



Next Generation
Network

CIGRE NL Takeaway Event

Perspectives of Next Generation Network

26th September 2024



cigre

Next Generation
Network



Aleksandar Boričić

Introduction and Agenda



Aleksandar Boričić (30)

- **Originally from:** Montenegro, in the Netherlands since ~2018.
- **Education:** PhD graduate from TU Delft on the topic of power system stability (MSc alumni from KTH & TU/e, BSc & Spec from Univ. of Montenegro).
- **Work:** Couple of years of industry experience (CGES, DNV, ABB, TenneT...). Since 2023 at TenneT TSO, currently as a Dynamics and Stability Expert in System Operations.
- **CIGRE:** Active within CIGRE over 6 years, in CIGRE NL NGN board since 2019. Contributed to two CIGRE WGs and published a few CIGRE papers. Primarily active on C2 & C4 topics.

Agenda of my talk today:

- Introduction
- About CIGRE NGN (NL)
- CIGRE Paris 2024 highlights & takeaways
- Showcase competition 2024
- Going forward

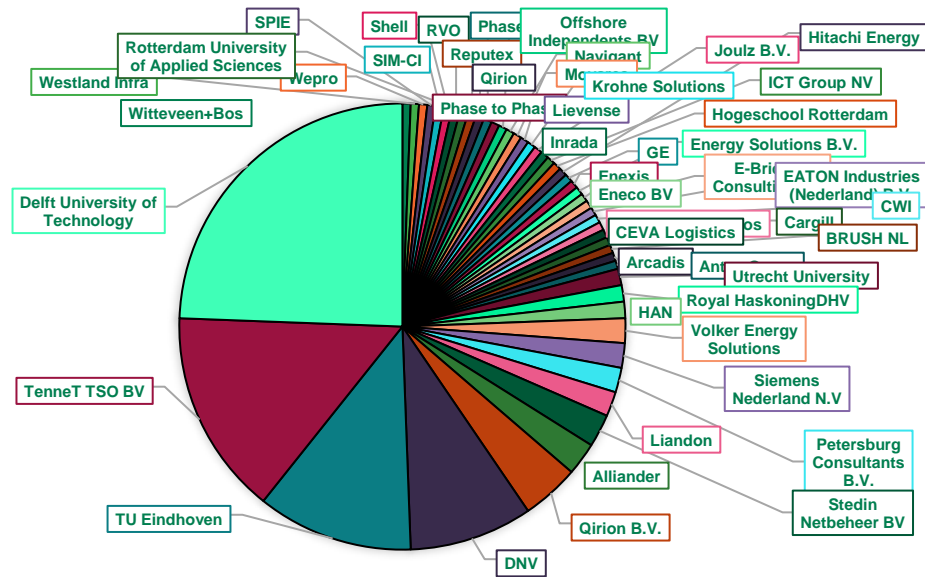
About CIGRE Next Generation Network (NGN) NL

Mission & Structure



Our mission:

- Create a bridge between young professionals/students and the world of CIGRE, with the focus on the Netherlands
- Organize technical and networking events, engage collaboration within CIGRE NL and internationally
- Supports career development of young professionals in the energy sector



168 NGN subscribers (95 Individual members),
from 49 companies

CIGRE NGN NL Structure

Chair



Sanjay Ganeshan



Secretary



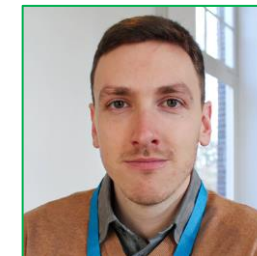
Lakshna Kalpoe



Board members



Parya Pourebrahim



Aleksandar Boričić



Ioan Juravle



About CIGRE Next Generation Network (NGN) NL

Some of our activities



Some recent NL events:

- Team day at TU Delft, incl. RTDS Lab Visit and the Control Room of the Future (CRoF) tour
- Matchmaking event – NGN members meet the SC chairs
- CIGRE Paris session (incl. Showcase event)

International NGN Activities:

