGRE Paris Session



CIGRE NGN Forum

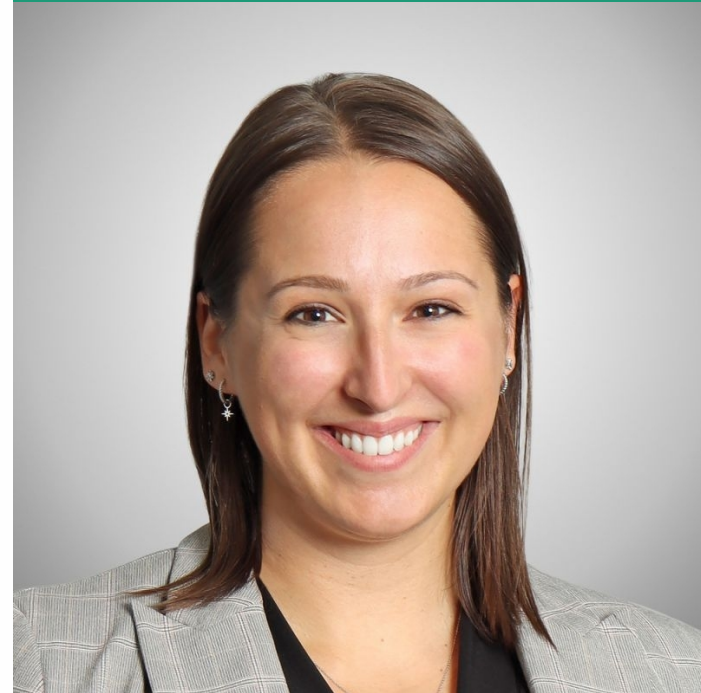
Congratulations to Bogdan and Logan for being elected into the position of International NGN Chair and Vice-Chair! We wish you all the best!

CHAIR



Bogdan Leu (RO)

VICE-CHAIR



Logan Rolles (US)

International NGN Community

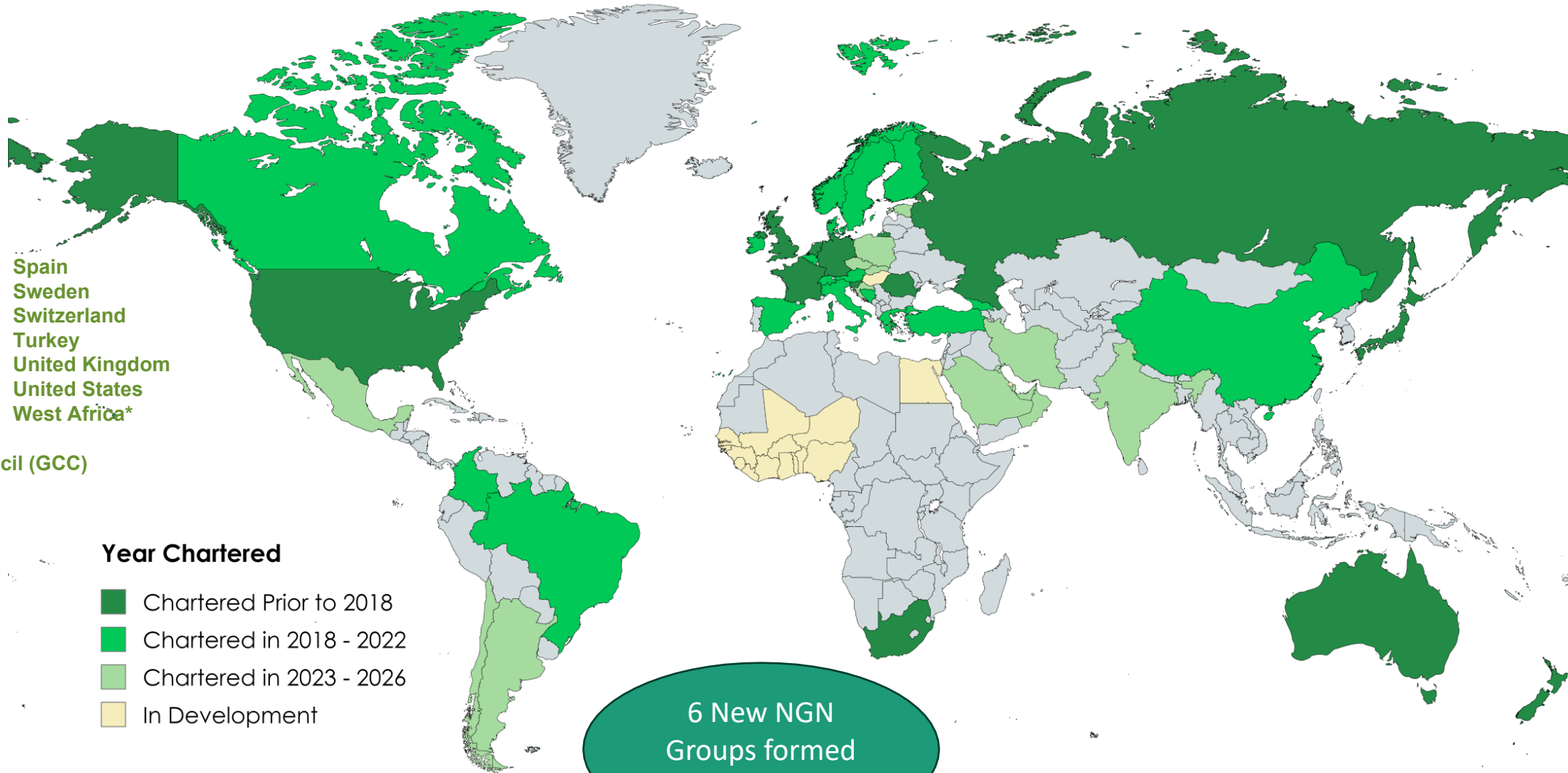
1. Argentina*
2. Australia
3. Austria
4. Belgium
5. Bosnia & Herzegovina
6. Brazil NGN Community

7. Canada
8. Chile
9. China
10. Colombia
11. Croatia
12. Czech & Slovak
13. Denmark
14. Estonia
15. Finland
16. France
17. Georgia
18. Germany
19. Greece
20. Gulf Cooperative Council (GCC)
21. Hungary
22. India
23. Iran
24. Ireland
25. Italy
26. Japan
27. Mexico
28. Netherlands
29. New Zealand
30. Norway
31. Poland
32. Romania
33. Russia
34. Serbia
35. Slovenia
36. South Africa

37. Spain
38. Sweden
39. Switzerland
40. Turkey
41. United Kingdom
42. United States
43. West Africa*

Year Chartered

- Chartered Prior to 2018
- Chartered in 2018 - 2022
- Chartered in 2023 - 2026
- In Development



6 New NGN
Groups formed
since Paris'24

NGN Activities & Mission



Training Programmes

Successful CIGRE NGN training programme formed with NGN & CSG. Future training programmes being developed



Working Groups

New initiative to help simplifying the progress for NGN members to join Working Groups and provide greater visibility



Social Reach

4,890 followers across 43 countries and 69,541 Interactions on NGN LinkedIn Posts



ELECTRA Publications

Creating an avenue for NGN Members to publish their activity and work in ELECTRA



Central Office Engagement

Direct line of contact with CIGRE Central Office on NGN Challenges & Supports

Our mission: Growing young professional activity across CIGRE - building skills, connections and leadership for a sustainable energy future.

