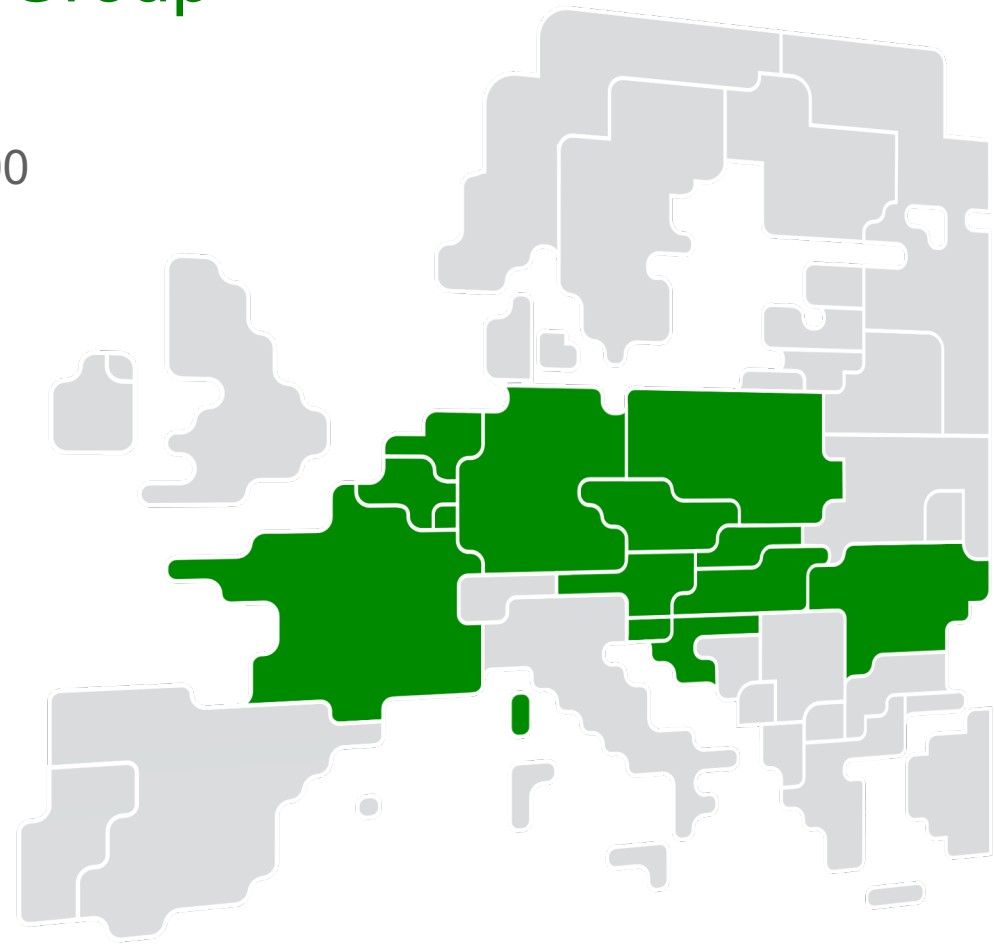
Core Consultative Group

29 March 2022, 13:00 – 17:00

Microsoft Teams meeting



1. Welcome and Introduction

Practicalities, announcements and reminders

R.OTTER/
H.ROBAYE

Co-chairs

Hélène ROBAYE
Market Participants, Eurelectric

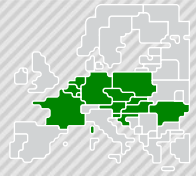
Ruud OTTER
Core TSOs, Tennet BV

Practicalities

- During meeting
  - Use of ‘hand’ function will facilitate all participants to have the opportunity to ask questions
  - Use of ‘chat’ function will give opportunity to address all questions and will facilitate proper tracking and answering
- Follow up
  - Minutes and final meeting documents will be shared with CCG distribution list
  - JAO Q&A forum
- MS Teams workshop and Q&A will be recorded and made available for all Market Participants

1. Welcome and introduction

R.OTTER/
H.ROBAYE



Agenda

	SUBJECT	WHO	TIMING
1	**Welcome and introduction** • Announcements • Agenda for today	R.OTTER/ H.ROBAYE	13:00 – 13:15

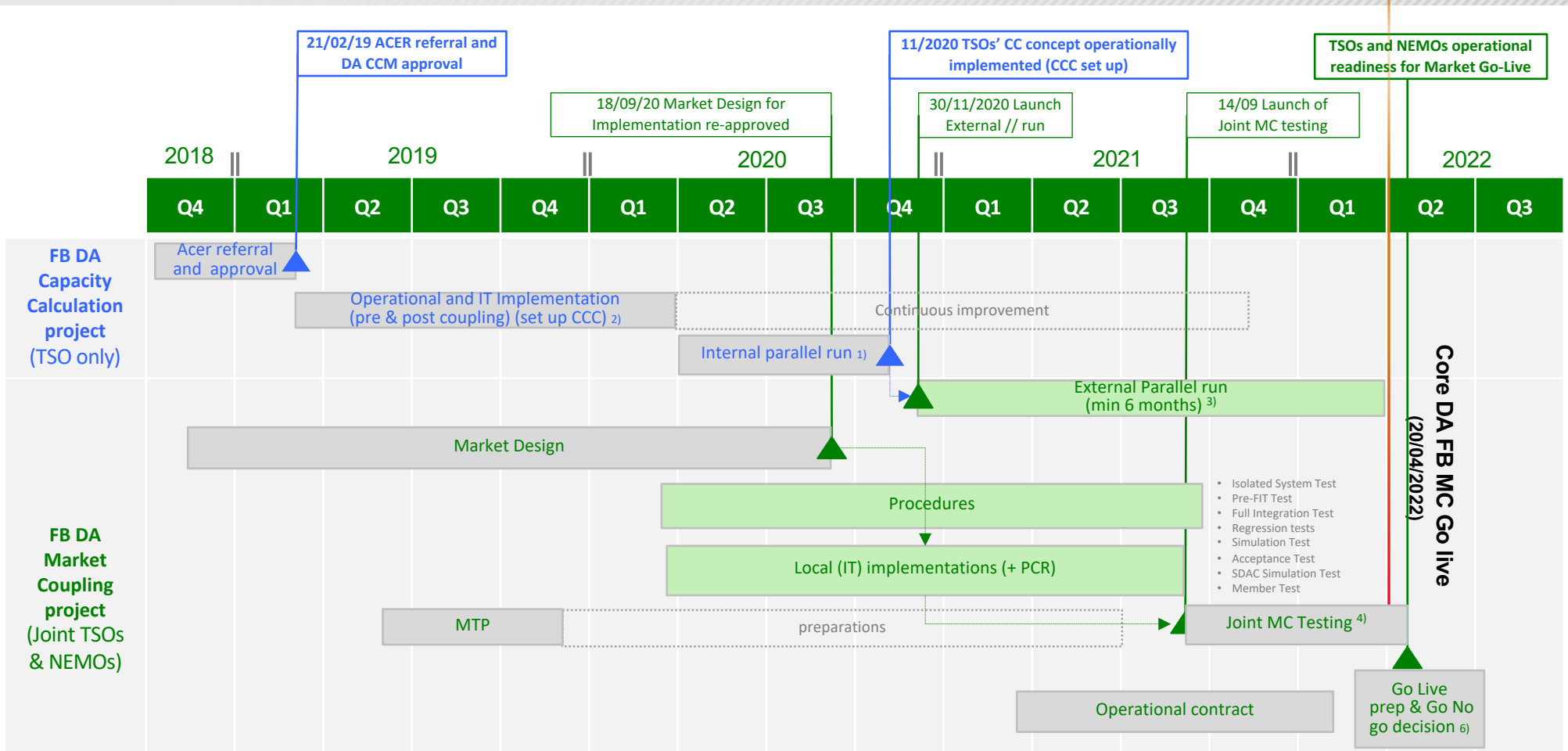
2	**Day Ahead Capacity Calculation & Market Coupling**
	• Core FB DA MC roadmap
	• Core FB DA Capacity Calculation – latest status
	• Observations parallel run from stakeholders
	  • EFET/Eurelectric/IFIEC
	  • CREG
	• Core ID ATCs
	  • ACER: ACER referral on ID CCM first amendment
	  • ID ATC results based DA extraction
	  • Core TSOs approach to further improve the ID ATCs results
	• Update on data quality and publication
	
	• Data quality indicators and reporting after FB DA MC Go-Live
	• EXT // run KPIs & results
	• SPAICC in Core
		R.OTTER
		R.OTTER
		
		ACER
		A. BENZARTI
		L. VAN KESTEREN
		S. VAN CAMPENHOUT
		
		J. MUNKESØ-THØGERSEN
		M.SCHRADE & A. VESELINOVIC
		S. VAN CAMPENHOUT
			13:15 – 15:00
			
			Break 15:00 – 15:15
			
			15:15 – 16:00

3	**Intraday Capacity Calculation** • Status update • Core Intraday CC methodology implementations • Intraday capacity calculation with IDA & ID continuous trade	W.SNOEREN	16:00 – 16:30
4	**Long Term Capacity Calculation** • EXT//run organization and KPIs • LT CC Implementation timeline	J.FERNANDEZ	16:30 – 16:45
5	**AOB & closure** • Feedback on Market Parties webinar 23/03/2022 • Next CCG meeting	R.OTTER/ H.ROBAYE	16:45 – 17:00

2. Day Ahead Capacity Calculation & Market Coupling

R. OTTER

Core FB DA MC roadmap

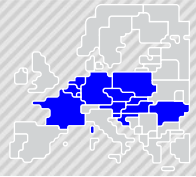


Assumptions and disclaimers:

1) finalisation of the so-called internal parallel run by Core TSOs in October 2020
2) based on the current Core FB DA CCM approved by ACER on 21/2/2019 & CCM amendment 10/05/2021
3) legal obligation for a minimum of 6 months external //run (art. 20(8) CACM)
4) Updated Joint MC integration test timings depending on progress and confirmation external parties (e.g. SDAC)
5) sufficient performance of Euphemia shown in a PCR simulation tests
6) possible timeline for NRAs to fulfil potential local requirements confirming the MC go live not included

2. Day Ahead Capacity Calculation

R. OTTER



Core FB DA Capacity calculation – latest status

Core TSOs from a Capacity Calculation point of view expect to be timely ready by 20 April 2022 (trading day, D-1) for Core FB DA Capacity Calculation according to the Core DA CCM obligations

- This is based on
  - the current stability level of the EXT//run process
  - acknowledging the stability improvements currently implemented
  - as well as the agreements to further optimizing the process
- The final measures and improvements to stabilize the process are foreseen to be implemented by beginning of April
- There however are remaining risks for finalizing the last implementations of a local implementation of an unforeseen ID ATC validation tool.

Core TSOs are aware and understand the concerns raised by some Market Participants/ associations (in CCG) related to:

- EXT//run results and stability
- ID ATC values after Core DA MC go live
- Publication tool

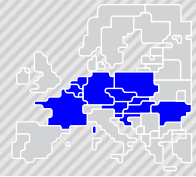
Core TSOs are of the opinion that ultimately this shall be discussed with Core NRAs during the ad-hoc Core IG+ call 01/04/2022.

The go / no go for Core FB DA Market Coupling go live is a Core Joint Steering Committee decision

2. Day Ahead Capacity Calculation & Market Coupling

Observations parallel run from stakeholders - EFET/Eurelectric/IFIEC

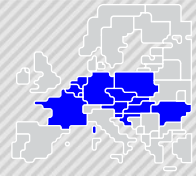
EFET/
Eurelectric/IFIEC



PLACEHOLDER PRESENTATION

2. Day Ahead Capacity Calculation & Market Coupling

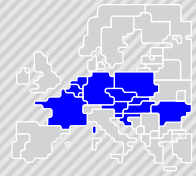
Observations parallel run from stakeholders - CREG



PLACEHOLDER PRESENTATION

2. Day Ahead Capacity Calculation & Market Coupling

ACER referral on ID CCM first amendment

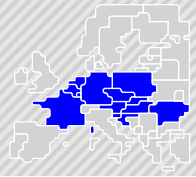


PLACEHOLDER PRESENTATION

2. Day Ahead Capacity Calculation & Market Coupling

ID ATC results based DA extraction: background

A. BENZARTI



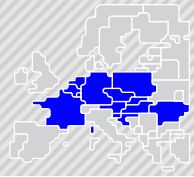
Core TSOs amended the Core ID CCM, held a Public Consultation from 22/10-22/11/21 and submitted the Core ID CCM first amendment to Core NRAs on 02/12/21 to reflect another approach of ID ATC Extraction.

- Core TSOs aim to implement Extended LTA Inclusion (ELI) in Core, which is reflected in the amended Core DA CCM.
  - ELI means that a FB domain & LTA domain (BEX restrictions domain) are provided separately as input for Market Coupling
  - This as an alternative to providing one Flow based domain with LTA included based on FAV/LTAmargin
- The combination of ELI applied in Core DA CC and the flexibility allowed in Core ID CCM to deduct (all or part of) virtual capacities (rLTAincl and rAmrId) prior computing the ID ATCs requires a new approach.
- The known iterative ATC extraction (Art. 21 ID CCM) must be replaced by an optimisation based on the concept behind ELI .
  - The original ID ATC Extraction approach optimises the ID ATC extraction within the Flow based domain
  - The new ID ATC Extraction approach optimises the ID ATC extraction between the FB domain & LTA domain

Core NRAs could not unanimously approve the Core ID CCM first amendment due to a disagreement on LTA inclusion under ELI and referred the amendment to ACER. The ACER referral process started on 11/02.

2. Day Ahead Capacity Calculation & Market Coupling

A. BENZARTI



ID ATC results based DA extraction: analysis

After the preparation of the Core ID CCM amendment and after further analysis of the results, various Core parties raised concerns about the very low initial ID ATC capacities, based on the EXT // Run results.

- Updated algorithm works as designed, i.e. uses either the FB domain (RAM_ID) or the LTA domain (LTA_ID) or a share of each
- In many MTUs ID ATC=0 on many borders
  - Effect is partly inevitable (due to allocation in SDAC which is very effective)
  - Effect is partly exacerbated by parameters for reduction of virtual capacities (rLTAincl and rAmrId)
  - However, this is not predominantly an inherent property of the new ID ATC extraction algorithm – see ANNEX 1 for details

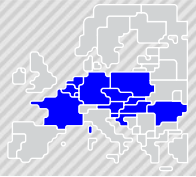
Comparison with historical data has been requested by NRAs, but has inevitable conceptual limitations

- Initial ID ATCs are leftovers from DA
- Historical DA results differ from simulated Core DA results used for ELI analysis, both in terms of DA capacities and DA allocation
  - FB only in CWE
  - CEE: NTC-based, 4MMC & explicit allocations
  - Due to the change to FB in ID on all borders, an optimization of the whole Core region will lead to changes in flows and levels of capacities compared to the old worlds. Therefore, expectations that all borders will gain additional capacities are not realistic.
- Assumption in the internal parallel run: Core region will not change the market behavior.

Results of comparison between ELI-based ID ATC extraction first results and historical initial ID ATCs – see analysis slides for details

- Historical values are higher on average
- Historical values are higher on all borders (on average over time) except for CZ→DE, FR→BE, PL→SK, SK→PL
- For historical values ID ATC=0 for 26% of TSs, for the ID ATC extraction after Core go-live ID ATC=0 for 77% of TSs.

2. Day Ahead Capacity Calculation & Market Coupling



ID ATC results based DA extraction: concerns

Core TSOs have a shared view on the challenges related to ID ATC left-over capacities and the willingness to improve the initial ID ATC results and especially avoiding initial ID ATC=0 on multiple borders at the same time.

To have the ability to increase ID ATC values, Core TSOs on the other hand need to have the ability to have an ex-post process to adapt the intraday ATC capacity when operational security issues are observed.

These concerns were raised in the ACER referral process and Core TSOs analysed several options in discussion with ACER and Core NRAs.

Core TSOs identified two main streams for possible solutions to improve the Core ID ATC values:

1. **Improving the algorithm of Core ID ATC Extraction, for example**
   a. Setting low PTDFs to 0, avoiding (very) remote CNECs blocking exchanges in the whole Core region
   b. Improve the objective function with a min{ATC} part, trying to reduce number of borders with simultaneous ID ATC=0

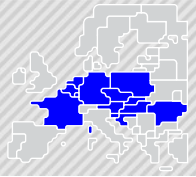
These ideas focused on improving the algorithm of Core ID ATC Extraction require IT system changes, for which it is known that – next to the analysis required – this cannot be implemented prior Core FB DA go-live (20/04).

2. **Changing the parameters used for Core ID ATC Extraction**
   - rLTAincl and rAmrId
   - Enabling full netting on borders for LTA domain (so far no netting if rLTAincl=0)
     - Netting means that DA exchanges from A to B free up ID capacities for exchanges from B to A.

The Core ID CCM amendment and decision of ACER is expected to give Core TSOs the possibility to implement an improved algorithm and configure the reduction factors rAmrId and rLTAincl. However, the ACER process to decide on the final ID CCM amendment is ongoing, therefore the methodology is not yet final.

2. Day Ahead Capacity Calculation & Market Coupling

ID ATC results based DA extraction: analysis results



Core TSOs analysed several ID ATC extraction options from February – mid March and discussed the results in the ACER referral process:

- 13 scenarios, each to be compared to a reference (i.e. 14 computations in total)
  - Reference: rLTAincl=0 on all Core borders (no LTA included, ID ATCs extracted from FB domain only)
  - **Scenario 1: rLTAincl according to current plans of Core TSOs (FR-BE=1, HR-SI=0.2)**
  - Scenario 2: As scenario 1 plus DE-AT=1
  - Scenario 3: rLTAincl=1 on all Core borders
  - Scenario 4a: rAmrId=20% on all CNECs, rLTAincl=0 for all borders
  - Scenario 4b: Same as scenario 4, but extraction by using the iterative (classic) approach → *TSO added scenario. With rLTAincl = 0 either the ELI or iterative approach can be applied. Note: this option cannot be implemented prior go live.*
  - Scenario 5: rAmrId=20% on all CNECs, rLTAincl=1 for all borders
  - Secenario_netting: rAmrId=max(20%, TSO's value); rLTAincl as provided by TSOs, but 0 replaced by 0.001 to switch on netting for respective borders → *TSO added scenario. A Trade off scenario which could be achieved before Go-Live.*
  - Scenario X1: rAmrId=max(20%, TSOs' value); rLTAincl=max(20%, TSOs' value)
  - **Scenario X2: rAmrId=max(20%, TSOs' value); rLTAincl*LTA=min(1500 MW, full LTA)**
    → *Implementation of X2 before GL would require simplified approach to convert 1500 MW cap into border-wise rLTAincl (e.g. based on historic average LTA)*
  - **Scenario X3: rAmrID and rLTAincl as provided by TSOs on 18/03/2022, all PTDFs – see ANNEX 2 for overview table**
  - Scenario X4: As scenario X3, but PTDFs above threshold (1% or 2%)
    → TSOs analyzed a set of thresholds as stated below:
    - Scenario X4_0.005: As scenario X3, but z2z PTDFs < 0.5 % set to zero
    - **Scenario X4_0.01: As scenario X3, but z2z PTDFs < 1 % set to zero**
    - Scenario X4_0.02: As scenario X3, but z2z PTDFs < 2 % set to zero

Scope

- Time period: 73 BDs from 2021-01-09 until 2021-04-25
- Further parameters unchanged (WSUM=0.5)

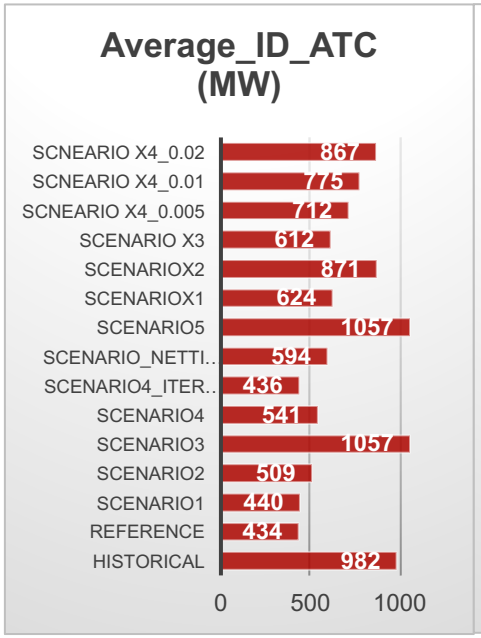
2. Day Ahead Capacity Calculation & Market Coupling

ID ATC results based DA extraction: analysis results

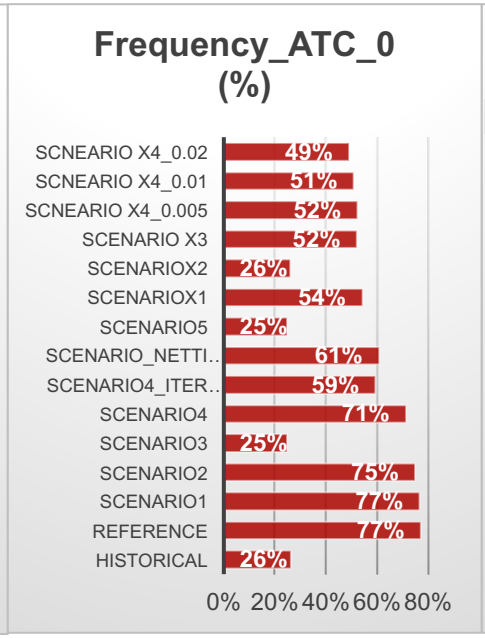
Scope continued

- Indicators:
  - KPI 1: Average ID ATC per oriented border → The higher, the better for the market
  - KPI 2: Frequency of ATC=0 per oriented border → The lower, the better for the market
  - KPI 3: Frequency of domain selection: As the objective function (based on the Balas approach) combines both the LTA domain and the FB domain in order to maximize the ATC across all Core oriented borders, the share of domain selection could be a helpful information. It depicts how frequently the FB or LTA domain, or a combination of both, are selected for the extraction of the ID ATCs
  - KPI 4: Maximum neglected flows: Setting small z2z PTDFs to zero results in neglecting of some flows. These flows can occur in reality and load CNECs beyond the limits imposed by the FB domain. The higher the threshold for setting PTDFs to zero, the higher the neglected flow.
    → The lower the better for operational security (important KPI).

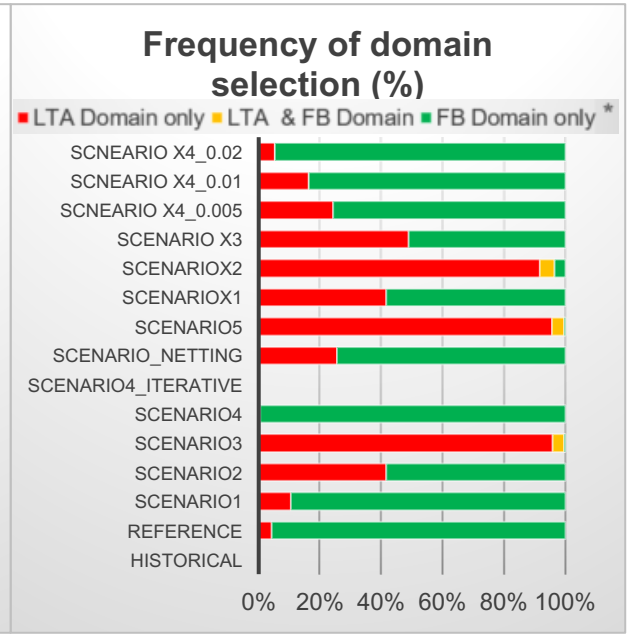
KPI 1



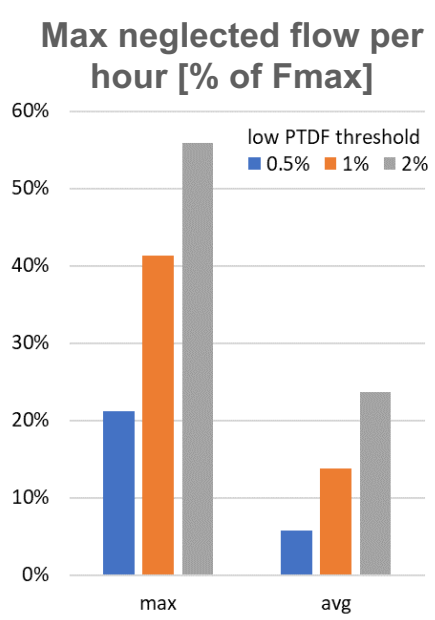
KPI 2



KPI 3



KPI 4 (Sc. X4 only)



*The thresholds α=0.05 and α=0.95 were applied for the classification.

