



A stylized map of Southeast Europe and the Mediterranean region, showing the electrical grid connections between Italy, Romania, Bulgaria, and Greece. The map is rendered in shades of blue and purple, with white lines representing power lines. The countries are labeled in white capital letters: ITALY, ROMANIA, BULGARIA, and GREECE. A red horizontal bar is located at the top left of the slide.

Southeast Electricity Network Coordination Centre (SEleNe-CC)

The Regional Coordination Centre (RCC) for SEE

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Outline of the Presentation

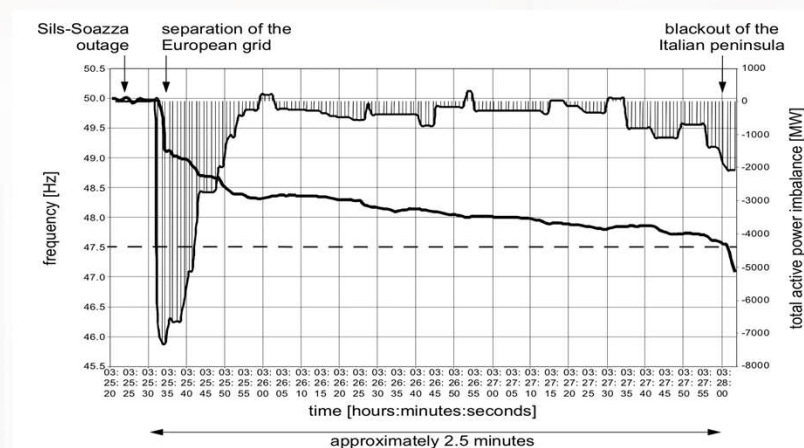
- Regional Coordination Centres (RCCs) – Why do we need them?
(Significant Blackout cases that led to their creation)
- RCCs in Europe
- What is the role of the RCCs
- The Southeast Electricity Network Coordination Centre (SEleNe-CC)
- Provided Services

New Regional Coordination Structures

Main triggering events

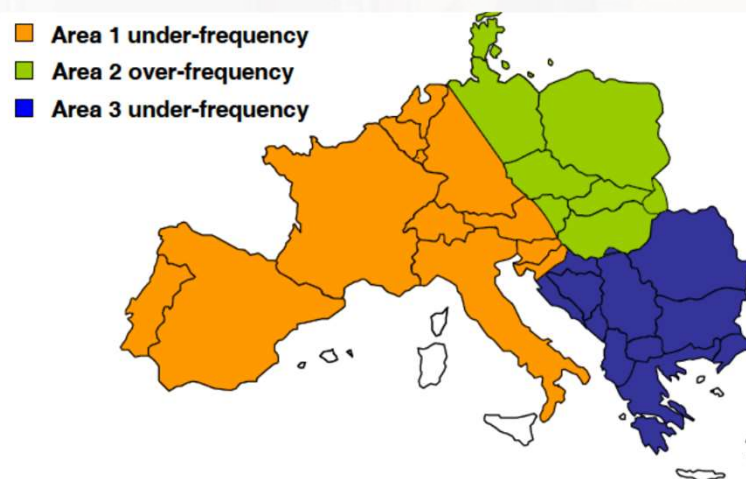
➤ 28th September 2003: Black-out in Italy

- at 03:01. Italy imports bulk power (mainly from Switzerland)
- Cascading disconnection north interconnectors due to a SC (loading was 85%) with **€1.2 billion worth of damages**



➤ 4th November 2006: The worst incident in Europe

- at 21:38 a series of unfortunate events led to the separation of the European network into 3 parts
- The event led TSOs to closer cooperation and relevant measures