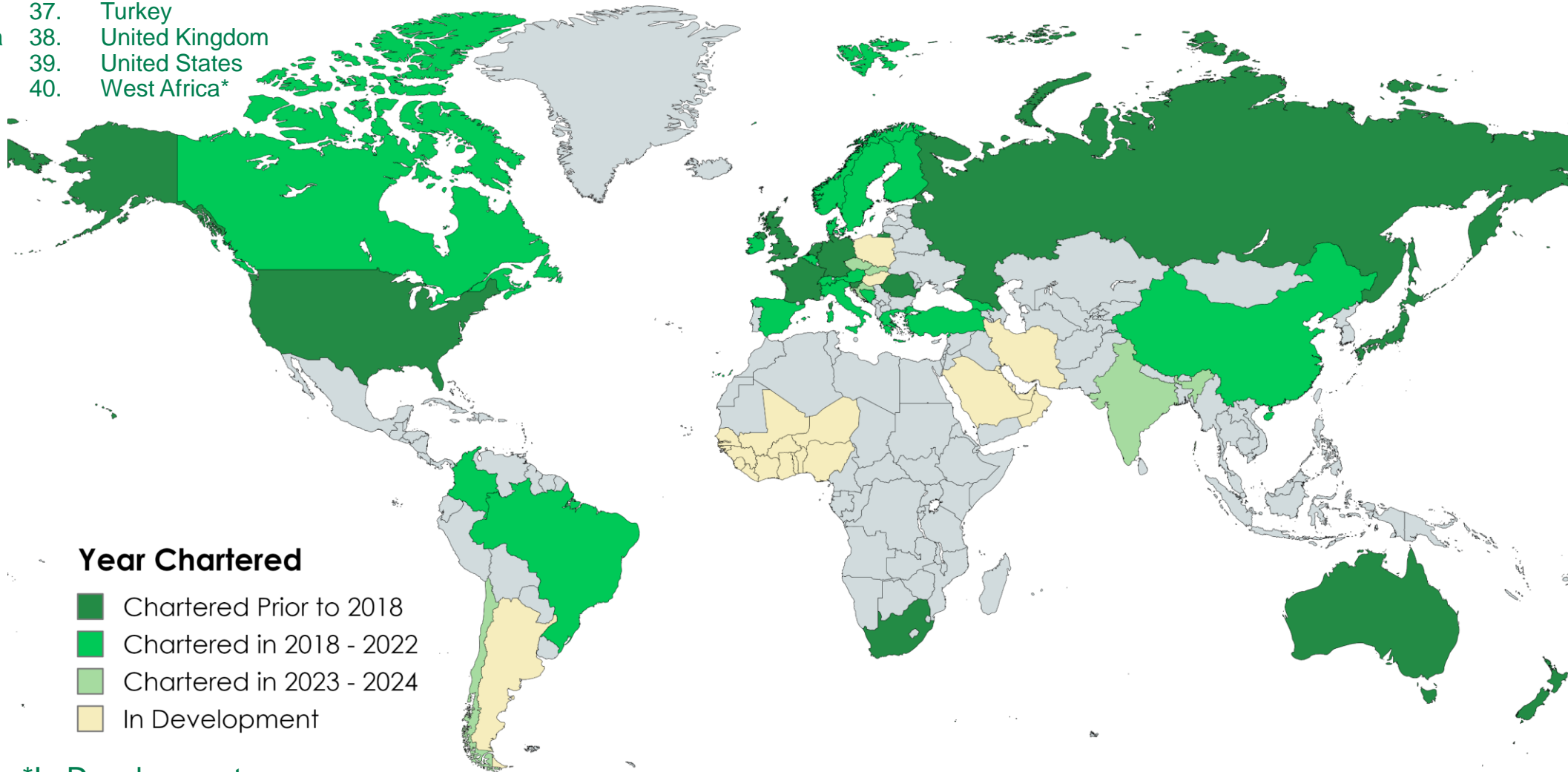
- Active participation in NGN International Executive Committee (IEC) activities
- Collaboration events and activities with other NGNs, e.g. recent joint technical webinars with NGN BE and NGN UK
- Support CIGRE NGN & Women in Energy (WiE) developments
- Career & Development events in the energy sector



Broader view: NGN Groups Worldwide

1. Argentina*
2. Australia
3. Austria
4. Belgium
5. Bosnia & Herzegovina
6. Brazil
7. Canada
8. Chile
9. China
10. Colombia
11. Croatia
12. Czech & Slovak
13. Denmark
14. Finland
15. France
16. Georgia
17. Germany
18. Greece
19. Gulf Cooperative Council (GCC)*
20. Hungary*
21. India
22. Iran*
23. Ireland
24. Italy
25. Japan
26. Netherlands
27. New Zealand
28. Norway
29. Poland*
30. Romania
31. Russia
32. Slovenia
33. South Africa