PANEL DISCUSSION SESSION I

Panel Discussion Chair

Career Development and Growth Opportunities for Young Professionals

Pikria Elizarashvili

CIGRE Georgia NGN Chair



Panel Discussion: Career Development and Growth Opportunities for Young Professionals

Session Chair	Panelist	Panelist	Panelist	Panelist	Panelist	Panelist
 Pikria Elizarashvili Chair of CIGRE Georgia NGN	 Yousef Pipelzadeh Director of European Operations at Manitoba Hydro International	 Konstantin Papailiou CIGRE President	 Nenad Uzelac CIGRE OneGrid Convener	 Gen Li Professor at the North China Electric Power University	 Conor Mulholland Chair of CIGRE NGN IEC	 Aditie Garg Vice-Chair of CIGRE NGN IEC

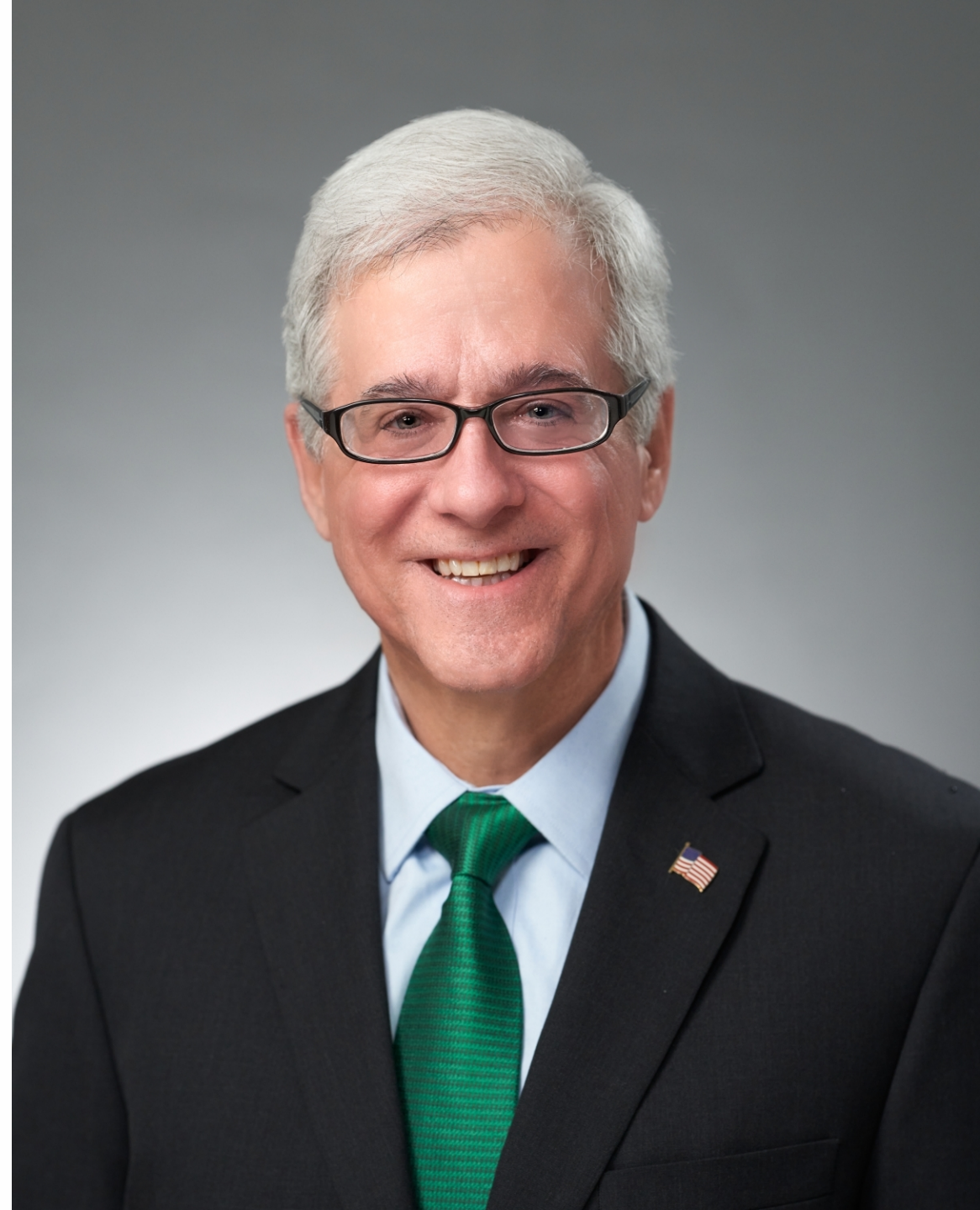
INTERMISSION

The Forum will resume at 12:40

CIGRE NGN Forum

Michael Heyeck
CIGRE Vice-President Finance

2026 CIGRE Paris Session



CIGRE-Brazil NGN

2026 Paris Session NGN Forum

Barbara Duarte – Chair of the Brazilian NGN of CIGRE



Agenda



1

Introduction of NGN Brazil

2

Recent Highlights

3

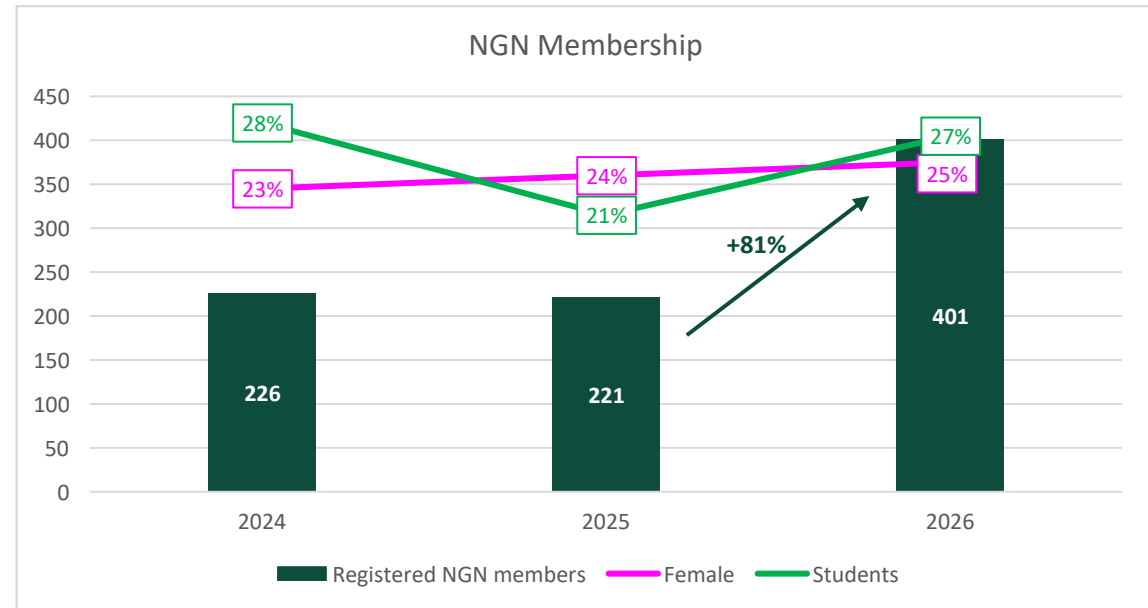
Future focus – the road to Paris 2028

- Challenges and Opportunities

1 Introducing NGN CIGRE-Brazil



- 401 NGN members
 - Structured in 2022
 - 81% increase on 2025
 - 25% female
 - 27% students



Opening Ceremony featuring the NGN Chair, at SEPOPE 2026



NGNs at the Symposium on Power System Operation Planning and Expansion (SEPOPE) (May 2026)

Introducing NGN Brazil

Committee Structure



2024 - 2025

CIGRE Brazil NGN

NGN Mentor - Prof. Dr. José Sidnei Martini



Chair NGN
Joyce Meirelles

Vice-chair NGN
Barbara Duarte



Study Committee
Liaisons

A1

D2

Pedro Torres
Media & Communications
Representative

Hannah Caldeira
Mentoring Representative

2026

CIGRE Brazil NGN

NGN Mentor - Prof. Dr. José Sidnei Martini



Joyce transitioned from NGN Brazil Chair to **Finance Director** of CIGRE Brazil.