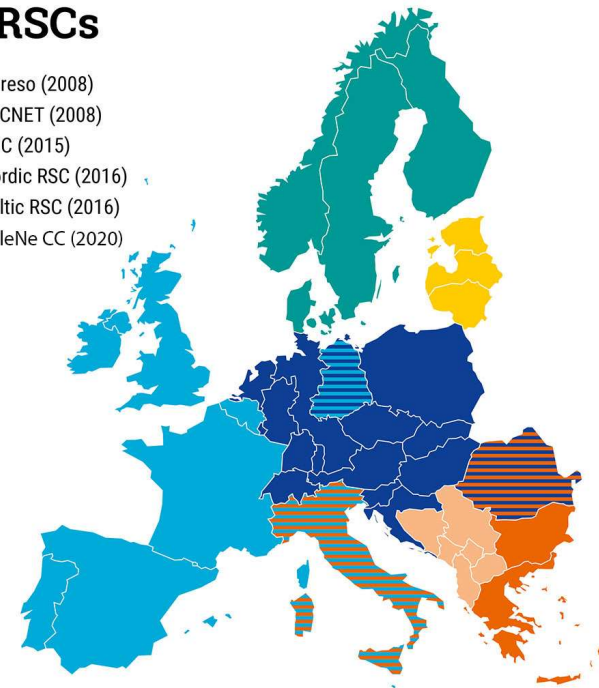


RCCs in Europe

- **SEleNe-CC is the last Coordination Centre to be established in May 2020.**
- Coreso (2008), located in Brussels
- TSCNET (2008), located in München
- SCC (2015), located in Belgrade
- Nordic (2016), located in Copenhagen
- Baltic (2016), located in Talin, Riga, and Vilnius
- SEleNe-CC (2020), located in Thessaloniki

6 RSCs

- Coreso (2008)
- TSCNET (2008)
- SCC (2015)
- Nordic RSC (2016)
- Baltic RSC (2016)
- SEleNe CC (2020)



■ Services obtained from several RSCs

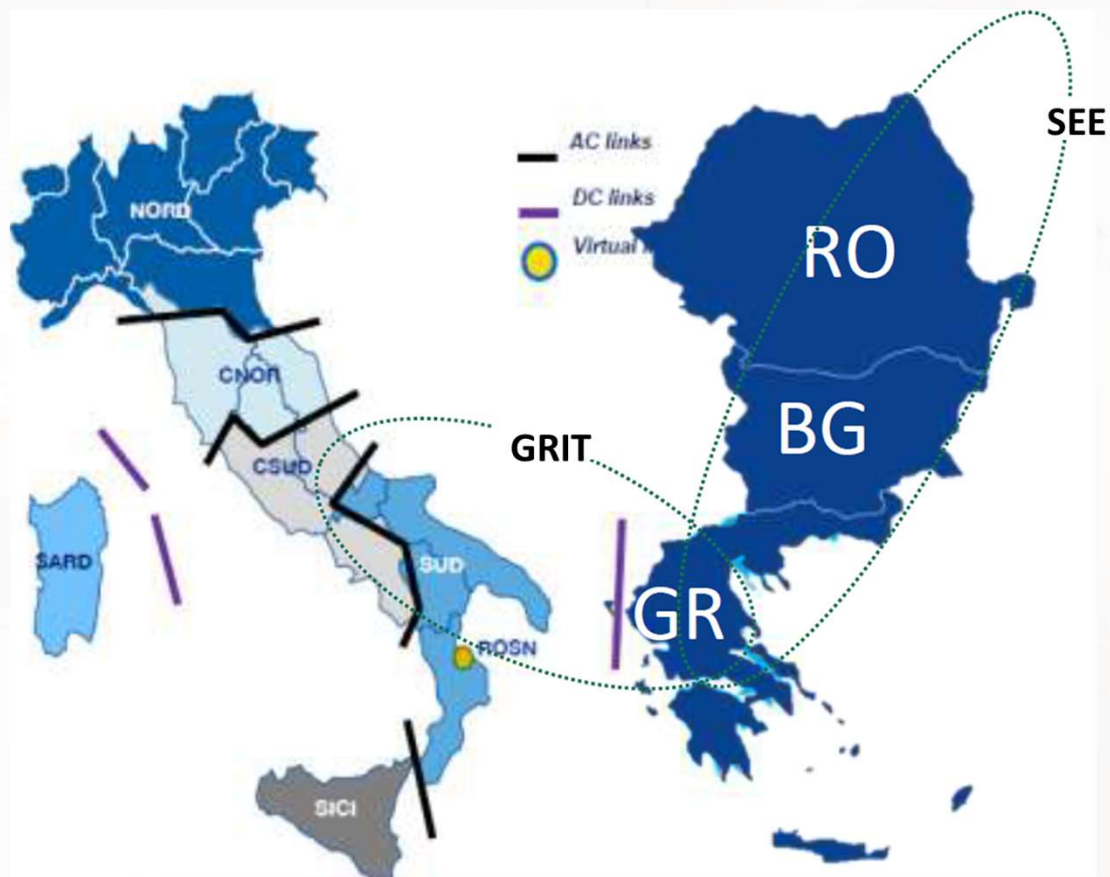
The Role of RCCs

- The **massive integration of renewable sources** (which are by nature intermittent) as well as the **increase in cross-border exchanges** within the European electricity market make electricity flows increasingly variable. They are therefore much more difficult to predict and calculate than in the past
- **RCCs coordinate high-voltage electricity flows** for European Transmission System Operators (TSOs) to support them ensuring the **security** of electricity supply on a European regional basis and to guarantee **transparency**
- RCC activities consist in performing analyses, recommending and coordinating solutions (both in the short and long term) for TSOs in different areas in Europe

