Welcome to



Stakeholder Involvement Event

2026

TSCNET Services

We will begin at 10 am.

Stakeholder Involvement Event

2026

TSCNET Services

Stine Kirkegaard
Lead Communication

Stakeholder Involvement Event

2026

TSCNET Services

- TSCNET Insights
- SOR Cooperation
- Regulatory Reporting
- Day-to-Day Use Cases
- TSCNET Outlook

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TSCNET Insights

Dieter Weiss
Managing Director

TSCNET **In Numbers**

2008

TSO Security Cooperation (TSC) founded

2013

TSC TSOs' Joint office opened in Munich

2014

TSCNET Services GmbH founded

Our Shareholders:

16 TSOs from

12 European Countries

~130
Employees
November 2026



Our employees:

+35 Different nationalities

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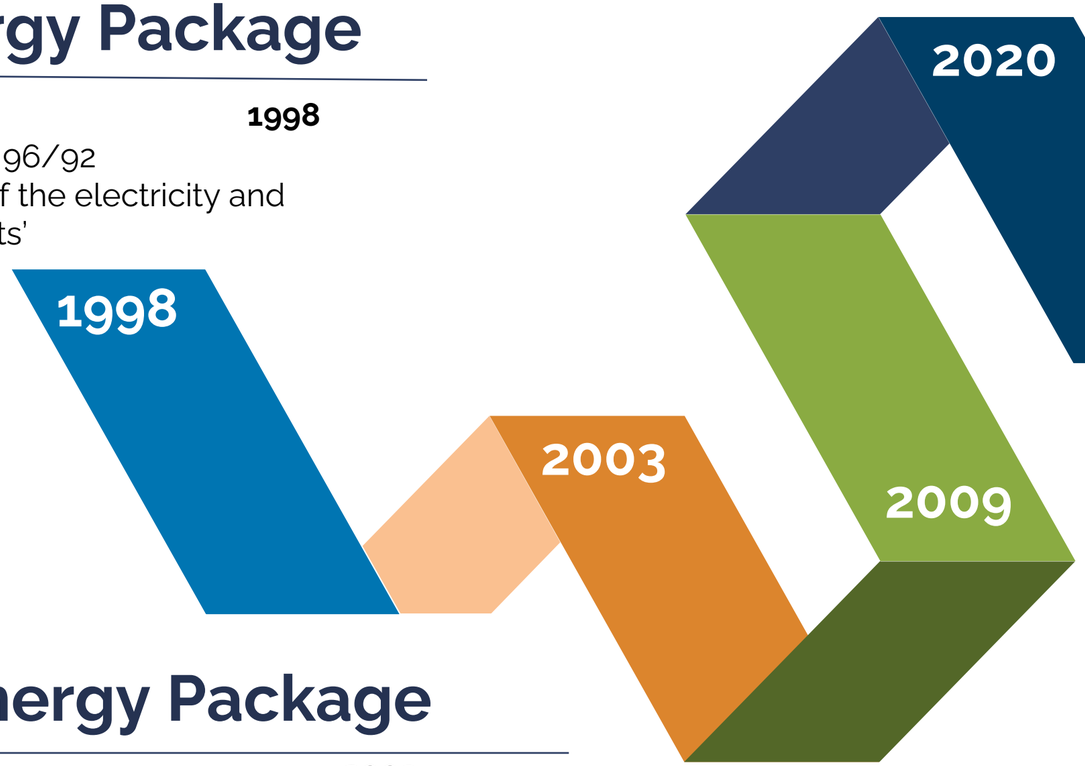
Our Regulatory Framework

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First Energy Package

1998

Regulation (EC) No 96/92
'first liberalisation of the electricity and gas national markets'



Second Energy Package

2003

Regulation (EC) No 1228/2003
'Conditions for access to the network for cross-border exchanges in electricity'

Third Energy Package

2009

2 Directives and 3 Regulations (especially 'Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003')

Clean Energy Package

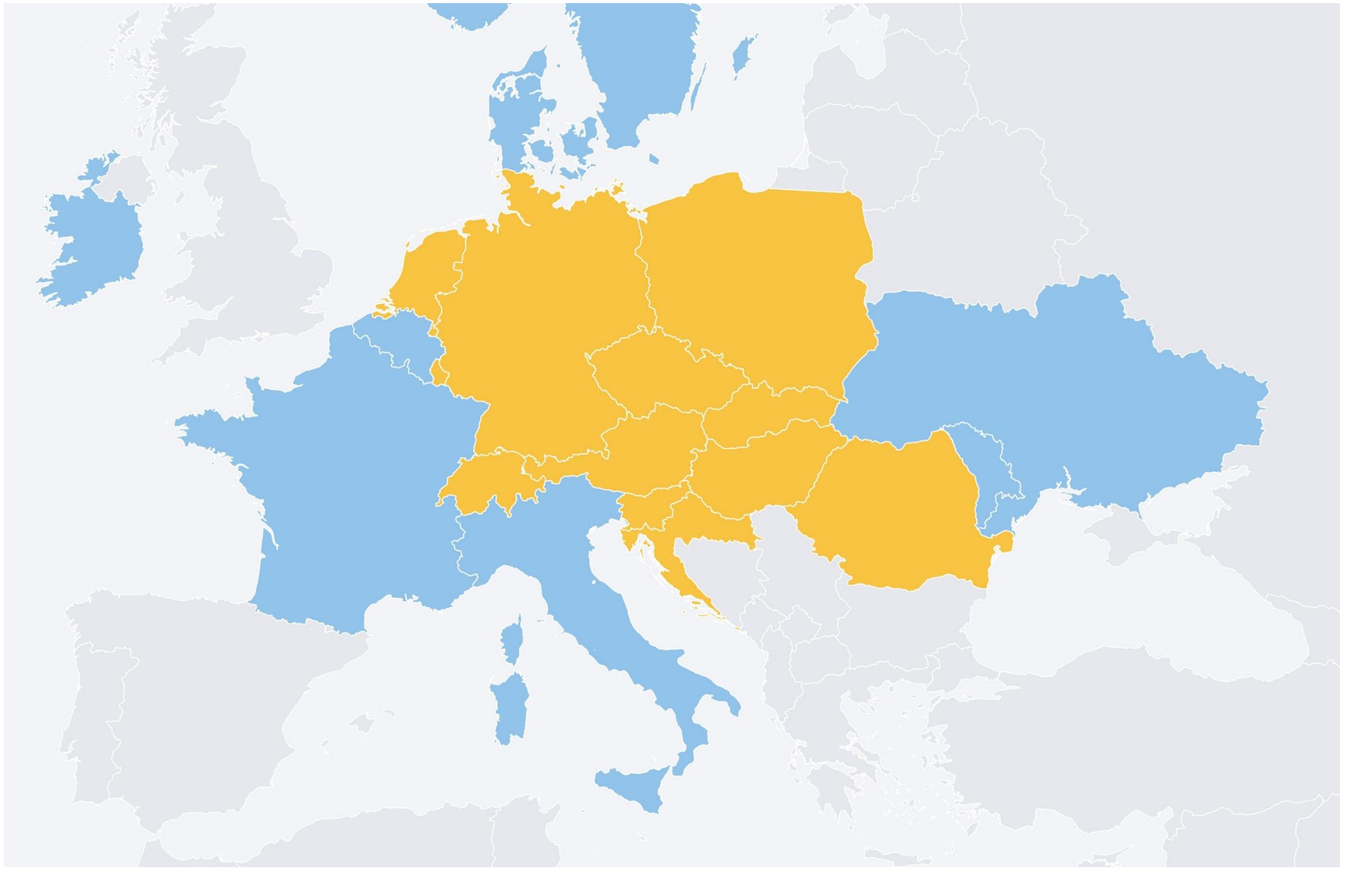
2020

'Clean Energy for all Europeans' (COM(2016) 0860) package to implement the Energy Union (energy efficiency, renewable energy, design of the electricity market, security of electricity supply and governance rules for the 2030 horizon)

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Geographical Footprint – regions and countries where TSCNET provide services

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Customers and Shareholders
Customers

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Growing Our Services

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16 **Legally defined RCC tasks (not all tasks are mandatory)**