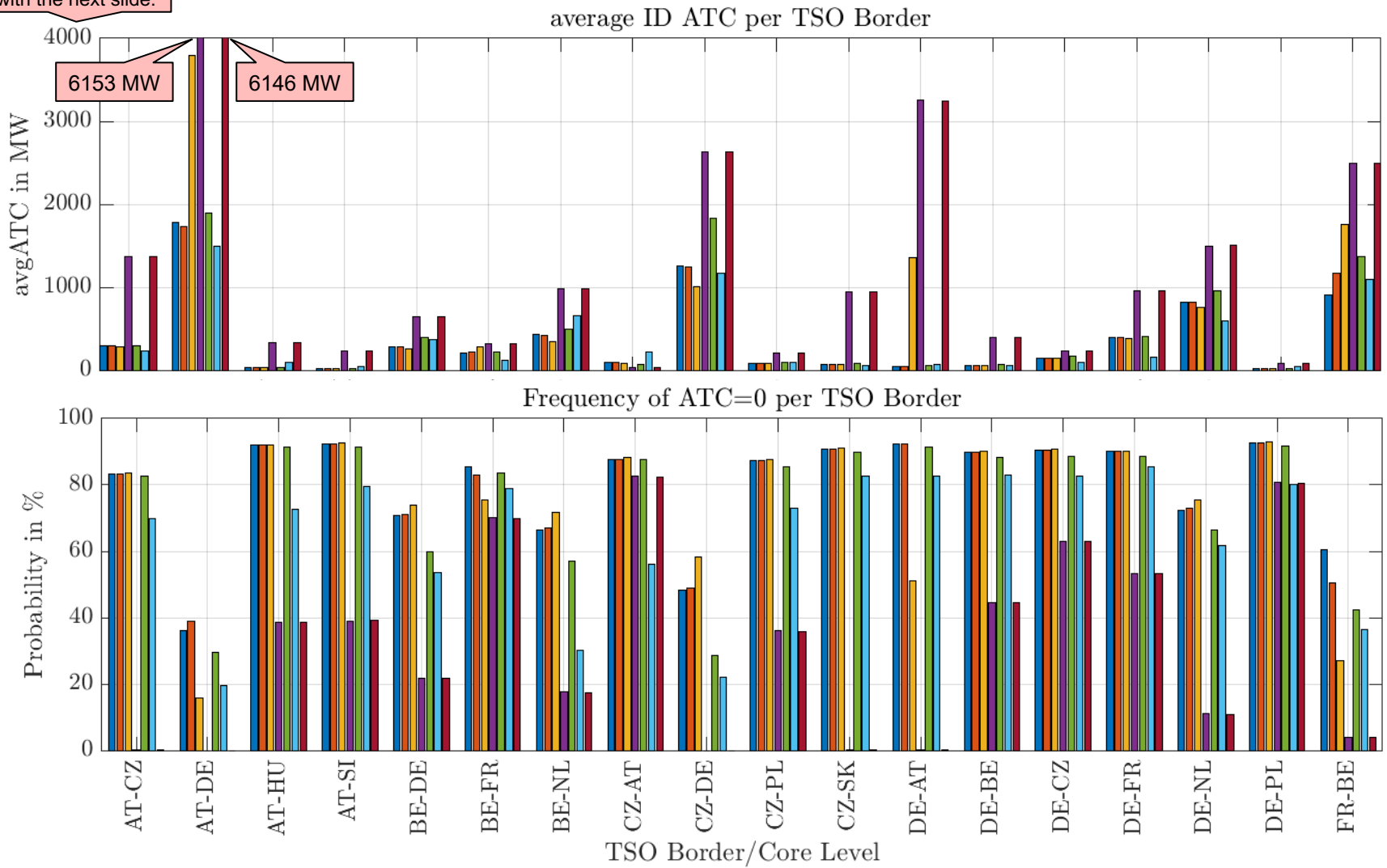
2. Day Ahead Capacity Calculation & Market Coupling

Analysis ID ATC extraction and ELI – Comparison of seven scenarios

Results per scenario for 18 out of 36 borders (see next slide for second half and average across Core borders)

The Y axis is intentionally limited to 4000 MW for the sake of comparison with the next slide.

(Legend on next slide)



2. Day Ahead Capacity Calculation & Market Coupling

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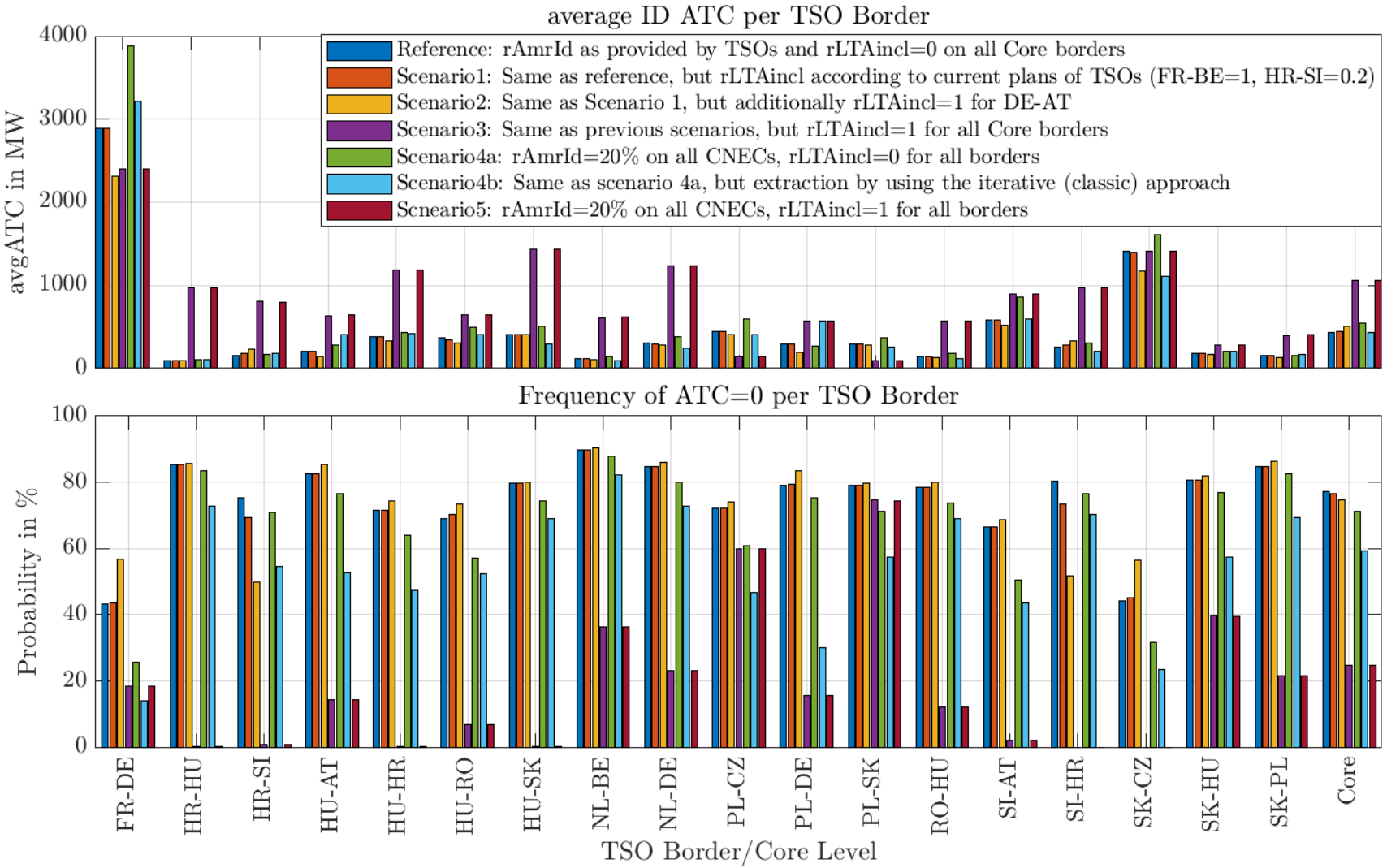

2. Day Ahead Capacity Calculation & Market Coupling

Analysis ID ATC extraction and ELI – Comparison of selected scenarios

Results per scenario for 18 out of 36 borders (see next slide for second half and average across Core borders)

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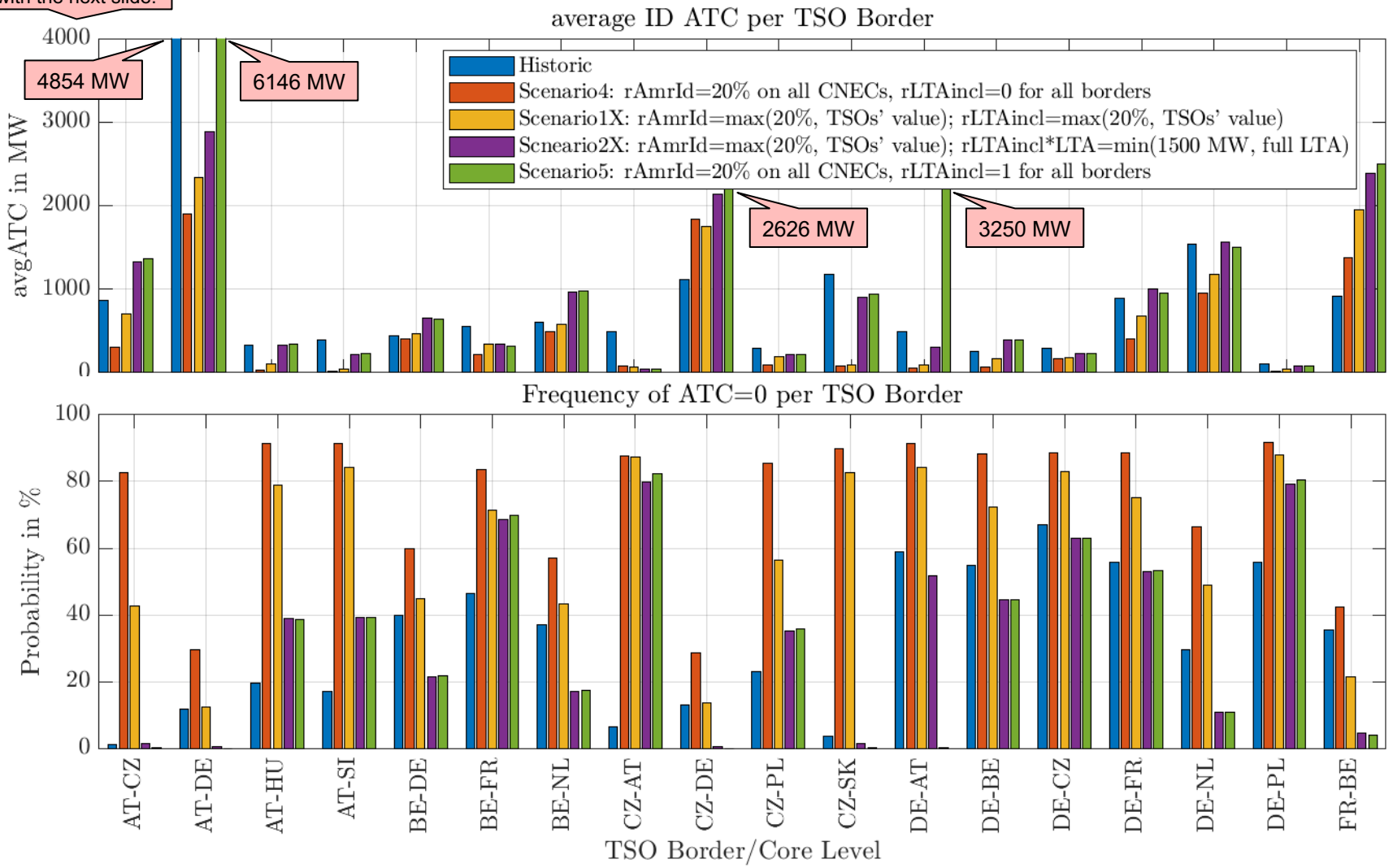

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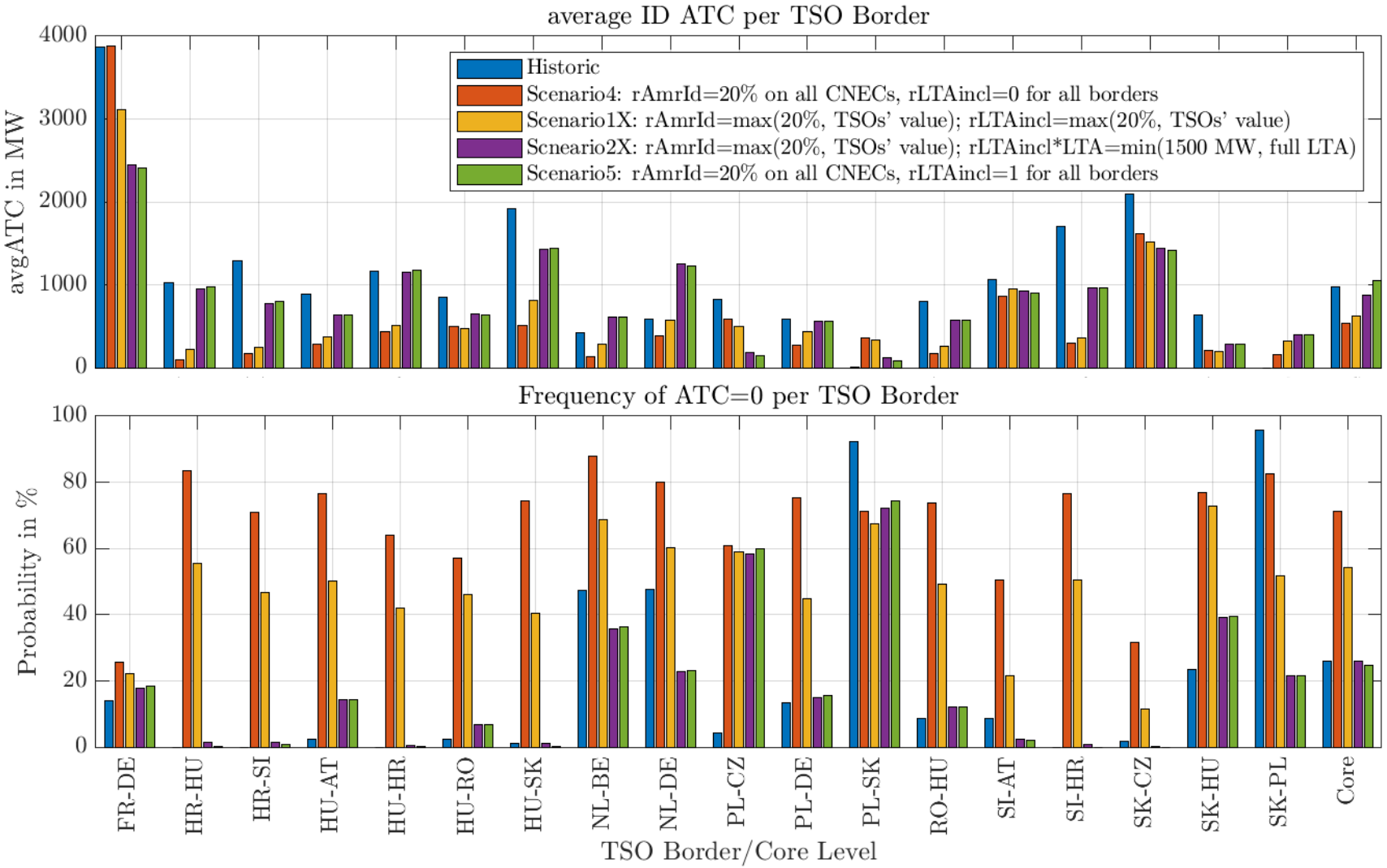

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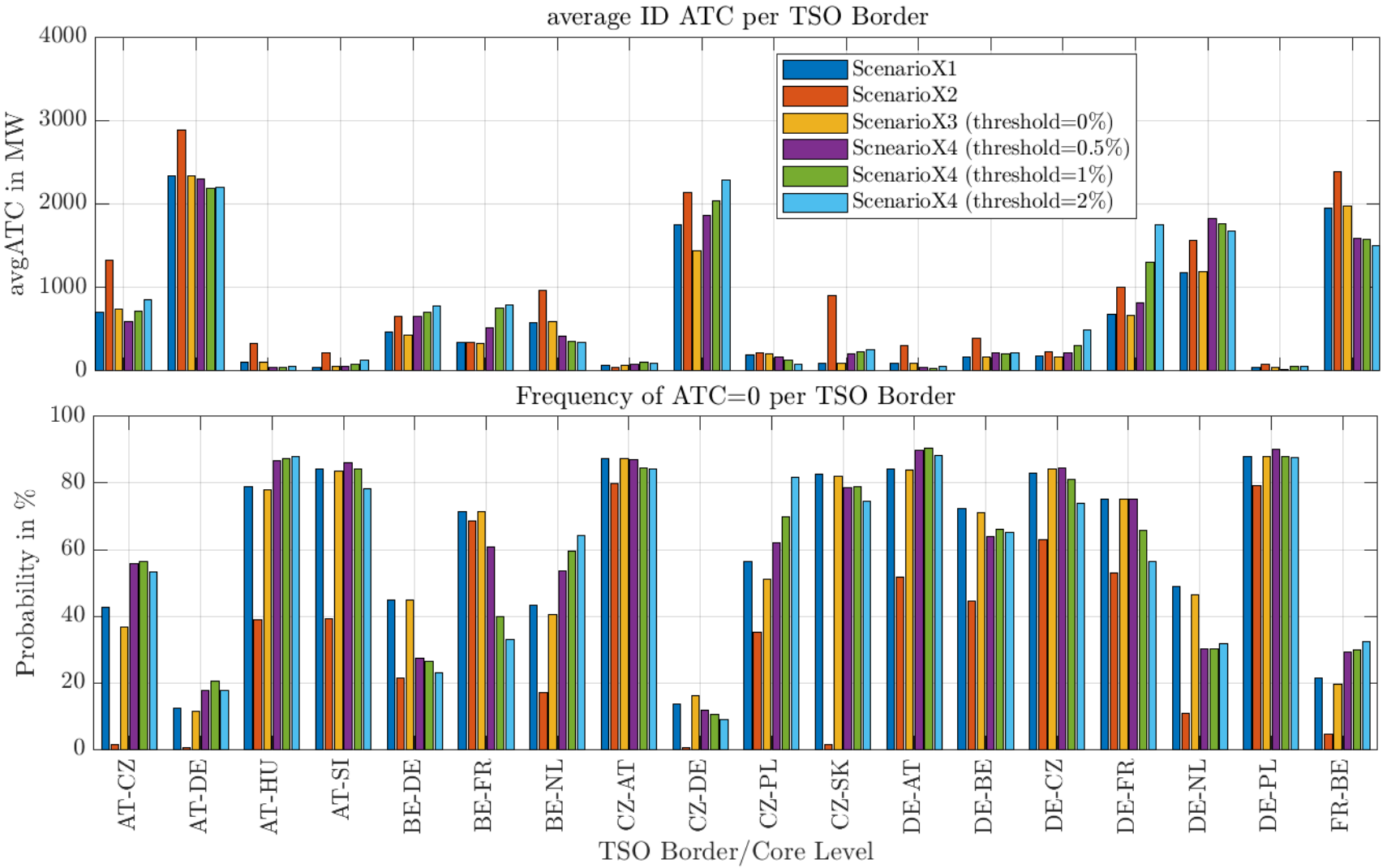

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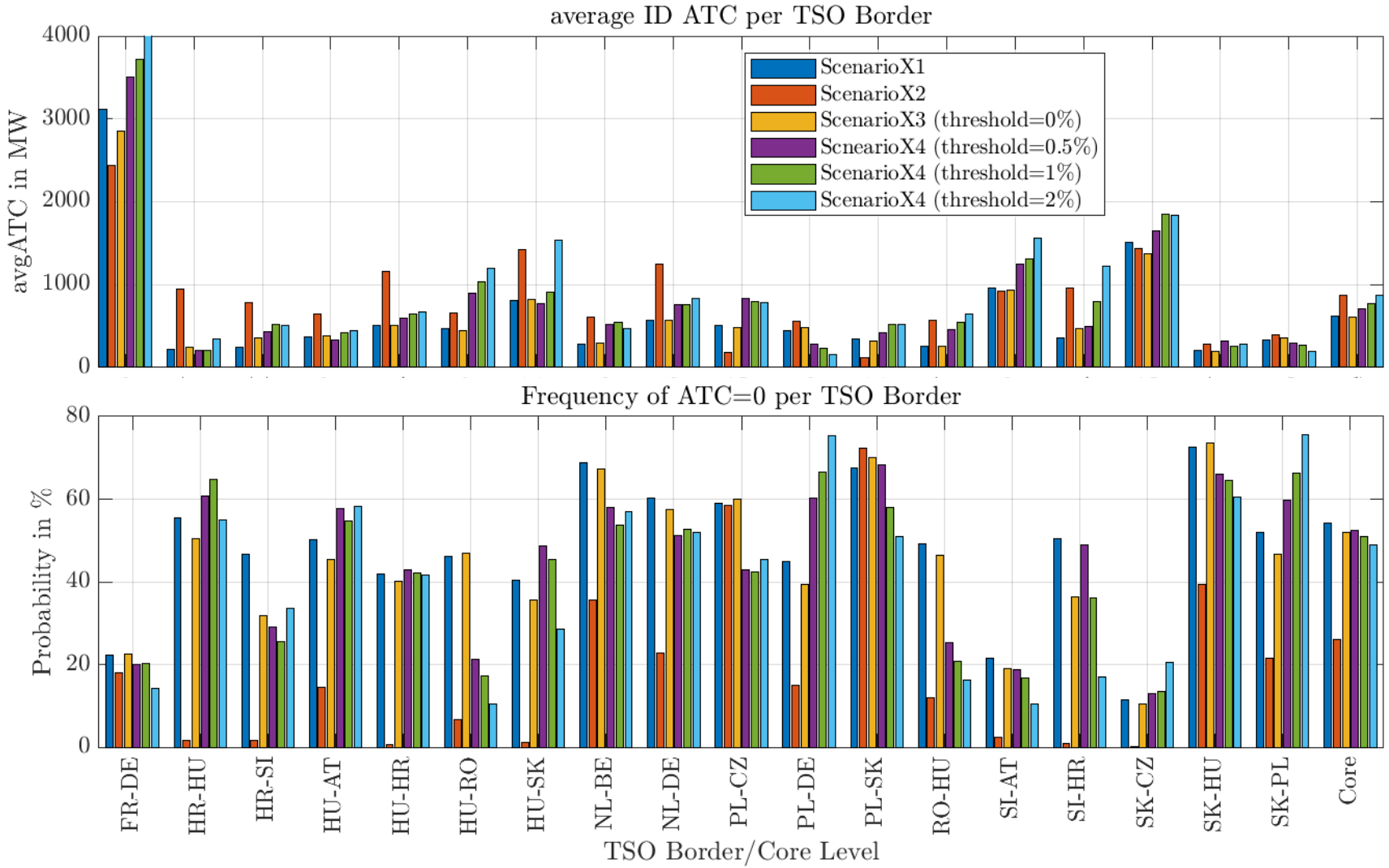
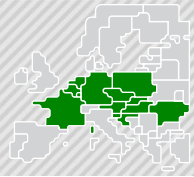


2. Day Ahead Capacity Calculation

L. VAN KESTEREN



Core TSOs approach to further improve the ID ATCs results

Core TSOs objective is to avoid a much a possible ID ATC=0 considering operational security and to further develop Core TSOs tools to assess the impact and provide full transparency on this. Core TSOs therefore agreed on the following approach:

Algorithmic improvements

- There are algorithmic improvements defined that can optimise the outcomes without changes needed in input
- A Proof of Concept is prepared, and implementation is planned for shortly after go-live

Local tools

- Core TSOs will investigate possible implementations of local transitional solutions to avoid ATC=0 – (beginning of April)
- Core TSOs will investigate possible implementations of new tools to facilitate higher ID ATC values – (end of April)

Analysis of impact of higher ID ATC values

- A dedicated TF will be created within Core TSOs with the following tasks
  - Scoping of the analysis – end of April
  - Perform 1st analysis – end of May
- Core TSOs aim to conclude on possible improvements and implementation plan in June

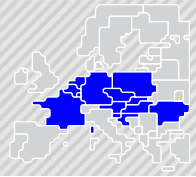
Monitoring:

- Monthly reporting based on go-live data will be done and discussed between Core TSO to track developments

Overall delivery of the possible improvements: 6 months from now (deadline: September 2022)

2. Day Ahead Capacity Calculation & Market Coupling

L. V KESTEREN



Update on data quality and publication: Background

Core TSOs have received enclosed feedback from Core Market Participants (MPs) on the Core DA EXT // run data publication. As (some) MPs indicate to have low confidence in the overall quality of results that have been published. This relates to completeness, possible errors and clarifications.

This has been discussed in a dedicated informal meeting (11 March 2022) with representatives from EFET and MPP. Aim of the meeting was to determine the relevant information for this CCG. Specific questions were not discussed → these are transparently handled through the Q&A forum.

In this meeting Core TSOs would like to give feedback by going through:

1. What happened in the EXT // run so far?
2. What can be expected from now until go live?
3. What will happen after go live?

2. Day Ahead Capacity Calculation & Market Coupling

Update on data quality and publication: EXT // run

1. What happened in the EXT // run?

The EXT // run enabled TSOs and RSCs to gain operational experience and make the process more robust. This learning curve continued after summer 2021:

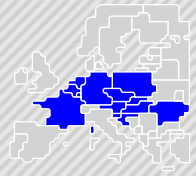
- DFPs did happen during 7 BDs in Q4 2021 and 3 BDs in the course of Jan-Feb 2022
- Issues with local validation regularly occurred, underlining the importance of having fallback strategies in place. Fallback strategies typically lead to reduced capacities.

Core TSOs acknowledge this learning curve is not an ideal setting for MPs as the EXT // run also serves the purpose to assess the impact of the methodology. Core TSOs do believe the daily publication of results, combined with transparent overview on issues occurred (Overview of limitations updated on weekly basis) puts all the cards on the table.

- MPs have requested recalculations to complete the dataset. Unfortunately, this is infeasible as this is an operator-ran process with significant efforts, and no parallel stream of operations can be set-up to re-run past BDs

Reliability of the publication of results goes up. Core TSOs with support of JAO have undertaken actions to complete missing data and avoid a backlog of publication

1. Overview of missing publication was created and where possible re-publication was done.
   - Several tool updates (CCCt and PuTo) improved completeness of data publication.
   - Adjustments in mapping between tools solved blocking issues in publication.
2. Enhanced human monitoring is in place to check if data is missing (until the monitoring tool is implemented)
3. Completion of SGM publications and inconsistencies solved after MPs questions in Q&A Forum

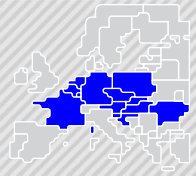


2. What can be expected until go live?

Core TSO and JAO are working to release the following improvements of PuTo by go-live. This is taking longer than initially planned. The highlighted elements mark where the remaining implementation effort is highest

- Automatic monitoring tool for data completeness
- *Implementation of the Extended LTA inclusion approach (core Market View page)*
- Post-coupling pages
  - General release of post-coupling pages: scheduled exchanges, net positions, price spread, *ID ATCs, congestion income* (planned for: early April 2022)
  - *Extension of initial ID ATCs extracted from the DA domain to cover also the non-CWE borders*
- Fixing data inconsistencies in a series of pre-coupling pages
  - Validation Reductions
    - CNEC name and TSO naming issue
    - Display information on returned branch
  - D2CF: correction for BE-DE
  - Max Net Positions: add DE +Alegro Hubs
  - Pre-final + final computation: Fref, init & Fnrao
  - LTN: some borders show blanks instead of zero’s

An update of the publication handbook will be made available to help with the interpretation of results and explain some caveats.