The Southeast Electricity Network Coordination Centre

SELENE-CC serves the TSOs of:

- Bulgaria (ESO-EAD)
 - Greece (IPTO)
 - Italy (Terna)
 - Romania (Transelectrica)
- Shareholders: ESO-EAD, IPTO and TERNA (33,33% each)
 - 24 highly qualified employees
 - 24h/365d continuous operation
 - **Esperia**: subsidiary for Italy and GR-IT based in Rome

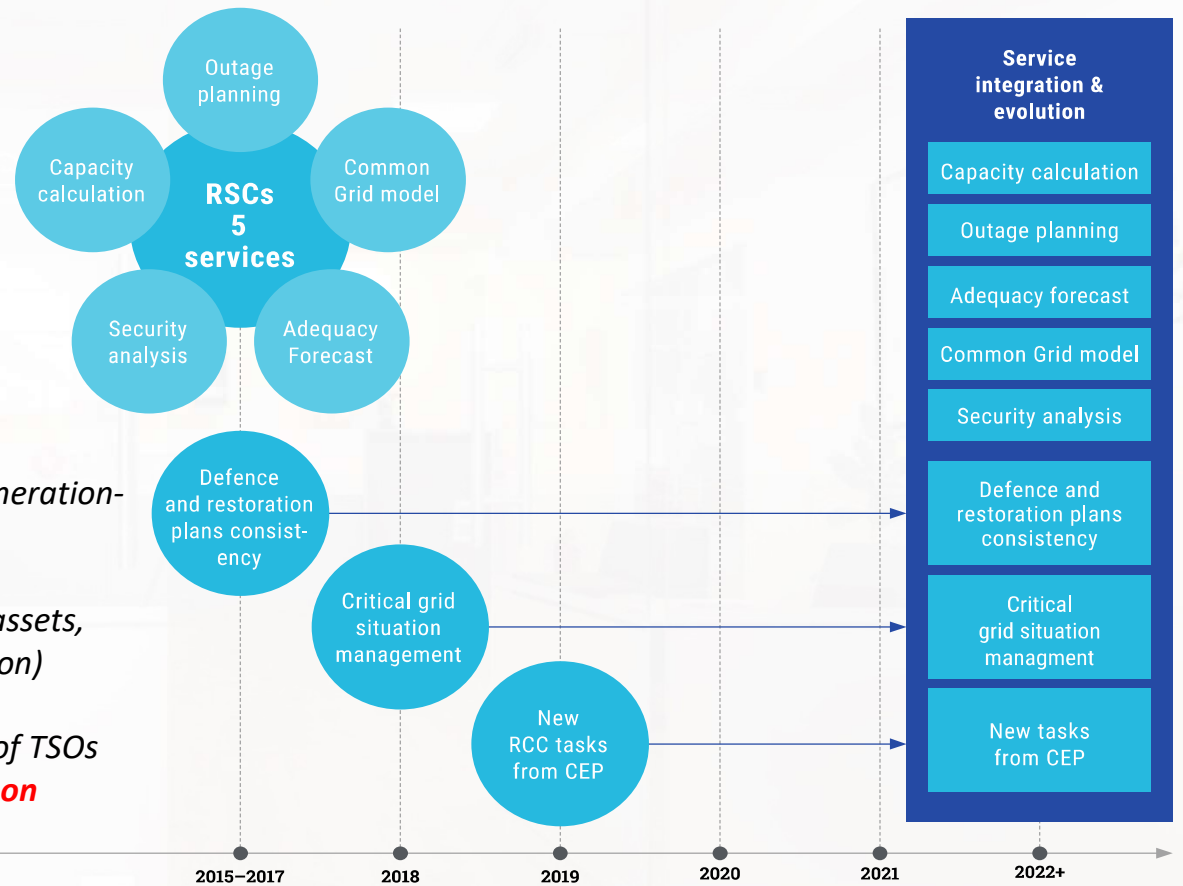


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SELENE-CC became a RCC on 01/07/2022

Services Provided by SELENE-CC

- 1. Common European grid model delivery**
(Individual Grid Models from TSOs → Common Grid Model)
- 2. Coordinated Security Analysis** (focus: flows)
- 3. Coordinated Capacity Calculation** (input for the day ahead markets),
- 4. Short-term Adequacy** (short term matching of generation-load for one week ahead; link with balancing)
- 5. Outage planning coordination** (optimized use of assets, incl PST (Phase Shifter Transfo) and HVDC coordination)
- 6. Critical grid situations management** (facilitation of TSOs in handling of rare but very severe events) – **Started on March 2023 – No charge to TSOs**