13 **Tasks assigned to TSCNET *provided in:***

5 **Capacity Calculation Regions &**

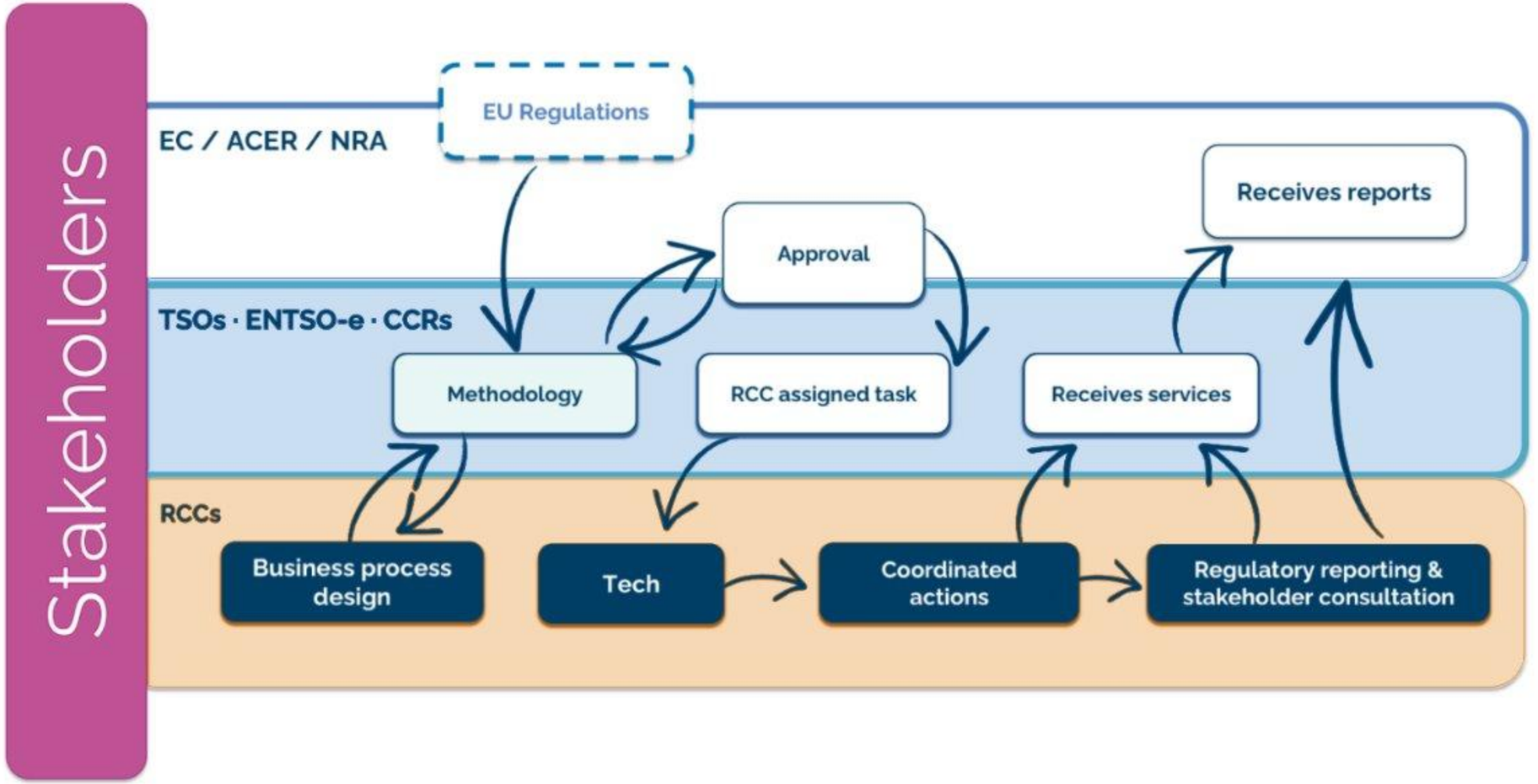
1 **System Operation Region &**

1 **ENTSO-E / Pan-EU**

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RCC role explained

How regulation becomes coordinated services, actions and reporting



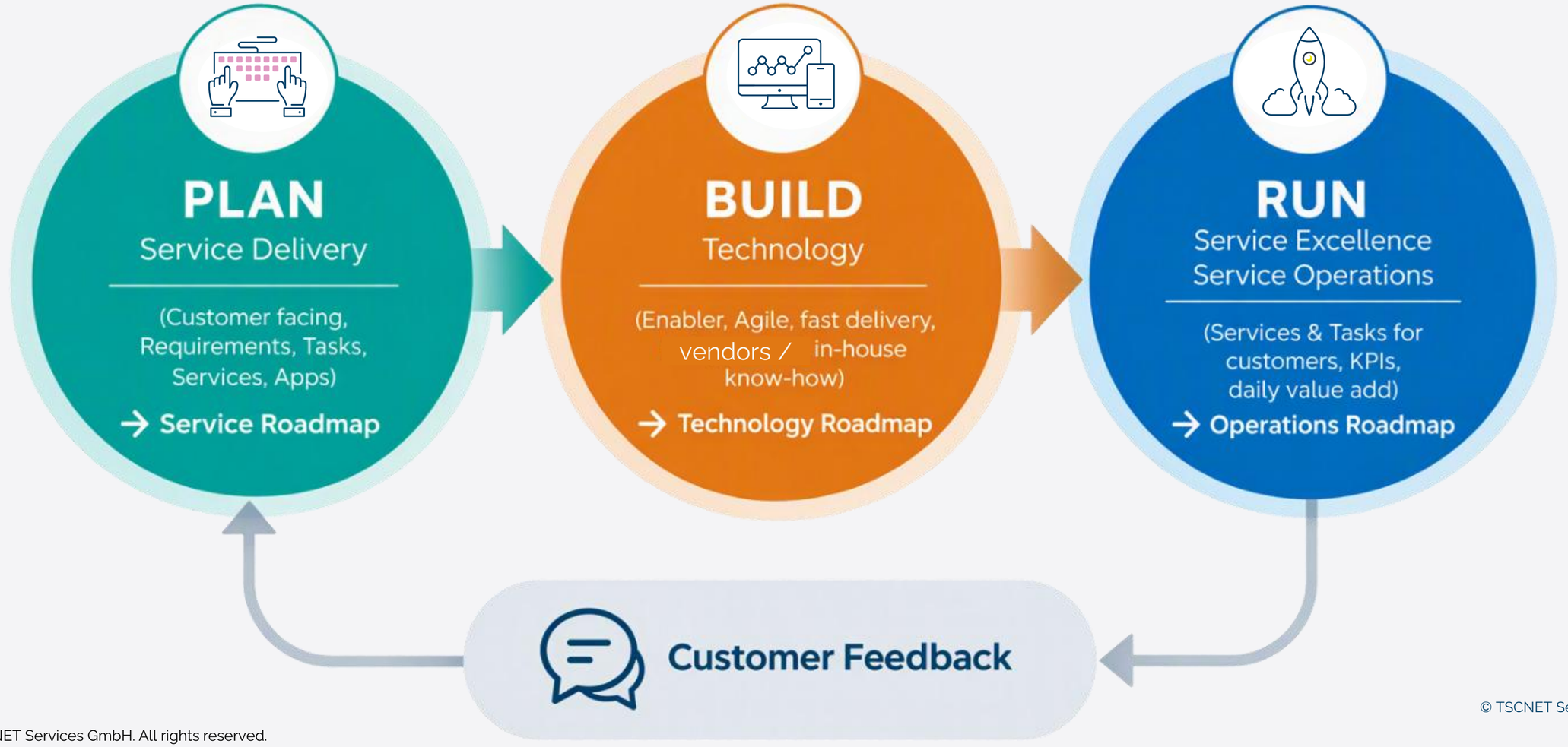
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TSCNET Operating Model

Regulation / Requirements / Tasks



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Stakeholder Cooperation

Mario Princip, Head of Service Development

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Europe's interconnected electricity system requires close *cooperation* across borders, regions, operational organizations and regulatory institutions.

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ONE Connected System

- A connected system needs connected stakeholders

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Day-to-Day Cooperation

1 TSO Security Cooperation (TSC)

TSC consists of 15 TSOs

1 System Operation Region (SOR)

Central Europe SOR – 20 TSOs

5 Capacity Calculation Regions (CCR)

Central Europe, Italy North, CORE, HANSA, East Europe CCRs – in total 25+ TSOs

NEMOs & Market Participants

6 Regional Coordination Centers (RCC)

Cooperating within RCC Working Table

1 ENTSO-E

Rules – Policies - Reporting

EU institutions

European Commission

Regulatory institutions

ACER, BnetzA and other NRAs in Central Europe

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Value Gained through cooperation

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Day-to-Day Cooperation



RCCs Working Table

ENTSO-E

- Framework within which security coordination tasks are governed, developed and operated
- Provide regional requirements
- Efficiency benefit: Experience gained in one region can help improve work in another, reusability of commonalities.

- Forum for alignment on topics that affect more than one RCC
- Exchange operational experience, discuss common topics and develop common understanding as an input for cross-regional / pan-European developments

- TSOs' association where standards and Pan-European methodologies are developed and coordinated
- Requirements and solutions that must be translated back into regional processes, systems and services

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Value Gained through cooperation

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Rules – Policies - Reporting

EU Commission

ACER

NRAs / BnetzA

- **EU POLICY & LEGISLATION:** framework and direction for RCC Tasks
- **METHODOLOGY APPROVALS:** requirements for implementation of RCC Tasks
- **REGULATORY CLARIFICATION:** alignment on implementation and reporting expectations
- **REGULATORY DIALOGE:** exchange practical experience with regulatory requirements

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Value Gained through cooperation

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Day-to-Day Cooperation

- CCRs & SOR
- RCCs Working Table
- ENTSO-E

Rules – Policies - Reporting

- EC Commission
- ACER & NRAs

- **TRANSLATE** regulatory and methodological requirements into practical services
- **CONNECT** operational delivery with regional governance and pan-European requirements
- **OPERATE** the services and tools that support regional security coordination
- **REPORT** on performance, outcomes and identified shortcomings
- **IMPROVE** the services based on operational experience, stakeholder feedback and changing needs of the European electricity system

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Day-to-Day Cooperation

Rules – Policies - Reporting

The value of cooperation is the connection between all these levels: turning different perspectives, requirements and expertise into services that work in daily operations.