Chair NGN
Barbara Duarte

Vice-chair NGN
Ana Karollina Lacerda



Study Committee
Liaisons

A1

D2

Pedro Torres
Media & Communications
Representative

Hannah Caldeira
Mentoring Representative

Launch a pilot mentorship program to support professional development and knowledge transfer. Organized by mentorship representatives (Hannah Caldeira & André Hoffman) with support from NGN coordination.

Launch of Pilot Phase 1: June 2025

- Opening of applications: volunteer mentors & mentees (NGNs associated with CIGRE-BR)
- 16 pairs formed (mentor + mentee)

Mentor Training (August 2025):

- 4 sessions (2h each) led by Bibiana Zereu
- Focus on mentoring techniques & experience sharing

Mentorship Program in Progress (Aug 2025 – Nov 2025):

- 6 to 8 meetings by pair

Initial Impacts:

- Strong engagement of young professionals
- Established intergenerational support & exchange network



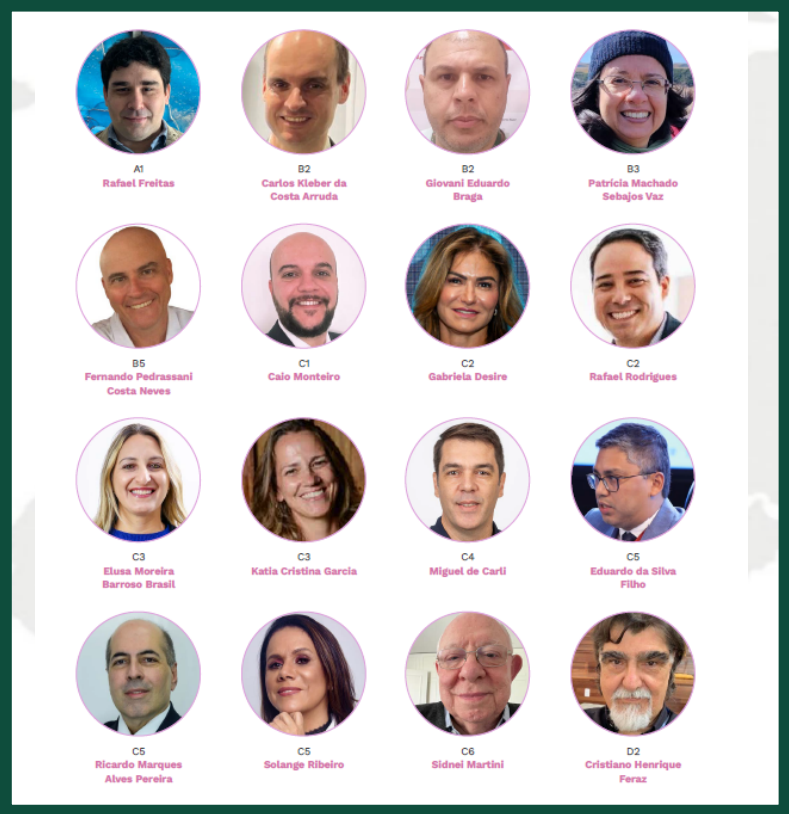
Pilot Mentorship Program - NGN Brazil



Mentors at the Training Session



Selected Mentors 2025



Positive Feedback from Mentors and Mentees: *"A transformative journey, enhancing self-awareness and professional growth"*

Eletroevolução | CIGRE Brazil Journal



- Open Access since 2025
- Quarterly publication in Portuguese of technical and institutional content
- Exclusive NGN section showcasing the activities of NGN Brazil, including event participation, panel discussions, technical publications, and other initiatives developed by the group.



Highlights of NGN Brazil Participation in Events



Seminar – XXVIII SNPTEE 2025

NGN Showcase:

- 28 NGN technical presentations.
- 3 NGN members received the award for the best NGN paper

Other Activities at the event:

- **NGN Networking Event** – Happy hour cocktail.
- **NGN Technical Visit** – Visit to the CHESF Control Center.

Seminar – XVI SEPOPE 2026

NGN Showcase:

- 26 NGN technical presentations.

Other Activities at the event:

- **Opening Ceremony** – Introduction of the NGN by the NGN Chair.
- **NGN Forum** – Technical Panel with NGN and Senior Professionals: *“From Expansion to Operation: How to Maintain a Renewable Power System”*.

Highlights of NGN Brazil Participation in Events



NGN Brazil participating in the "NGN Around the World" at Symposium in Montreal 2025)



NGN Technical Visit to the CHESF Control Center during SNPTEE 2025



Brazil NGN at Networking Cocktail at SNPTEE 2025



Awards for the best NGN papers at SNPTEE 2025



NGN of CIGRE-BR during SNPTEE 2025



NGN Forum at SEPOPE 2026

First NGN Brazil Meeting at the CIGRE-Brazil Office



- This was the first NGN Brazil meeting held at the CIGRE Brazil Office (Abril/2026)
- As our members are located across Brazil, we usually meet online, with face-to-face meetings taking place during CIGRE events.



CIGRE Brazil Office - Rio de Janeiro, Brazil



China Exchange Program – Brazilian NGNs



First Edition – November 2025

Key Highlights

- 76 applicants from 19 countries
- 10 young professionals selected for the inaugural program
- Hosted by **China Southern Power Grid**

Brazilian Representatives

- **Renata Fernandes** – Study Committee D2
- **Jesus Guevara** – Study Committee C4

Impact

Brazil was represented by two NGN members, highlighting the international engagement of the CIGRE Brazil National Committee.



China Exchange Program – Brazilian NGNs



Knowledge Sharing & International Collaboration

- **March/2026:** NGN Brazil organized a webinar to share the participants' experience and lessons learned from the China Exchange Program, in Portuguese (<https://www.youtube.com/watch?v=loJXpMaxCgE>)
- **Upcoming:** NGN Brazil and the IEC are organizing a global NGN webinar, in English, to share the lessons learned from the CSG Exchange Program (November 2026)



Renata Fernandes presenting at the Opening Ceremony



Jesus Guevara presenting at the Opening Ceremony

Future Focus: the road to Paris 2028

NGN Brazil



- **Increase Webinars**

Host more professional and educational webinars to share knowledge.

- **Strengthen the collaboration with universities**

In collaboration with UNICENPE Program (CIGRE-Brazil University and Research Center Engagement Program), strengthen the collaboration with some universities to engage young engineers and students.

- **Mentorship Program**

Launch the second edition of the Mentorship Program to support professional development and knowledge transfer.

- **Integrate with NGN Groups Worldwide**

Strengthen connections with NGN groups from other countries to foster international collaboration and exchange.



Thank you!

✉ ngn@cigre.org.br

🌐 <https://cigre.org.br/>

PARIS
SESSION
2026



CIGRE China NGN

2026 Paris Session NGN Forum

Ming Cheng, China



Agenda



- Introduction of NGN China
- Recent Highlights
- Looking forward

Introduction of NGN China

1. 1st Term of NGN CNC

- In 2020, CIGRE CNC founded NGN CNC under the guidelines of NGN International . The 1st term has done a great job to build up the foundational management structure and operational mechanism.

2. 2nd Term of NGN CNC

- In 2022, NGN CNC transitioned to its 2nd term. Compared with the 1st term, the 2nd term has expanded efforts in international collaboration, domestic outreach and has motivated more Chinese young engineers to engage with CIGRE.

3. 3rd Term of NGN CNC (The current term)

- In September 2025, CIGRE CNC officially approved the transition from the 2nd term to the 3rd term. The governing body has 8 members (up from 4) to better serve organizational growth. Altogether 52 young members (age≤38) have been selected.



Recent Highlights



● Technical Activities

- ✓ 1 leading WG (C1.54) and participating 20+ WGs.
- ✓ 11 submitted showcases, 5 selected ones, in which 1 was awarded Outstanding Work.