CGM (Common Grid Model) – UCTE & CGMES

- **Scope:** To enable studies using an overview model of the entire European Power System to all TSOs
- **Each TSO** provides an accurate representation of their own grid model (a computer model that contains information regarding grid topology, generation pattern, load consumption, thermal and voltage limits).
This is the so-called **Individual Grid Model (IGM)**
- **RCCs** receive IGMs from TSOs across Europe and **merge** everything together to create **CGM**, that represents the **electricity grid at European level**
- This way all relevant parties (TSOs, RCCs) have a **common** and **accurate** “picture” about the European power system. Therefore, they can study grid behavior under several cases/contingencies
- CGMs are created a year, a week, two days, and one day in advance and they are updated several times during the actual delivery day



CSA (Coordinated Security Analysis)

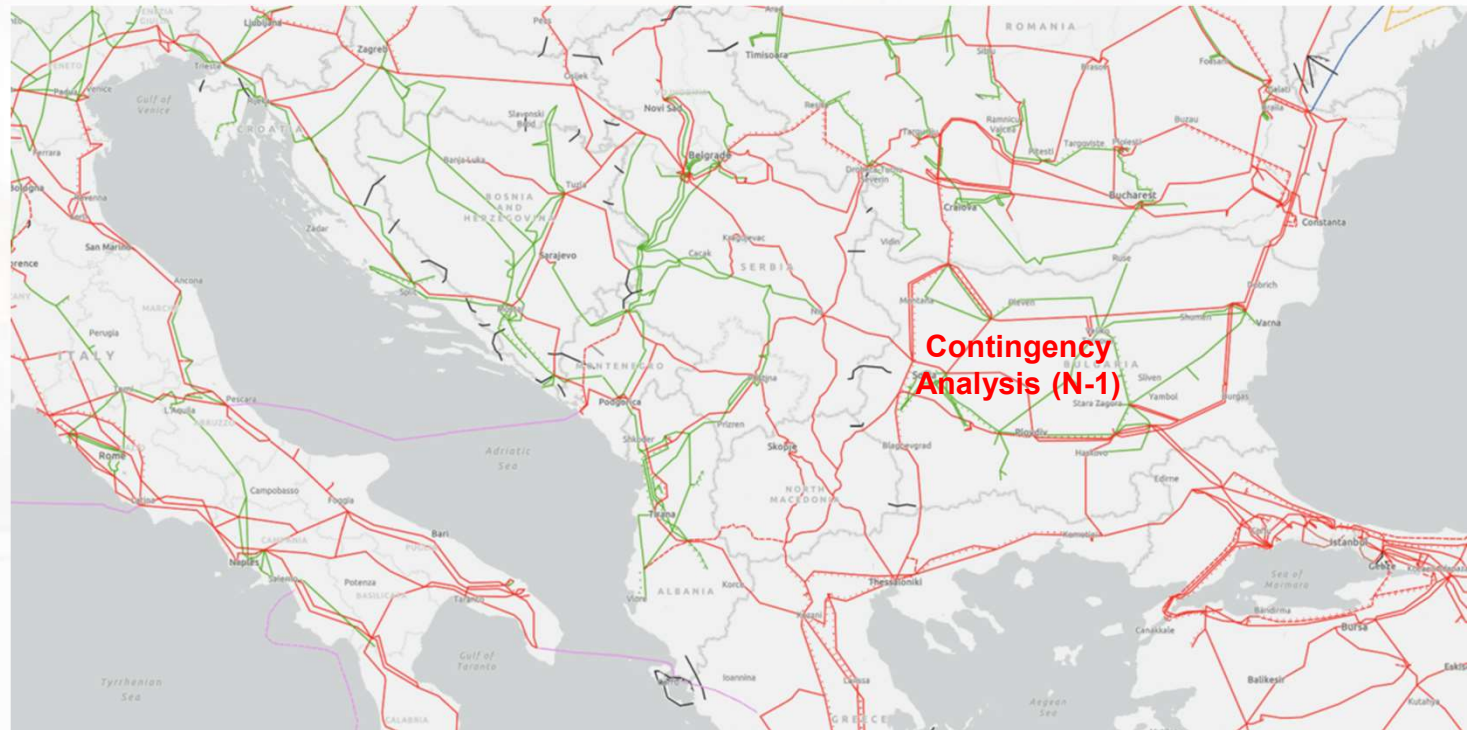
Scope:

Identify potential operational security risks (N-1, N-x conditions) **one day in advance.**

- over-, under-voltage
- congestion issues

Added value:

Determine preventive **Remedial Actions** in advance
Minimise decisions that shall be taken during real time operation.