34. Spain
35. Sweden
36. Switzerland
37. Turkey
38. United Kingdom
39. United States
40. West Africa*



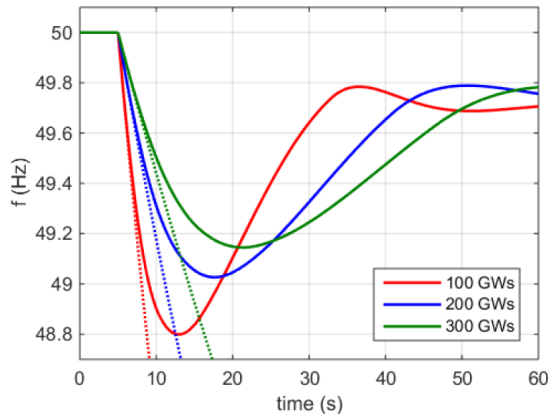
*In Development

CIGRE Paris 2024 highlights & takeaways

Our contribution (C2 – PS2)

Improving Frequency Defence Schemes for Critical System Conditions in the Continental European Power System

- **Problem definition:** Inertia of the Dutch grid decreases, leading to stability challenges



Lower inertia levels → Higher RoCoF & deeper Nadir →
Risks of load shedding, cascading, and instability

Last resort measure → LFDD (Low-Frequency Demand Disconnection) i.e. “Load shedding” to arrest the frequency

- **Findings** → LFDD schemes in the Netherlands are insufficient in modern systems
 - May also *disconnect DERs* (unintended “generation” instead of “load” shed)
 - Are *too slow* given the lower inertia and rising RoCoF
 - The schemes face *challenges due to localized inertia/RoCoF behavior*
- Some of the explored improvement possibilities:
 - *Improve feeder selection* to reduce DER disconnection during LFDD
 - *RoCoF-based LFDD schemes* for large loads/feeders for faster/effective LFDD
 - *Shed less in weak-grid areas* to avoid other stability challenges (e.g. voltage)



Poster session impressions:

- Lots of interest from many delegates, very good discussions
- TSOs are often dealing with similar challenges
- Collaboration interests from a few parties
- Experienced delegates from high-RES countries (e.g. Australia) stress that these challenges need to be addressed more!

This R&D project will be continued and expanded in the coming period!

CIGRE Paris 2024 highlights & takeaways

Overall (Technical) Takeaways – Few of my highlights

C2/C5 Large Disturbances Workshop

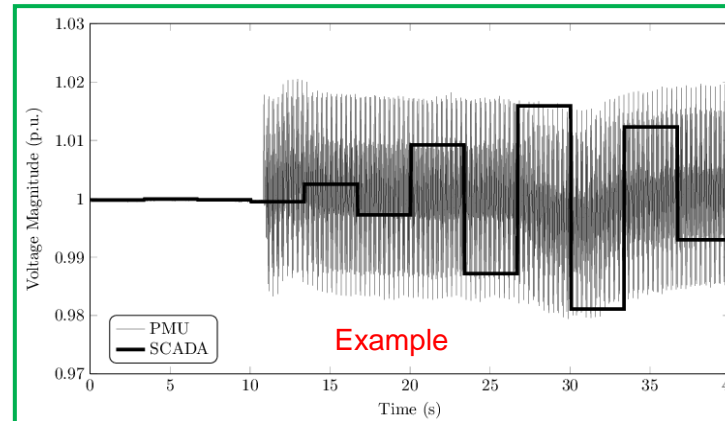
Experience shared from several countries:

- Poland, Scandinavia, Singapore, Australia (east coast), Alberta (Canada), The Netherlands, Brazil, Mozambique and India...