● Communication and Exchange Activities

- ✓ 17 governing body members (CIGRE & CIGRE CNC) had face-to-face meetings with CIGRE NGN members and other young professionals.
- ✓ 3 joined on-line webinars with African Area, the UK and Australia respectively.
- ✓ A “Dialogue with Young Professionals” forum was created at the annual Doctoral Consortium, supported by Tsinghua University.



2025年国际大电网发展论坛
International Forum on Large Electric System 2025
数智化与电力电子化的大电网

Recent Highlights



- **Communication and Exchange Activities**

- To assist and promote CIGRE's first Global Young Engineers' Exchange Program, 10 engineers have been selected to study in and experience at the Greater Bay Area for around one month.

- **Personal Achievement and Development**

- Liao Mengjun and Lei Bo have received NGN Significant Contribution Award.
- 5 NGN regular members serve as Study Committee contact.
- 3 members served as Global showcase coordinators in 2024.



Looking forward

1. Why NGN

- Passion and Variety.
- Career and Personal Development.
- Friendship.

2. What to Do

- To be more fearless.
- To be more involved.
- To be more persistent.

Thank you for your attention!

CIGRE Denmark NGN

2026 Paris Session NGN Forum

Daniela Pagnani-Harbech, Denmark



Ørsted



Agenda



Introduction of NGN Denmark



Recent Highlights

NGN Representatives in SDU and AU

Webinar Series on Energy Islands

Webinar Series in Collaboration with the NRCC



Future Focus – The Road to Paris 2028

LinkedIn Community

New Members Enrolment

Keeping Engagement

NGN Denmark was born in 2019, from strong bond with Aalborg University and Ørsted

- Currently over 200 members
- 12 committee members
- Born thanks to international collaborations with the UK & the NL
- Active student collaboration with AAU and SDU, and more recently with AU and SDU



Active social media pages



CIGRE Denmark Next Generation Network

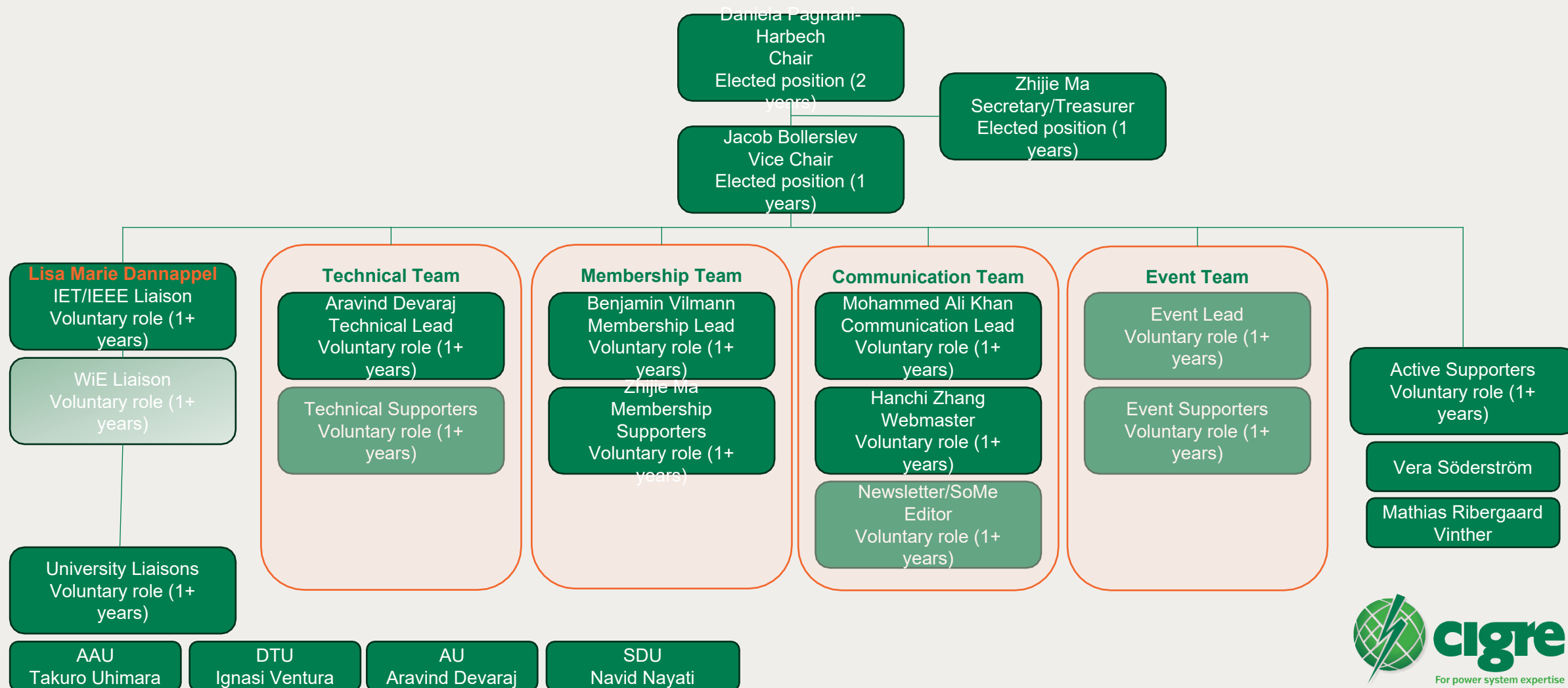
[Facebook](#)



CIGRE Denmark Next Generation Network (NGN)

[CIGRE Denmark Next Generation Network \(NGN\): Overview | LinkedIn](#)

Structure of the DK NGN Committee



DK NGN Committee: The Team



Daniela Pagnani-Harbeck
Chair



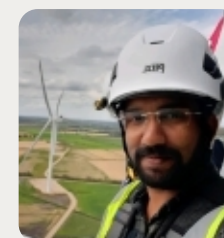
Jacob Bollerslev
Vice Chair



Zhijie Ma
Secretary



Mohammed Ali Khan
Communication Lead



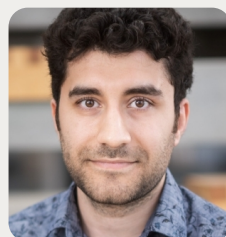
Aravind Devaraj
Technical Lead / AU Liaison



Benjamin Vilmann
Membership Lead



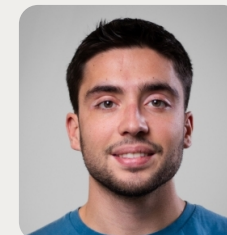
Hanchi Zhang
Webmaster



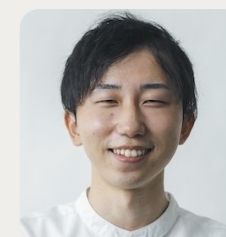
Navid Bayati
SDU Liaison



Vera Söderström
Active Supporter



Ignasi Ventura
DTU Liaison



Takuro Umihara
AAU Liaison

Recent Highlights



- New engagement with South Denmark University and Aarhus University



Syddansk Universitet



AARHUS UNIVERSITY

- New Webinar Series: Energy Islands



- New Webinar Series in collaboration with NRCC



Future Focus: The Road to Paris 2028

NGN Denmark



- LinkedIn Community
 - Closed group
 - NGN Committee steers
 - Easy way to reach each other and promote activities
- New Members Enrollment
 - Presentation in all university every new academic year
 - Presentation to key companies as part of onboarding
 - New events and technical visits every year
- Keeping Engagement
 - Survey about how CIGRE is relevant and how to make it more relevant
 - CIGRE freebies and merchandise

Thank You!