Update on data quality and publication: until go live

3. What will happen after go live?

Complete missing publication requirements

- Publication of shadow prices – fix needed in CCCt (*currently assessed if still possible before go-live)*
- Publication of detailed daily IVA justifications for all Core TSOs – development needed in CCCt

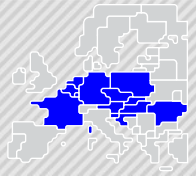
FB domain pages

- Filter out irrelevant entries which only serve a technical purpose (equality constraints, non-core tie-lines,…)
- Fix the formula for the ‘minRAM target for Core’ – development needed in CCCt
  - In case AMR > 0: the value is correct and one can see the relationship minRAM_target_Core = R_amr – Fuaf
  - In case AMR = 0: the value shown is the RAM as percentage of Fmax instead of R_amr – Fuaf

Break 15:00 – 15:15

2. Day Ahead Capacity Calculation & Market Coupling

J. MUNKESØ-THØGERSEN



Data quality indicators and reporting after FB DA MC Go-Live: Reminder

Core TSOs worked on a common procedure for monitoring and ensuring the quality and availability of the data. In line with DA CCM article 26(1), this was discussed with Core NRAs and Market Participants.

- Discussion with Core NRAs on Core TSOs' foreseen approach was held during the Core IG meeting on July 2nd 2021.
- The topic was introduced to Market Participants during the Core CG meeting on July 7th 2021.

The publication of data will be on the JAO website in the so called: "Publication tool" - see here.

- EXT//Run results are already published on this platform and will be enriched until Go Live with all information required.
- There will be a link on ENTSO-E Transparency Platform to the JAO website to direct stakeholders to meaningful FB parameters.

Summary of the common procedure for monitoring and ensuring the quality and availability of the data:

- The main responsibilities for performing the procedure will be for the CCC (Common Capacity Calculator) to ensure
  - Continuous monitoring process
  - Reporting in the annual report
- The continuous monitoring process covers
  - Quality checks within the central systems – already implemented
  - (Detailed) quality indicators (targets) and reporting – under implementation
- In terms of publication
  - Information will be available to Market Parties on data quality (e.g. spanning / Default Flowbased Parameters - DFP applied)
  - There will be monitoring on completeness and notifications to allow completing the data (under implementation by JAO)
- Finally, there will be a satisfaction survey performed annually with stakeholders and the Core regulatory authorities

In the next slides, an overview of the data quality indicators and foreseen reporting after Core FB DA MC go live is presented.

2. Day Ahead Capacity Calculation & Market Coupling

Data quality indicators and reporting after FB DA MC Go-Live: Process

Monitoring and ensuring the *quality* of data during the **Core Capacity Calculation process**

- Focus on monitoring of reliability, availability and performance
- For the Core DA CC process there will be a list of quality indicators per process step. Such as:
  - Duration of process step, within/outside target timings
  - Success of process step (i.e., CNEC selection, NRAO, IGM replacement, Spanning, DFP)
  - Input accuracy (i.e., Slack imbalance, Net Position Forecast)
  - This will be reflected in the annual report

Ambition level for the 5 data quality indicators and reasoning behind

Data quality indicator	Monthly Ambition level	Reasoning
IGM replacement was performed (for Core TSOs)	≤ 24 MTUs	Similar impact on capacities as application of Spanning and CNEC selection failure.
Spanning was applied	≤ 24 MTUs	Similar impact on capacities as IGM replacement and CNEC selection failure.
DFP was applied	0 MTUs	Compared to the other 4 DQIs, application of DFPs have the biggest impact on capacities, hence the ambition level of 0 MTUs.
CNEC selection failed	≤ 24 MTUs	Similar impact on capacities as application of Spanning and CNEC selection failure.
NRAO was not applied	≤ 48 MTUs (of triggered MTUs)	NRAO is a beneficial process step, aiming to increase the capacities. However, it is not a mandatory step. Compared to the other 4 DQIs, failure of NRAO step has the least impact on capacities.

Explanation of quality indicator process

As per Art. 26(4), Core TSOs commit to the ambition levels of the 5 Data Quality Indicators. In case those ambition levels are not met on average on a monthly basis for all 5 DQIs:

- Within 1 month: respective party/parties shall provide detailed reasons for failure and action plan to correct past failures and prevent future failures
- Within 3 months: the action plan shall be fully implemented

Above information shall be published on the Publication Tool and in the annual report.

2. Day Ahead Capacity Calculation & Market Coupling

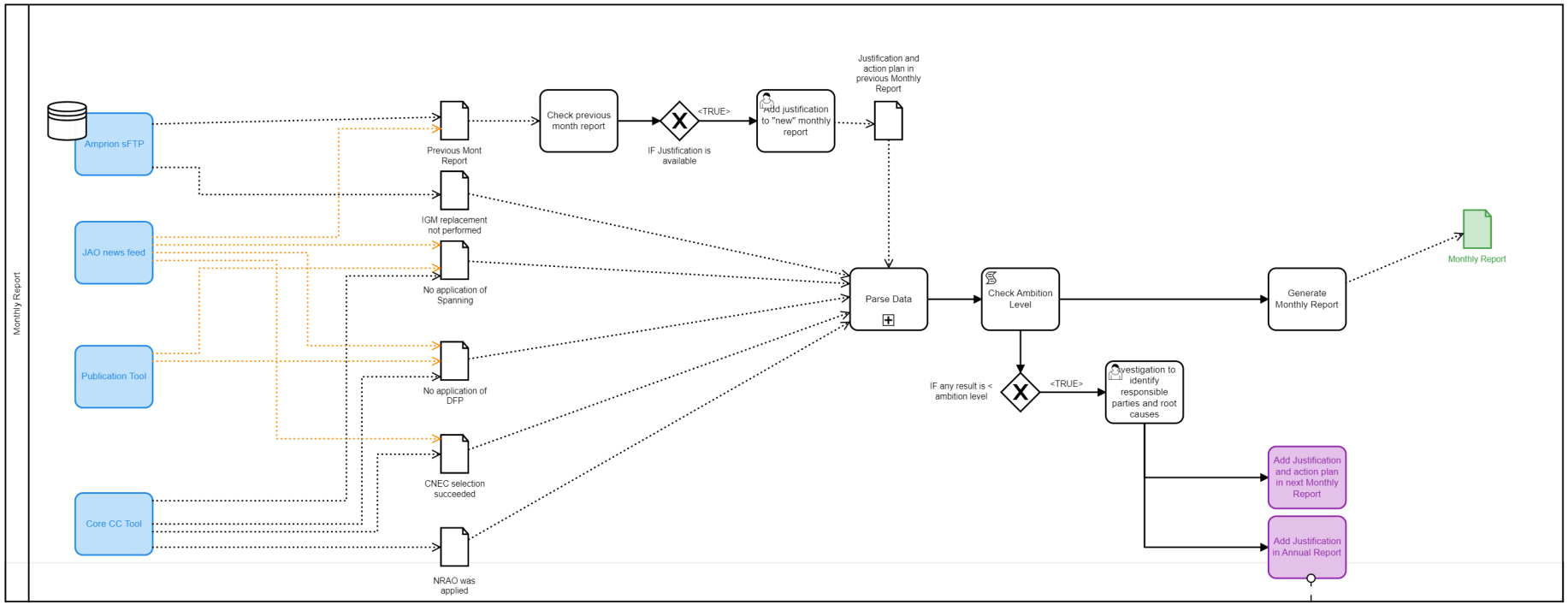
J. MUNKESØ-THØGERSEN

Data quality indicators and reporting after FB DA MC Go-Live: Process

Monthly Report

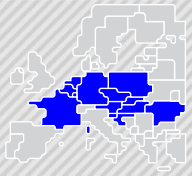
- Contains data quality indicators monitoring IGM replacement, if CNEC selection succeeded, if NRAO was applied and if spanning or DFPs were applied

High-level flow chart for monthly report



2. Day Ahead Capacity Calculation & Market Coupling

J. MUNKESØ-THØGERSEN



Data quality indicators and reporting after FB DA MC Go-Live

According to DA CCM articles 26(4), 27(5) and 27(4) three reports are to be generated and published

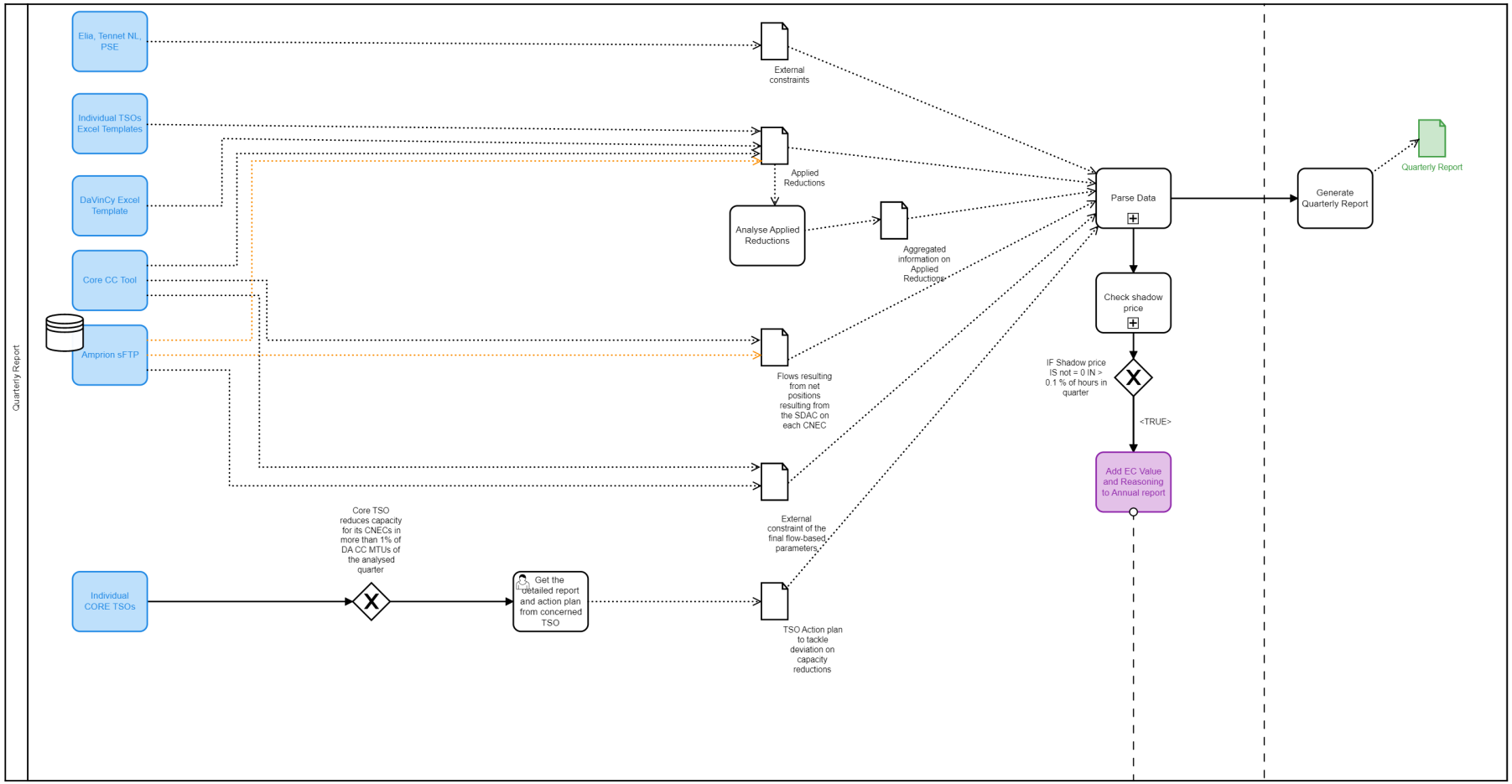
- Monthly Report (explained in previous slides)
  - Contain data quality indicators monitoring IGM replacement, if CNEC selection succeeded, if NRAO was applied and if spanning or DFPs were applied
- Quarterly Report
  - Contain legal reporting items monitoring external constraints, applied reductions, flows from net positions from the SDAC on each CNEC and if needed TSO action plans for reduced capacity on CNECs
- Annual Report
  - Contain legal reporting items monitoring stakeholder satisfaction survey, CC KPIs, external constraints, efficiency of NRAO, withholding of RAs, availability of non-costly RAs and if needed TSO justification for why not providing non-costly RAs

Solutions to generate and publish the reports

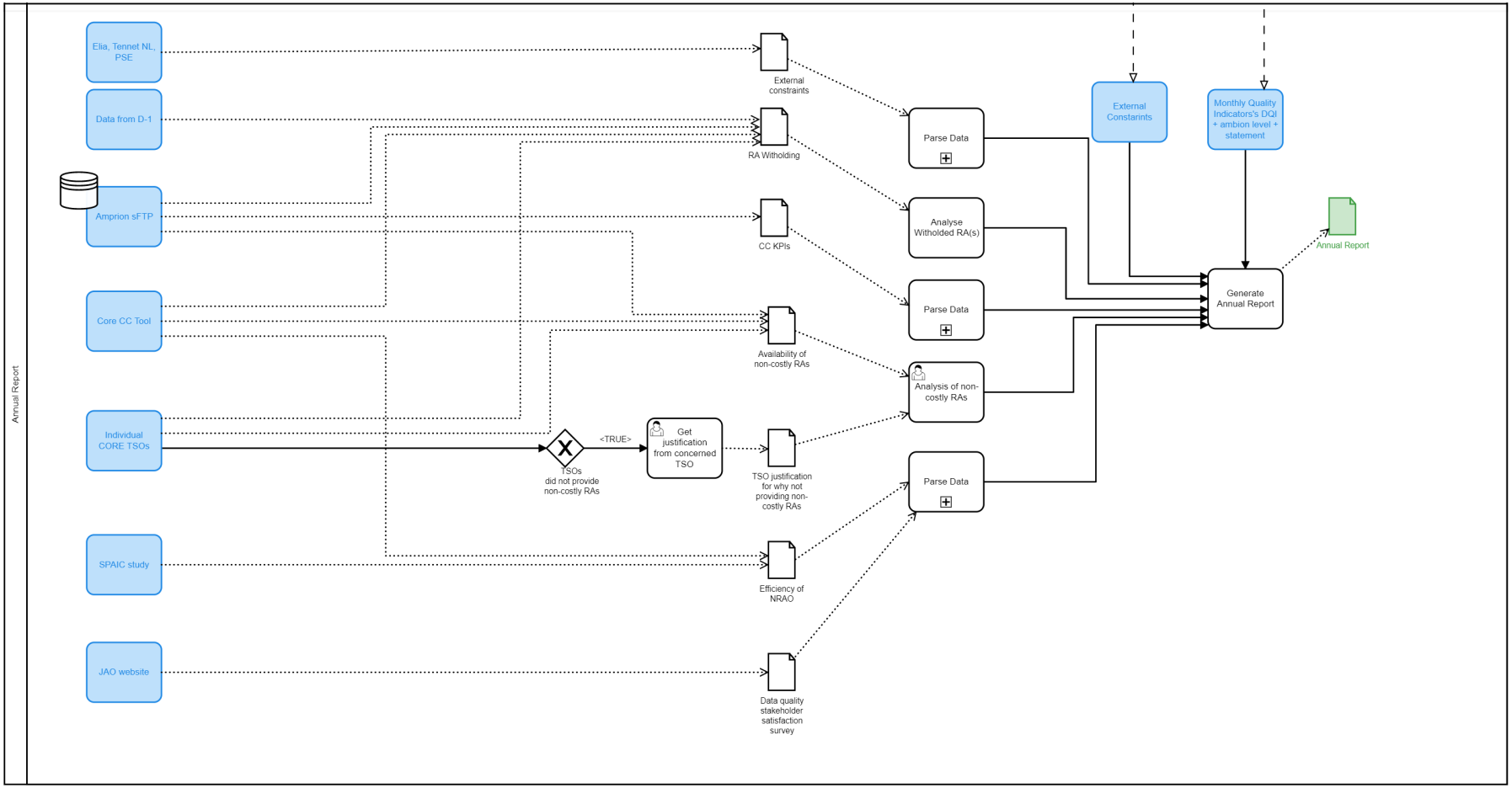
- Short-term solution
  - In the transition period until Analytical & Reporting tool is in place, the reports will be generated by following a semi-automated approach
  - First monthly report is to be published in June 2022
  - First quarterly report is to be published during Q3 2022
  - First Annual report is expected to be published during first half of 2023
- Long-term solution
  - Analytical & Reporting tool will be implemented to generate the reports on the long term

High-level flow charts for the quarterly and annual report can be found in the two next slides.

High-level flow charts for the quarterly report

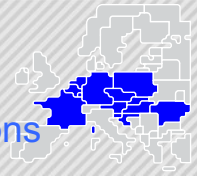


High-level flow charts for the annual report



2. Day Ahead Capacity Calculation & Market Coupling

EXT // run KPIs & results: Comparison of market coupling results between Core //run and current operations



Summary

- The period 18/06 – 31/12/2021* was investigated. The overview and also the individual Bidding Zone dashboards in the appendix aim at providing you a high-level overview of the extensive KPI reports available on JAO.
- **Near Price Convergence**** was on average **higher** during the //run: 12.45% vs. 6.24%.
  - Seasonal variation and impact of the stressed market can also be observed: Third quarter 18.81% vs. 9.15%, fourth quarter 2.47% vs. 2%.
- The absolute average SDAC net positions of Core BZs is slightly higher during the //run, which hints at increased exchange possibilities. The general direction of the net position per BZ (import/export) did not change during the //run.
- Cross-border elements still make up the highest share of elements limiting the market coupling, either by occurrence (~63% of the time) or weighted by the sum of the shadow price (~53%).

Disclaimer for interpretation of comparison of EXT//run and current operational market coupling results:

- Please note that during the EXT//run market coupling simulations the operational order books are used, meaning there is no modification of the order books being performed to anticipate any kind of adjusted bidding behavior under flow-based market coupling.
- The only modification performed is extension of supply/demand curve on the Min/Max price based on explicitly nominated capacity in daily timeframe (as of Interim Coupling go-live for BD 18/06/2021 this only affects the HU-HR border), which won't be allocated explicitly any more in coupled markets.

Information on the underlying data

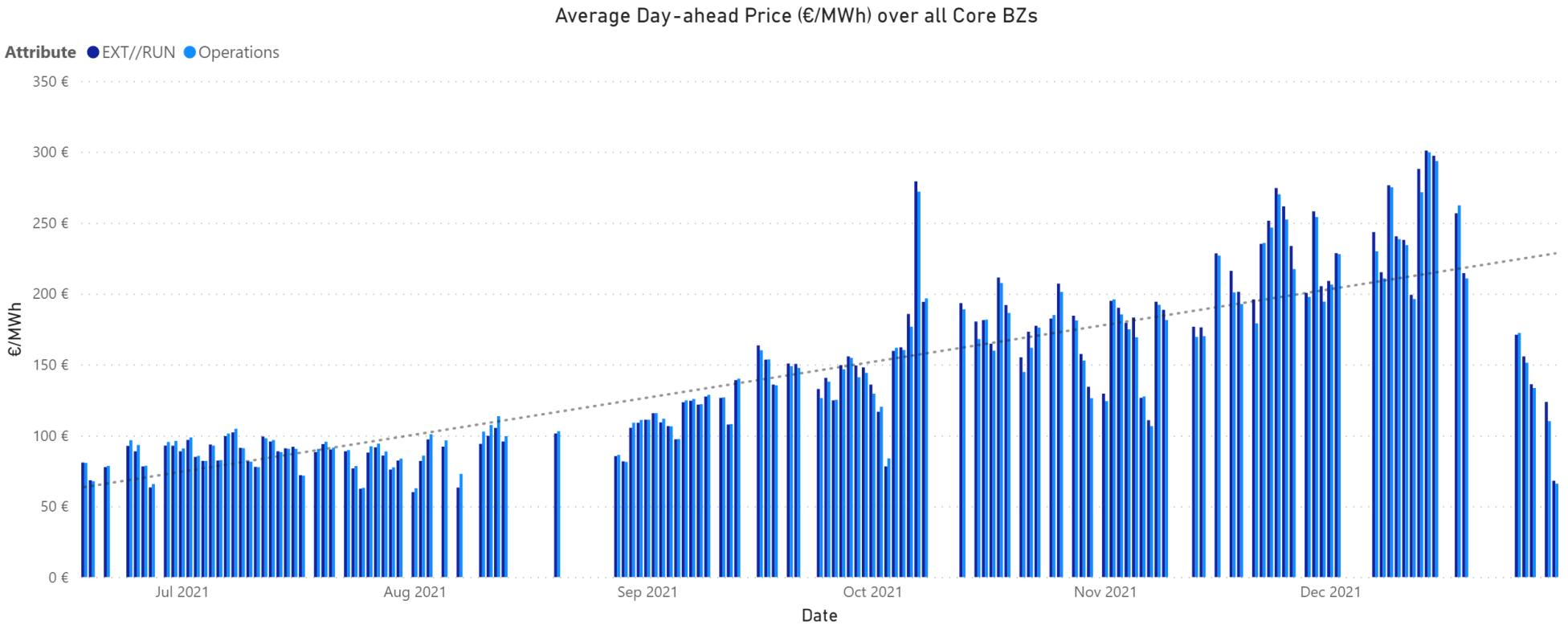
* Hours with default flow-based parameters or for which TSOs reported the application of individual validation fallback were excluded to ensure comparability with operational data.

** Defined as <1 €/MWh price difference between the most expensive and cheapest Core BZ.

2. Day Ahead Capacity Calculation & Market Coupling

EXT // run KPIs & results: Comparison of market coupling results between Core //run and current operations

Setting the scene: The Core FB MC //RUN in an environment of high and increasing prices.

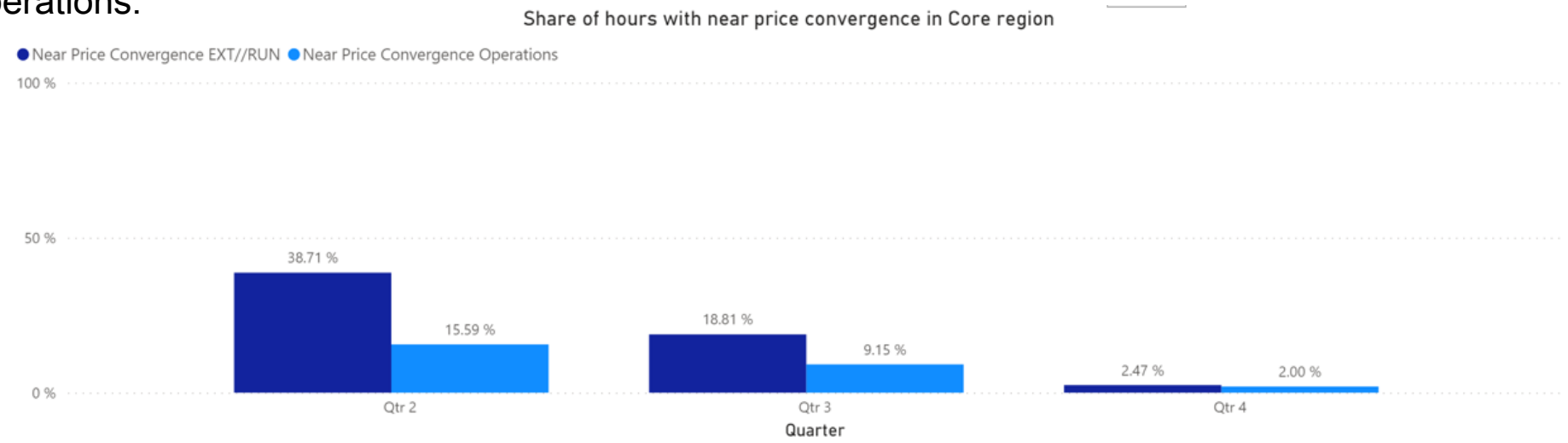


White spaces indicate excluded hours for which either no market coupling results exist or that were excluded due to default flow-based parameters or application of an individual fallback.

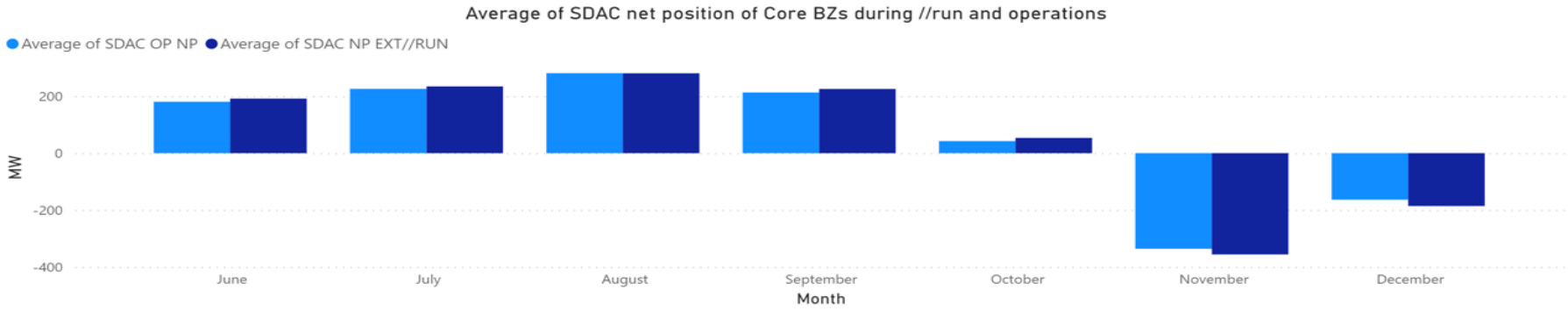
2. Day Ahead Capacity Calculation & Market Coupling

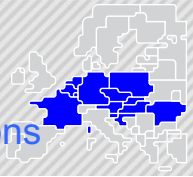
EXT // run KPIs & results: Comparison of market coupling results between Core //run and current operations

Share of near price convergence is considerably higher with Core FB MC compared to operations.