CCC (Coordinated Capacity Calculation)

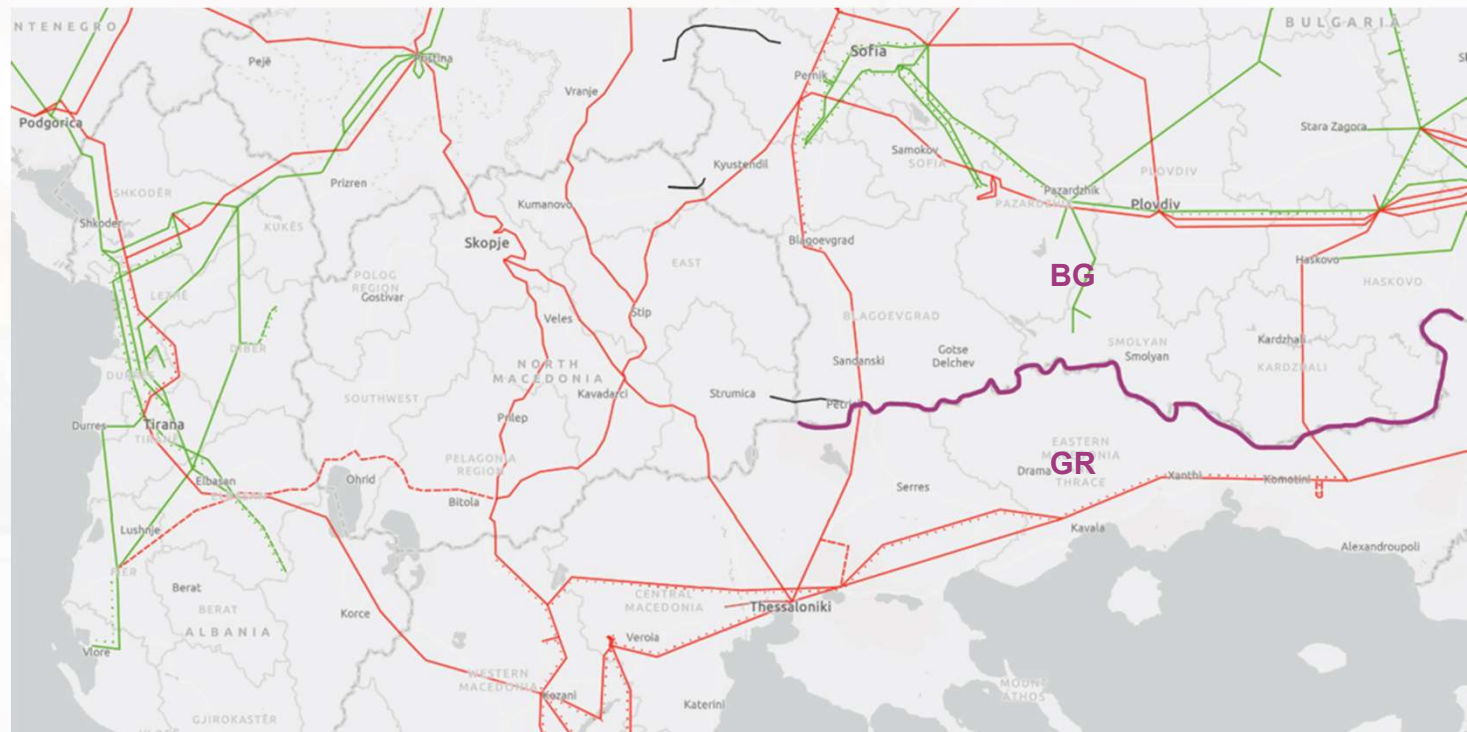
Scope:

For **BG-GR**, **GR-IT**, and **RO-BG**, SEleNe CC computes the max available cross-border capacity for:

- the current day, 1 and 2 days ahead,
- 1 month and 1 year ahead.

Added value:

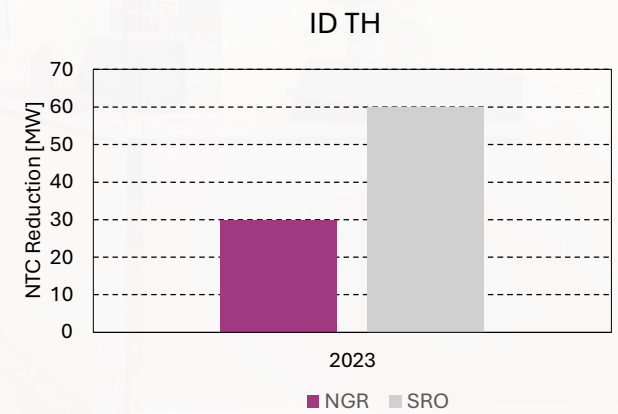
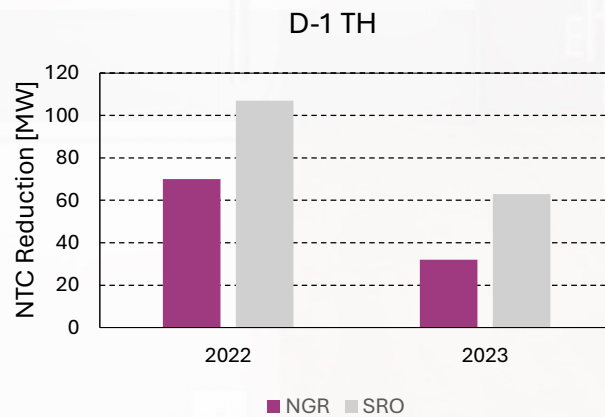
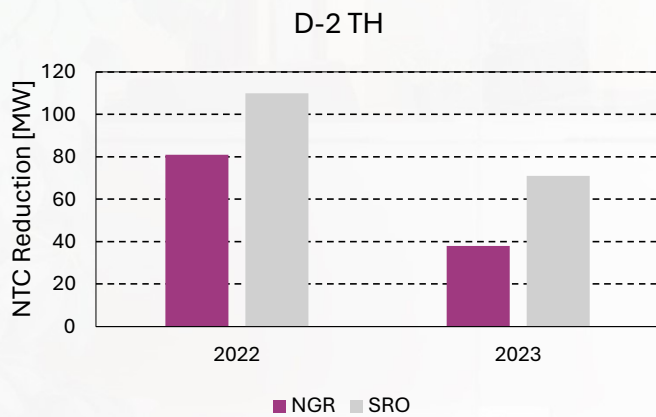
Provide Net Transfer Capacity to the **Market** energy platforms taking into consideration SEE grid security.



Coordinated Capacity Calculation

- The average reduction between the calculated NTC by the RCC tool and the validated NTC by the TSOs is presented for **all Time Horizons; D-2, D-1 and ID and for NGR and SRO.**
- ✓ The average NTC reduction by the TSOs is **92 MW** for 2022 and **49 MW** for 2023.
- ✓ The calculations are trusted by the TSOs, as NTC reduction is low.

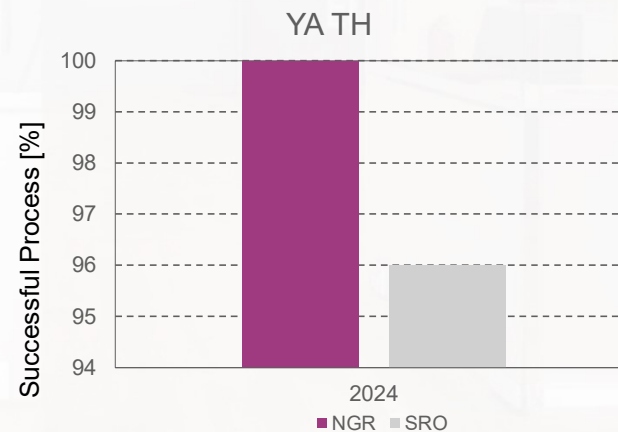
Validated NTC Reduction [2022 & 2023]



Coordinated Capacity Calculation

- The Long Term Capacity is calculated in a **coordinated manner for Month Ahead (MA) and Year Ahead (YA) Time Horizon.**
- The efficiency of the CC process for MA and YA Time Horizon and for NGR and SRO borders is presented.
- ✓ The process is successful for more than **97%** of the examined periods.

LT CCC process success rate [2023 & 2024]



Security under all conditions



Outage Planning Coordination (OPC)

Scope:

Identify outages of elements and production units that affect neighboring countries; Ensure coordination in outage planning to preserve the operational security of the system one week up to one year in advance.

Added value:

Identify and **prevent** colliding outages that could bring the EU power system into unstable or insecure states



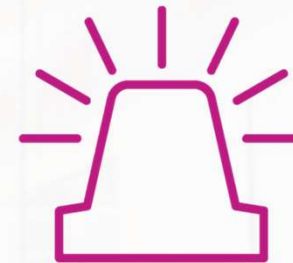
Short Term Adequacy (STA)

Scope:

Investigate if generation capacity meets demand on a week ahead basis

Added value:

TSOs are informed about adequacy issue. **Coordinated actions** are taken to resolve or mitigate the energy deficit.



Critical Grid Situation (CGS)

Scope:

Initiate coordination among relevant TSOs in critical operational conditions, where **extraordinary countermeasures** are required.