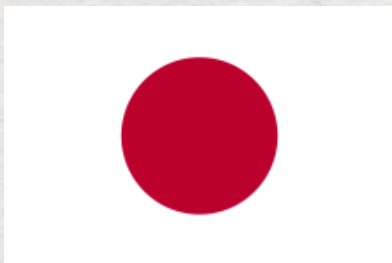
cigre

For power system expertise

CIGRE Japan NGN

2026 Paris Session NGN Forum

Masayuki Habukawa, Japan



HITACHI



Agenda

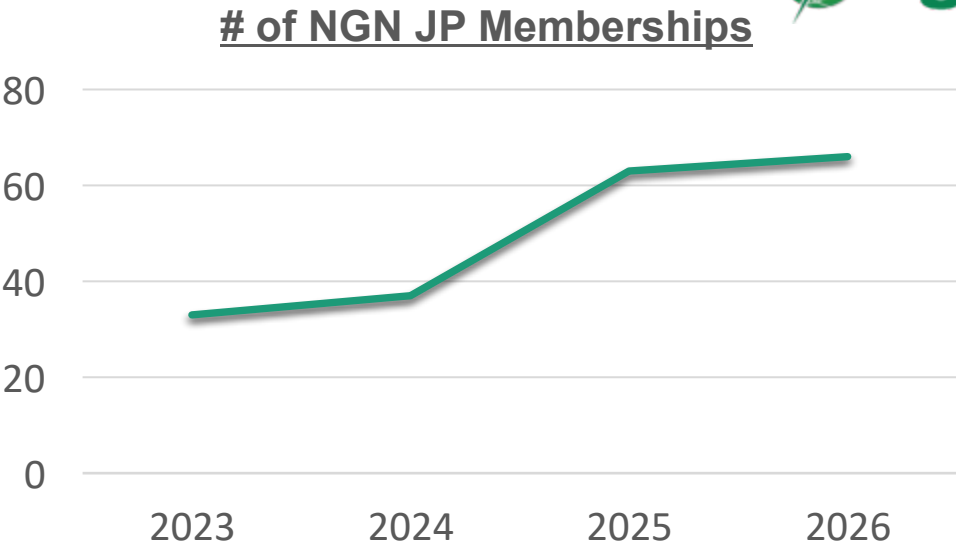


- Introduction of NGN Japan
- Recent Highlights
- Future focus – the road to Paris 2028
- Tokyo A3 & B3 Joint Colloquium 2027

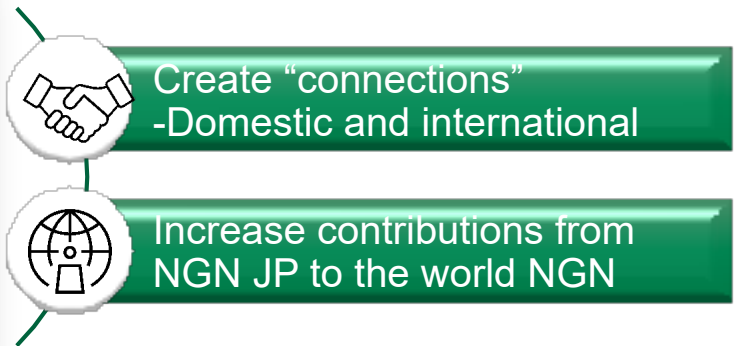
Introducing NGN Japan



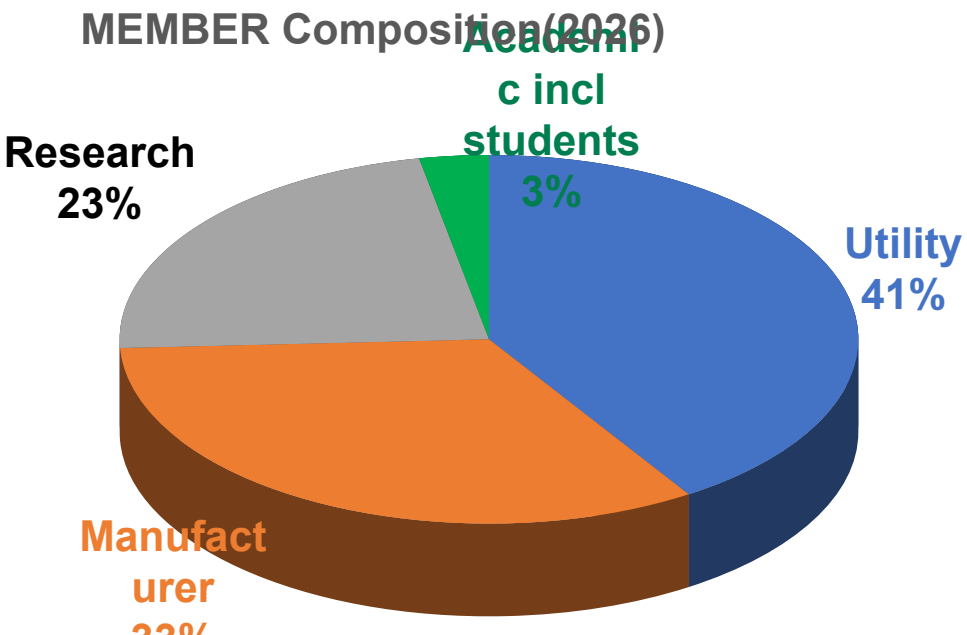
- New NGN leadership established in 2025
- 66 NGN members - 2026
 - 80% increase on 2024



Kickoff for new NGN-JP org (2025)