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Regulatory Reporting

TSCNET reports stemming from Regulation (EU) 2019/943:

Martin Mach, Head of Service Quality & Agreement

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Annual Report

- Annual report jointly prepared by Coreso and TSCNET in accordance with the **Article 46 of Regulation (EU) 2019/943** for Central Europe SOR.
- Report includes KPIs defined to help monitor RCCs' **operational performance, coordinated actions and recommendations** issued, and the evaluation of task **effectiveness and efficiency.**
- Annual report is available on TSCNET and Coreso website.

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Quarterly Report

- Quarterly reports jointly prepared by Coreso and TSCNET in accordance with the **Article 16.3 of Regulation (EU) 2019/943** for the **Core and Italy North CCRs.**

- RCCs are required to submit a report every three months which details any **reduction of capacity** or **deviation from coordinated actions**, assess the incidences, and make recommendations.

- Reports are submitted to ACER and the NRAs of the respective CCRs within **45 working days** after the end of the reporting period.

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Cost Report

- Annual reporting obligation of TSCNET as per Article **46.2 of Regulation (EU) 2019/943**.
- TSCNET Cost Report is an **annual statutory report** prepared by the finance team and approved by an external auditor, in line with German national regulations.
- The report is submitted to ACER and Central SOR NRAs by **1 July** each year.

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Q&A Session

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Day-to-Day Use Cases

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Impact Assessment

Cross-Border remedial actions: identification and coordination

Partial implementation of the regulatory requirements stemming from CSAm 15

Ana Žanetić, Principal Service Development Analyst

Impact Assessment in ICS

From one remedial action to a coordinated cross-border decision

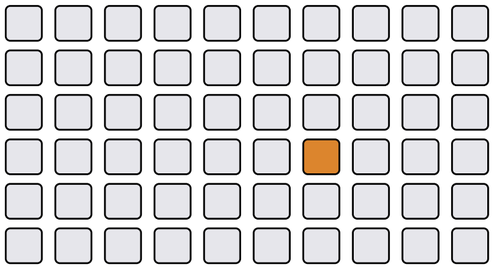
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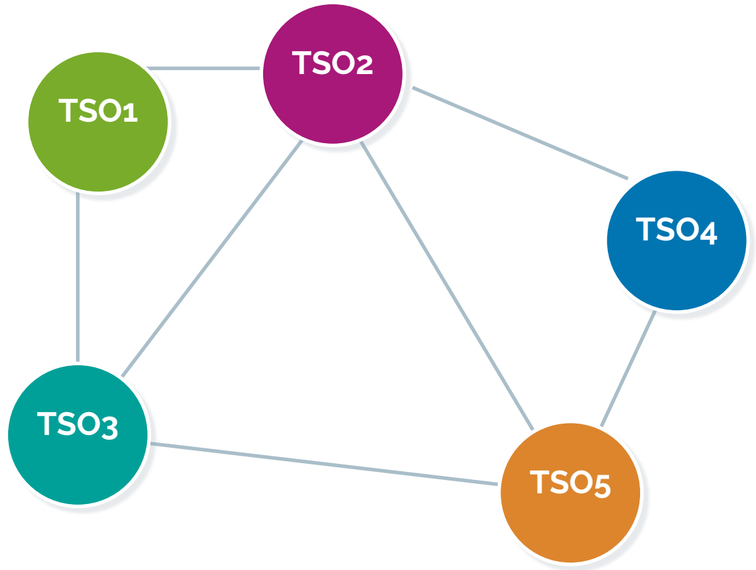
The question is simple:

“Which TSOs are affected by this action?”

OFFLINE PROCESS **TSO AGREEMENT** **RCC ASSISTANCE**

- **Improved Coordination Solution** -> Extension of the existing legacy Security Analysis processes with mandatory involvement of all impacted parties which were identified as such through the impact assessment process as designed for ICS.
- **The focus of ICS:**
  - identify Cross-Border Relevant Remedial Actions (XRAs)
  - identify affected parties
  - ensure those parties are consulted before implementation
  - document the outcome
- How a shared matrix turns many TSO views into one coordinated regional understanding





A single grid action can create measurable effects beyond its own control area.

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The IA Matrix: the heart of the process

The connecting TSO view is compared with each TSO's own affected-party assessment

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TSO 1 is the owner of RA-01 and RA-02

TSO 4 is the owner of RA-03

RA	Connecting TSO	Foreseen affected	Feels affected	Result
RA-01	TSO 1	TSO 2 = TRUE	TSO 2 = TRUE	**AGREED**
RA-02	TSO 1	TSO 3 = FALSE	TSO 3 = TRUE	**MISMATCH**
RA-03	TSO 4	TSO 2 = FALSE	TSO 2 = FALSE	**AGREED**

The common Impact Assessment Matrix records the TRUE/FALSE affected-TSO entries and highlights disagreements

INPUT

Individual TSO RA lists and the connecting TSO view of potentially affected TSOs.

PROCESS

RCC merges the files. TSOs review each RA and state whether they feel affected.

OUTPUT

A common IA Matrix with the agreed affected TSOs for every RA.

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How the quantitative check works

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RAIF turns a simulated network effect into a comparable percentage.

$$\textbf{RAIF} = \frac{|\ \text{Flow with RA} - \text{Flow without RA}\ |}{\text{Permanent admissible load}} \times 100$$

Calculated for relevant XNEs in base case, under contingencies and under all relevant scenarios

Decision signal



5% threshold

13.12%
Example maximum impact of an RA of TSO 2 on TSO 1

Example:
RA1 of TSO2 impact on TSO1 observed elements

Dataset:
Regional Merged Model (UCTE)
Additional Operational Data

Method:
AC load flow + contingency analysis

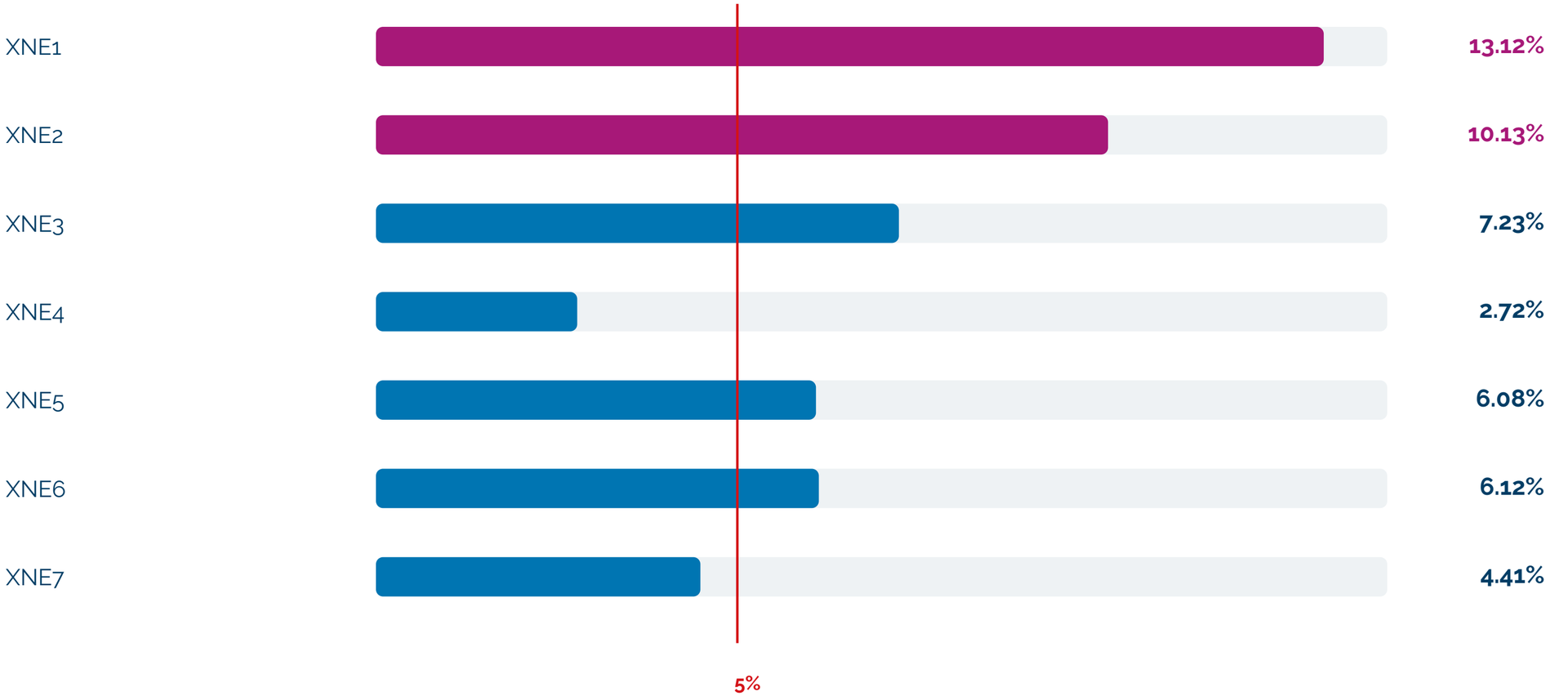
Question answered:

Does this remedial action create a significant impact on TSO1's monitored elements?

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RA of TSO 2: the impact on TSO 1 observed elements

The AC calculation identifies several elements impacted above the 5% threshold.