The general direction of the net position per BZ (import/export) did not change during the //run (see also individual BZ dashboards)





Average price difference operational price of BZ and //run price per BZ

Year	Month	Price Diff AT	Price Diff BE	Price Diff CZ	Price Diff DE/LU	Price Diff FR	Price Diff HR	Price Diff HU	Price Diff NL	Price Diff PL	Price Diff RO	Price Diff SI	Price Diff SK
2021	June	-0.45 €	-0.60 €	1.24 €	0.06 €	-1.09 €	7.76 €	4.34 €	0.22 €	0.22 €	3.28 €	7.93 €	1.61 €
2021	July	-0.64 €	-1.24 €	0.11 €	0.09 €	-1.18 €	5.18 €	3.79 €	0.83 €	-0.40 €	2.27 €	5.75 €	-3.47 €
2021	August	-0.08 €	0.03 €	-0.44 €	-0.17 €	-1.46 €	11.02 €	13.34 €	1.39 €	-0.50 €	17.76 €	11.64 €	-0.96 €
2021	September	-1.22 €	0.36 €	-2.58 €	2.21 €	-0.30 €	-0.45 €	-2.34 €	0.70 €	-0.59 €	-3.25 €	-0.58 €	-4.39 €
2021	October	-10.13 €	3.58 €	-4.61 €	3.96 €	1.41 €	7.52 €	-5.87 €	5.00 €	-2.74 €	-12.86 €	9.33 €	-40.42 €
2021	November	-6.21 €	5.71 €	-0.88 €	7.99 €	-2.63 €	-8.77 €	-16.86 €	4.07 €	-2.25 €	-21.49 €	-4.38 €	-31.44 €
2021	December	-4.11 €	4.53 €	1.43 €	6.97 €	-6.00 €	-0.44 €	-13.46 €	6.04 €	-3.37 €	-19.67 €	-4.56 €	-16.30 €

- (Unweighted) average price difference: (Operational Price – Core //run price). A positive sign indicates a lower average price during the //run and a negative sign vice versa.
- Except for Austria, all BZs experience a change in signs over time.

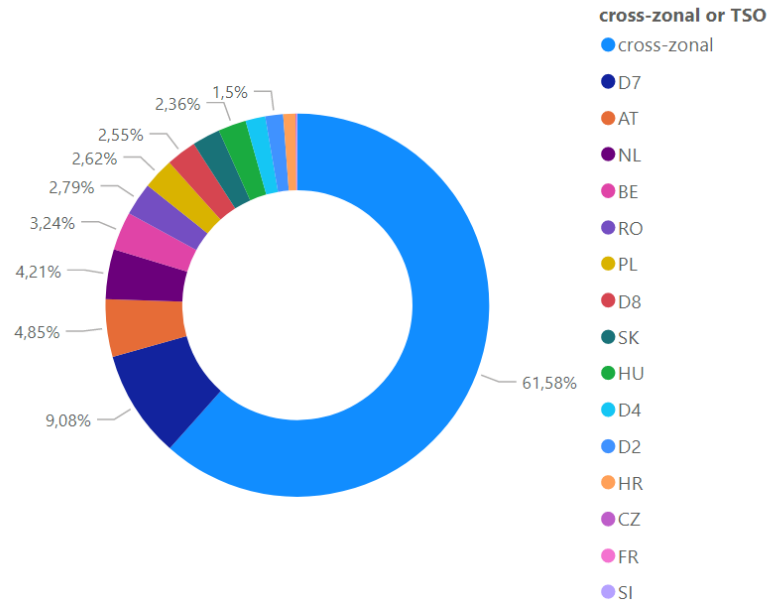
2. Day Ahead Capacity Calculation & Market Coupling

M. SCHRADE

EXT // run KPIs & results: Comparison of market coupling results between Core //run and current operations

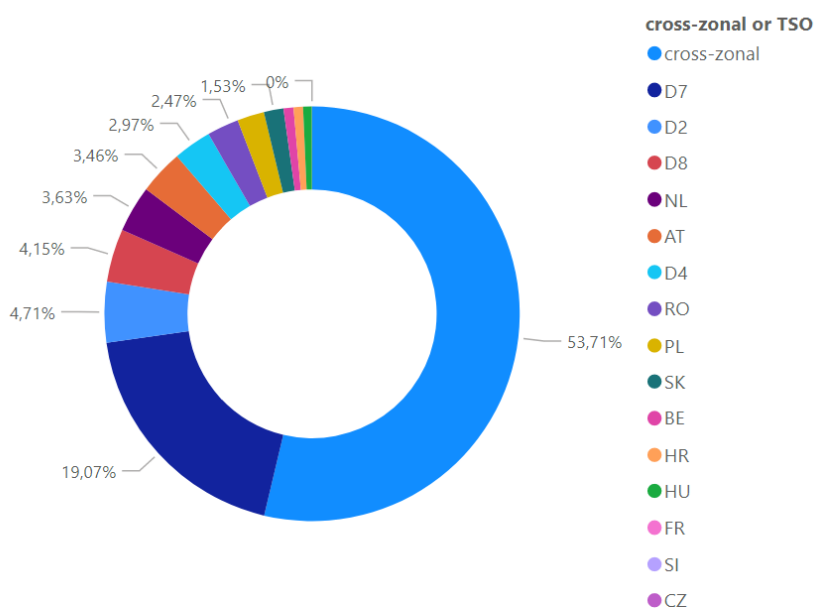
Cross-border elements make up the highest share of elements limiting the market coupling during the //run. *Caveat: dataset is without LTA domain and Allocation Constraints*

Share of limiting CNEs per tieline or TSO internal

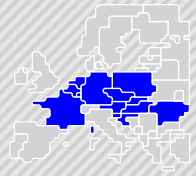


CNE	Count of Shadow Price	RAM%	max z2zPTDF
[AT-D2] St. Peter 2 - Pleinting 258 [OPP] [AT]	599	54,93 %	0,05
[CZ-PL] Wielopole - Nosovice [DIR] [PL]	536	50,69 %	0,04
[SK-PL] Lemesany - Krosno Iskrz 2 [OPP] [PL]	461	65,11 %	0,11
[D7-D7] Buerstadt - Lambsheim BUERST W [DIR]	263	33,37 %	0,13
[NL-NL] Diemen-Lelystad 380 Z [OPP]	263	25,64 %	0,20
[AT-HU] Wien Suedost - Gyoer 245 [DIR] [AT]	246	31,52 %	0,06
[FR-D7] Vigy - Ensdorf VIGY2 S [DIR] [D7]	241	33,50 %	0,10
[AT-CZ] Duernrohr 1 - Slavetice 437 [OPP] [AT]	213	53,71 %	0,15
[SK-SK] V.Dur - Levice 2 [DIR]	206	36,86 %	0,18
[D8-D8] Pasewalk - Vierraden 306 [DIR]	204	30,35 %	0,08

Share of limiting CNEs per TSO weighted by Shadow Price



CNE	Sum of Shadow Price	RAM%	max z2zPTDF
[AT-D2] St. Peter 2 - Pleinting 258 [OPP] [AT]	239.437,56	54,93 %	0,05
[AT-HU] Wien Suedost - Gyoer 245 [DIR] [AT]	209.863,59	31,52 %	0,06
[D7-D7] Buerstadt - Lambsheim BUERST W [DIR]	132.951,38	33,37 %	0,13
[SK-PL] Lemesany - Krosno Iskrz 2 [OPP] [PL]	111.700,62	65,11 %	0,11
[D2-D7] Grosskrotzenburg - Urberach UMAIN N2 [DIR] [D7]	97.530,47	23,82 %	0,07
[D4-D4] PST Buers BMT37 [OPP]	76.341,04	57,24 %	0,05
[D8-D8] Pasewalk - Vierraden 306 [DIR]	67.655,19	30,35 %	0,08
[NL-NL] Diemen-Lelystad 380 Z [OPP]	61.221,40	25,64 %	0,20
[D7-D7] Mengede - Y Huellen WESTFL W [DIR]	53.048,30	21,07 %	0,10
[CZ-PL] Wielopole - Nosovice [DIR] [PL]	52.123,92	50,69 %	0,04

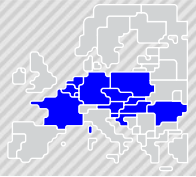


Comparison of active constraints between CWE and Core

- Period: Aug 2021 – Nov 2021
- DFP hours have been filtered out
- Observations
  - CWE CNECs limiting in Core are also limiting in CWE
  - Congestion pattern is more spread out as also CEE CNECs limit the market coupling
  - Core market coupling data needs to be complemented with LTAs (relevant for Core since switch to ELI Sep 15) to be fully comparable with CWE

2. Day Ahead Capacity Calculation & Market Coupling

M. SCHRADE



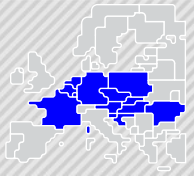
EXT // run KPIs & results: CORE top 20 CNEs - frequency

	AUG 2021	SEP 2021	OCT 2021	NOV 2021	DEC 2021
PL AC Export	34,6%	45,0%	22,7%	33%	40,2%
PL AC Import	10,3%	0,1%	6,8%	2.7%	5,6%

CNE	AUG 2021	SEP 2021	OCT 2021	NOV 2021	DEC 2021	Grand Total	CWE
[AT-D2] St. Peter 2 - Pleinting 258 [OPP] [AT]	0,0%	14,4%	29,3%	28,0%	6,3%	20,9%	14,8%
[CZ-PL] Wielopole - Nosovice [DIR] [PL]	0,4%	26,1%	24,0%	17,1%	5,9%	19,9%	
[SK-PL] Lemesany - Krosno Iskrz 2 [OPP] [PL]	0,0%	4,4%	17,1%	20,1%	16,0%	14,9%	
[NL-NL] Diemen-Lelystad 380 Z [OPP]	0,0%	4,0%	22,0%	5,8%	1,0%	8,9%	10.9%
[AT-CZ] Duernrohr 1 - Slavetice 437 [OPP] [AT]	0,0%	4,6%	23,1%	3,6%	1,4%	8,9%	
[D7-D7] Buerstadt - Lambsheim BUERST W [DIR]	0,0%	1,4%	0,0%	9,5%	15,1%	6,3%	17,2%
[AT-HU] Wien Suedost - Gyoer 245 [DIR] [AT]	1,8%	3,9%	3,0%	10,7%	4,3%	6,1%	
[CZ-SK] Nosovice - Varin [DIR] [SK]	0,0%	7,5%	13,4%	0,3%	0,9%	6,1%	
[D2-NL] Diele - Meeden SCHWARZ [DIR] [D2]	3,3%	11,1%	0,3%	4,2%	4,3%	5,9%	16,7%
[NL-D2] Meeden-Diele 380 Z [OPP] [NL]	0,0%	1,7%	5,3%	9,7%	5,7%	5,8%	5,6%
[RO-RO] TR Rosiori 400	0,9%	2,8%	8,0%	7,4%	3,0%	5,8%	
[SI-AT] 220 kV Podlog - Obersielach [OPP] [SI]	0,0%	0,0%	15,2%	3,6%	2,4%	5,7%	
[SK-SK] V.Dur - Levice 2 [DIR]	2,9%	0,0%	1,6%	9,8%	9,2%	5,6%	
[D2-D7] Grosskrotzenburg - Urberach UMAIN N2 [DIR] [D7]	0,0%	0,1%	3,0%	10,1%	9,0%	5,6%	Not in top 20
[AT-SI] Obersielach - Podlog 247 [DIR] [AT]	0,0%	10,8%	3,4%	2,8%	1,4%	5,1%	
[D4-D4] PST Buers BMT37 [OPP]	1,5%	7,5%	5,9%	2,7%	0,0%	4,7%	5,4%
[SK-HU] Levice - God [DIR] [SK]	0,0%	0,0%	12,4%	1,8%	1,4%	4,2%	
[FR-D7] Vigy - Ensdorf VIGY2 S [DIR] [D7]	9,4%	4,3%	2,3%	1,5%	0,5%	4,0%	10,8%
[BE-FR] Achene - Lonny 380.19 [DIR] [BE]	0,0%	2,1%	3,7%	5,8%	1,9%	3,6%	5,3%
[CZ-D2] Hradec - Etzenricht 441 [DIR] [D2]	0,0%	0,0%	1,0%	8,8%	4,0%	3,5%	

2. Day Ahead Capacity Calculation & Market Coupling

M. SCHRADE



EXT // run KPIs & results: CWE top 20 CNEs and LTAs - frequency

CNE	AUG 2021	SEP 2021	OCT 2021	NOV 2021	DEC 2021	Grand Total
[D7-D7] Buerstadt - Lambsheim Buerstadt W [DIR]	0,0%	3,5%	0,8%	24,6%	39,1%	17,2%
[D2-NL] Diele - Meeden 380 Black [DIR] [D2]	15,9%	12,4%	12,4%	11,0%	14,9%	16,7%
[D2-AT] Pleinting - St. Peter 258 [DIR] [AT]	10,2%	18,8%	16,3%	14,0%	0,1%	14,8%
[NL-NL] Diemen - Lelystad 380 Zwart [OPP]	0,9%	7,9%	24,2%	8,3%	2,4%	10,9%
[D7-FR] Ensdorf - Vigy 2S [OPP] [D7]	31,6%	6,1%	2,5%	2,3%	0,4%	10,8%
[D2-D2] Altheim - Sittling 219 [OPP]	0,0%	0,1%	8,3%	18,1%	14,5%	10,4%
[BE-FR] Avelgem - Avelin 380.80 [DIR] [BE]	2,0%	1,0%	1,4%	5,1%	22,4%	8,1%
[BE-BE] PST_ZANDV_1 [N - S]	3,4%	7,4%	6,7%	0,0%	9,3%	6,7%
[BE-FR] Avelgem - Avelin 380.80 [OPP] [BE]	9,4%	11,9%	1,5%	0,0%	0,0%	5,7%
[D2-NL] Diele - Meeden 380 Black [DIR] [NL]	0,9%	1,9%	3,8%	8,6%	7,1%	5,6%
[D4-D4] Buers Transformer 37 [DIR]	1,9%	1,7%	12,5%	5,5%	0,0%	5,4%
[BE-FR] Achene - Lonny 380.19 [DIR] [BE]	2,7%	2,8%	2,1%	9,4%	4,2%	5,3%
[BE-BE] Achene - Gramme 380.10 [OPP]	0,4%	1,8%	5,6%	9,1%	1,9%	4,7%
[BE-BE] PST_ZANDV_2 [N - S]	1,1%	4,3%	3,2%	7,7%	2,0%	4,6%
[NL-NL] Krimpen a/d IJssel - Geertruidenberg 380 Zwart [OPP]	9,8%	1,0%	4,3%	0,5%	1,3%	4,3%
[D7-D7] Y - Oberzier (- Paffendorf - Sechtem) Sechtem N [DIR]	0,0%	0,0%	8,1%	7,3%	1,2%	4,1%
[D7-D7] Y - Oberzier (- Paffendorf - Sechtem) Sechtem S [DIR]	0,0%	0,0%	7,1%	1,5%	7,5%	4,0%
[D7-D7] Paffendorf - Rommerskirchen Paffendorf N [OPP]	0,0%	2,2%	6,9%	5,0%	0,0%	3,5%
[BE-BE] Gramme - Lixhe 380.11 [DIR]	11,7%	0,4%	0,0%	0,3%	0,0%	3,1%
[D7-D4] Hoheneck - Pulverdingen weiss [DIR] [D4]	0,0%	0,1%	11,9%	0,0%	0,0%	3,0%

In Core top 20 list

Not in Core top 20 list

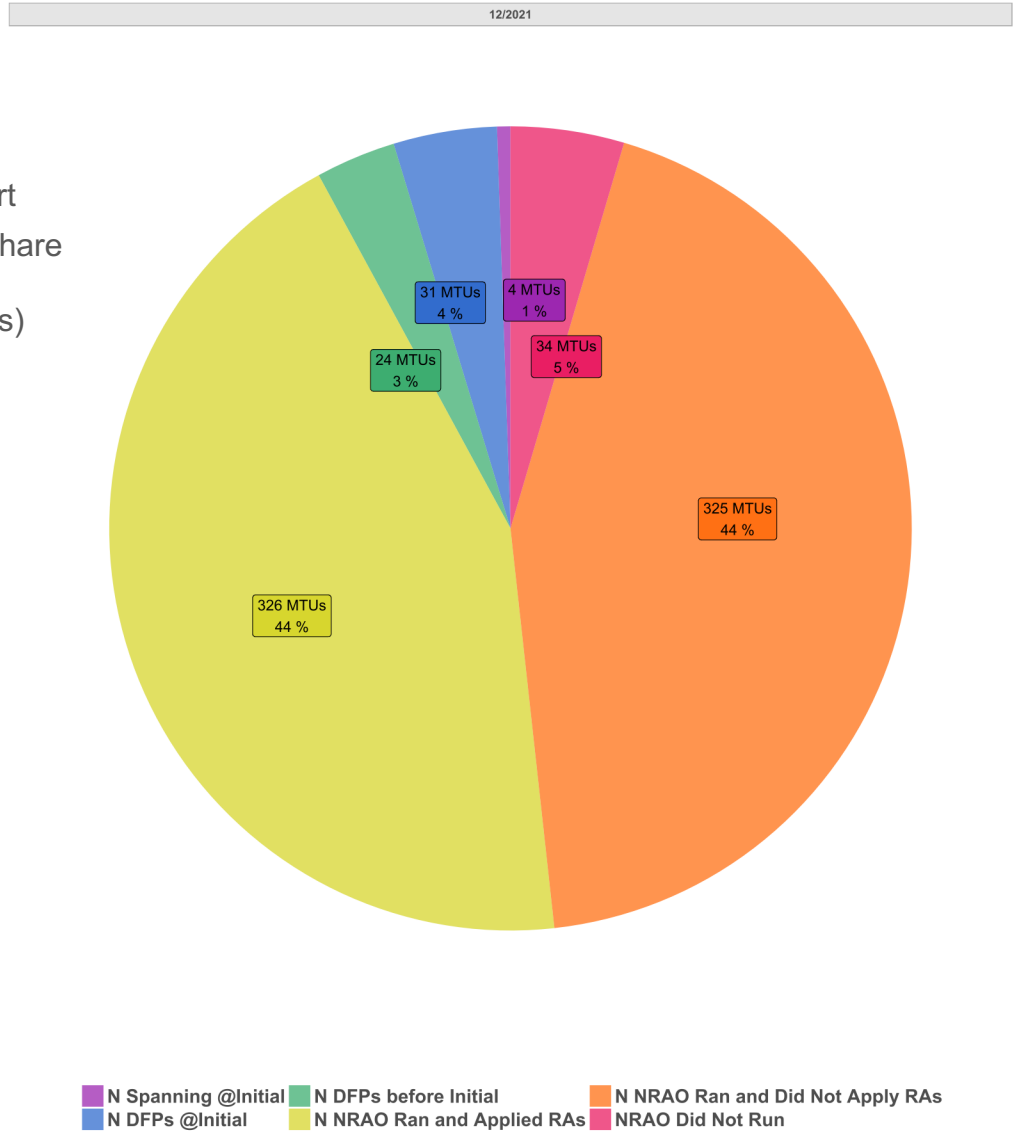
Row Labels	AUG 2021	SEP 2021	OCT 2021	NOV 2021	DEC 2021	Grand Total
LTA DE-ALDE	46,8%	0,0%	34,6%	10,2%	6,5%	24,6%
LTA DE-FR	12,1%	18,1%	38,5%	13,4%	8,7%	22,6%
LTA DE-AT	7,4%	0,0%	46,1%	16,5%	9,7%	19,9%
LTA DE-NL	22,7%	0,0%	33,9%	7,7%	7,4%	17,9%
LTA BE-ALBE	45,6%	0,0%	7,2%	8,3%	4,4%	16,6%
LTA BE-NL	29,2%	0,0%	18,1%	3,2%	5,5%	14,1%
LTA BE-FR	3,2%	0,0%	24,3%	14,2%	9,5%	12,8%
LTA FR-DE	17,9%	13,1%	5,0%	5,2%	2,6%	11,0%
LTA FR-BE	25,1%	0,0%	11,1%	2,7%	1,5%	10,2%
LTA NL-BE	0,9%	0,0%	16,0%	13,2%	4,4%	8,6%
LTA NL-DE	6,9%	0,0%	4,4%	9,7%	2,7%	6,0%
LTA AT-DE	14,1%	0,0%	0,7%	0,9%	0,7%	4,2%

2. Day Ahead Capacity Calculation & Market Coupling

EXT // run KPIs & results: NRAO – Applied Remedial Actions

A. VESELINOVIC

- On the analysis:
  - Data from December 2021
  - The total number of MTUs (744 hours) was distributed as shown in the pie chart
  - In the following plots, the relative time share relates to the hours labeled '*NRAO Ran and Applied RAs*' (326hours)



2. Day Ahead Capacity Calculation & Market Coupling

EXT // run KPIs & results: NRAO – Applied Remedial Actions

A. VESELINOVIC

NRAO: Relative Time Share* with at least One Non-Costly RA Applied During Month of December, by TSO

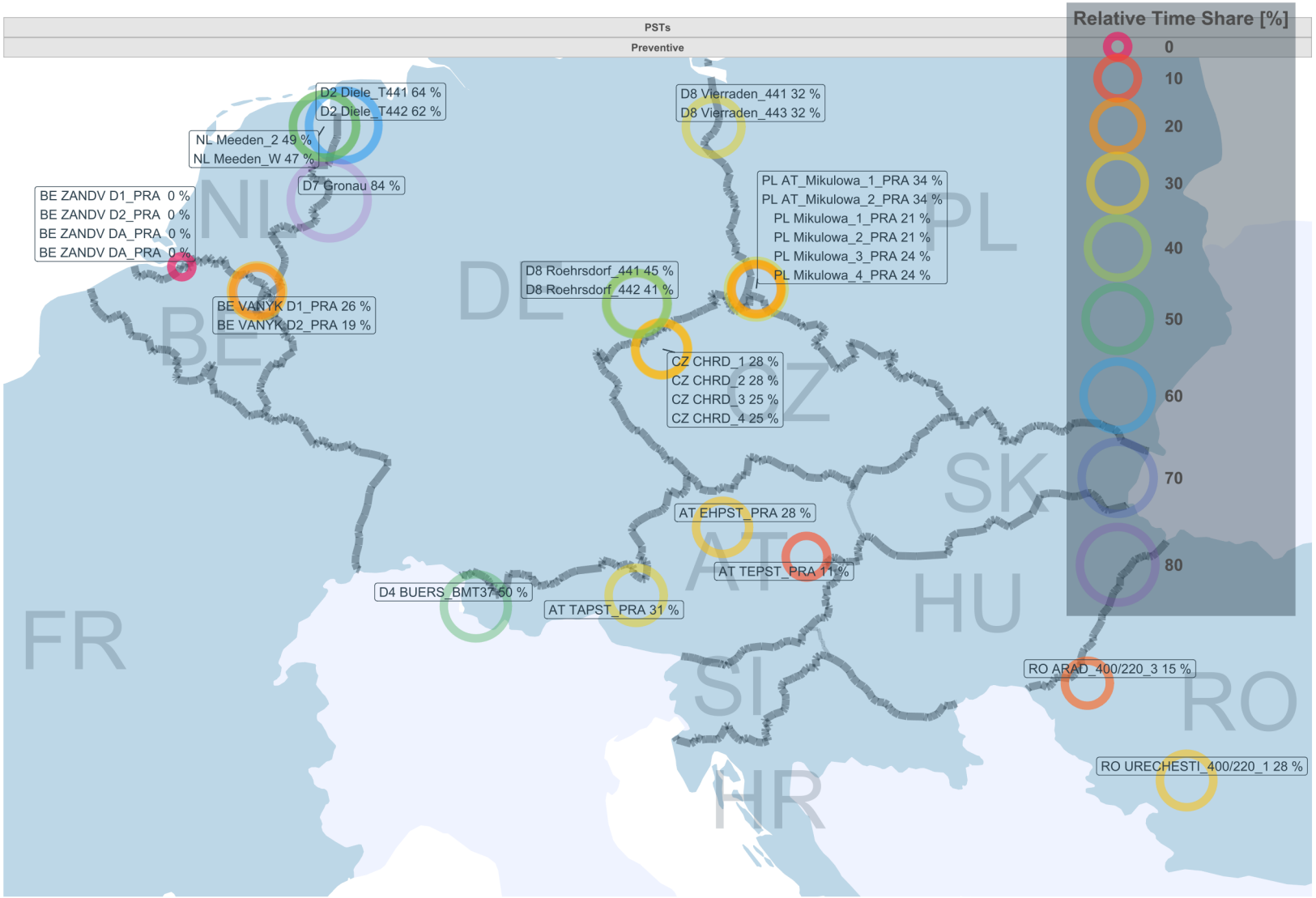
* Number of occurance of RAs applied relative to time stamps with NRAO results (326 hours)

2. Day Ahead Capacity Calculation & Market Coupling

EXT // run KPIs & results: NRAO – Applied Remedial Actions

A. VESELINOVIC

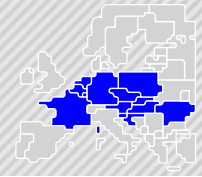
NRAO: Utilized Remedial Actions for Period December