NGN-JP's goals

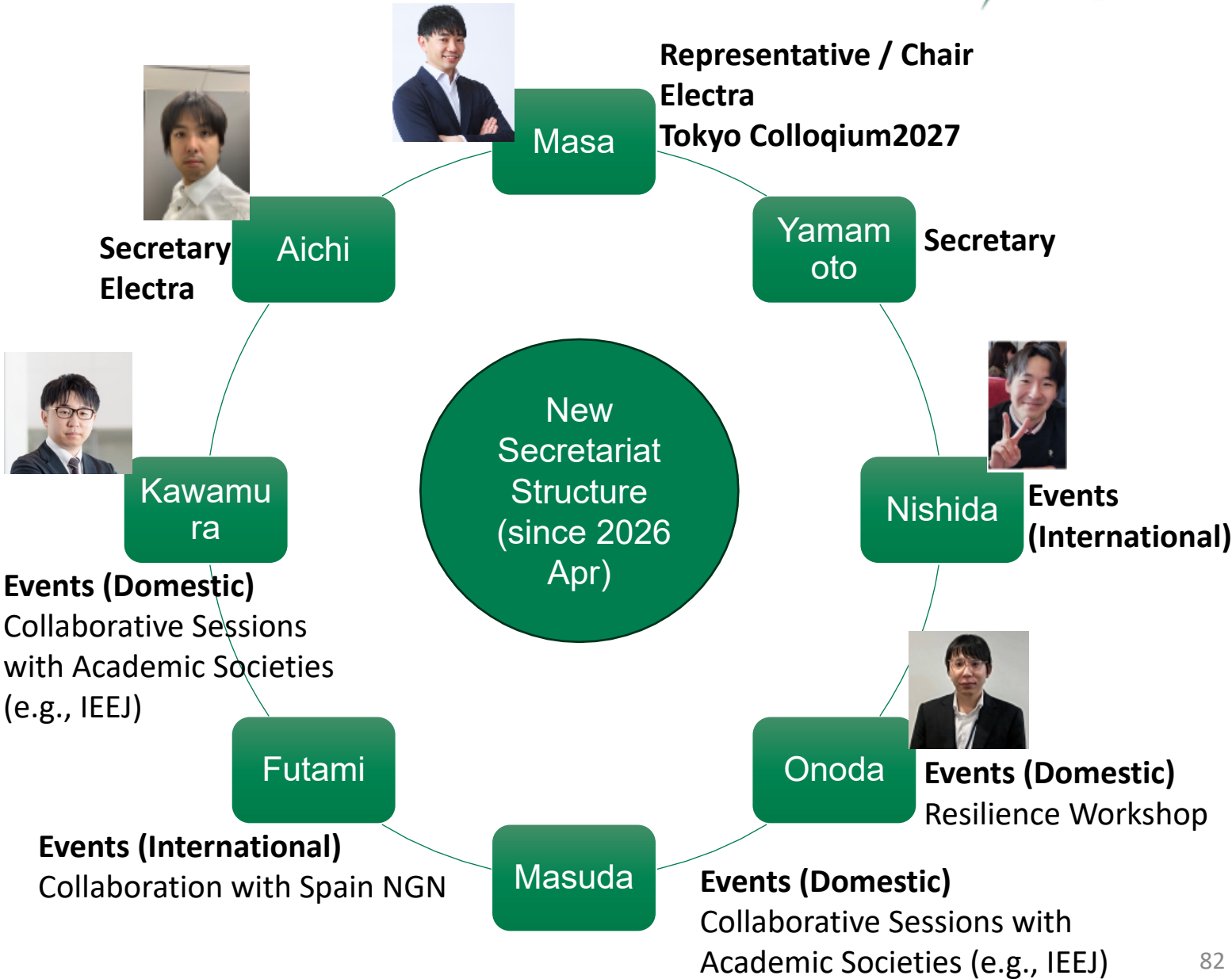


Introducing NGN Japan - Committee members



Activity-based Role Assignment

Role	Activity
Overall Coordination	Representative / Chair
Secretary	Operations / Management
Events (International)	Collaboration with Spain NGN
	Collaboration with Other National NGNs
Events (Domestic)	Resilience Workshop
	English Technical Exchange Session
ELECTRA	Collaborative Sessions with Academic Societies (e.g., IEEJ)
	Introduction of JNC NGN activities
Tokyo Colloquium2027	NGN/WiE session



Recent Highlights *Japan*



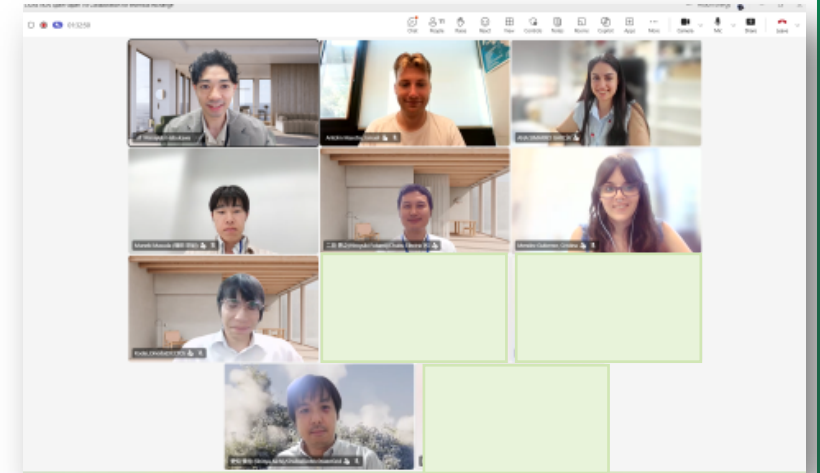
01



NPS Webinar (Apr 2026)

- Japan NPS (National Power System) was presented.
- Attracted approx. 50 participants

02



Collaboration with Spain NGN (June 2026)

- Introduced NGN activities and national Power system from both countries
- Topics of SC A, B, C, D will be covered in regular technical exchange calls as a next step

Future Focus: the road to Paris 2028

NGN *Japan*



Strengthen Academic Engagement

- Attract more academic members
- Build stronger links between industry and academia



Expand Global Collaboration

- We welcome connections from all NGNs and countries
- Open to technical exchange, joint activities, and knowledge sharing



Contribution from JP to the world

- Share Japan's experiences, best practices, and technical expertise
- Promote collaboration through webinars, workshops, and joint initiatives

Let's expand our global network through both technical collaboration and cultural connections!

Tokyo A3 & B3 Joint Colloquium 2027 (Oct 25th – 29th)



Theme

“Resilient and Sustainable Substations and T&D Equipment for the Energy Transition”

Presential Subjects

- ❖ PS1: Enhancing resilience of substations and T&D equipment under extreme environmental and natural disaster conditions
- ❖ PS2: Practical deployment and operating experiences of sustainable technologies and environmentally compatible solutions for Net Zero
- ❖ PS3: Digital intelligence for asset management and knowledge transfer in substations and equipment

➤ Key dates

- ✓ **Synopsis Open: 10 July 2026**
- ✓ **Registration start: Oct 2026**
- ✓ Synopsis Submission: 12 March 2027
- ✓ Notification of acceptance: 23 April 2027
- ✓ Presentation materials Submission: 10 July 2027
- ✓ Notification of acceptance: 31 July 2027

➤ NGN/WiE session

- **Location (Conference Hall)**
near Tokyo Station

➤ Website

[CIGRE A3&B3 Joint Colloquium 2027](#)



cigre

Japan

CIGRE Japan NGN representative
Masayuki Habukawa – Hitachi Energy

masayuki.habukawa@hitachienergy.com
+81-70-2834-9008

CIGRE SOUTHERN AFRICA NGN

2026 Paris Session NGN Forum

Nomlindelo Mgidi – South Africa



Agenda



Introduction of CIGRE Southern
Africa NGN



Recent Highlights (*What we achieved
from 2024 to 2026*)

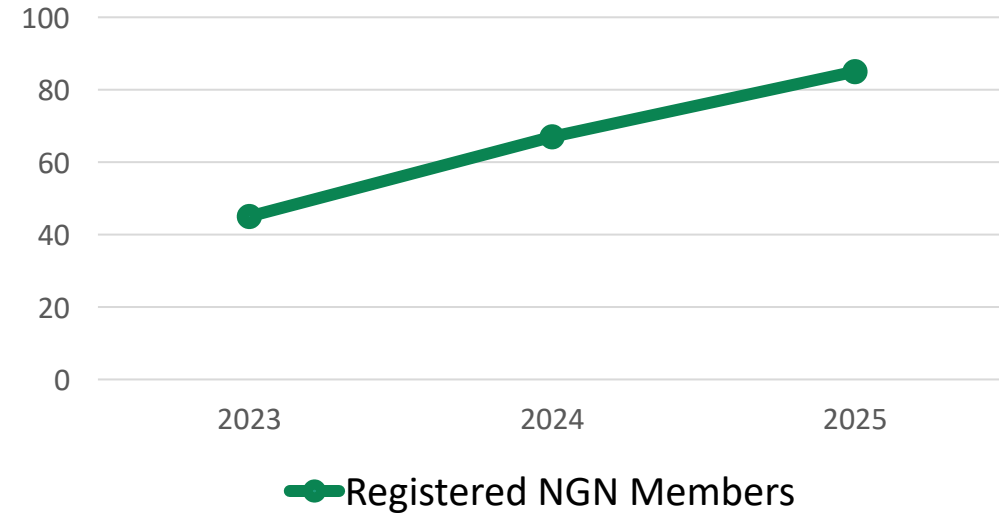


Future focus – the road to Paris 2028
(*challenges and opportunities*)

Introducing the Southern Africa NGN

- 85 NGN members
 - 47% increase on 2023
 - 35% female
 - 73% students
- Increase NGN participation in:
 - Study Committee Memberships
 - Technical Paper
 - Attending Conferences

NGN Membership



Introducing the CIGRE Southern Africa NGN Committee



Chairperson
Nomlindelo Mgidi
Mgidinv@eskom.co.za
Eskom Distribution



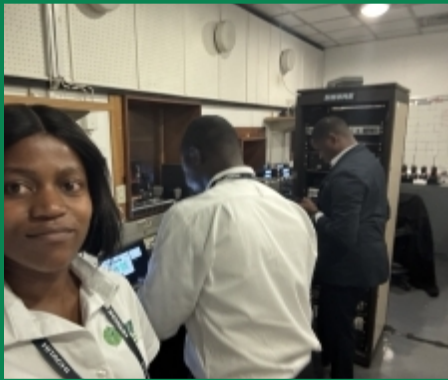
Technical lead
Ndoro Netshipale
NetshiNr@eskom.co.za
Eskom NTCSA