Added value:

Provide **solutions** in security risks that can only be tackled through coordinated action among different TSOs.

SEleNe CC presentation of Pan-EU services

- SEleNe-CC has obtained access to OPDE.
- Delivery of the CGM Pan-European service in a rotational fashion with other RCCs.
- CGM (in CGMES format) YA model delivery for the whole of Europe (ENTSO-E service).
- Delivery of the OPC Pan-European service in a rotational fashion with other RCCs.
- Delivery of the STA Pan-European service in a rotational fashion with other RCCs.

Pan European OPC



40 TSOs participate in the outage planning coordination

Lessons Learned

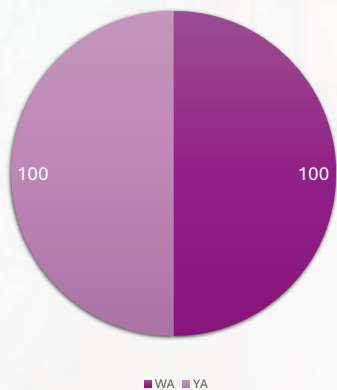
- Target business process continuous improvement
- Active involvement in RCC tasks

Evolution

- Outage coordination framework
- Empower TSO engagement
- Coordination & Transparency

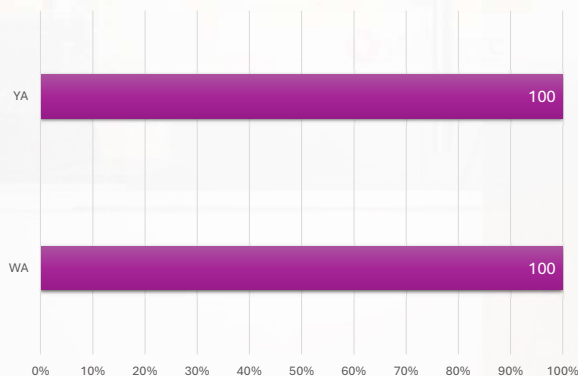
PE OPC Effectiveness

2022 [%] of result delivery within defined deadlines (YES=100%, NO=0%)



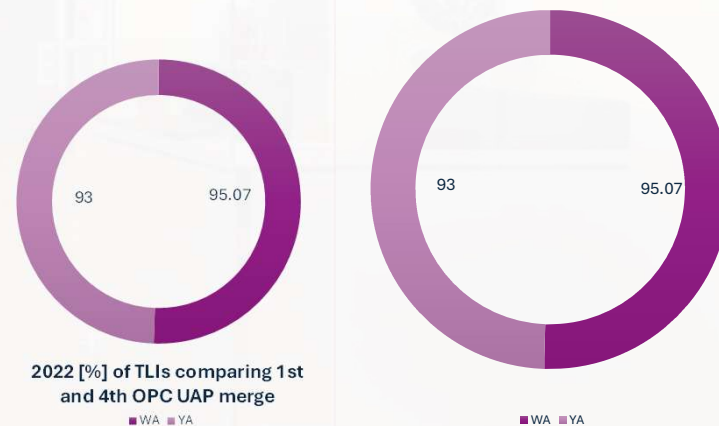
PE OPC Operational Performance

2022 [%] of process successes



PE OPC Efficiency

2022 [%] of correctly mapped network elements between OPC data & used CGM



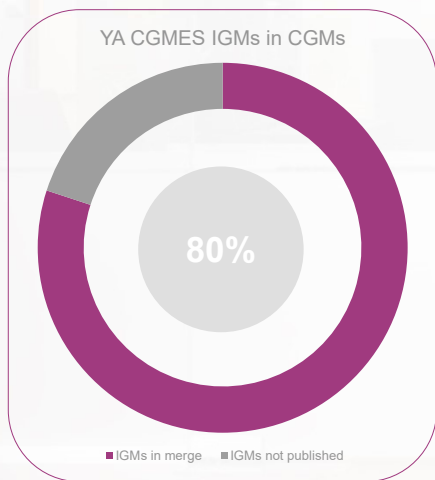
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SEleNe CC in CGMES (YA 2024)

✓ Leading "IGMs inclusion in CGMs" rate

🚩 Milestone: creation of the most complete CGMES CGM

✓ 100% inclusion of published YA IGMs in CGM



Future RCC services | Status

Status

- 14 of 16 legal RCC tasks to be implemented, 2 remain optional
- For 8 existing ● tasks & obligations knowhow and capabilities are established at RCCs
- Basis for 8 new ● tasks & obligations has to be newly created – feasibility is key
- Complexity of operational tasks can become a challenge for human interaction & business continuity
- Strong focus on transparency & reporting