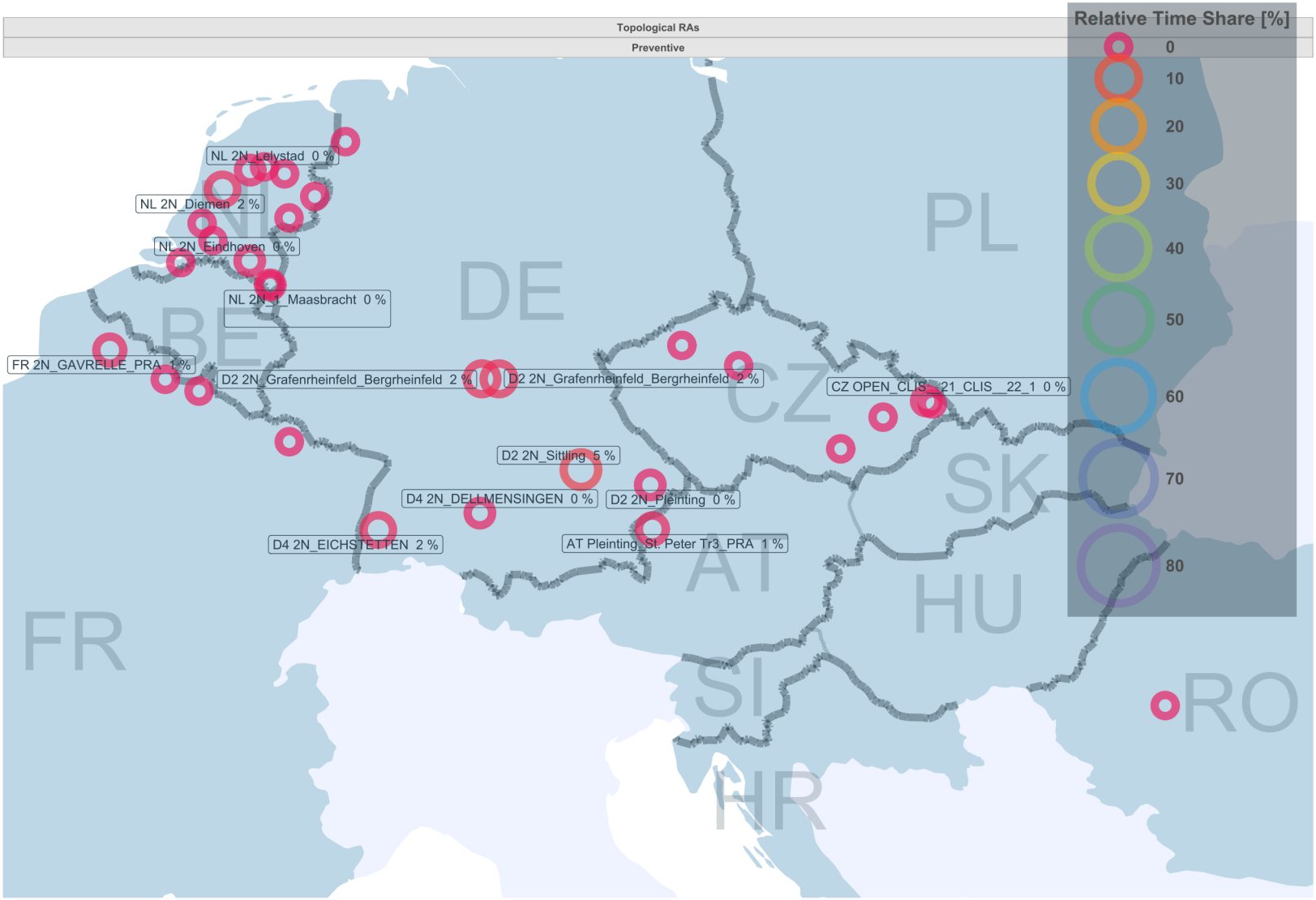
2. Day Ahead Capacity Calculation & Market Coupling

EXT // run KPIs & results: NRAO – Applied Remedial Actions

A. VESELINOVIC



NRAO: Utilized Remedial Actions for Period December

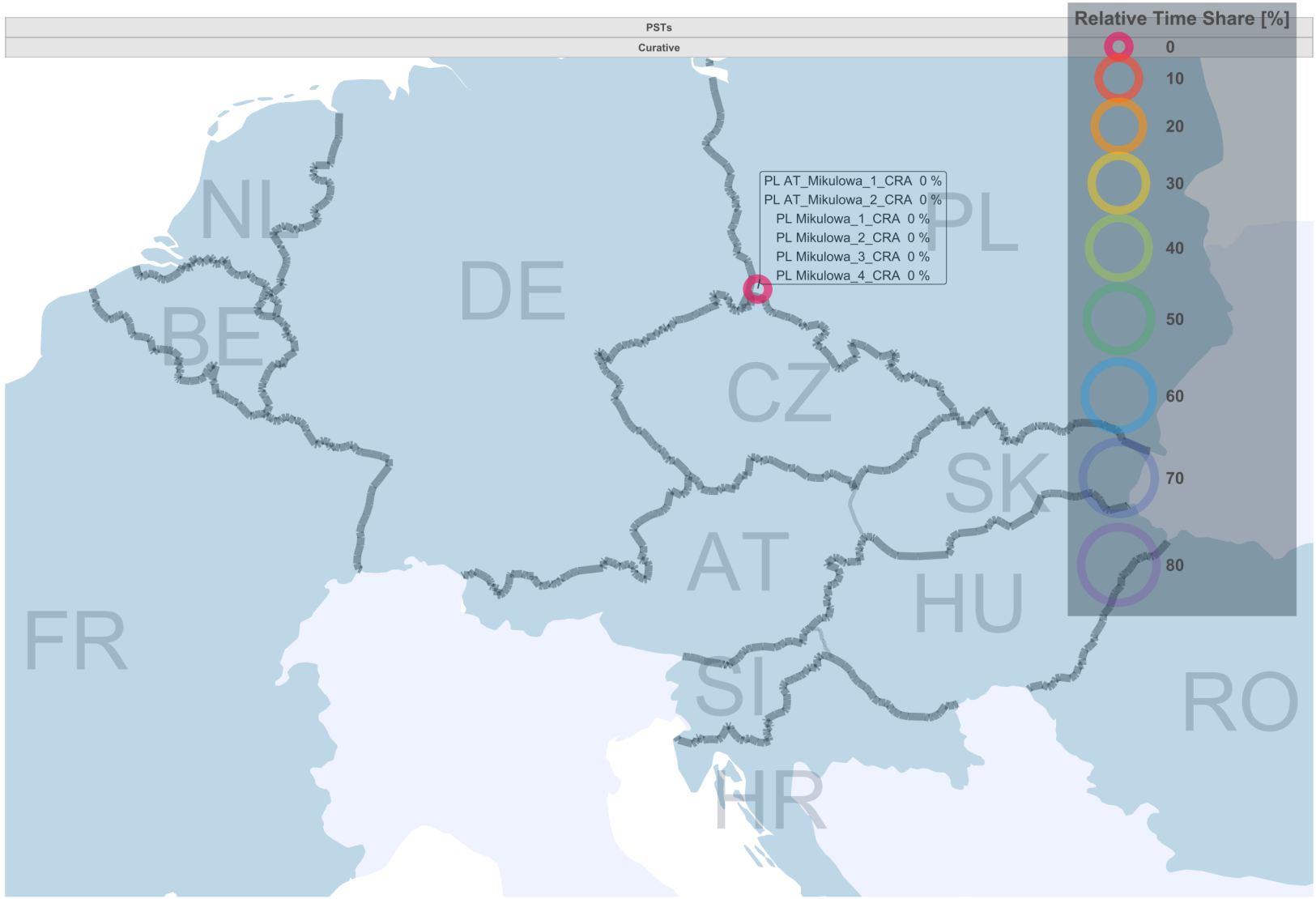


2. Day Ahead Capacity Calculation & Market Coupling

EXT // run KPIs & results: NRAO – Applied Remedial Actions

A. VESELINOVIC

NRAO: Utilized Remedial Actions for Period December

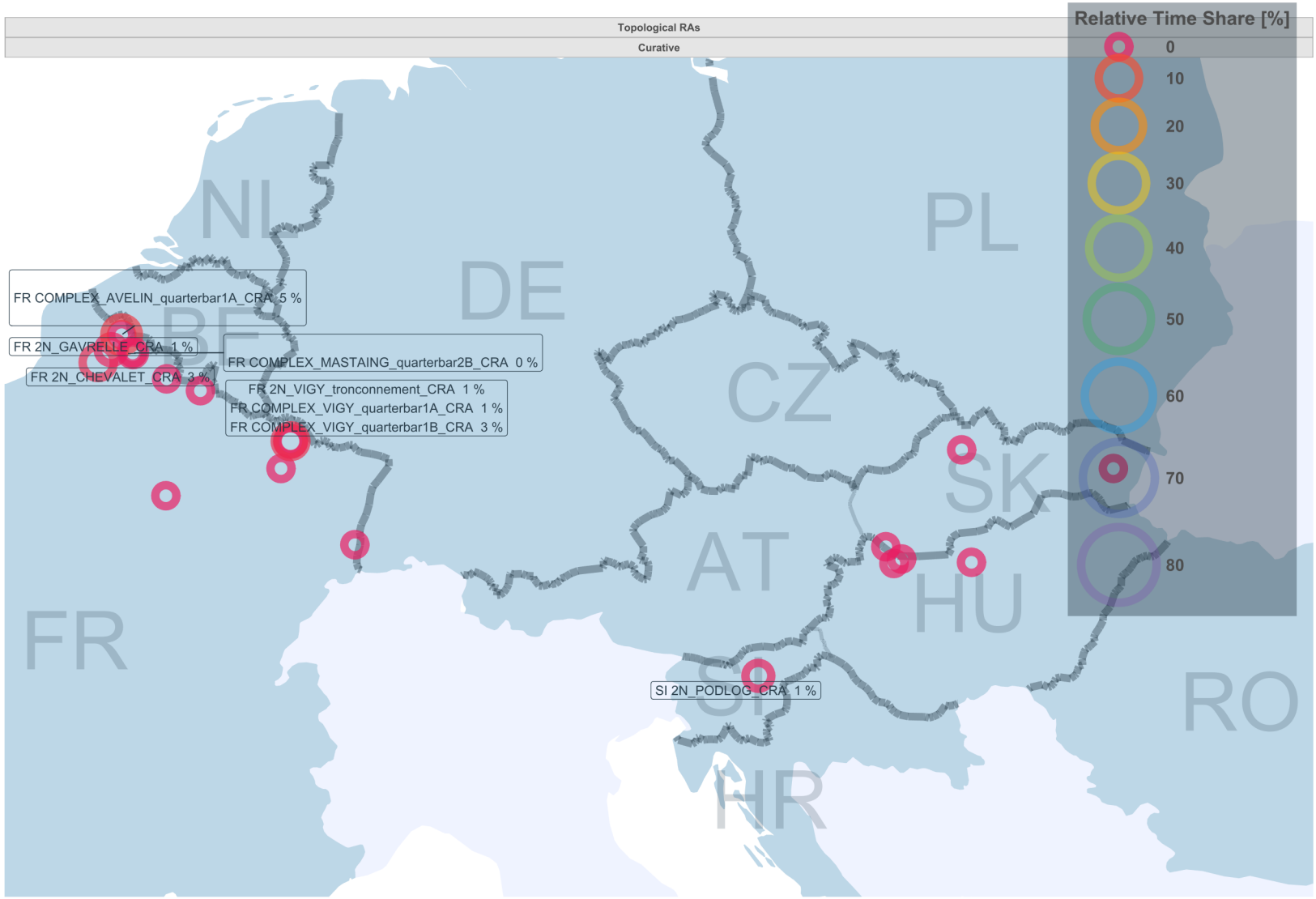


2. Day Ahead Capacity Calculation & Market Coupling

EXT // run KPIs & results: NRAO – Applied Remedial Actions

A. VESELINOVIC

NRAO: Utilized Remedial Actions for Period December



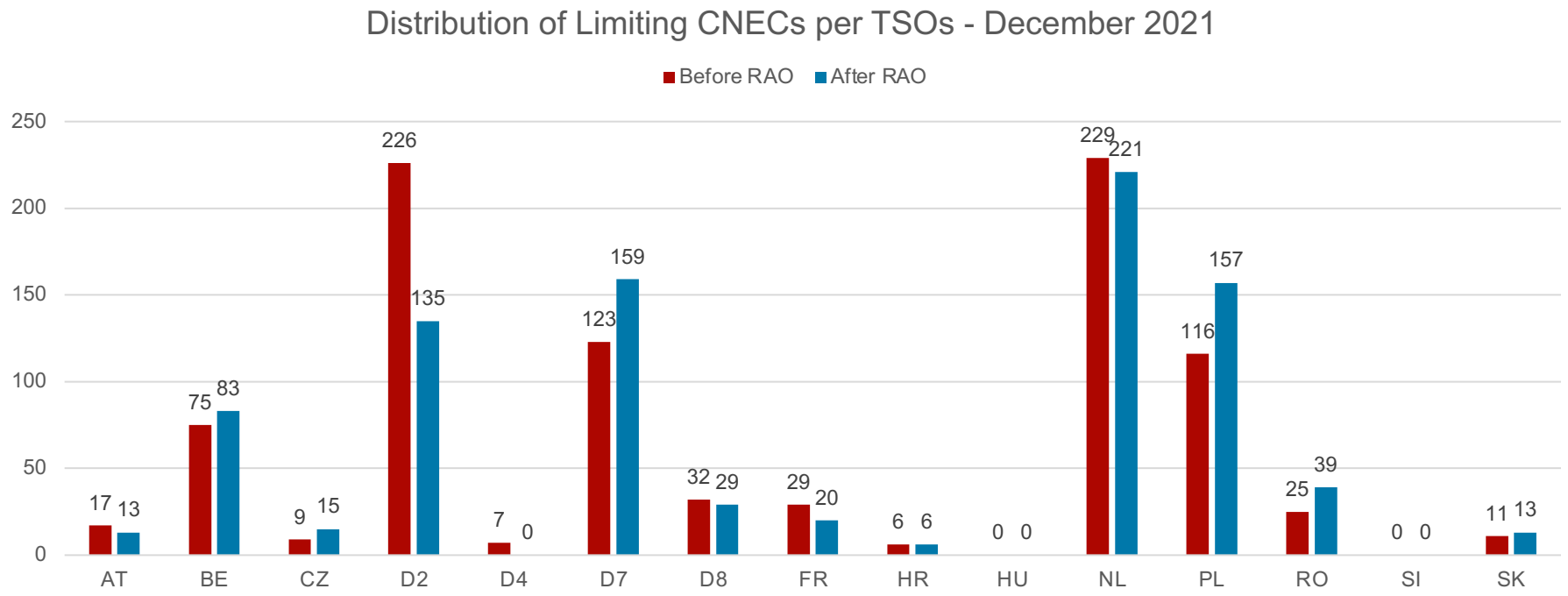
2. Day Ahead Capacity Calculation & Market Coupling

A. VESELINOVIC

EXT // run KPIs & results: Most limiting CNEC per TSO – December 2021

The graph below shows the distribution of CNECs which are the most limiting from NRAO perspective, these are the CNECs with lowest relative RAM per MTUs.

Disclaimer: due to CNEC Selection step being performed after generation of F300 file (one of the input files used in NRAO KPI generation process), status of NEC from F300 is not always the same as after CNEC selection. This impacts data from December NRAO KPIs (may also have impact on NRAO KPIs of previous months). To address this, NRAO KPI generation process will be adjusted to consider input from F301 (merged filtered CB) and will be in place from January data onwards.



As expected, there is redistributing of the most limiting CNECs. This is because the application of Remedial Actions does not eliminate flows but re-routes, reducing the flows on some limiting CNECs and increasing the load on others, which at the end impacts also the RAM values.

In case of D4, after RAO there are no most limiting CNECs.

In case of HU and SI, there were no most limiting elements from NRAO perspective.

2. Day Ahead Capacity Calculation & Market Coupling

A. VESELINOVIC

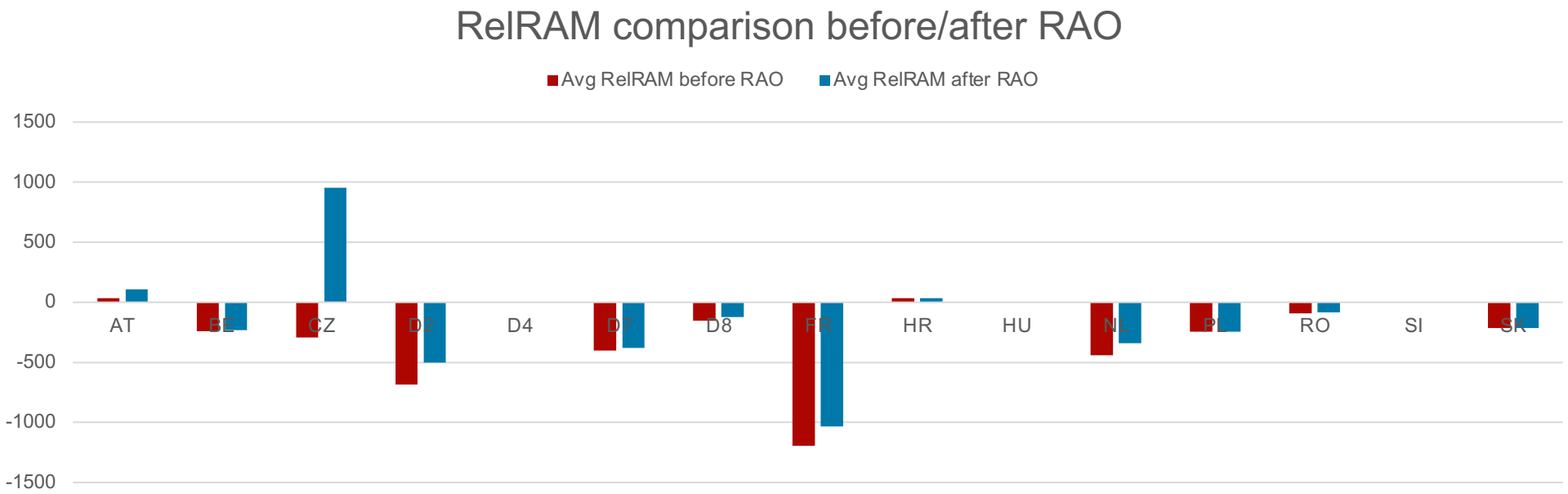
EXT // run KPIs & results: Average variation of relative RAM before and after RAO – December 2021

The graph shows average values of relative RAM before and after NRAO, per TSO on the most limiting CNECs from NRAO perspective. Selected CNECs before RAO are the same as after RAO, and average computed for MTUs when NRAO was used further in the process.

- Most limiting element from NRAO perspective is the one which has the lowest relRAM per MTU.
- To determent value of relative RAM, the following formula was used:

$$RAM_{rel} = \frac{RAM_{nrao}}{\sum_{(A,B) \in \text{neighbouring Core bidding zones pairs}} |PTDF_{A \to B,nrao}|} \; if \; RAM_{nrao} \geq 0$$

$$RAM_{rel} = RAM_{nrao} \; if \; RAM_{nrao} < 0$$



- The increment of relRAM values after RAO shows that the optimization performed did increase the capacity on some areas.
- In case of CZ, it is obvious that RAM before RAO was negative and therefore relRAM= negativeRAM. After application of RAs, the flow on the element decreased leading to an increased RAM (equal or above 0), and this results in relRAM no longer being absolute (RAM) but proper calculated relative value.
- In case of HU and SI, there were no most limiting elements from NRAO perspective.

2. Day Ahead Capacity Calculation & Market Coupling

SPAICC in Core

Background

- SPAICC = **S**tandard **P**rocess for **A**ssessing **I**mpact on **C**apacity **C**alculation
- Introduced in CWE to assess impact of grid evolutions (new cross-border line, long duration outage,…) or to assess impact of significant methodological changes, by performing the capacity calculation upon a series of reference days
- No legal obligation

Core TSOs are open to consider the application of SPAICC in Core. However the SPAICC approach would have to be re-designed in order to be meaningful

- When Core TSOs perform a SPAICC, it should be representative for the CC process Core TSOs are running.
- However, since the initial design of SPAICCs in CWE major evolutions in the process took place
  - Addition of virtual capacity
  - Addition of NRAO
  - Process steps have been decentralised (local validation) and hence cannot be run without joint effort
- Furthermore, an individual approach ignores the interdependencies between grid evolutions

Without firm commitment at this stage, Core TSOs are thinking in the direction of a limited set of SPAICCs per year. A SPAICC would group upcoming grid evolutions throughout Core and assess its impact on capacities by running the full capacity calculation process upon a set of representative days

- For example: 2 SPAICCs per year, where each SPAICC assesses the major grid evolutions of the coming 6 months
- In addition, the concept of SPAICC can help to evaluate methodological aspects, as for example the assessment of the efficiency of the NRAO as part of the annual report.

Core TSOs welcome views from MPs and NRAs on such approach, which would then have to be further worked out as part of the post go-live activities.

3. Intraday CC

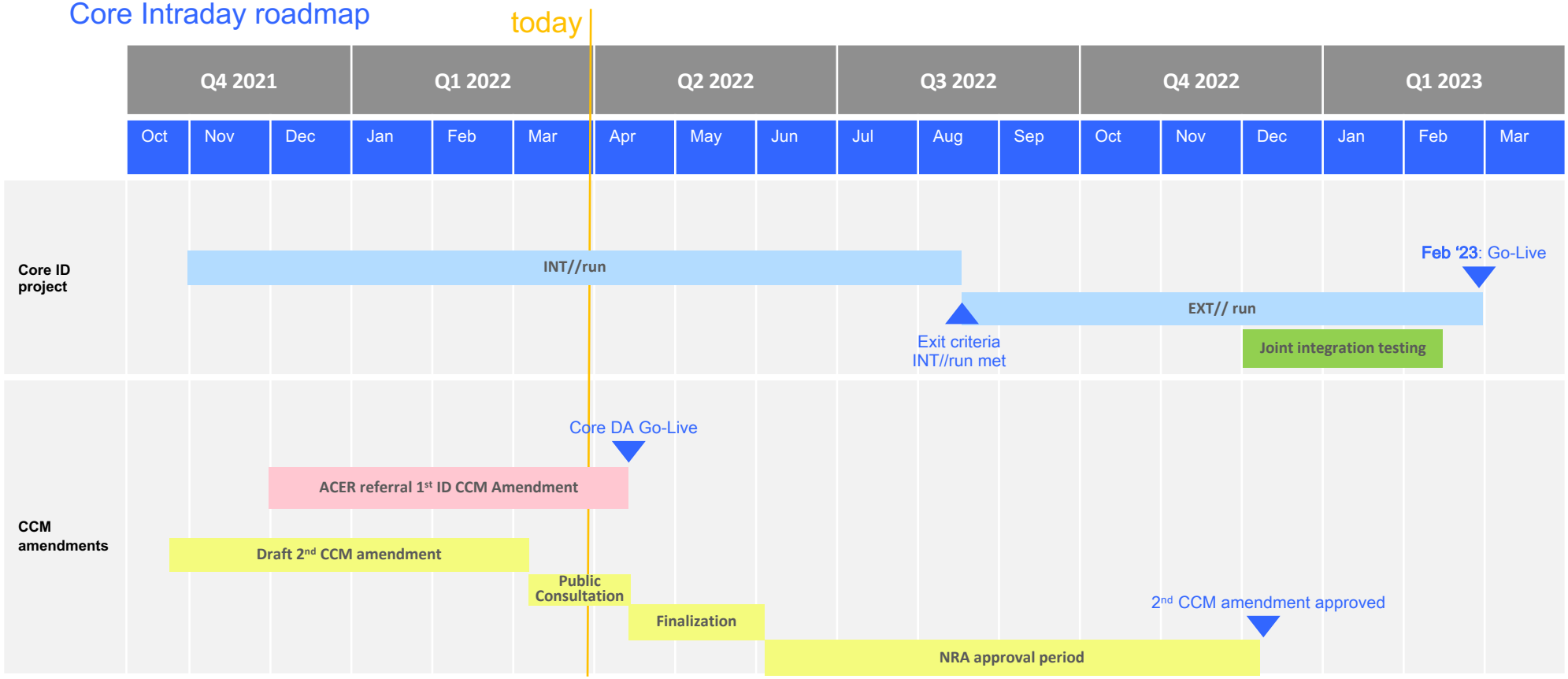
Project status update

W. SNOEREN

Core TSOs are implementing the Intraday Capacity Calculation methodology with a Go-Live in Feb 2023

- Core TSOs reviewed and updated the Intraday planning considering the new DA Go-Live date
- Core TSOs submitted the 2nd ID CCM amendment for the ROSC aligned business process for public consultation
- In August 2022, the Intraday project will switch to the external parallel run, publishing the results on JAO

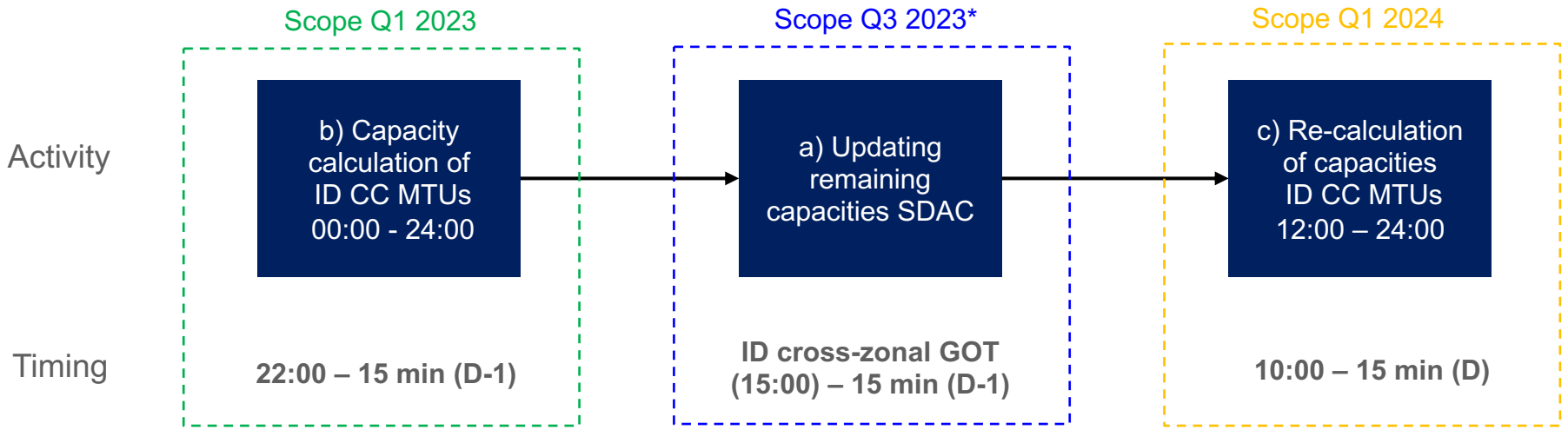
Core Intraday roadmap



3. Intraday CC

Reminder of Core Intraday CC methodology implementations

According to Article 4(2) of the Core Intraday CCM, Core TSOs shall implement the capacity calculation processes as follows:



* Between DA CCM implementation (Q1 2022) and 6 months after ID CCM at 22:00, TSO may set capacities to zero

3. Intraday CC

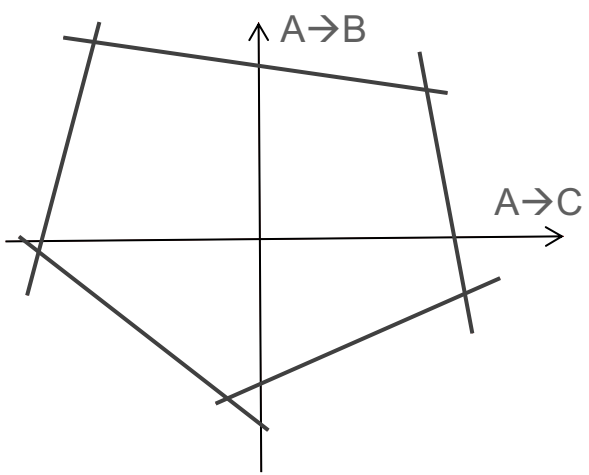
Intraday capacity calculation with IDA & ID continuous trade

Core MPs asked how the allocation of FB capacities will work in a continuous market, how will the full domain be delivered & recalculated with each new trade

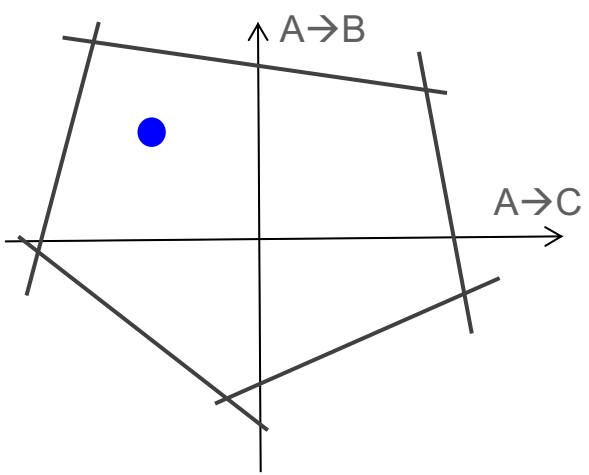
This example explains how capacities are calculated for IDA2 (22:00 D-1), but it is the same for IDA3 (10:00 D) just shifted by 12 hours

- The latest AACs are the already allocated capacities at the time the continuous ID trading is stopped.
- 15 minutes after the ID ATCs have been sent to XBID and published, the IDA will take place. Afterwards ID continuous trading resumes.
  - Until IDA is implemented, ID continuous trading is expected to resume immediately after the new ID ATCs are processed.