Some of the lessons learned:

- Large disturbances become more common in weakening grids!
- New types of stability challenges are arising
 - R&D is the key!
- Concentrated generation in a single substation can lead to N-X events
 - Risks for our 2GW Wind developments!
- Human errors occur, and can lead to large disturbances (e.g. Poland 3ph SC, several GW loss)
- ❖ **HILP events should not be underestimated!**
(high-impact low probability)

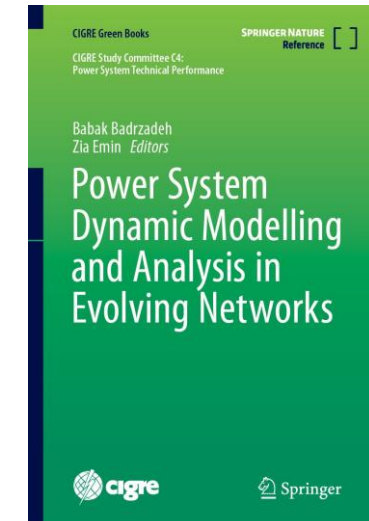
WAMPAC Systems – Decision Support for System Operators (C2)



- Dynamics are becoming much faster!
(far beyond SCADA/EMS capabilities)
- Oscillations in higher frequencies
(used to be <3Hz, nowadays 3-50Hz SSO and even kHz harmonic range)
 - At TenneT, we observe this already!
- Voltage *angle* importance!
(Entso-e Awareness System - EAS)
- ❖ **Need for PMUs + WAMS/WAMPAC, otherwise we remain blind to dynamics!**

C4 Workshop - Power system dynamic modelling and analysis in evolving networks

- One of the most comprehensive dynamics & stability books in many years
 - Focus on modern systems!
- Huge turnout & interest at the workshop, highlighting the importance of the topic
- ❖ **Very comprehensive book (~900 pages) and highly recommended!**



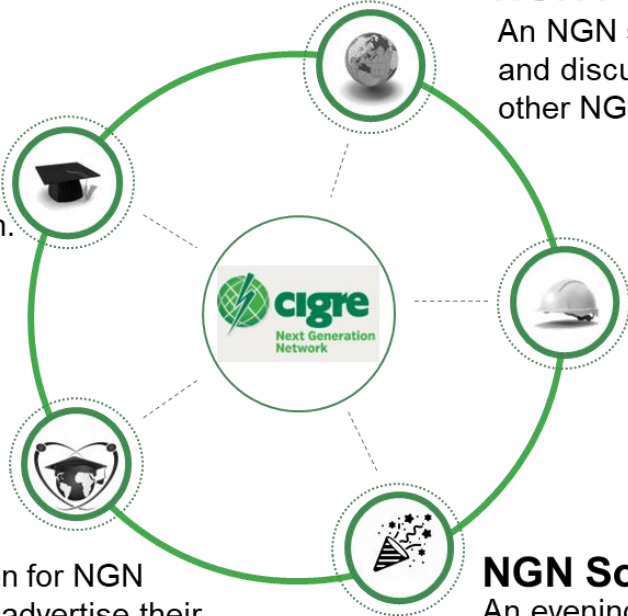
Paris 2024 Session: NGN Activities

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 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.



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

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

Background:

- Initially proposed by UK NGN with support from many other NGN groups in 2015
- Approved by CIGRE Central Office → first showcase held during the 2016 Paris Session
- Each country/NC can submit up to 4 nominations, max 1 per Study Committee

Motivation:

- Platform for young professionals to showcase their work to an international CIGRE audience
- Networking opportunities for international NGN members
- Enhancing collaboration among international NGN groups
- Driving sustainable CIGRE membership

Selected Candidates Receive:

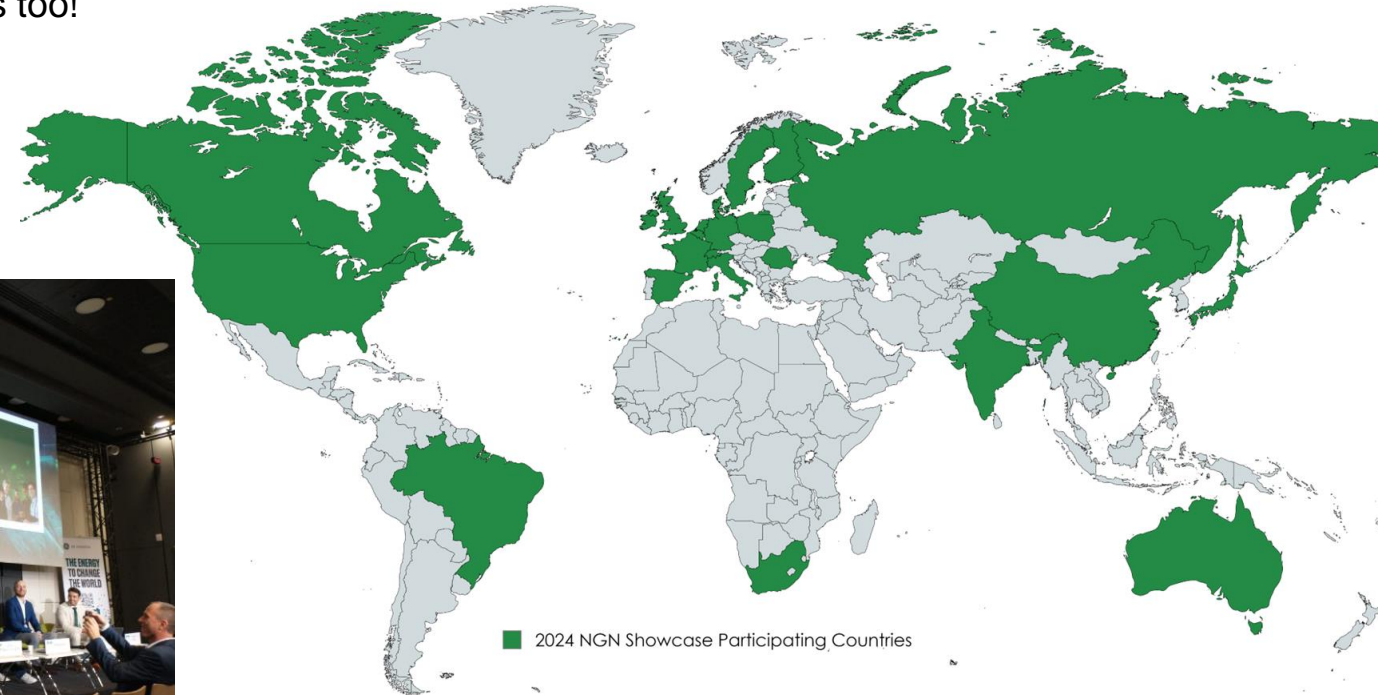
- 10-minute slot at discussion session in Paris, for the respective Study Committee
- Space at poster session in Paris, for the respective Study Committee
- Invitation to participate in the NGN Presentation Competition during the Paris Session
- Paper included in the Paris Session Proceedings
- Free Paris Session ticket for the entire session

CIGRE Paris NGN Showcase 2024

- Despite recent years' COVID challenges, showcase has become a core part of CIGRE Paris events!
- CIGRE NGN Netherlands is a regular participant, also in 2024!
- Key general takeaways:
 - Showcase enabled many interesting contributions from young members
 - Majority will continue to be active within CIGRE after this too!

| | 2016 | 2018 | 2020 | 2021 ¹ | 2022 ² | 2024 |
|--------------------------------|------|------|------|-------------------|-------------------|-----------|
| Participating Countries | 14 | 21 | 23 | 19 | 12 | 23 |
| Nominations | 38 | 52 | 63 | 44 | 30 | 55 |
| Selections | 22 | 31 | 33 | 29 | 26 | 28 |
| SCs Represented | 16 | 13 | 16 | 14 | 16 | 14 |

¹COVID Pandemic
²First year with full-paper submissions



CIGRE NGN (NL) Going forward



- Our core mission continues:
 - To create a bridge between young professionals/students and the world of CIGRE!
- We continue to grow, both in terms of members and companies involved
 - Reach out if you are interested to join us! ([LinkedIn](#), [website](#))
- The industry focus of CIGRE continues to expand
 - H₂, datacenters, transportation, heating/cooling... everything comes together in electric power systems
- CIGRE NGN is to become much more integrated within CIGRE
 - NGN SC leads to support central SCs, Electra magazine, NGN participation in WGs...
- Stay tuned for our upcoming CIGRE and CIGRE NGN events and see you at CIGRE Paris 2026!
 - Follow our page for the latest information on the events
 - NGN Showcase 2026 preparations will start mid-2025 – consider participating as a student/young professional!
 - In the meantime,...CIGRE Trondheim and CIGRE Montreal Symposiums in 2025