5

XNEs impacted above 5%

Maximum 13.12%

Operational meaning: TSO1 is an affected party and must be included in coordination before this concrete RA is agreed and implemented.

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What happens next?

We use the evidence to move from technical result to a coordinated decision.

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SCENARIO

RA1 of TSO 2 relieves a TSO 3 constraint, but RAIF reaches 13.12% on an observed TSO1's XNE(C).

TSO1 now evaluates the effect using the relevant model, operational limits and experience.

What should the coordination outcome be?

A **AGREE**

No operational-security issue is created.

B **REJECT**

A sound operational reason is demonstrated.

C **ALTERNATIVE**

Another RA is proposed and reassessed.

TSCNET's added value: make the regional impact visible, calculable and actionable.

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Common Grid Model Merging

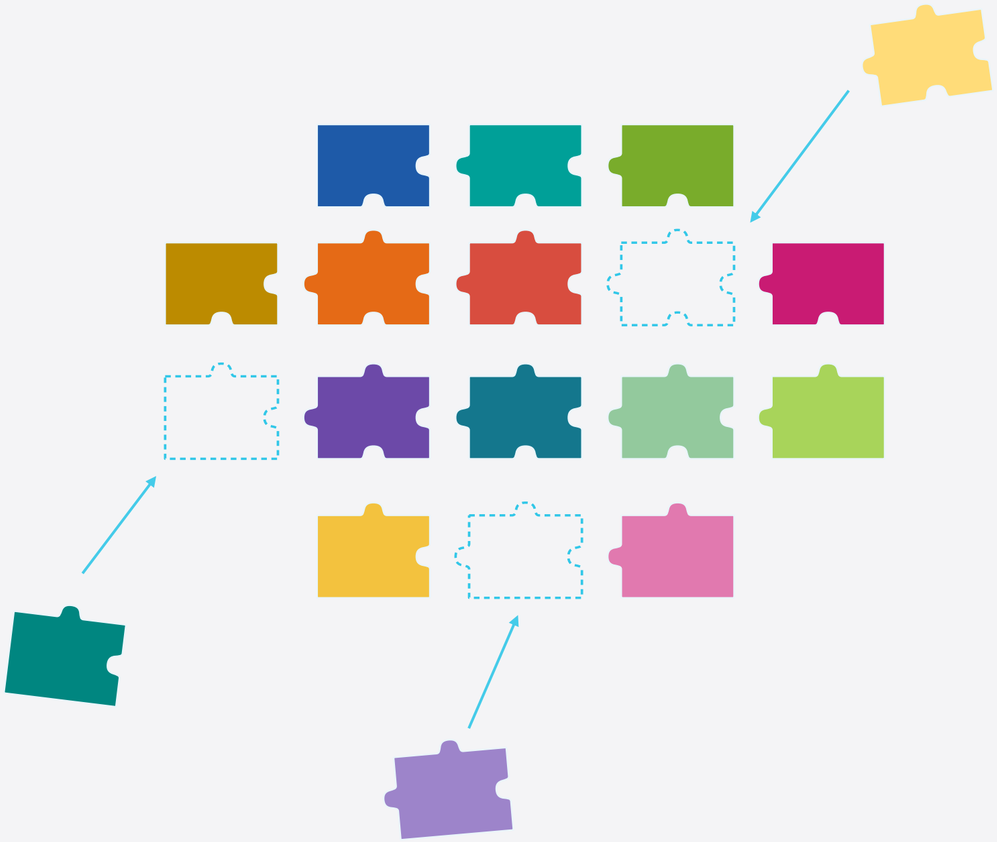
Creating a single pan-European grid model for operational studies

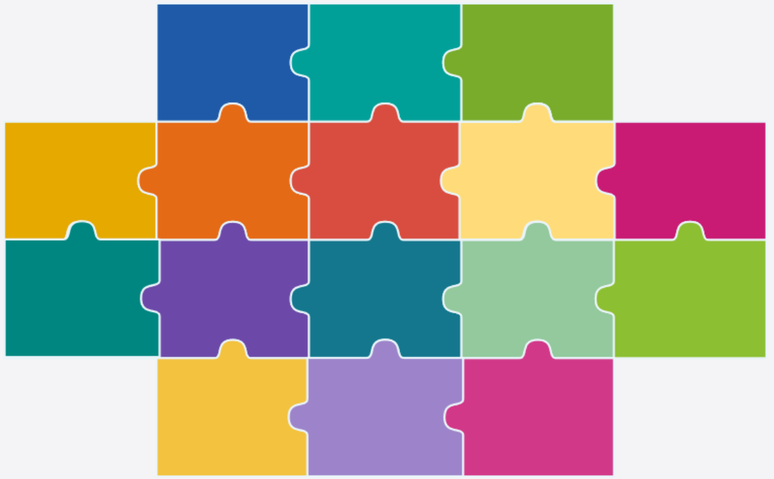
Endrit Memlika, Senior Service Analytics & Quality Analyst

FROM MANY PERSPECTIVES

Completing the shared picture

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Separate pieces → complete picture

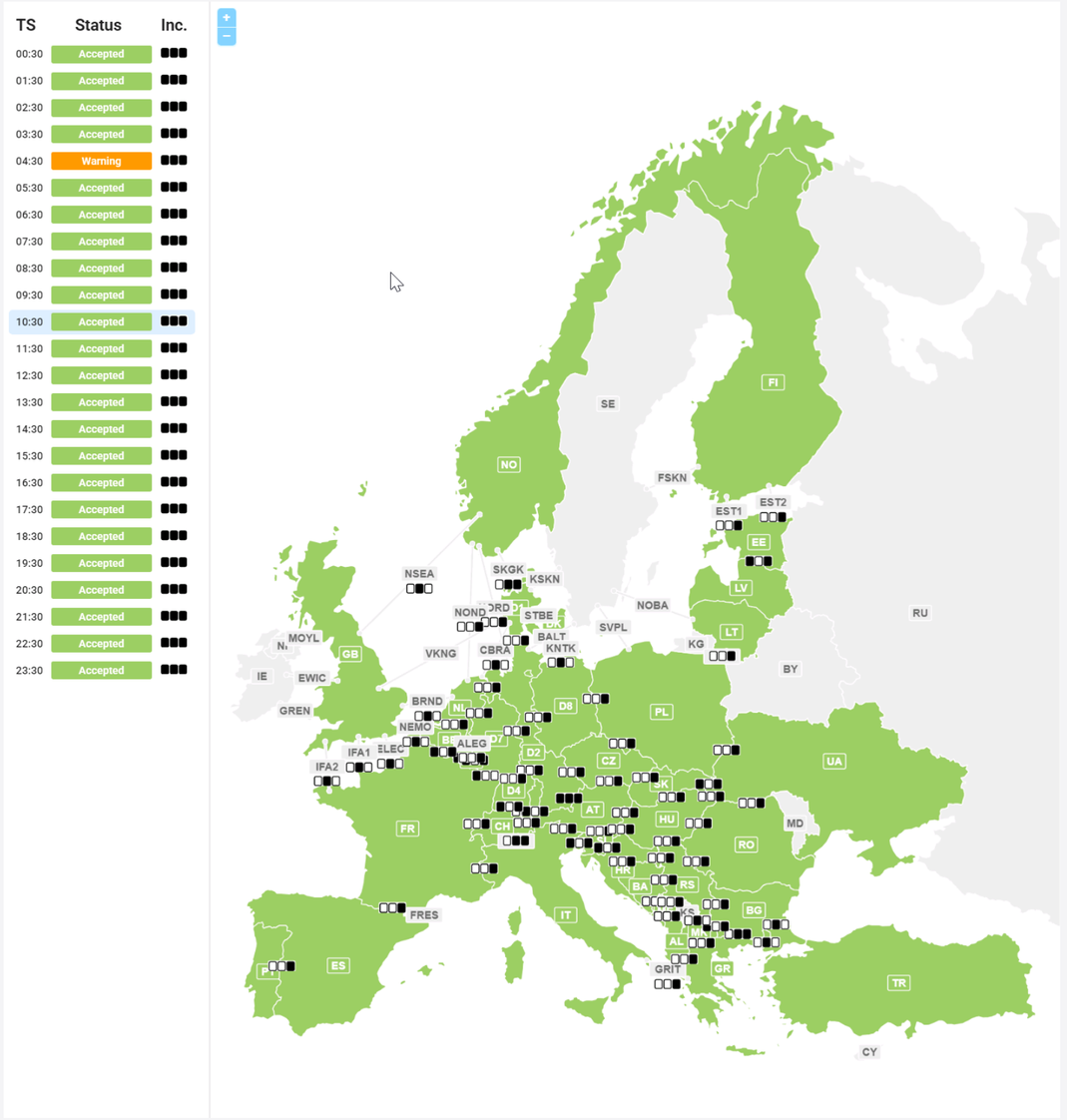
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One system, built from many perspectives

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Like pieces of a geographical puzzle, Individual Grid Models describe local equipment, topology and operating assumptions.