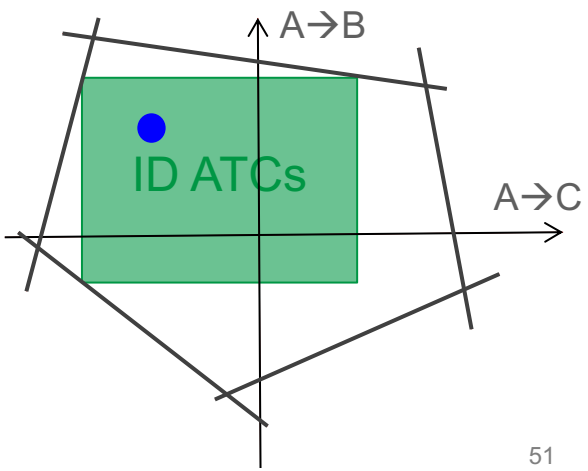
Flowbased Intraday Capacity Calculation determines the final FB Domain 20:00 – 21:40



ID continuous trading is stopped and XBID sends the latest AAC to the TSOs @21:40

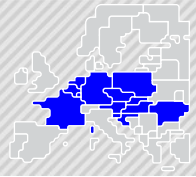


TSOs extract ID ATCs using AACs as starting point for the extraction and send it to XBID 21:40 – 21:45



4. Long Term Capacity Calculations

J. FERNANDEZ



EXT // run organization and KPIs

Reminder

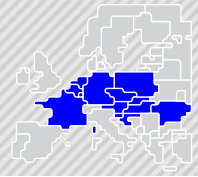
- Core TSOs informed market participants on 27/01 on a proposal to cooperate on the EXT // run during the ACER workshop on LT
- Core TSOs remind market participants on the LTCC roadmap. → *See last slide on Core LTCC*

Today Core TSOs request market participants to provide input for the EXT // run organization and KPIs:

- Input is requested on EXT // run organization:
  - How can market participants provide the data?
  - When should the data be provided?
  - Which kind of data should be provided (Union of domain, or market simulations)?
- Market participants are also requested to indicate whether any other KPI than the KPIs already defined in DA would be necessary for the LT EXT // run.

→ *See next slides*

Market participants to provide input on the KPIs and EXT // run organization in the next CCG meeting



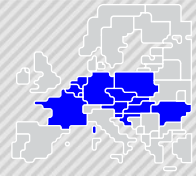
Existing DA KPIs:

KPI Category	KPI	Description
CNEC Selection Impact	Maximum AMR per CNE per TS (MW)	Maximum across all Contingencies per CNE
	Maximum AMR per CNE per TS (% of Fmax)	Maximum across all Contingencies per CNE
	Average maximum AMR per CNE per BD (MW)	For each CNE, average of KPI_1.1a across all 24 TS per BD
	Average maximum AMR per CNE per BD (% of Fmax)	For each CNE, average of KPI_1.1b across all 24 TS per BD
	Maximum AMR per TSO per TS	Maximum AMR across all CNECs of the respective TSOs
	Average maximum AMR per TSO per BD	For each TSO, average of KPI_1.3 across all 24 TS per BD
	Maximum AMR+LTA margin per CNE per TS (MW)	Maximum across all Contingencies per CNE
	Maximum AMR+LTA margin per CNE per TS (% of Fmax)	Maximum across all Contingencies per CNE
	Average maximum AMR+LTA margin per CNE per BD (MW)	For each CNE, average of KPI_1.5a across all 24 TS per BD
	Average maximum AMR+LTA margin per CNE per BD (% of Fmax)	For each CNE, average of KPI_1.5b across all 24 TS per BD
	Maximum AMR+LTA margin per TSO per TS	Maximum AMR across all CNECs of the respective TSOs
	Average maximum AMR+LTA margin per TSO per BD	For each TSO, average of KPI_1.7 across all 24 TS per BD
	Share of TSs with intervention per TSO	Share across all TS for which final domains are provided
	Share of BDs with intervention per TSO	Share across all BDs for which final domains are provided
	For each CNE affected by TSO intervention: share of TSs with TSO intervention	Share across all TS for which final domains are provided
	For each CNE affected by TSO intervention: Total IVA applied per TS (MW)	Taking the highest sum of IVA amongst all related contingencies
	For each CNE affected by TSO intervention: Total IVA applied per TS (%)	Taking the highest sum of IVA amongst all related contingencies
	For each CNE affected by TSO intervention: share of BDs with TSO intervention	Share across all BDs for which final domains are provided
	For each CNE affected by TSO intervention: Total IVA applied per BD (MW)	Taking the highest sum of IVA amongst all related contingencies
	For each CNE affected by TSO intervention: Total IVA applied per BD (%)	Taking the highest sum of IVA amongst all related contingencies

4. Long Term Capacity Calculations

EXT // run organization and KPIs

J. FERNANDEZ

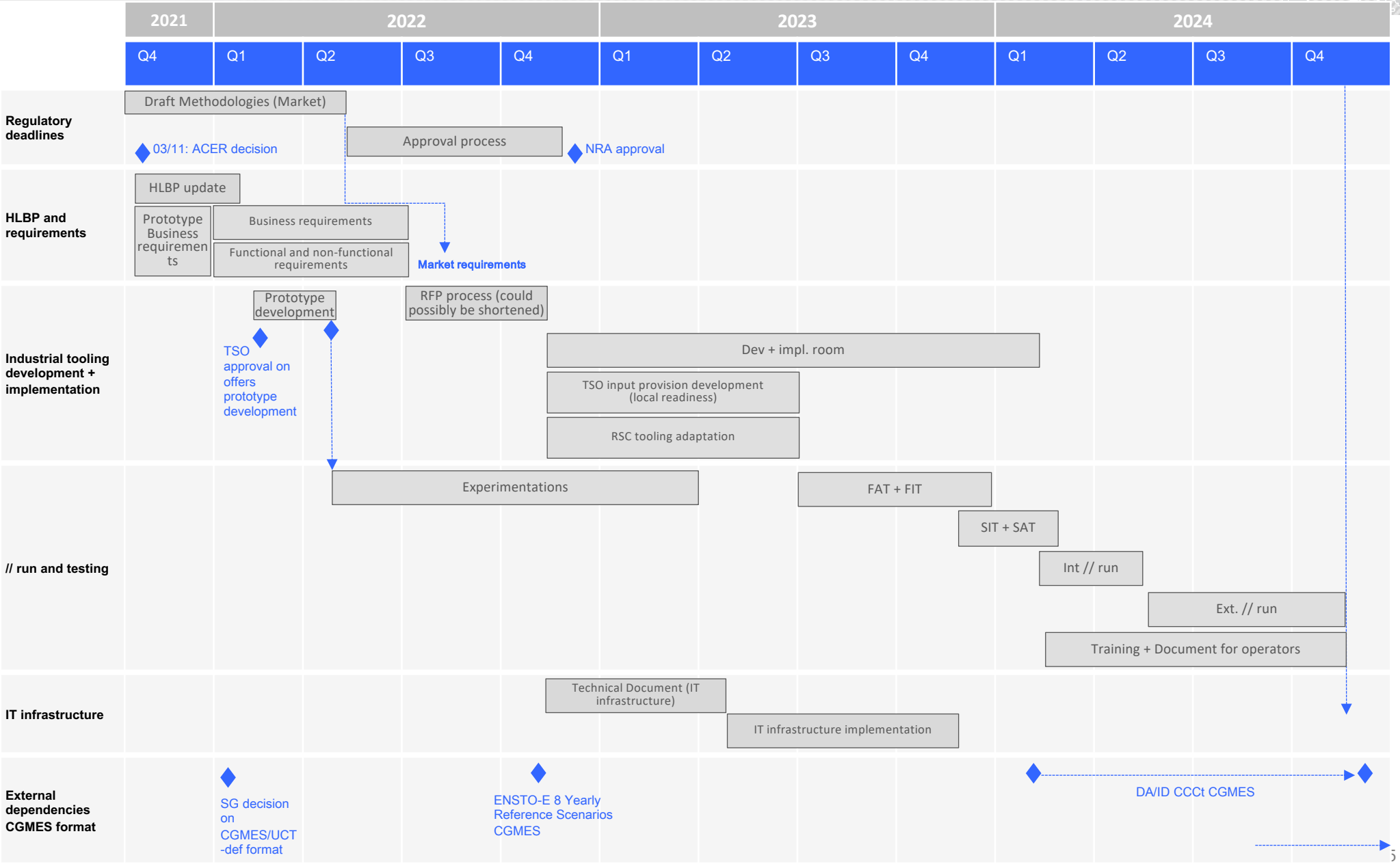


KPI Category	KPI	Description
Market Impact Assessment	Limiting CNEs (Top 20)	List of CNEs which are most often limiting the amount of power that can be exchanged. For each CNE there are maximum shadow price and number of hours, when the CNE is the limiting one. Furthermore, for each CNE, there is its maximal z2z PTDF, min, max and average RAM expressed as percentage of Fmax. Allocation constraints are part of CNEs in the pivot table.
	Price Spread	Graph that shows min, max and average clearing prices in the simulated BD for all Core hubs, a graph that shows the aggregated price spread information for whole Core region and additional graphs that show hub borders for a clearer view (divided in hubs that have borders in CWE, CEE or CWE/CEE region). The graphs also show the relative part of the converged price at each border/region level.
	Most often presolved CNEs (Top 20)	List of CNEs which are most often presolved (they are part of the FB Domain used for the SDAC). For each CNE there are number of hour in which the element was presolved. Furthermore, for each CNE, there is its maximal z2z PTDF, min, max and average RAM expressed as percentage of Fmax.
	Shadow prices	Table that shows one (or more) CBall CNECs with highest non-zero shadow prices in each hour for the simulated BD. Link is also made to minRAM compliance showing RAM in % of Fmax. IVA, CVA and status of the element (CNEC vs VNEC) would require further developments. Data should be gathered from the parsed domain file.
	Social Welfare	The KPI is provided as two sub KPIs : 1. Aggregated Core and SDAC area SW 2. Distribution of producer and consumer surplus per country (for Core region) The first one presents the SW for FBI, FBP, copper plate and SDAC, with a breakdown between PS, CS and CI for Core. The second one presents per country the producer and consumer surplus
Power System Impact Analysis	Min & max Net Position per BZ hub	Theoretical minimum and maximum net position per BZ hub and per timestamp
	Max overloads at MCP per TSO, per BD - two KPIs, one showing only the maximum overload and the other the distribution	Overloads per TSO, meaning RAM of CBCOs w/o minRAM and LTA margin when negative at market clearing point.
	RAM before and after RAO per TSO	Monthly average of the variation of the relative RAM for each TSO (after RAO compared to before RAO).
	Average sensitivity of RAs per TSO	Monthly average sensitivity of RAs provided to the NRAO per TSO.
Non-Core Exchange	Delta of Non-Core exchanges per border	Monitors the delta flow (ΔF) of non-Core exchanges between the D-2 and D-1 timeframe by aggregation of all non-Core tie-lines per non-Core border

4. Long Term Capacity Calculations

J. FERNANDEZ

LT CC mplementation timeline



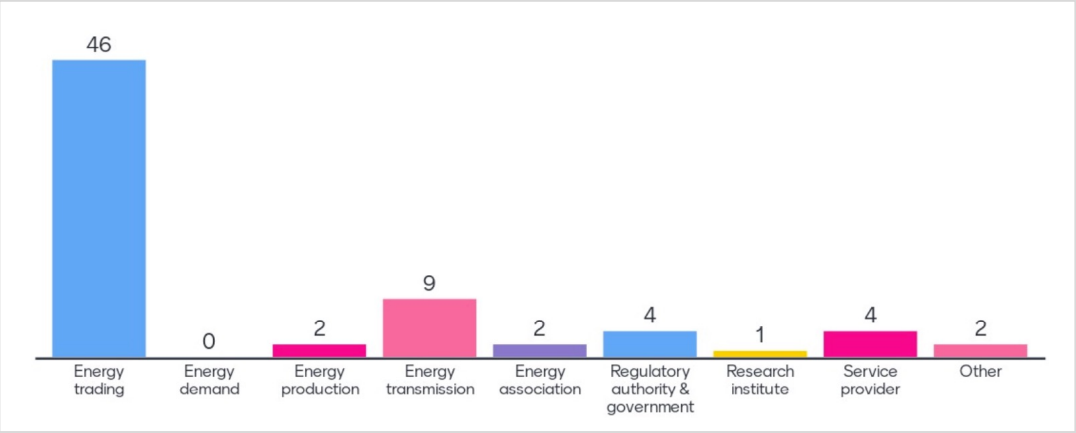
5. AOB & closure

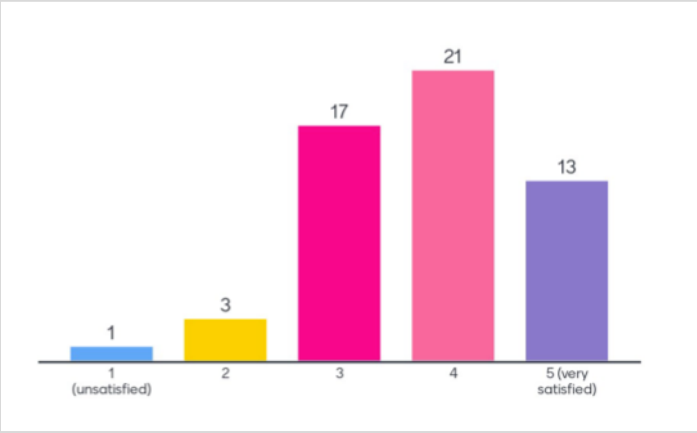
R.OTTER

Feedback on Market Parties webinar 23 March

Background

- The webinar was about the changes in the operational processes
- More than 450 registered participants from more than 25 countries (approx. 300 viewers connected during the whole webinar)
- Most participants were active in energy trading
- The overall satisfaction rate is positive





Is there a need for a second webinar on these topics? (if yes: what format?)

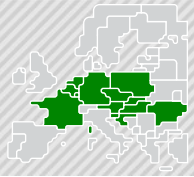
- Missing topics mentioned mostly about capacity calculation and publication of data

Follow up: Core Project Parties will share the webinar materials with MPs via the following channels:

- **Dedicated section Core CCR on ENTSO-E website:** https://www.entsoe.eu/network_codes/ccr-regions/#core
  - You will find here in the coming weeks the webinar presentations (PDF), a link to the webinar recording and a file with Q&As
- **Via email:** all people who registered will receive the webinar presentations (PDF) by 01/04
  - Once available, the link to the recording of the webinar will be shared via email as well

5. AOB & closure

R.OTTER/
H.ROBAYE



Next Core Consultative Group:

- What's the preference for a next Core CG meeting?

Existing Core communication channels

Core Consultative Group mailing list

- Register by sending an email to CoreCG@magnus.nl

Core section on ENTSO-E website

- Upload of methodologies and reports on public consultations, current status of the Core CCR program, CG minutes
- Link: https://www.entsoe.eu/network_codes/ccr-regions/#core

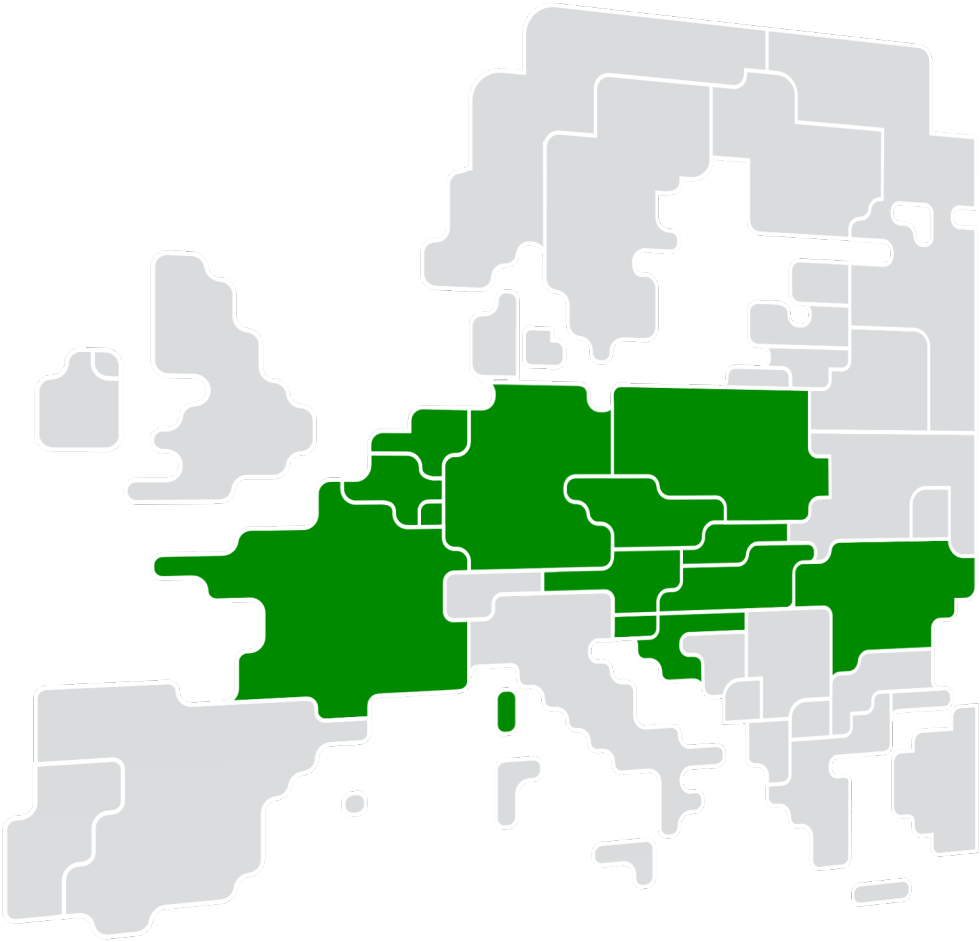
ENTSO-E newsletter

- Regularly updates on the different CCRs (e.g., submitted methodologies, launch of public consultations)
- Subscription via https://www.entsoe.eu/contact/

Q&A forum on JAO website

- Provides space to Market Participants to ask questions about the External Parallel Run and other relevant topics:
- Link: http://coreforum.my-ems.net/

APPENDIX



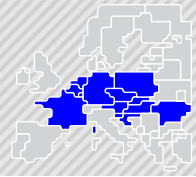
Appendix

Glossary

ACER	Agency for the Cooperation of Energy Regulators
AHC	Advanced Hybrid Coupling
BZ	Bidding Zone
CACM	Capacity Allocation and Congestion Management
CC	Capacity Calculation
CCR	Capacity Calculation Region
CGM	Common Grid Model
CGMES	Common Grid Model Exchange Standard
CNEC	Critical Network Element with a Contingency
CS	Cost Sharing
CSA	Coordinated Security Analysis
CSAM	Coordinated Security Analysis Methodology
CROSA	Coordinated Regional Operational Security Assessment
DA	Day-Ahead
ENTSO-E	European Network of Transmission System Operators for Electricity
FAT	Final Acceptance Test
FIT	Functional Integration Test
FB	Flow Based
GSK	Generation Shift Key
GLSK	Generation Load Shift Key
IDCC	Intraday Capacity Calculation
IGM	Individual Grid Model
IVA	Individual Validation Adjustment
KPI	Key Performance Indicator
LF-SA	Load Flow Security Analysis
NRA	National Regulatory Authority
NRAO	Non-costly Remedial Action Optimization
RA	Remedial Action
RAO	Remedial Action Optimizer
RFI	Request for Information
RFP	Request for Proposal
ROSC	Regional Operational Security Coordination
RD&CT	Redispatching and Countertrading
RSC	Regional System Operator
TSO	Transmission System Operator
SHC	Simple Hybrid Coupling
SO GL	System Operation Guideline
SAT	Site Acceptance Testing
SIT	System Integration Testing
V1/V2	Version 1/ Version 2
XNE	Cross-border element

ANNEX 1

ID ATC results based DA extraction: analysis 1/4



Core TSOs performed an analysis to determine the ID ATCs with the new method.

- The results were shared and discussed with Core NRAs in December 2021.
- Results are presented on this and the next slides.

- Input data: 73 BDs from 2021-01-09 until 2021-04-25 (based on availability of simulated market coupling results in Q4 2021)
  - Input data is based on LTAmargin approach → converted to ELI with reasonable accuracy, with following limitations:
    - IVA remained unchanged
    - Simulated MCP moved inside smaller ELI domain (approach: preserve the relative distance from the edge of the domain)

Main findings

- The algorithm works as designed, i.e. uses either the FB domain (RAM_ID) or the LTA domain (LTA_ID) or a share of each
- In many MTUs ID ATC=0 on many borders
  - Effect is partly inevitable (due to use of capacities in SDAC), partly exacerbated by parameters for reduction of virtual capacities (rLTAincl and rAmrId)
  - However, this is not predominantly an inherent property of the new ID ATC extraction algorithm
- Comparison with historical ATCs: Historical ATC higher on average, on 32 out of 36 borders*
- Extracting ATCs from LTA domain inevitably creates dependency on method for SEC computation (Art. 43 CACM)

*limited significance due to different ID capacity approaches in CWE and CEE compared to Core ID CCM

ANNEX 1

ID ATC results based DA extraction: analysis

ID CCM allows to exclude minRAM and LTA partly or completely

- Reduction factors rAmrId (per TSO, applied to CNECs) and rLTAincl (per border, applied to LTAs)
  ➔ RAM_ID and LTA_ID differ from RAM and LTA
- For rLTAincl, for each border the minimum of values provided by the adjacent TSOs is used
- The values below were used for the analysis shows on the next slides

D2 = TenneT Germany
D4 = TransnetBW
D7 = Amprion
D8 = 50Hertz

TSO	rAmrId	rLTAincl
AT	0	0
BE	0.2	1
CZ	0.7	0.5
D2	0	0
D4	0	0
D7*	0.2	1
D8	0	0
FR	0.2	1
HR	0.2	1
HU	0.7	0
NL	0	0
PL	0	0
RO	0.2	0
SI	0.7	0.2
SK	0	0

min. per border

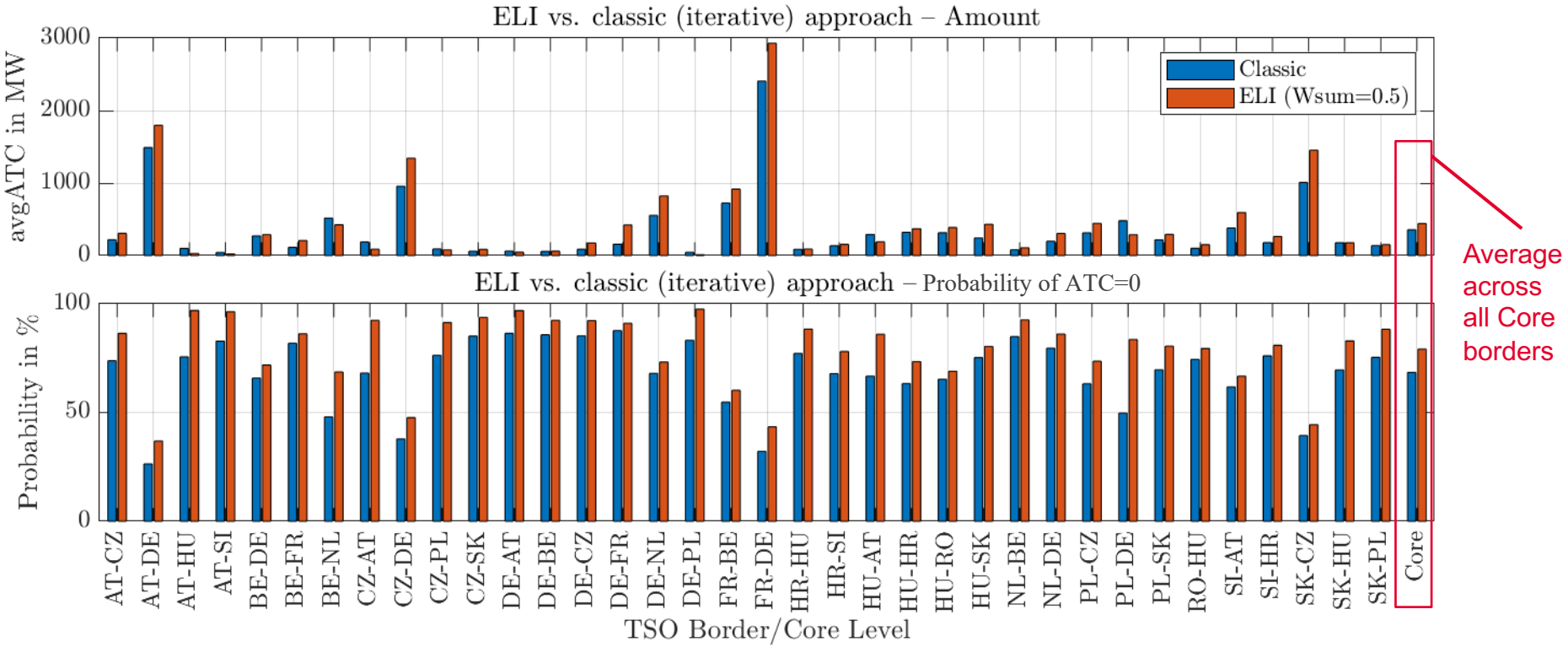
From	To	rLTAincl
AT	CZ	0
AT	DE	0
AT	HU	0
AT	SI	0
BE	DE*	1
BE	FR	1
BE	NL	0
CZ	AT	0
CZ	DE	0
CZ	PL	0
CZ	SK	0
DE	AT	0
DE*	BE	1
DE	CZ	0
DE	FR	0
DE	NL	0
DE	PL	0
FR	BE	1
FR	DE	0
HR	HU	0
HR	SI	0.2
HU	AT	0
HU	HR	0
HU	RO	0
HU	SK	0
NL	BE	0
NL	DE	0
PL	CZ	0
PL	DE	0
PL	SK	0
RO	HU	0
SI	AT	0
SI	HR	0.2
SK	CZ	0
SK	HU	0
SK	PL	0