Most challenging new Tasks

- Application of the “**70% rule**”
Delayed in SE Europe due to the specificities of the region (incompatibilities with non-EU TSOs operating framework) - The Methodology has been approved and deployment will start in the coming months
- ROSC (Regional Operational Security Coordination) methodology - Remedial Actions Optimisation (RAO) and cost sharing among benefited TSOs in the SOR
- Regional sizing of reserve capacity requirements for balancing
- Sharing reserve capacities among TSOs of each SOR
- Facilitation of regional procurement of balancing capacity
- Contribution to Ten Year Network Development Plan (TYNDP) is very much important since RCCs have a broader view of every SOR;
- Identification of regional electricity crisis scenarios and contribution to restoration plans and activities

Roadmap



Future development

2024 →

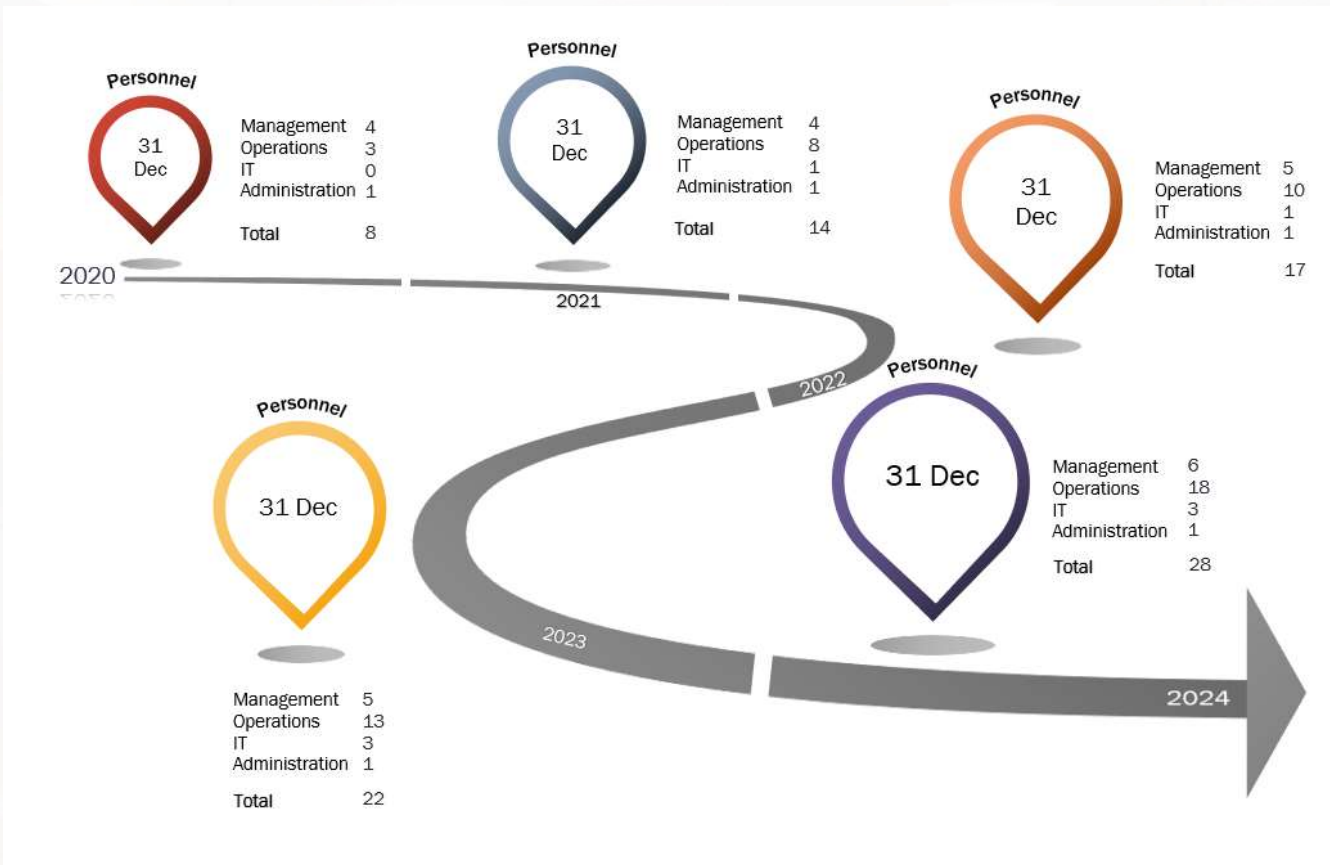
Development of new services in the scope of RCC transition

- ROSC
- 70% rule
- Reserve sizing
- TYNDP
- ...

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Progress In Numbers through Time



Thank you very much for your attention

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