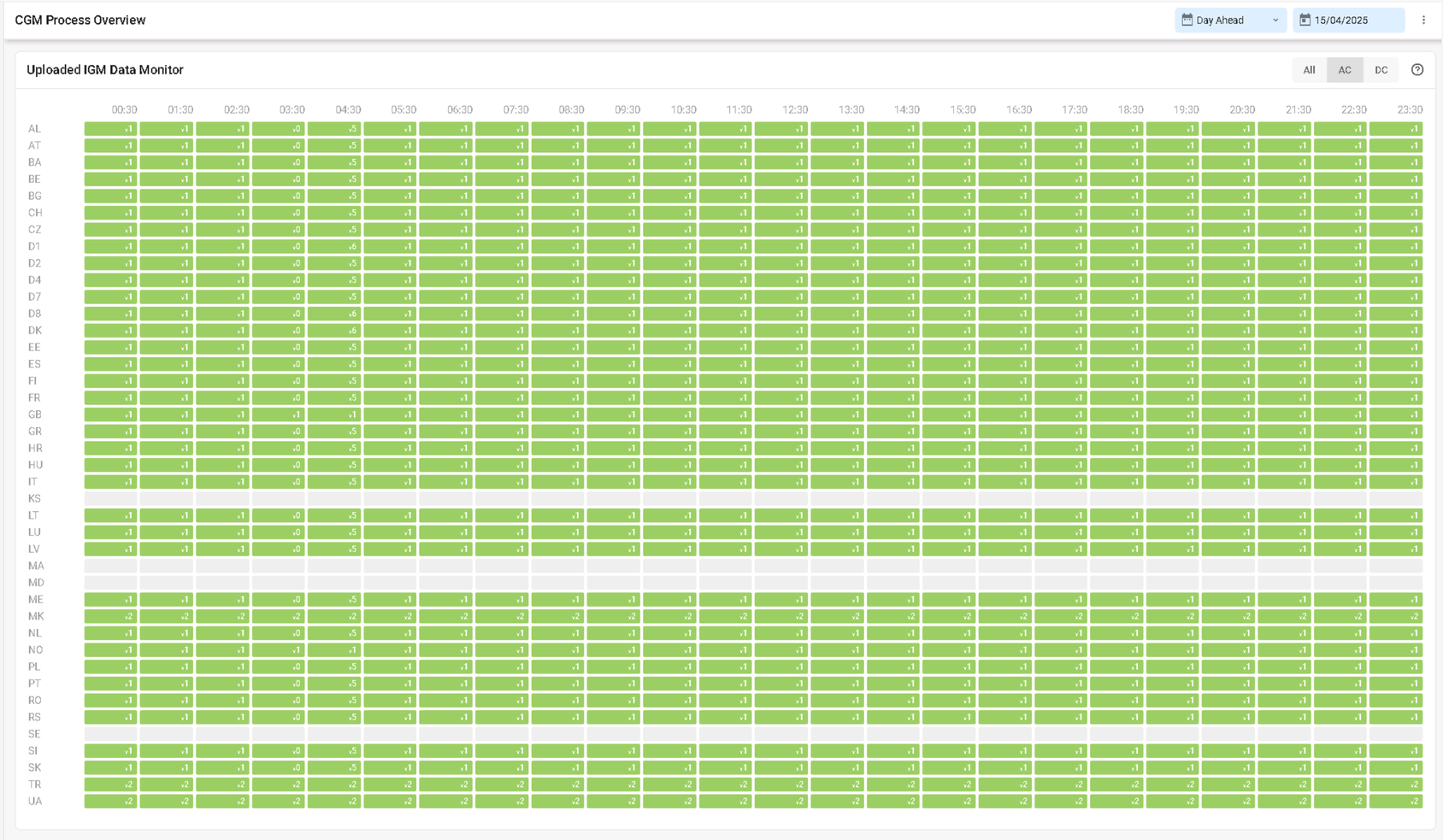
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One system, built from many perspectives

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Timestamp

Transmission System Operators (TSOs)



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Before merging: what a TSO contributes

One IGM is delivered as four complementary CGMES profiles. Together they describe both the grid and its operating state.

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EQ

Equipment

What exists

Lines, transformers, generators, loads

TP

Topology

How it is connected

Topological nodes and connectivity

SSH

Steady-state hypotheses

How assets are set

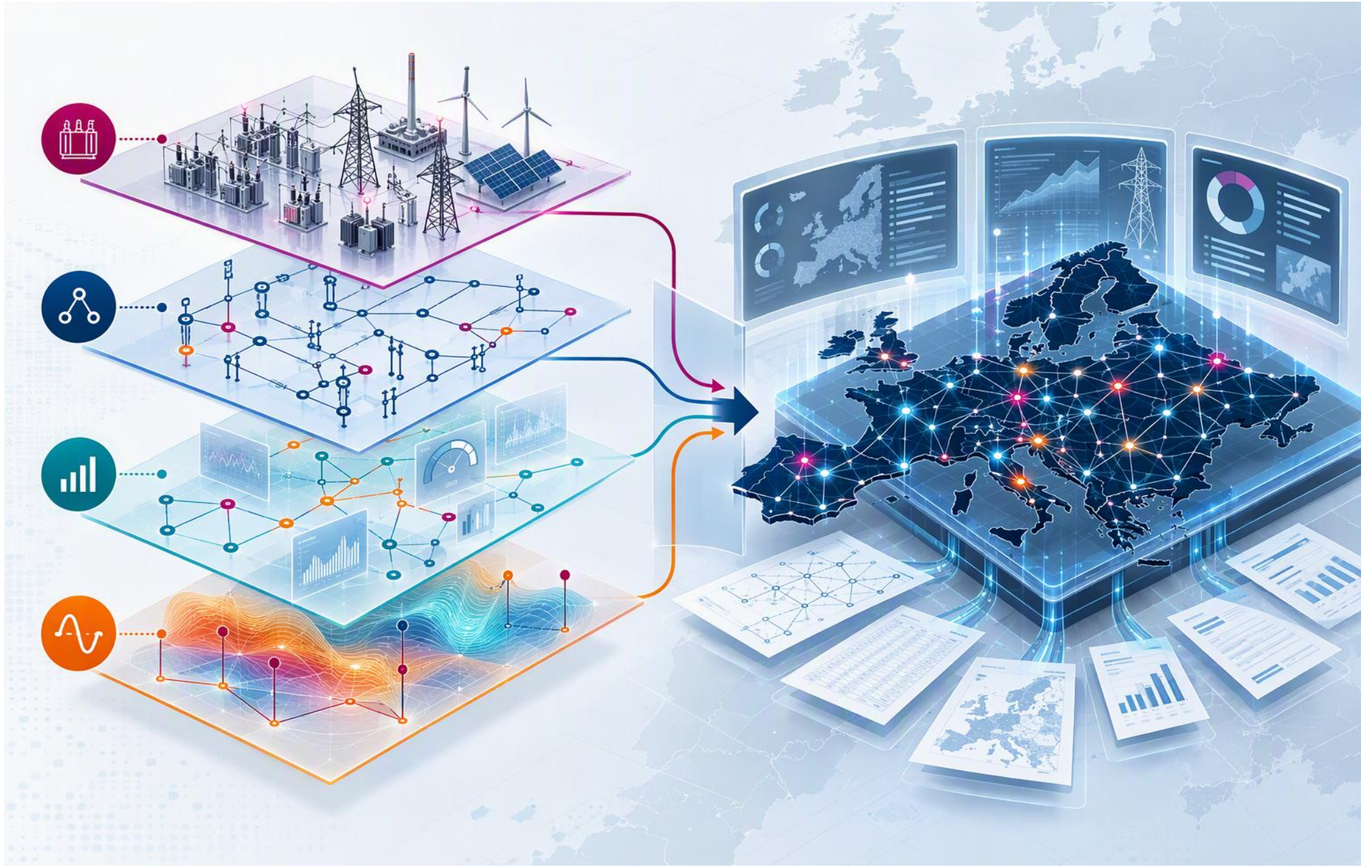
Switch positions, set points and controls