Academic liason
Mukumela Nthangeni
mukumela.nthangeni@actom.co.za
Actom



Communications & Marketing
Noble Kojo Akorttia
Noble@teslaghana.com
Tesla (Ghana)



The CIGRE Southern Africa NGN participation at the



SA NGN Committee members at the 2025 CIGRE SA 12th Regional Conference



2025 CIGRE SA Regional Conference: NGN Session Speaker and past chair "Passing the Torch."

Recent Highlights (What we have achieved from 2024 to 2026)



2026 Africa Energy Indaba Exhibition



SAUPEC 2025 and 2026 Exhibition



Career Day – CIGRE SA NGN in collaboration with SAIEE and Eskom



Membership Drive at the University of Johannesburg



Future focus – the road to Paris 2028



Challenges or opportunities

- **Attracting and retaining** young professionals
- Creating **awareness of CIGRE** and its value proposition
- Balancing geographical **accessibility** and costs associated with site visits, exhibitions, and networking events.
- Securing volunteers and industry **partners**.
- Connecting **NGN activities** to CIGRE Technical Committees and Working Groups.
- **Bridging the gap** between academia and industry.
- **Increasing the participation** for conferences particularly the NGN Paris showcase.



Thank you. 

CIGRE Serbia NGN

2026 Paris Session NGN Forum

Jana Toholj, Serbia



Agenda

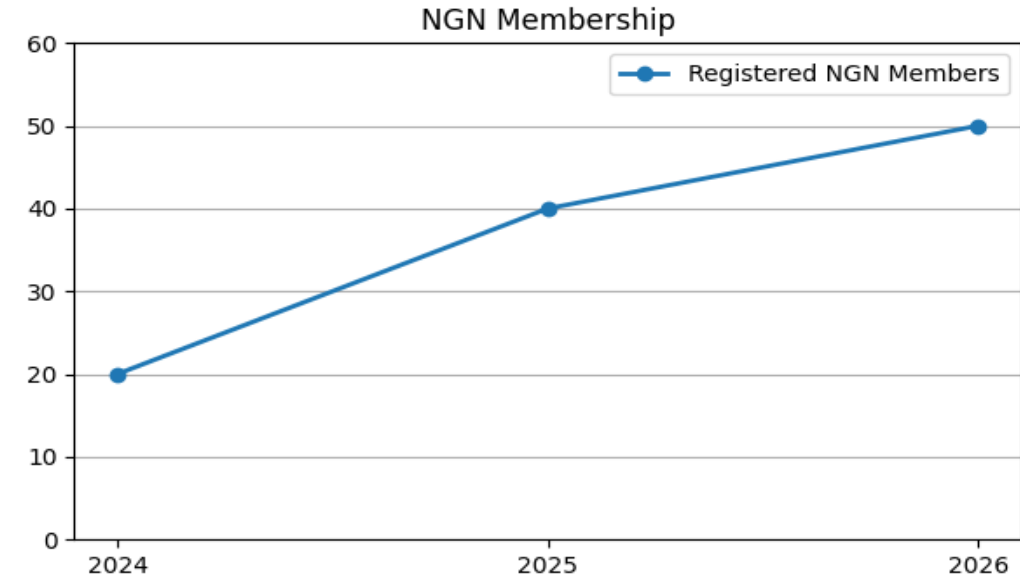


- Introduction of NGN Serbia
- Recent Highlights
 - Learning Through Webinars and Lectures
 - IEEE PES Collaboration
 - NGN Showcase 2026
- Future focus – the road to Paris 2028
 - Challenges and Opportunities

Introducing NGN Serbia



- CIGRE NGN Serbia is founded in December, 2024
- 50 NGN members
- 64% female
- 36% male
- 0% students – Collaboration with universities in progress



Introducing NGN Serbia



- Learning Through Webinars and Lectures
- IEEE PES Collaboration
- NGN Showcase 2026

PRESENT ME YOUR NATIONAL POWER SYSTEM

powered by **cigre**
Next Generation Network

► Presenting country: **SERBIA**

A GLOBAL TOUR OF POWER SYSTEMS

Tuesday **17th March 2026**
12:00 UTC

MS TEAMS



Paris 2026 Session: NGN Activities

NGN Showcase & Presentation Competition
Presenters will present in the Group Discussion Meetings, take part in the poster sessions and also present in a special competition event just before the NGN Forum.

NGN Forum
An NGN session packed with engaging presentations and discussions. A chance to meet and learn from other NGN groups and CIGRE experts.

NGN Technical Event
A visit to a local museum of technological innovation in Paris. An opportunity to learn and to network with fellow NGN members

NGN Social Event TBC
An evening event to facilitate networking and building of friendships between international NGN members and further ad-hoc opportunities to network.

NGN Booth
Exhibition stand as a central location for NGN members to meet, share ideas and advertise their contributions to CIGRE, including a program of events and meet-ups with industry experts.

Ancillary Services: a TSO vs Aggregator perspective

Technical Webinar

Tuesday 25th November 2025

10:00 AM (RO time)
09:00 AM (SRB time)
08:00 AM (UTC)

Nikola Tošić
Market Division Manager
Elektromreža Srbije

Olivian Savin
Country Manager
Nano Energies Romania

IEEE Serbia & Montenegro PES Chapter | Cigre NGN Serbia

Frequency Control in Modern Power Systems
From Theory to Practice

Featuring
Prof. Federico Milano
(UCD, IEEE PES Distinguished Lecturer) &
Nikola Obradović
(Corporate director for International and Regulatory Affairs, Elektromreža Srbije)

15:00h – 18:00h
April 29 | Palata nauke,
Sala Horizont (4th floor)

co-organised by:

Beyond Equations: Building a Career that Shapes the Future of Energy

with **Nenad Uzelac**

Thursday, 12 March
16:00-18:00 CET (Belgrade, Serbia)

The Palace of Science, Atom Hall
Kralja Milana 11, Belgrade

Registration link

Future Focus: the road to Paris 2028

NGN *Serbia*



- **Our priorities**

- Increase the number of active NGN Serbia members.
- Organize more technical lectures, workshops, and site visits.
- Strengthen cooperation with universities and power industry companies.
- Encourage greater participation of young professionals in CIGRE Study Committees and Working Groups.
- Increase the number of Serbian papers and delegates at CIGRE events.

- **Challenges**

- Keeping members engaged throughout the year.
- Attracting students and early-career engineers.
- Securing sponsorship and support for NGN activities.