Comparison between extraction approaches (ELI vs. classic)

- „Classic“ approach = methodology pursuant to Art. 21(5) ID CCM
- Pure methodical comparison: No LTA, extraction only from FB domain (LTA_ID=0, rLTAincl=0, alpha=1)
- Parameter Settings: Wsum = 0.5, rAmrId as provided by TSOs

➢ The extracted ID ATC is with the ELI approach on average ~24% higher than when applying the “classic” iterative approach

➢ The probability of having an ID ATC of zero is on average ~16% higher when applying ELI



ANNEX 1

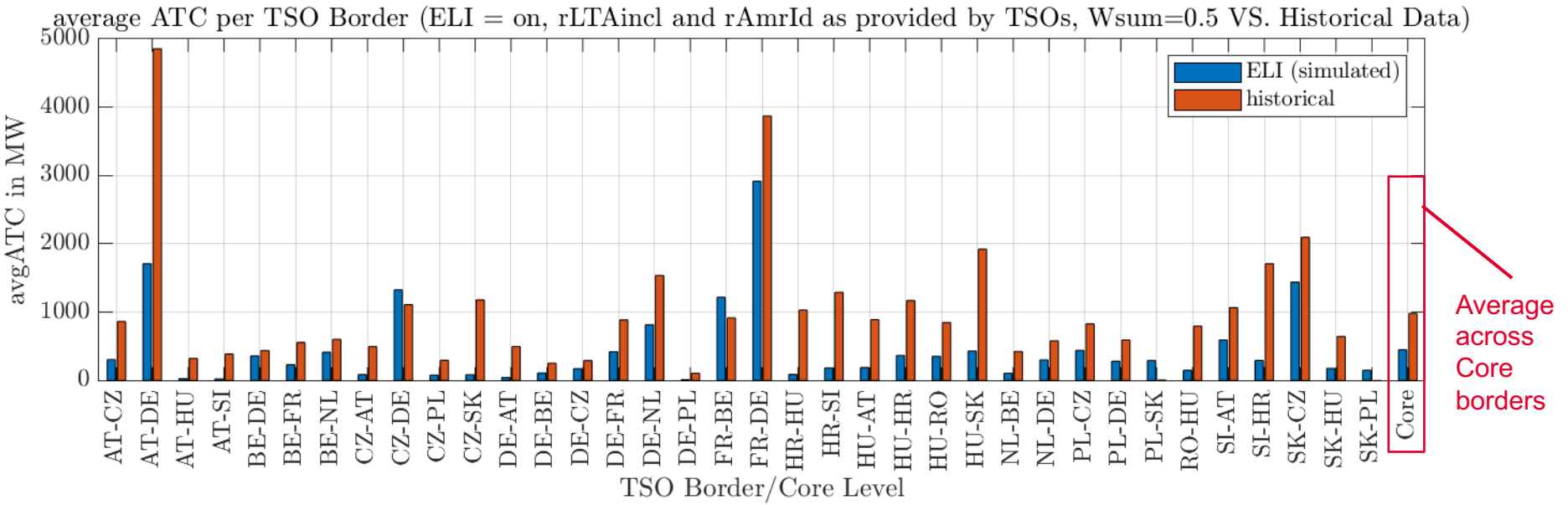
ID ATC results based DA extraction: analysis

Comparison with historical data has been requested by NRAs, but has inevitable conceptual limitations

- Initial ID ATCs are leftovers from DA
- Historical DA results differ from simulated Core DA results used for ELI analysis, both in terms of DA capacities and DA allocation
  - FB only in CWE
  - CEE: NTC-based, 4MMC & explicit allocations

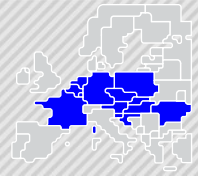
Results of comparison between ELI-based ID ATC extraction and historical initial ID ATCs

- Historical vales are higher on average
- Historical vales are higher on all borders (on average over time) except for CZ→DE, FR→BE, PL→SK, SK→PL



ANNEX 2

ID ATC analysis scenario X3: rAmrID and rLTAincl as provided by TSOs on 18/03/2022



Overview table of rAmrID and rLTAincl as provided by TSOs on 18/03/2022

Core ID CCM	AT	BE	CZ	FR	HR	HU	NL	PL	RO	SI	SK	LU	DE			
	APG	ELIA	CEPS	RTE	HOPS	MAVIR	TenneT NL	PSE	Transelect.	ELES	SEPS	CREOS	TransnetBW	TenneT DE	50 Hertz	Amprion
VOLUNTARY:																
rLTAid actual	0	1	0,5	1	1	0	0	0	0	0,2	0		0	0	0	0
rLTAid new	0,2	1	1	1	1	0,2	0,2	0,001	0,2	0,5	0,2	NA	0,2	0,2	0,001	0,2
rAMRid actual	0	0,2	0,7	0,2	0,2	0,7	0	0	0,2	0,7	0		0	0	0	0
rAMRid new	0,2	0,2	0,7	0,2	0,2	0,2	0,2	0,2	0,2	0,7	0,2	NA	0,2	0,2	0	0,2

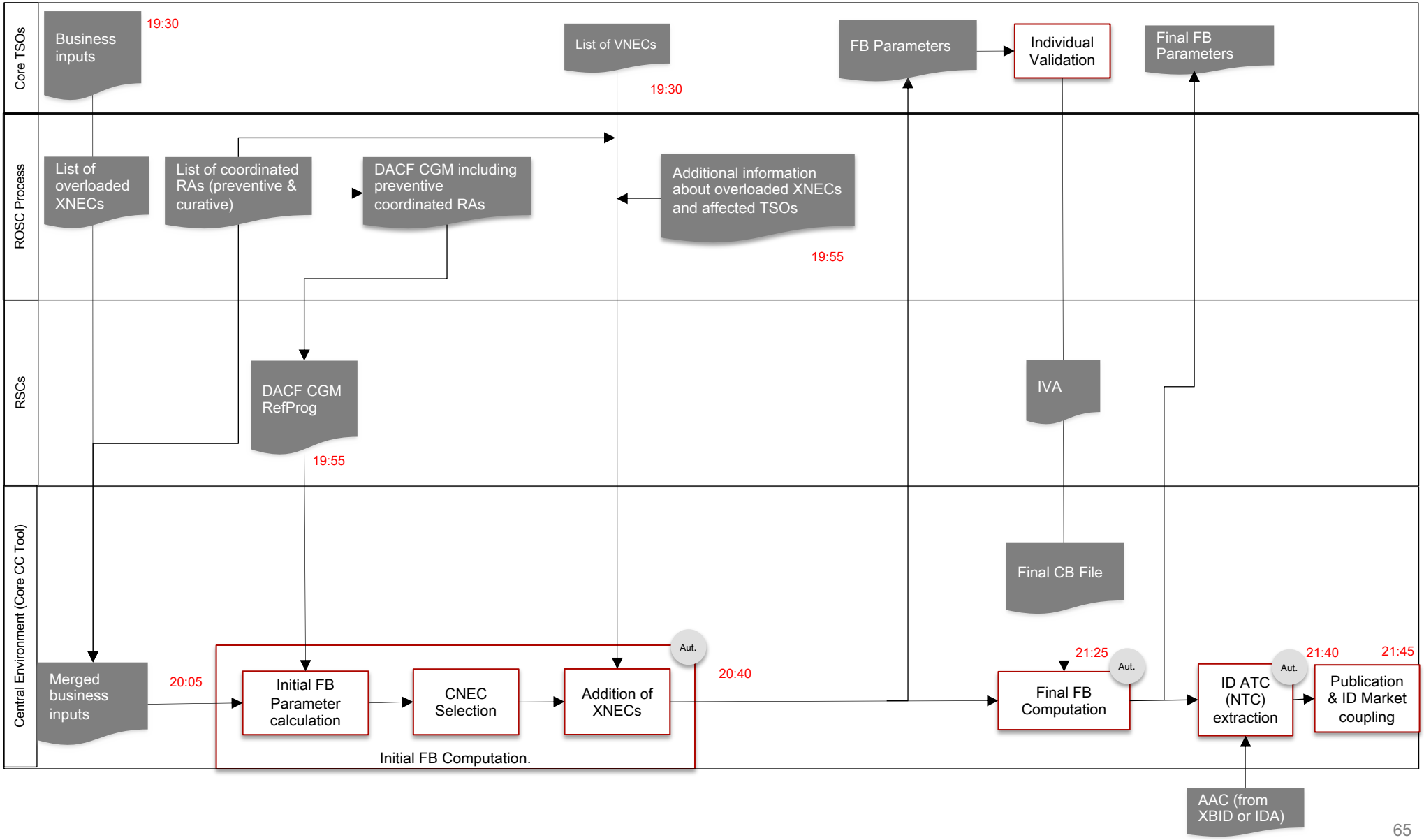
Comments

- MAVIR: For the simulation 0.2 + 0.2 is proposed by MAVIR, but it is still highly uncertain if we can provide 0.2 + 0.2 by the start of the Go-Live. Assurance of 0.2 + 0.2 is more realistic by 30.06
- 50Hz will step-wise implement an individual validation and gradually increase the virtual capacities following this implementation and the operational experience gained until then. We will immediately start the development of an individual validation and as soon as a first version is available for operations we will increase rAMR and rLTAincl to at least 20%. Until the validation is available, we will maintain rAMR = 0% and rLTAincl = 0.001%, since this leads to ID capacities we can facilitate.

ANNEX 3

Target High-Level Business Process (with ROSC v1)

W. SNOEREN



Core Flow Based

Market Participants concerns and recommendations before the go live

CORE Consultative Group

29/03/2022

EFET European Federation of Energy Traders
SO YOU CAN RELY ON THE MARKET

eurelectric powering people

ifiec europe
international federation of industrial energy consumers

Robustness of the capacity calculation process leading to default parameters

High number (+/- 10%) of hours where the parallel run process failed and resulted in (i) tiny to empty or (ii) incomplete final domains

i. Tiny or empty FB domains are most most likely due to issues with IVAs

- This leads to capacities available for market exchange at the level of the LTA (through the BALAS formulation in EUPHEMIA that combines the FB domain with the LTA domain)
- Reminder: at CWE FB go live, similar issue of empty/tiny domain has been encountered following too high level of pre-congested branches. As a reaction, a minRAM 20% approach has been imposed.

Minimum level of MACZT must be ensured to guarantee basic levels of capacity availability at CORE borders

ii. Incomplete FB domains are likely to be due to IT process issues

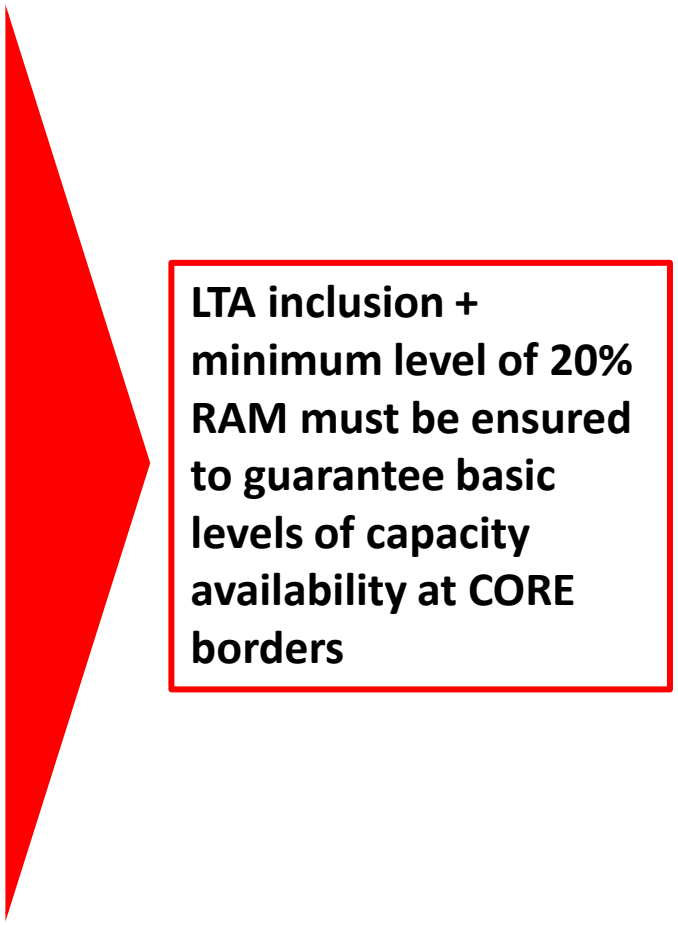
- This ofen happens for more than 2 subsequent Market Time Unit so that the problem cannot always be addressed by the “spanning” method
- Therefore, Default FB parameters (DFP) have to be used. The FB domain is simply limited the LTAs converted into import/export limits + “some margins” defined by TSOs and not known by MPs;

Risk of incomplete domains should go down to 1% max before go-live to avoid significant welfare loss

Unclarity around impact of new intraday CCM

ACER decision on ID capacity calculation expected by 13 April, one week before go live. Market participants expect an impact assessment asap.

- In CWE, ID capacities are based on DA leftovers used with LTA inclusion, a minRAM 20% principle and an increase/decrease process.
  - Will this minRAM be upheld in the future?
- Market parties have no visibility on upcoming CORE intraday capacity calculation:
  - Publish the results of left-over extractions
  - Publish the methodology asap
  - Apply a principle to safeguard min level of capacity (no step back)
  - Apply transparency and visibility on the calculation (iterative or optimization approach)



Incompleteness of the parallel run and data access

Operational issues in the parallel run lead to the incompleteness and to many errors in the data available, putting market participants in the dark on the impacts of the CORE FB on market prices

- Most parallel run days are incomplete for the price calculation
- PTDF publication is still lagging
  - Not at the necessary level of quality to be used operationally by MPs to make analysis
  - Not clear today whether the legal publication timing will be respected
- API publication tool lacks quality
  - Not complete yet
  - Handbook not up to date
  - Current curtailment publication on jao not sustainable

Observation on the Core DA FB MC

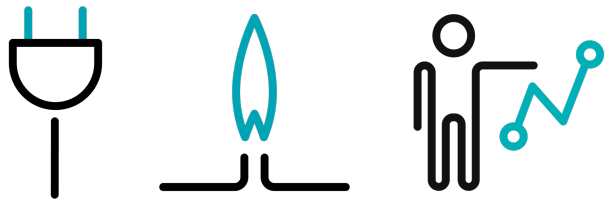
Interpretation of the parallel run results

CORE CONSULTATIVE GROUP

Clara Verhelst – Advisor, CREG

Nico Schoutteet – Advisor, CREG

29 March 2022



First, a word on the data…

1.401.811
(CNECs in pre-solved final domains)

The CREG analysed the results of the Core DA FB MC parallel runs, focusing on the pre-solved domains **from 1 October 2021 to 28 February 2022**

3.395
(MTUs)

1.395.332
(valid CNECs in pre-solved final domains)

Filtering on only those hours without spanning / default flow-based parameters, fewer (valid*) observations can be investigated

3.318
(MTUs)

281.300
(valid CNECs in pre-solved final domains where RAM ≠ 0)

Filtering on only those hours where the RAM does not equal 0% of F_{max}, even fewer observations remain

2.803
(MTUs)

Only 82,6% of all MTUs, or even only 20,1% of all CNECs, can be interpreted!
Furthermore, the reason for this RAM = 0% observations can only be guessed.

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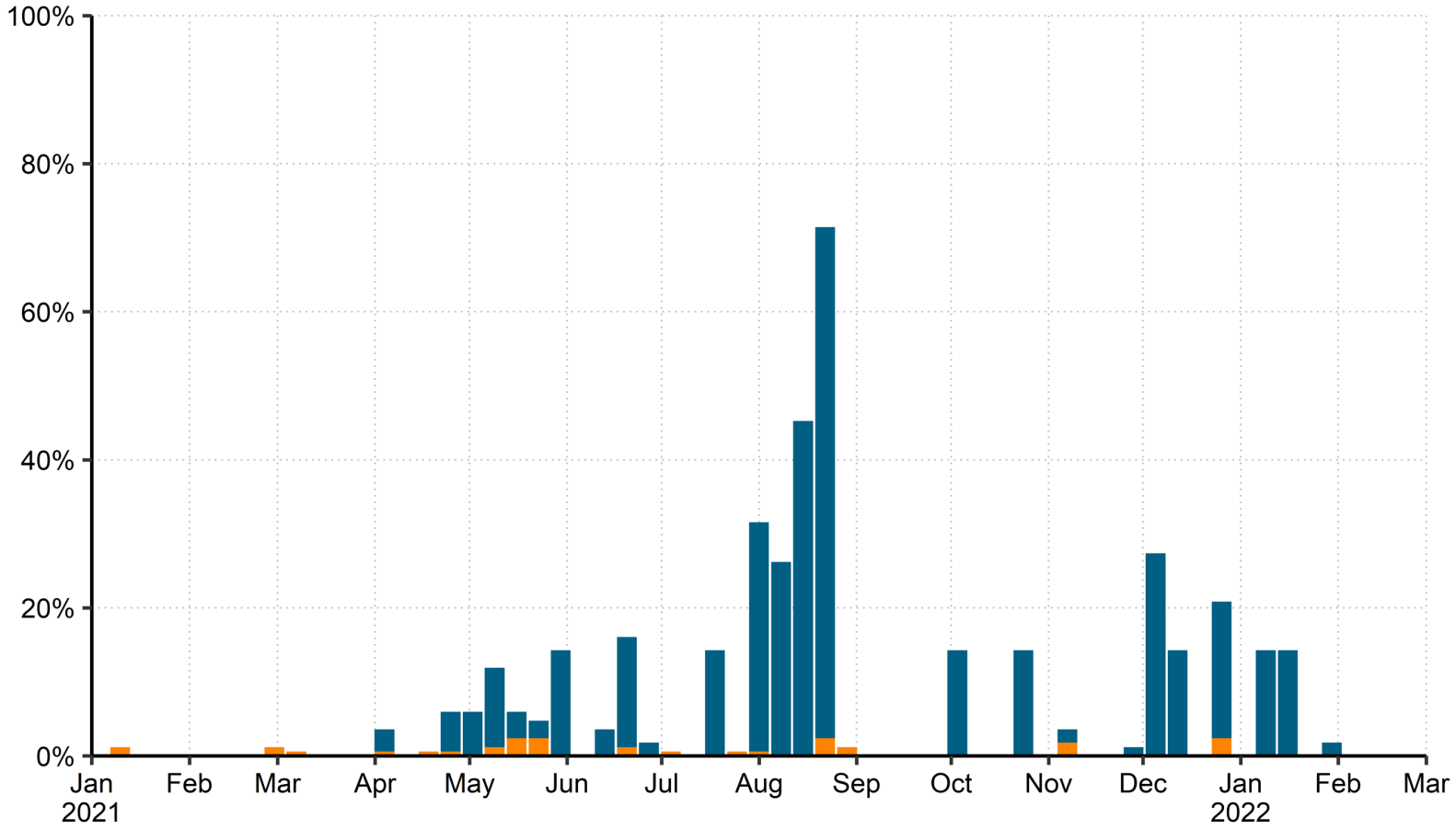
* Valid in the sense that they can be interpreted and their results have meaning.
Obviously, the absolute number of spanning / DFP hours in itself are a valuable metric of the stability of the parallel runs.

When was fallback (spanning / DFP) applied?

Application of fallback in capacity calculation processes

Evolution of weekly fraction of hours with **spanning** or **default flow-based parameters (DFP)** in final computation



Source: calculations CREG based on data JAO Publication Tool

Where do these CNECs with RAM = 0 come from?

For several TSOs, extremely high shares where CNECs have RAM = 0 are observed. These CNECs / timestamps are NOT marked as spanning / DFP.

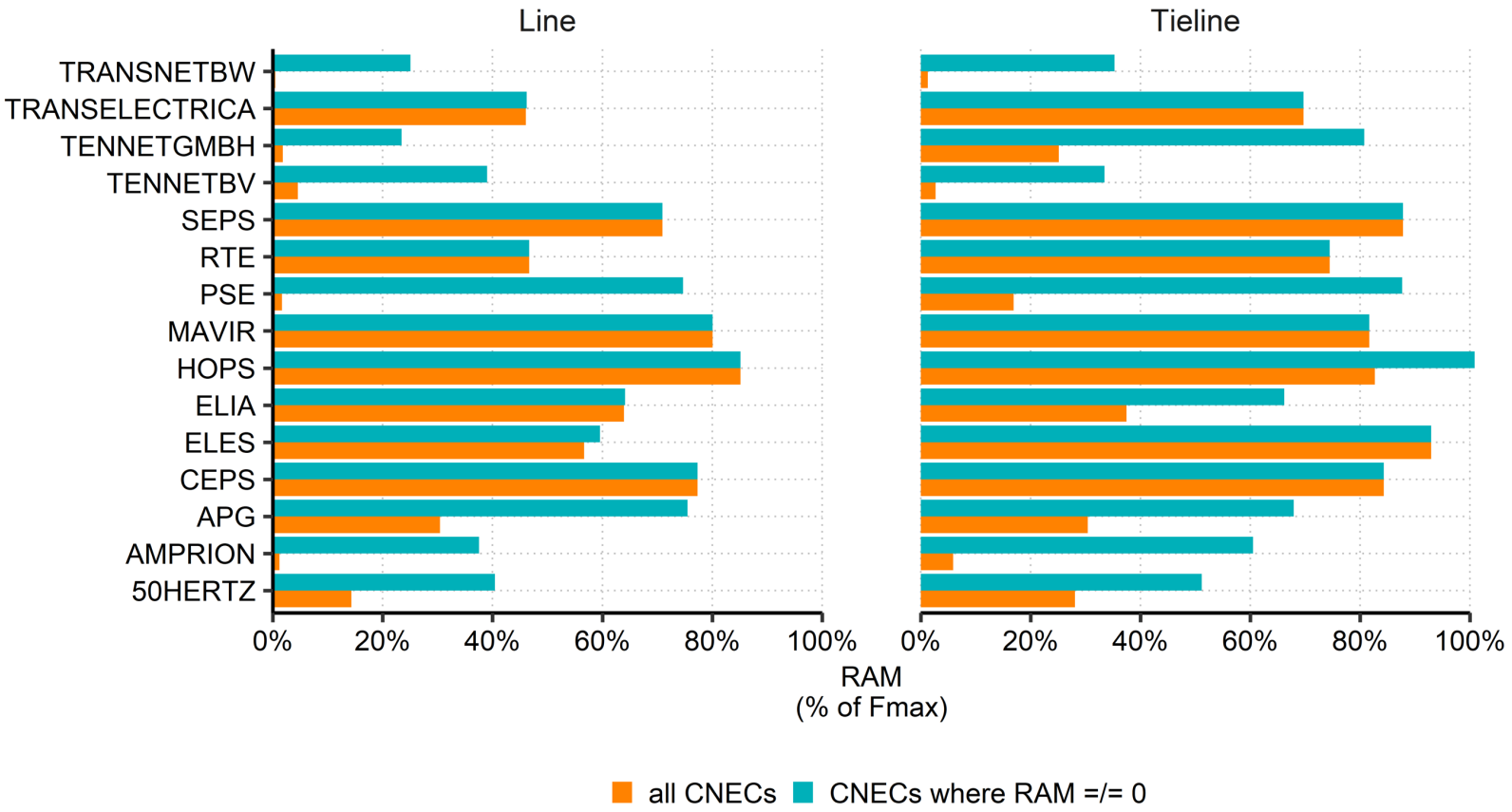
	RAM = 0	# of CNECs	Fraction where RAM = 0
50HERTZ	7.795	15.307	50,9%
AMPRION	503.973	525.462	95,9%
APG	38.408	78.273	49,1%
CEPS	182	11.852	1,5%
ELES	183	12.933	1,4%
ELIA	2.600	33.065	7,9%
HOPS	186	26.432	0,7%
MAVIR	182	27.691	0,7%
PSE	88.390	108.485	81,5%
RTE	182	7.327	2,5%
SEPS	182	28.236	0,6%
TENNETBV	78.128	88.979	87,8%
TENNETGMBH	77.359	91.574	84,5%
TRANSELECTRICA	213	12.064	1,8%
TRANSNETBW	306.763	314.536	97,5%
UNKNOWN TSO	*14.134*	*19.595*	*72,1%*

It is not clear how to interpret these values or under which conditions RAM = 0 materializes.