SV

State variables

The solved operating state

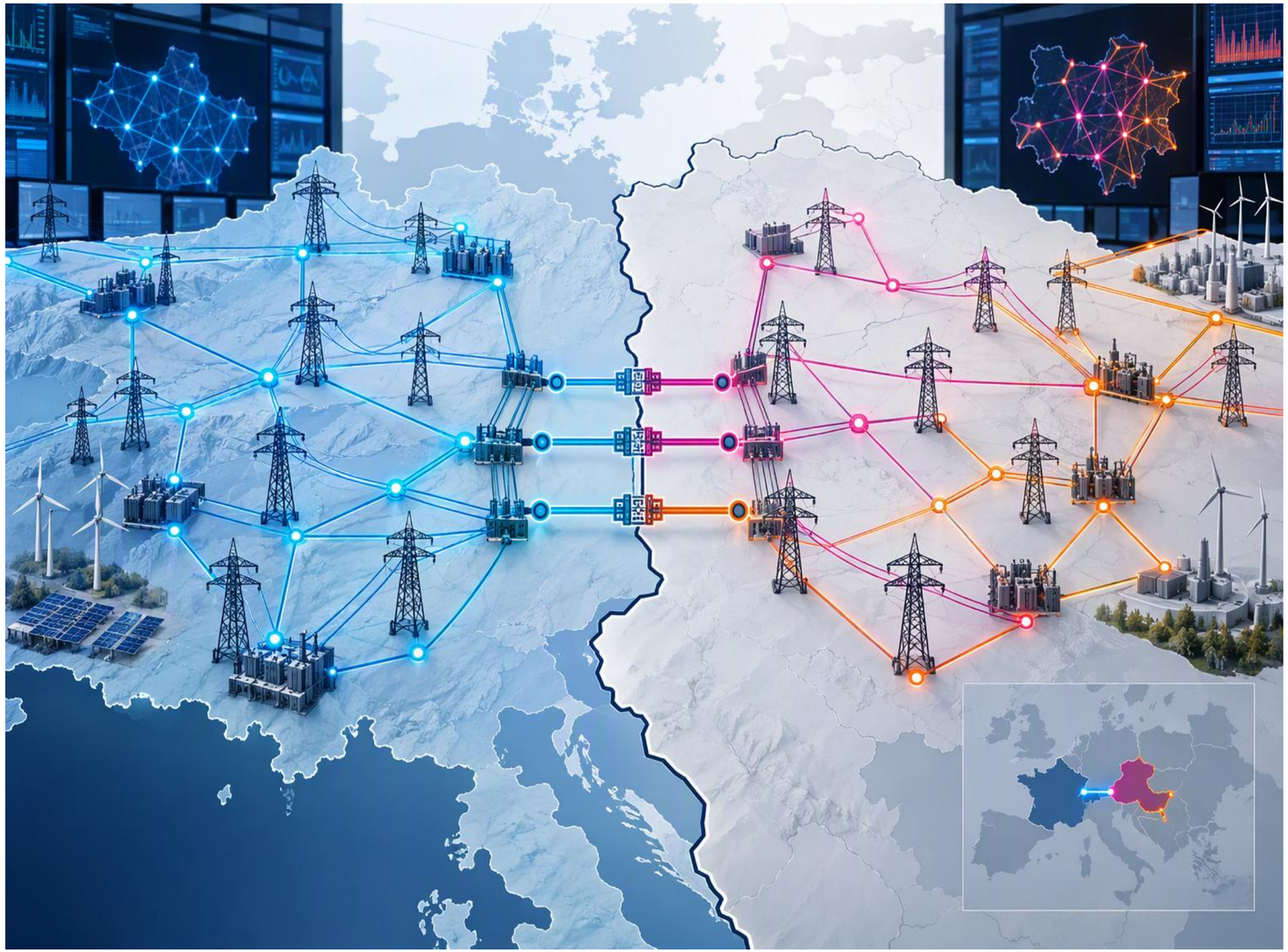
Voltages, angles and power flows



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Neighbouring models must meet at the border

The merge succeeds only when both sides describe the same cross-border connection consistently.



Boundary matching asks:

1. Are the tie-lines represented on both sides?
2. Do the boundary nodes refer to the shared Boundary Data Set (BDS)?
3. Do connectivity and terminal references line up?
4. Does the combined topology form the intended network?

Think of the BDS as the common “socket” that allows national models to connect.

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Inside the European Merging Function

The technical sequence moves from assembling the network to proving that it represents a feasible operating state.

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A **IMPORT** Validated IGMs, BDS and market document

B **MERGE** Duplicates, references, islands and topology

C **INITIAL LF** First convergence check per island

D **SCALE** Align control-area balance with market values

E **FINAL LF** Verify convergence and operational consistency

F **EXPORT** Export of convergent CGMs

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One model, shared responsibility

The CGM is produced through a chain in which every participant protects a different part of quality.

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TSOs	**Create, validate, correct and publish IGMs**	National model accuracy and timely delivery
OPDM / OPDE	**Exchange, validate and publish model packages**	Traceable, standardized data exchange
EMF / RCCs	**Import IGMs, match boundaries, merge, solve, scale and export CGMs**	European consistency and operational availability

A trustworthy CGM is the result of standardisation, transparency and repeated electrical checks, not a single merge command.

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AMICA - **A**dvanced **M**ultisite **I**ntegral **C**ongestion **A**ssessment

Supporting legacy security analysis process with modern tooling

Rodolfo Mussiato Gonçalves, Operations Manager

DISCLAIMER: Process described in the following slides is based on UCTE data exchange format

Information Classification*: ☐ Public ☒ Restricted ☐ Confidential ☐ OPDE Confidential

From system state to system resilience

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01

BUILD

Country-level Individual Grid Models

02

MERGE

Merged Continental Europe Model

03

GRID SIMULATION

Base case load flow

04

OUTAGE SIMULATION

Security analysis via simulation of distinct outage scenarios

05

RESPOND

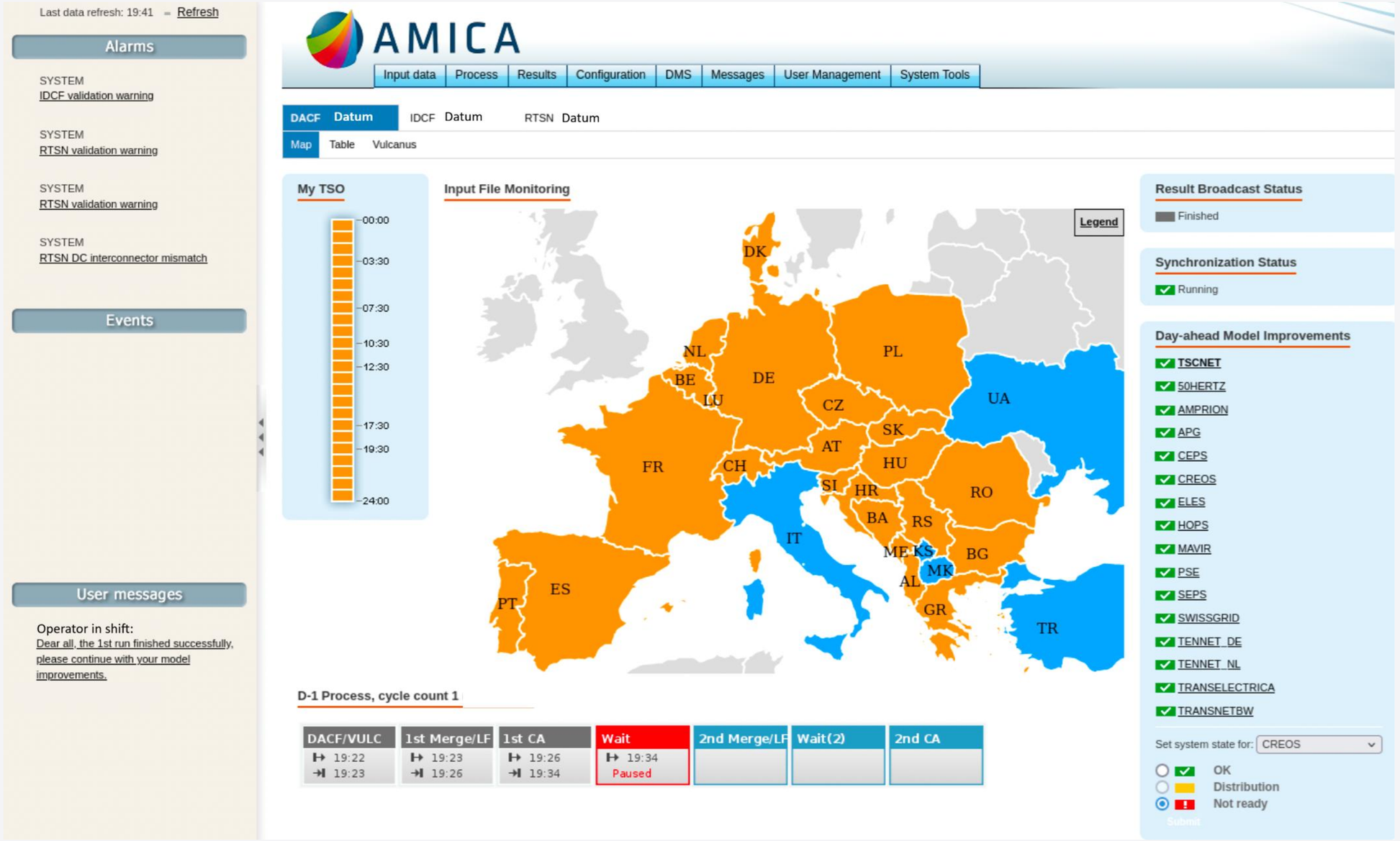
Detect, assess, coordinate and resolve

Shared results. Common understanding. Coordinated decisions.