- **Opportunities**

- Growing interest in renewable energy, digitalization, and AI in power systems.
- Strong cooperation with the Serbian National Committee.
- Networking with other NGN groups.
- Greater involvement in international CIGRE activities leading up to Paris 2028.



cigresrb.ngn@gmail.com



Next Generation Network Serbia



cigre_ngn

PARIS
SESSION
2026

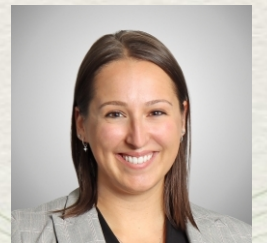


Next Generation
Network

CIGRE United States NGN

2026 Paris Session NGN Forum

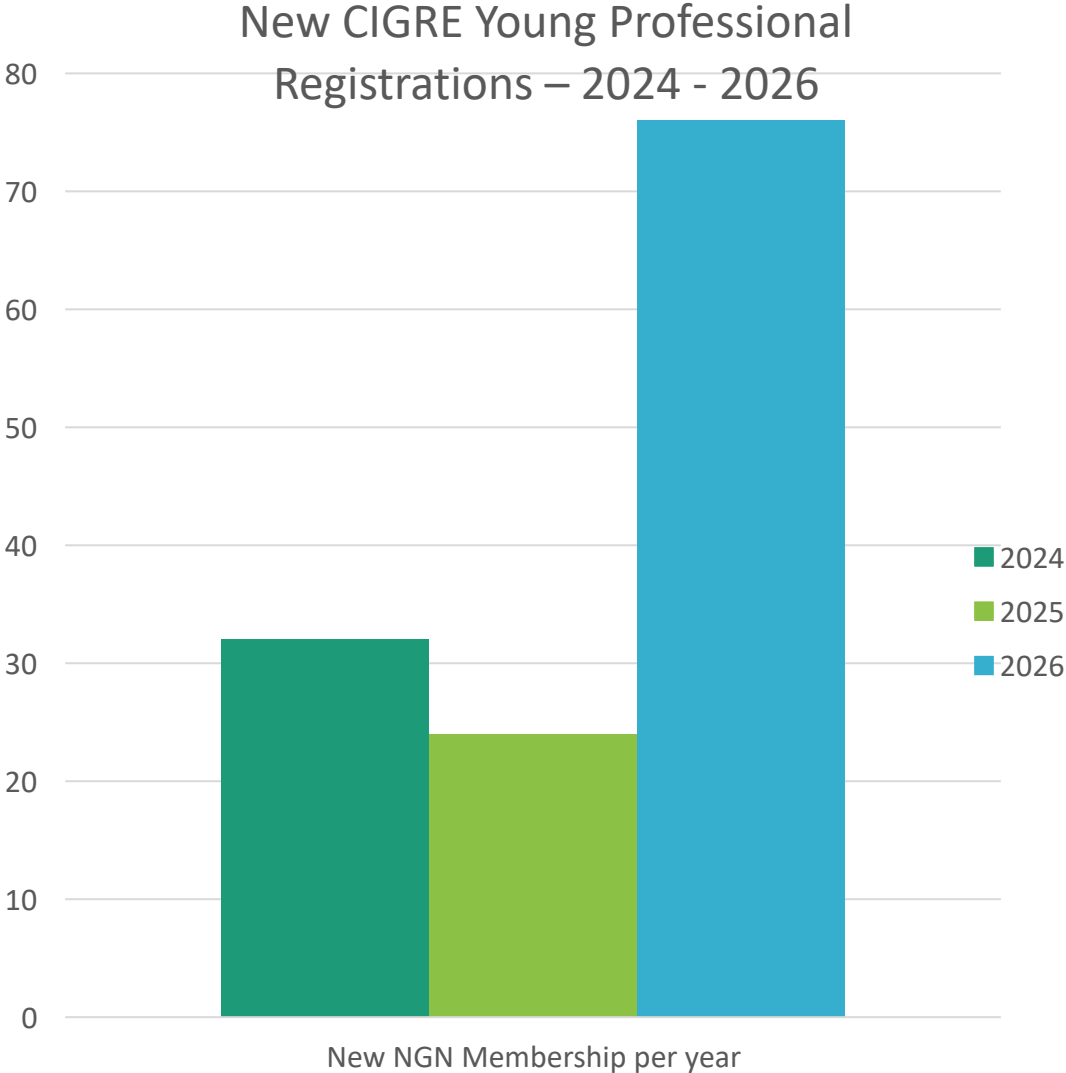
Logan ROLLES, United States



Agenda

- Introduction of USNC NGN
- Recent Highlights
- Future focus – the road to Paris 2028

Introducing United States NGN

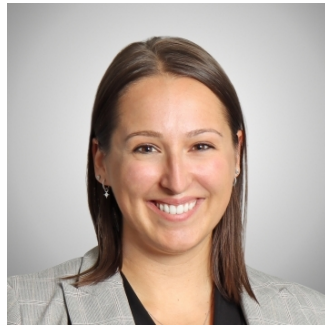


- **USNC Membership by the numbers:**
 - 1,430 active memberships
 - 283 Student Memberships
 - 133 YP Year 1-3 Memberships
 - 305 new CIGRE memberships since 2024
 - 42 Collective Memberships
 - 12 Educational Memberships



Introducing United States NGN

Committee Structure



Logan Rolles
NGN Chair



Jodie Lupton
*Paper Competition &
Social Media Co-Chair*



Adam Nussbaum
*Paper Competition Co-
Chair*



Maigha
Webinars Co-Chair



Leila Chebbo
Events Chair



Zejia Jing
Mentorship Co-Chair



Sahilpreet Singh Mann
Mentorship Co-Chair



Nicholas Skoff
*International
Collaboration Chair*



Parth Shah
*Technical Membership
Chair*



Nayara Montes
Webinars Co-Chair



Genesis Alvarez
Member-At-Large

Introducing United States NGN

Recent Highlights



Mentorship



Webinar Program



USNC Grid of the Future Symposium



College Outreach



Industry Partnerships



Next Generation
Network



Future Focus: the road to Paris 2028

United States NGN

Challenges

- **Demonstrating the Value of Participation**
 - Helping early-career professionals and employers recognize the technical, professional, and global networking benefits of CIGRE involvement.
- **Broadening Participation Across the Power Sector**
 - Engaging a balanced mix of utility, academic, consulting, and industry professionals to strengthen the diversity of perspectives in NGN and CIGRE activities.
- **Sustaining Engagement Across a Large Geographic Footprint**
 - Creating meaningful connections and opportunities for participation despite the size and geographic diversity of the United States



Opportunity

- **Increase Awareness of CIGRE's Career and Technical Value**
 - Showcase pathways to technical leadership, international collaboration, publication opportunities, and global professional networks to attract new participants.
- **Strengthen Industry and Employer Partnerships**
 - Equip members to demonstrate the value of CIGRE engagement while encouraging organizational support for technical working groups, conferences, and knowledge exchange.
- **Build Accessible and Connected Communities**
 - Leverage virtual engagements like webinars, networking, and mentorship, host regional events, and share member success stories to foster lasting connections and participation throughout the year.

PANEL DISCUSSION SESSION II

Panel Discussion Chair

NGN Across Regions: Challenges, Experiences and Best Practices

Pikria Elizarashvili

CIGRE Georgia NGN Chair



The background of the slide is a photograph of the Eiffel Tower in Paris, France, taken from a low angle across a body of water. The tower is illuminated with golden lights, and its reflection is visible in the water. The sky is a deep blue, suggesting dusk or dawn. The foreground shows a paved walkway and some greenery.

Powering universal progress

Paris Session 2026 / CIGRE

Asmita Schoettli
IEC Country Engagement Coordinator

Powering Universal Progress



**Enabling global trade and socio-economic welfare since
1906**

Who is the IEC?

~170
countries

A global network that covers 99% of the world population and offers a free programme to developing countries

10 000+
standards

Develops international standards that represent a global consensus of state-of-the-art know-how

1M+
certificates

Four Conformity Assessment Systems that cover the breadth of electrical and electronic technologies

30 000
experts

Over 30 000 experts and more than 100 years expertise

A platform for the next generation of experts



YP Programme

Engaged YPs from France



40 YPs

4 YP leaders

17 YPs in TCs/SCs and NCs

Active engagement through
bootcamps and events



IEC YP Alumni network hub

Keeps YP alumni connected beyond the annual workshop

Networking, shared activities, collaboration and community engagement

YP Alumni mid-year event, 23-25 June 2025 (online)

OW us



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[facebook.com/InternationalElectrotechnicalCommission](https://www.facebook.com/InternationalElectrotechnicalCommission)



[youtube.com/@IECstandards](https://www.youtube.com/@IECstandards)

CIGRE Next Generation Network Forum

See you at 2028 CIGRE NGN Forum!