How does this impact the results? (i)

Average margins on critical network elements

Average RAM for internal and cross-border CNECs per TSO (% of Fmax)

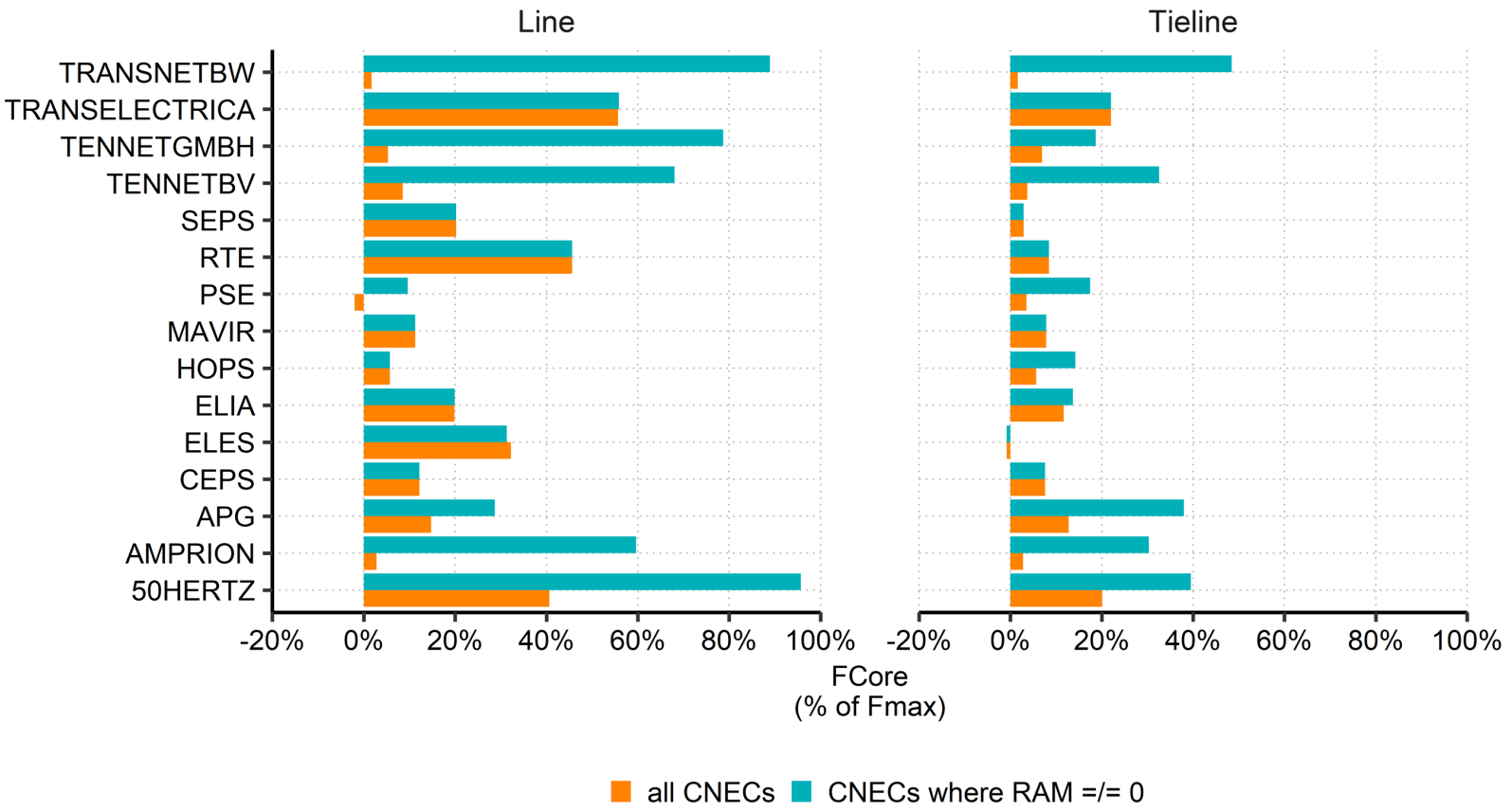


Source: calculations CREG based on data JAO Publication Tool
(Final pre-solved flow-based domain)

How does this impact the results? (ii)

Reference flows on critical network elements

Average FCore for internal and cross-border CNECs per TSO (% of Fmax)

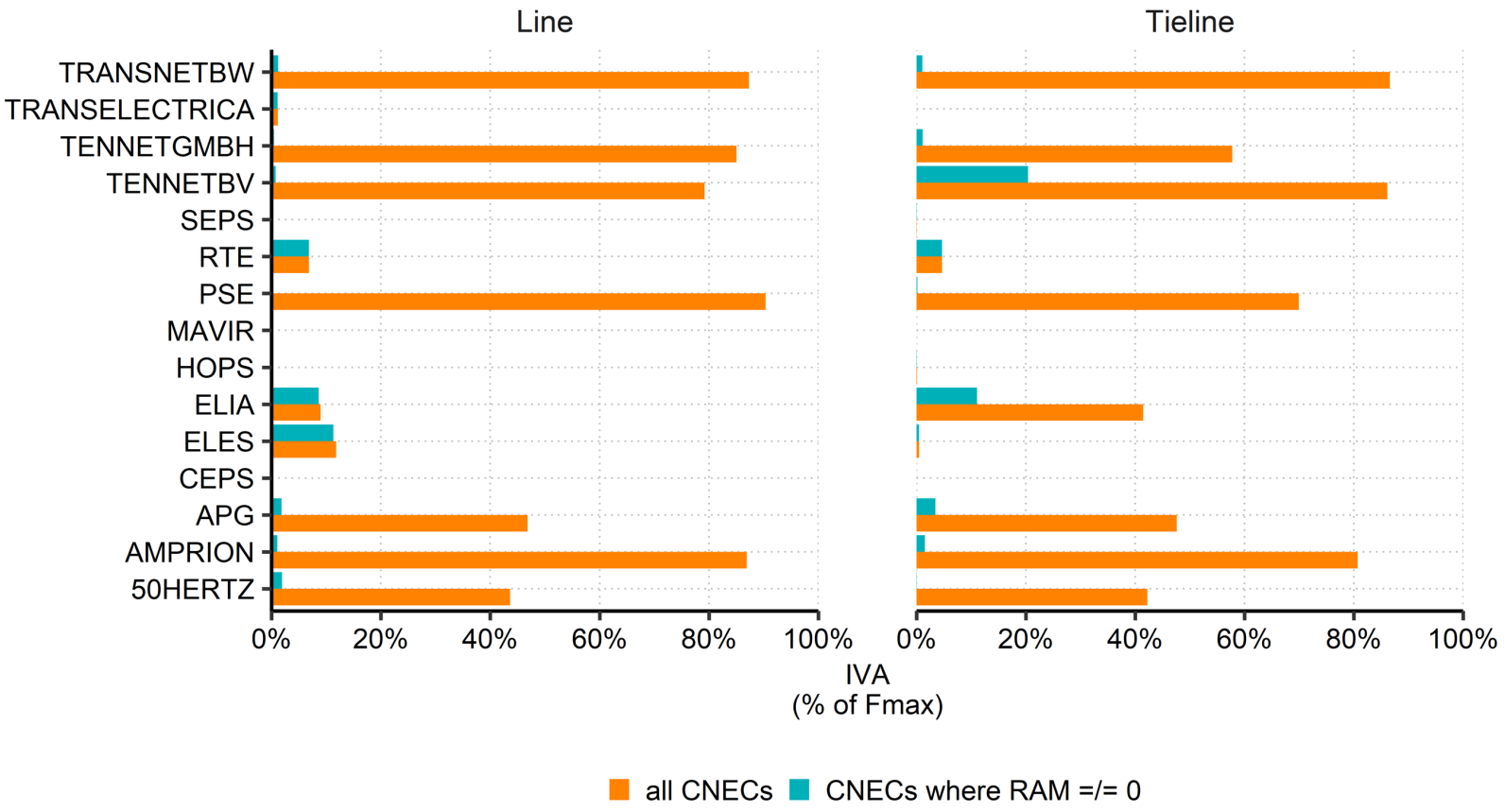


Source: calculations CREG based on data JAO Publication Tool
(Final pre-solved flow-based domain)

How does this impact the results? (ii)

Validation reductions on critical network elements

Average IVA for internal and cross-border CNECs per TSO (% of Fmax)

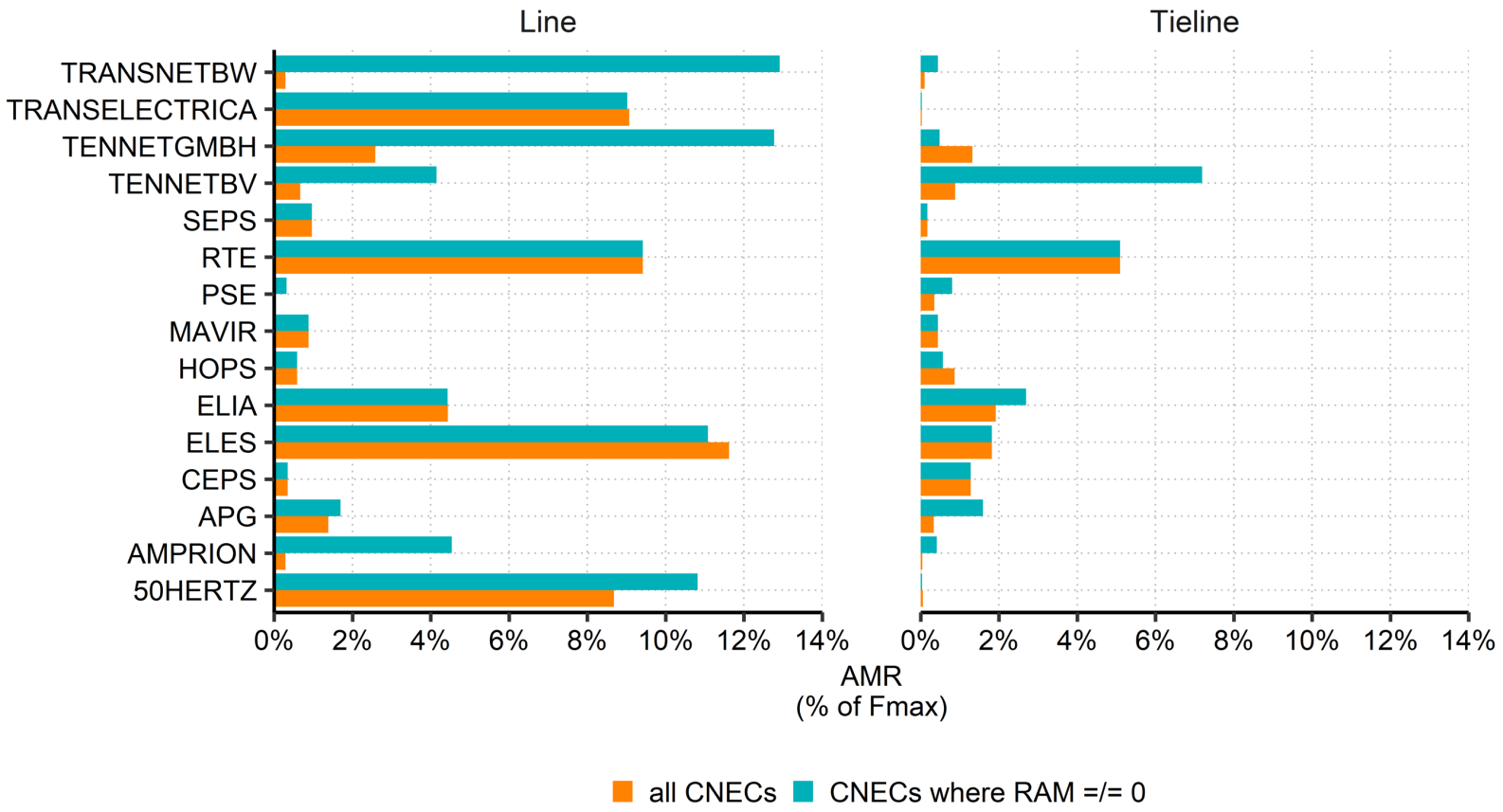


Source: calculations CREG based on data JAO Publication Tool
(Final pre-solved flow-based domain)

How does this impact the results?

Adjustments for minRAM on critical network elements

Average AMR for internal and cross-border CNECs per TSO (% of Fmax)



Source: calculations CREG based on data JAO Publication Tool
(Final pre-solved flow-based domain)

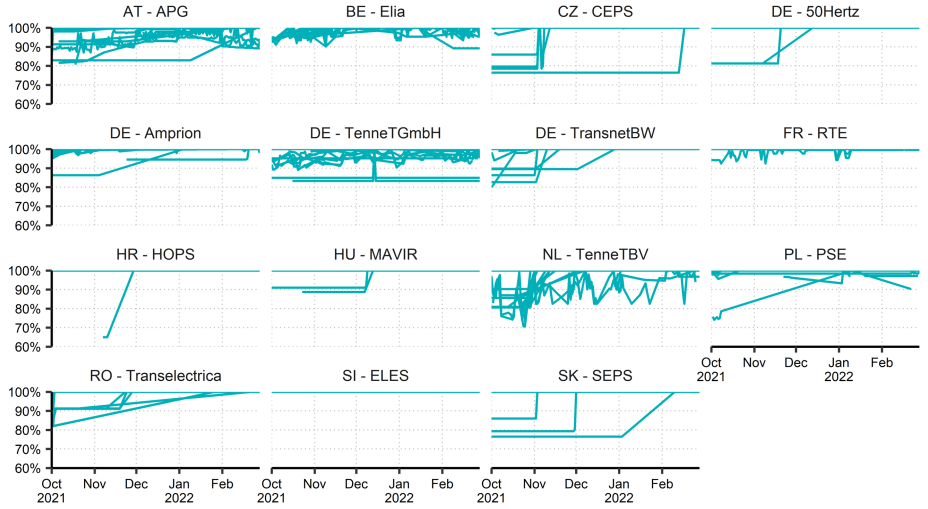
Other examples of concerns with regards to inaccuracies

Reported F_{max} calculation policies do not align with the observations

	Dynamic	Fixed	Seasonal	Unknown
AT - APG			71	
BE - Elia			25	2
CZ - CEPS	7	10		
DE - 50Hertz		23		
DE - Amprion	36	26	10	
DE - TenneTGmbH	10	26	1	
DE - TransnetBW	4	11	8	
FR - RTE			7	
HR - HOPS			14	
HU - MAVIR		18	4	
NL - TenneTBV			30	2
PL - PSE	18			
RO - Transelectrica			23	
SI - ELES	11			
SK - SEPS		17	1	

Variation in observed Fmax values per TSO

Daily average Fmax expressed as a % of the maximum observed Fmax for each CNE between 1 Oct 2021 and 28 Feb 2022



Source: calculations CREG based on data JAO Publication Tool
NOTE: hours with spanning / DFP or CNECs with RAM = 0% are excluded

Questions

- Knowing what we know – how can we be sure that the results (even when filtered to remove all doubt) are representative?
- How can we explain the extremely high % of hours where RAM = 0? (not on one, but on all CNECs)
- How will Core TSOs ensure the quality of the data that is published after the Core DA FB MC go-live?
- Will the Core TSOs consider improvements to the accessibility of the data in the JAO Publication Tool? (e.g. automated extraction, extending the API's functionalities,…)

Next steps

Additional observations will be included in the CREG's "Note on the functioning and the results of the Core Day-Ahead Flow-Based Market Coupling Project's external parallel runs", to be published by the end of this week.

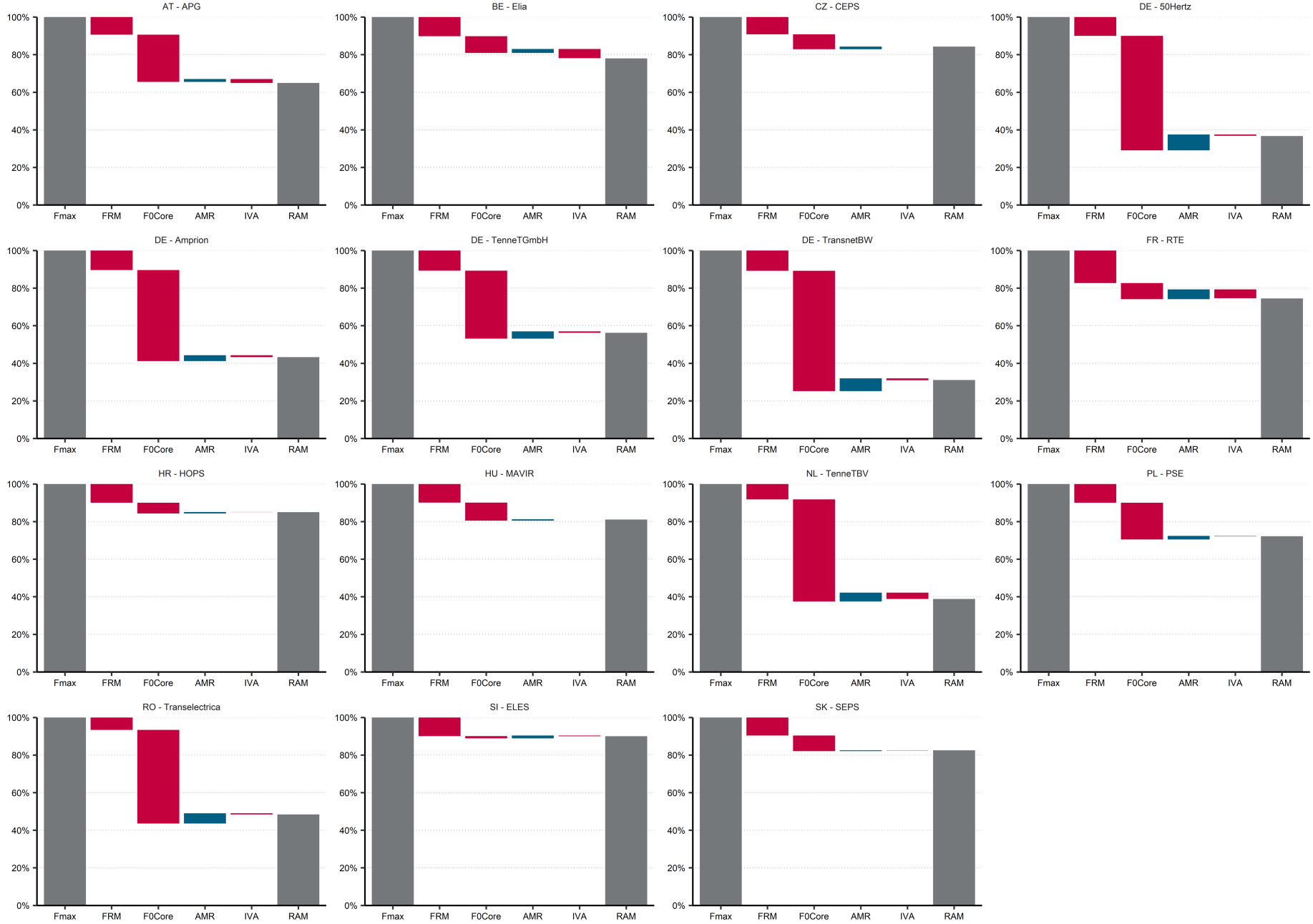
Any questions?

Back-up

BREAKDOWN OF FMAX / RAM VALUES PER TSO

Breakdown of Fmax and RAM values

Average Fmax, FRM, F0Core, AMR, IVA and RAM per TSO for all CNECs in the pre-solved final domain



Source: calculations CREG based on data JAO Publication Tool

Note 1: blue values (AMR) increase the RAM, red values (FRM, F0Core, IVA) decrease the RAM
Note 2: dataset only includes MTUs without spanning / DFP and CNECs with RAM not equal to 0

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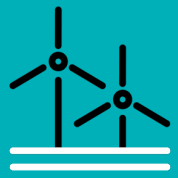
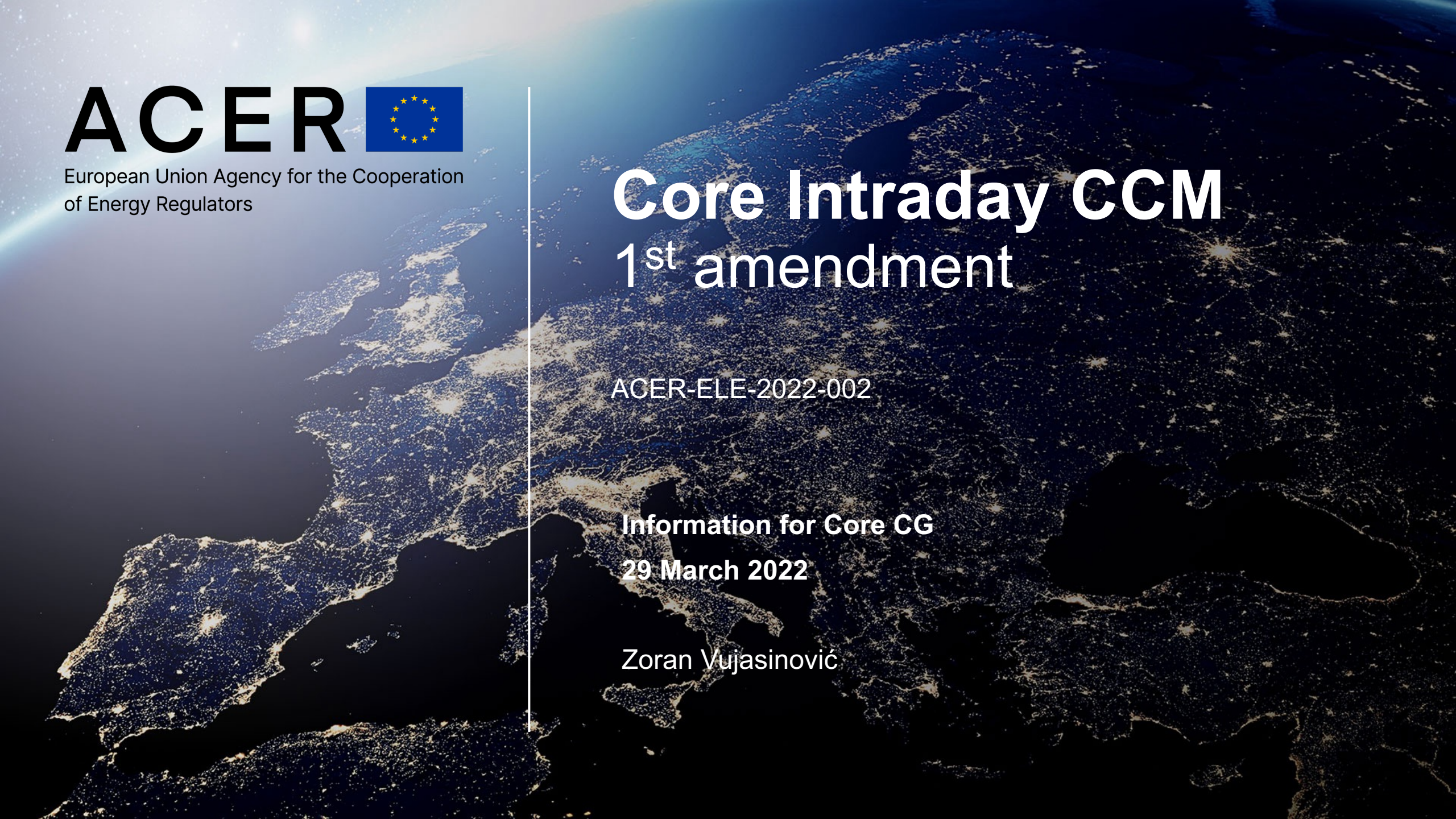



Thanks for your attention! Questions?

Clara.Verhelst@creg.be
Nico.Schoutteet@creg.be



ACER

European Union Agency for the Cooperation of Energy Regulators

Core Intraday CCM
1st amendment

ACER-ELE-2022-002

Information for Core CG

29 March 2022

Zoran Vujasinović

ACER
European Union Agency for the Cooperation of Energy Regulators

Core ID CCM 1st amendment: **planning**

- 1st amendment of Core ID CCM: referred to ACER on 8th February 2022

- Due to the necessity to coordinate the ID with DA FB (**go-live 20 April**):
  - the Decision is planned until **13 April**

- After common proceedings with Core TSOs and NRAs
  - the amended methodology has been submitted to the Board of Regulators

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Main issues

There are two main, rather opposite issues with ID CC:

1) Concern about security: as the required LTA inclusion approach does not allow the direct control over the LTA-related portion of capacity provided per CNEC
   - Extended LTA inclusion (ELI) approach will be applied on DA level
   - therefore an equivalent (optimization-based) approach has to be applied on ID level
   - however, ELI prevents the CNEC-wise control of LTA inclusion (only border-wise)

2) Concern about low ID capacities: as shown by the TSOs' simulations
   - Historically, Core ID ATCs were higher on average, and less frequently on zero level (26% cases)
   - Perspective ID capacities highly depend on the level of inclusion of virtual margins:
     - Adjustment of Minimum RAM (AMR)
     - Long Term Allocation (LTA) inclusion

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Options

- It is needed to enable sufficiently high ID capacities (ID ATCs) based on leftovers from SDAC, to control efficiently the LTA inclusion i.e. the ID ATCs in general, through validation

- Mandatory inclusion of virtual margins on ID level is controversial for some NRAs from the legal point of view

- Validation: in the evening of D-1 the DACF network models are available, which enables rather credible validation of combined DA market clearing point + possible influence of ID ATCs
  - However, the TSOs are concerned by the lack of time until the go-live (and lack of tools and experience) to develop complex coordinated validation procedures

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Way forward

ACER is currently considering the following way forward:

- Focusing this ID CCM amendment only on the transition period (1st year) and treatment of leftovers after SDAC

- Voluntary LTA inclusion for virtual margins rLTAid and rAMRid
  - Encouraging Core TSOs to initially apply as high as feasible virtual margins, at least those which the TSOs considered and proposed as minimum during the common proceedings
  - Further gradual increase after the go-live, based on experience gained

- A cap on the excessive LTA inclusion in order to control their influence on network security

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Way forward (2)

- Bilateral validation of ID ATCs
  - allowed local transitional solutions (such as CWE): to control the excessive ATCs in case of security concerns, but also to enable certain increase of ID ATCs where feasible
  - Further develop the coordinated validation based on DACF data

- ATC extraction adjustments: supported, can be applied whenever ready, and agreed among the TSOs

Thank you for your attention.

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