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AMICA Main Screen



Legend:
- Error
- OK
- Warning
- Not processed
- Substituted
- Substituted with different day-type
- Delayed
- Not Found

⚠ Status of the tie-line elements

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AMICA Security Analysis results overview

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Time	Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
00:30	LF	69.70	69.00	70.98	40.12	49.07	29.77	47.10	61.77	64.09	72.48	65.46	64.71	65.58	69.80	72.09
00:30	CA	90.80	99.48	78.73	60.43	90.13	43.68	67.77	72.48	112.97	85.84	73.51	85.17	110.02	90.87	92.77
01:30	LF	67.14	64.72	72.96	38.00	45.30	29.47	47.17	57.42	61.02	72.08	65.30	63.54	62.58	67.24	72.64
01:30	CA	84.70	91.89	80.42	50.22	84.35	44.96	67.81	61.64	97.00	85.84	65.63	83.82	108.90	84.79	89.35
02:30	LF	60.97	63.37	68.64	35.83	38.63	28.55	38.41	57.65	54.12	67.74	64.79	62.58	60.49	65.58	68.27
02:30	CA	77.85	89.97	76.88	54.30	74.56	44.39	55.63	62.93	88.63	80.67	67.90	81.29	110.27	82.17	80.99
03:30	LF	60.77	65.95	73.39	40.17	37.05	26.74	43.28	62.51	55.82	70.78	64.58	64.66	61.98	65.44	73.03
03:30	CA	78.15	89.69	83.20	60.47	59.64	42.04	60.42	64.87	86.32	84.50	65.22	92.80	123.52	82.48	84.14
04:30	LF	58.09	69.66	74.00	42.30	38.54	26.17	44.73	63.54	55.63	68.93	64.66	67.53	60.68	65.01	73.63
04:30	CA	72.61	89.31	90.06	63.71	65.60	41.11	63.67	65.37	83.40	82.43	65.35	99.05	110.00	82.01	83.70

Below 80% Between 80 and 100% Above 100%

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DACF and IDCF: evening planning and hourly updates

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DACF

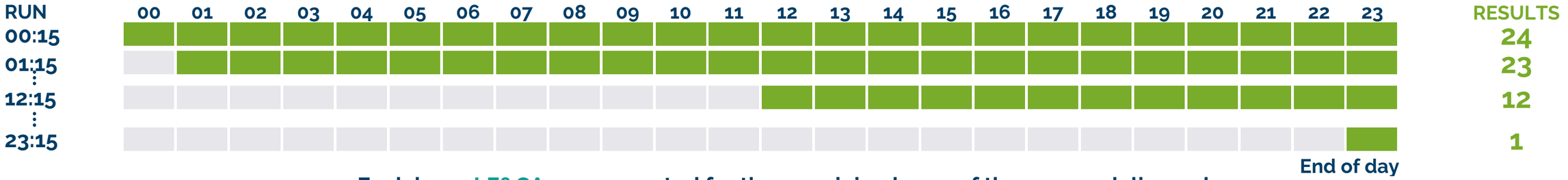
Manual runs cover all 24 hours of the next day.

18:00–18:15	18:15–19:00	19:00–20:00	20:00–20:50	20:50–21:15	21:15–00:00	00:00
Start	Run 1	Model Improvements	Run 2 and follow-up run(s)	DOPT	Additional follow-up run(s)	Close process and share the report

GOAL A secure, congestion-free operational plan for the day ahead.

IDCF

At HH:15 every hour, merges are automatically triggered for a new run covering the current and remaining hours of the day.



Each hour, LF&CA are computed for the remaining hours of the energy delivery day.
Model improvements can be implemented throughout the process, and intraday teleconference(s) can be arranged on demand.

GOAL Address congestions left unresolved after DACF and any new congestions that could arise.

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Multilateral Remedial Action (MRA)

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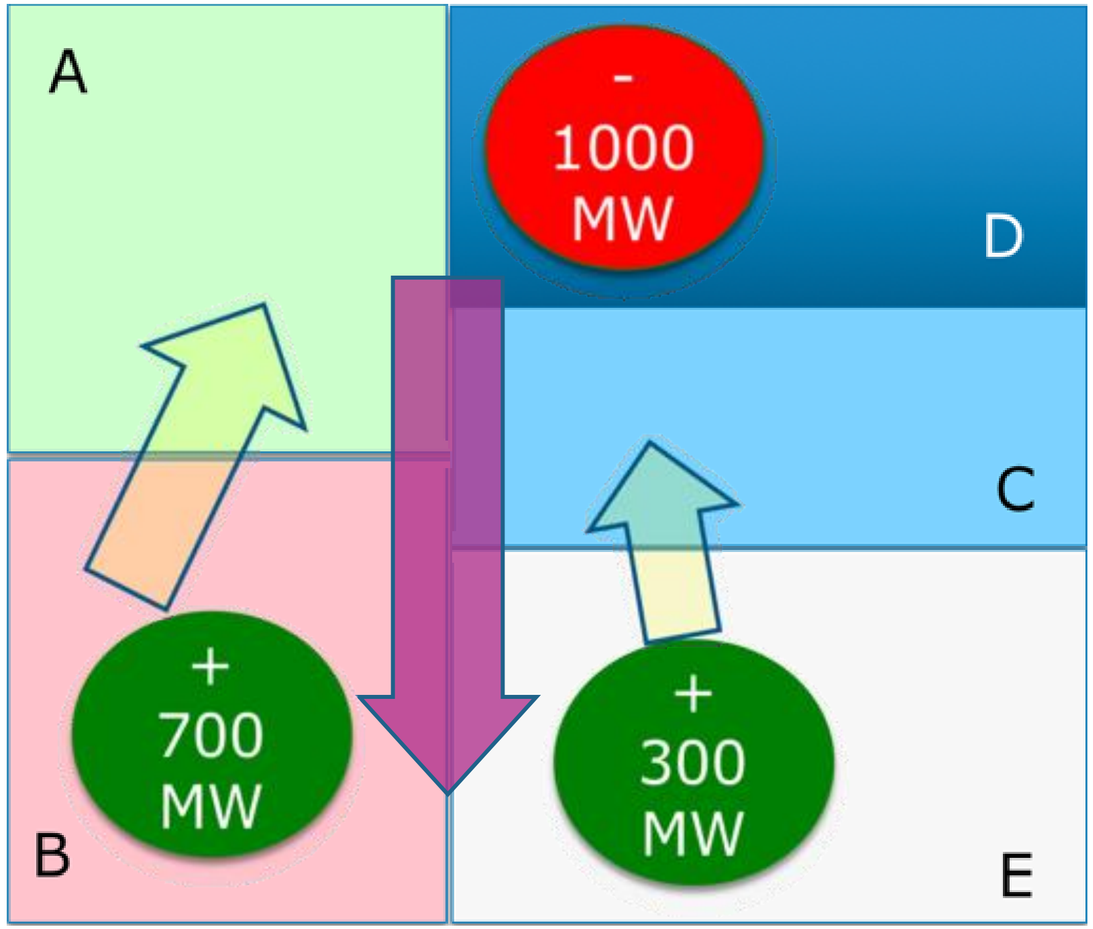
Enabling the coordination of last-resort congestion management actions

MRA example

Strong north-to-south power flow.

- **TSO D** is in distress and remedial actions are insufficient
- **TSO D** requests an MRA (*Requesting and Coordinating TSO*)
- **TSOs B, D** and **E** are involved through changes in production (*Connecting TSOs*)
- **TSOs A** and **C** are transiting energy (*Transiting TSO*)

Note: Related to scheduling and not physical flows.



The coordinated actions reshape power flows, relieving the constraint(s) in TSO D.

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DISCLAIMER: The example shown on this slide is a simplified graphical illustration intended solely to support understanding of the concept and does not represent a real-world scen

Why it matters

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01

ONE SHARED VIEW

All parties work on the same model and results in the same tool

02

EARLY DETECTION

Overloads anticipated before they become real-time problems

03

COORDINATED ACTION

Time to respond properly, and conference calls to coordinate efficiently

04

LAST-RESORT SECURITY

A route to a solution when bilateral options are exhausted

Shared results. Common understanding. Coordinated decisions.

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EMF KPIs

European Merging Function performance dashboard

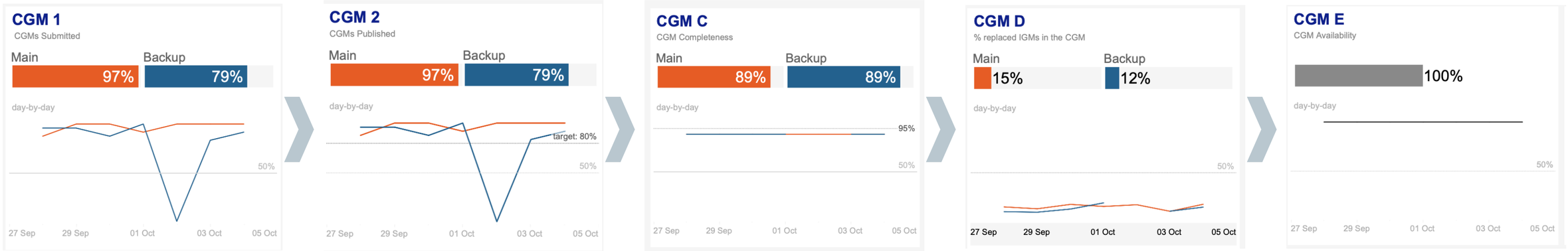
Endrit Memlika, Senior Service Analytics & Quality Analyst

Information Classification*: ☐ Public ☒ Restricted ☐ Confidential ☐ OPDE Confidential

One dashboard, one operational story

The next five dashboards, answer five different questions; none should be interpreted alone. Together they tell the CGM story.

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ARRIVED

How many CGMs arrived from the RCC in rotation, Main or Backup?

PUBLISHED

How many were published without an error?

COMPLETE

Is it complete: IGMs available vs. total expected at PanEU level?

SUBSTITUTED

How many IGMs in this CGM had to be substituted?

AVAILABLE

Is the final model available?

18:00 CET

IGM publication GateClosureTime

18:00–18:30

EMF / CGM building window

18:30 CET

CGM publication GateClosureTime

Together, the five dashboards confirm whether a complete, consistent CGM reaches every stakeholder on time.

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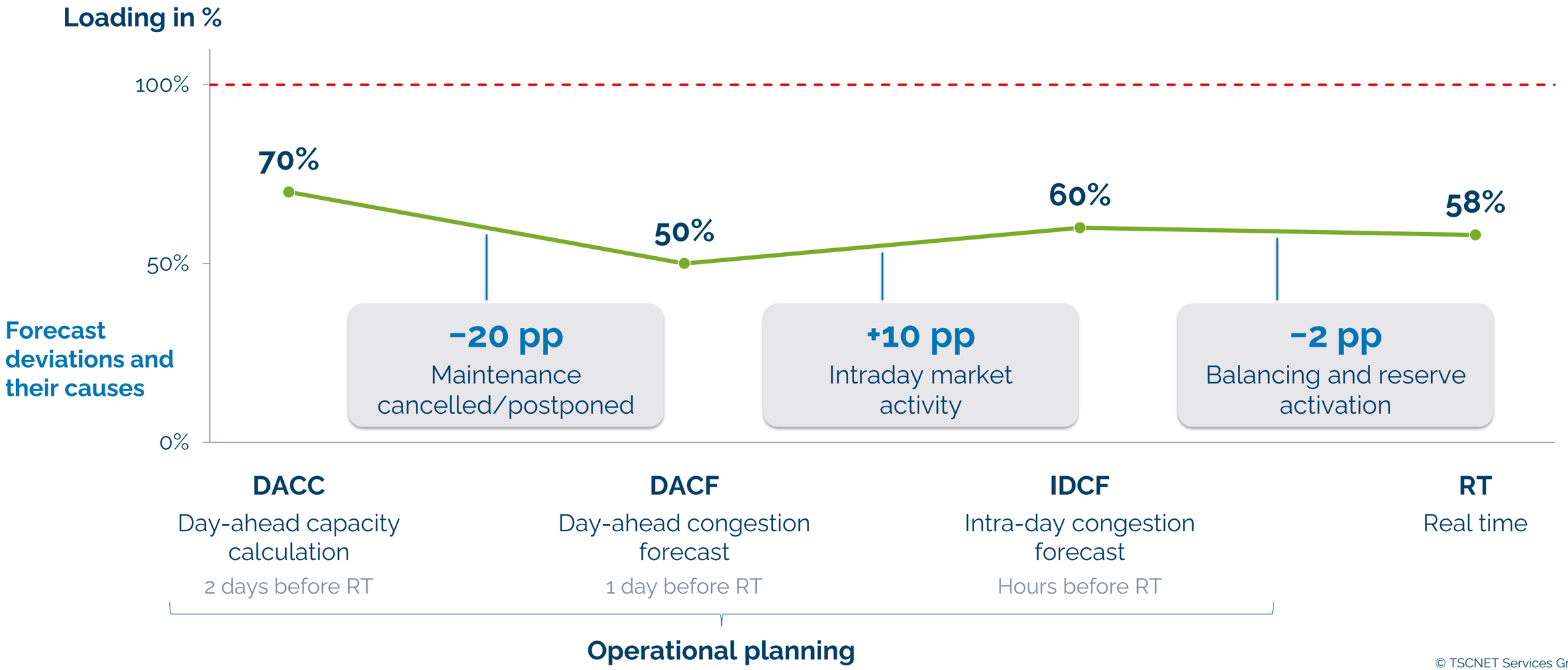
Forecast Deviation Analysis

Jonas Häusler, Service Analytics & Quality Manager

Information Classification*: ☐ Public ☒ Restricted ☐ Confidential ☐ OPDE Confidential

A different view on grid security data

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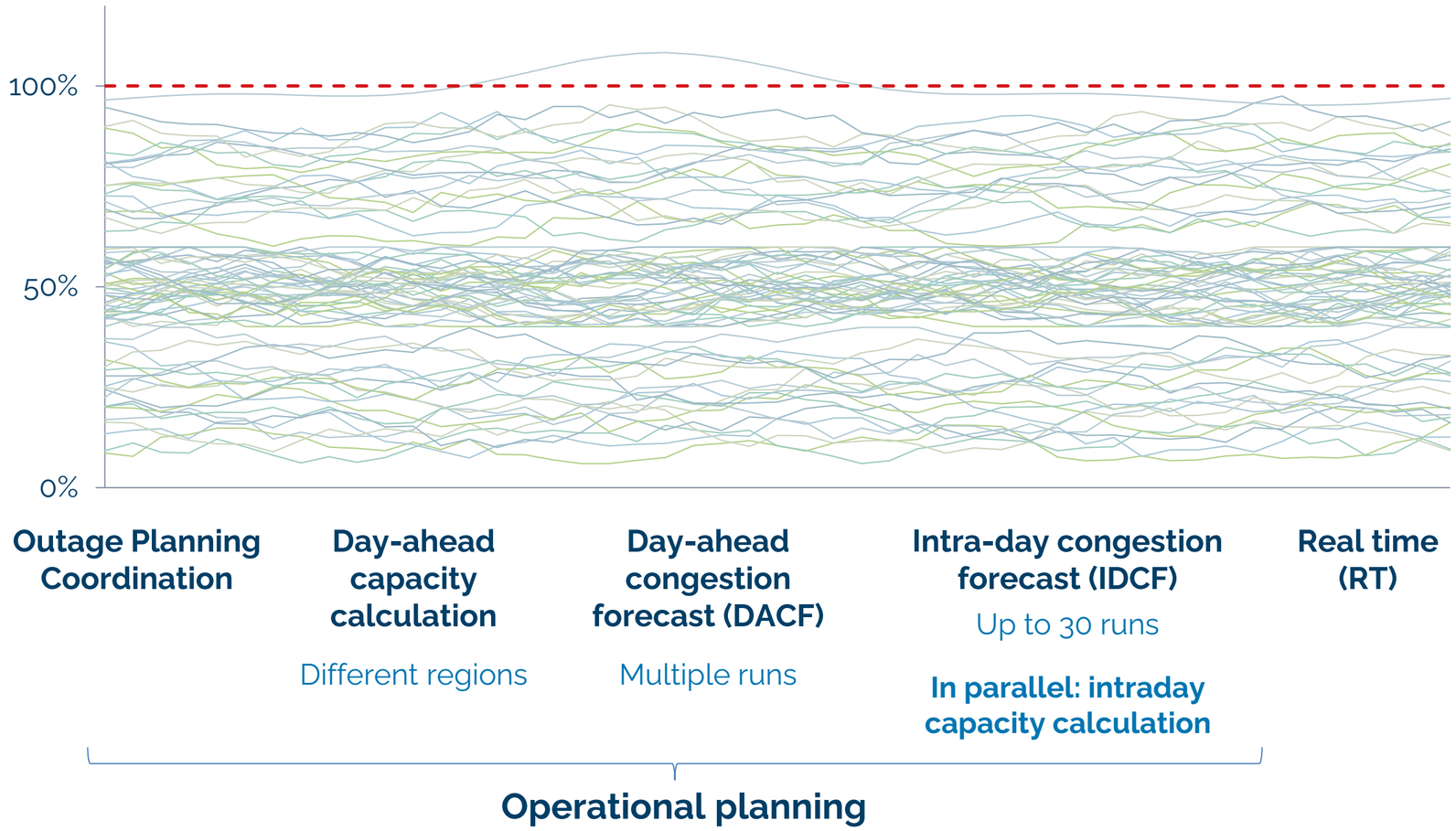
Illustrative loading values. pp = percentage points.

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How it actually looks

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Loading in %



Thousands

of grid-element and contingency combinations, each with its own loading line

Contingency = a possible outage scenario

Deviations usually have more than one reason

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Explaining forecast deviations

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Forecast deviations are normal and often unavoidable.
Transmission System Operators (TSOs) often – but not always - know the cause.

THE PROBLEM

Some high-impact deviations have unexplained causes

Example: Harder grid situation than expected

Conditions near real time can be more challenging than the forecast suggested.

Example: Redispatch required only ex-ante

Accurate ex-post data may show potential for better-targeted activation of costly remedial actions.

TSCNET'S SOLUTION (currently a Prototype)

01 Compare two grid models

Systematically identify the differences.

02 Quantify each difference's effect

Measure how much each change influenced load flow.

03 Identify the highest-impact changes

Focus the investigation on what mattered most.

Better understanding can enable data-quality improvements in some cases, but not always.

Forecast deviation analysis is one of several TSCNET concepts that enable continuous improvement.

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Q&A Session

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TSCNET Future Outlook

Dieter Weiss, Managing Director

TSCNET Outlook

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STRATEGIC DIRECTION

WHERE WE ARE GOING

Strategic priorities

- Operational Excellence
- In-House Capabilites

Become a technology driven service provider

EFFICIENCY

HOW WE WORK

Future Fit >>> 2030

TSCNET's single enterprise transformation programme.

Smarter - Better - Faster

CHANGING MARKET CONDITIONS

WHAT WE AIM FOR

- Simplified end-to-end processes
- Integrated data-supported decisions
- Modern technology-enabled services
- Excellent talent

A trusted partner

CUSTOMER VALUE

WHAT VALUE WE WILL DELIVER

- Timely delivery
- Resilent & secure, service provison
- Flexible solultions / reusability

Added value for all stakeholders

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Thank you for being here!

Presentation and recording will be distributed in due course.

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