Analysis of the Core Day-Ahead Flow-Based Market Coupling Project's go-live

ELIA WG EMD & SO

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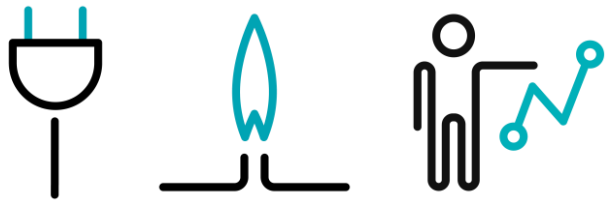


INTRODUCTION

BACKGROUND

FLOW-BASED MARKET COUPLING

MARKET COUPLING AND INTEGRATION

Short background of the Core DA FBMC Project

- Core Day-Ahead Flow-Based Market Coupling (Core DA FBMC) Project went live on 8 June 2022, after years of adopting, designing and implementing methodologies, tools and processes.

- The Core DA FBMC Project brings together:
  ⚡ 16 transmission system operators (TSOs)
  💱 10 nominated electricity market operators (NEMOs)
  🌍 the borders between 12 bidding zones (BZs)

- Most advanced market coupling mechanism to date, embedded within the SDAC, building on historic experience and taking into account legal requirements from the 3rd and 4th Energy Package.

- More information on the Core DA FBMC Project, hosted on the JAO webpage:
  🔗 https://www.jao.eu/core-fb-mc

What is flow-based market coupling?

- Method for calculating and allocating available cross-zonal capacities, by ensuring that the physical limits of the transmission networks are respected.

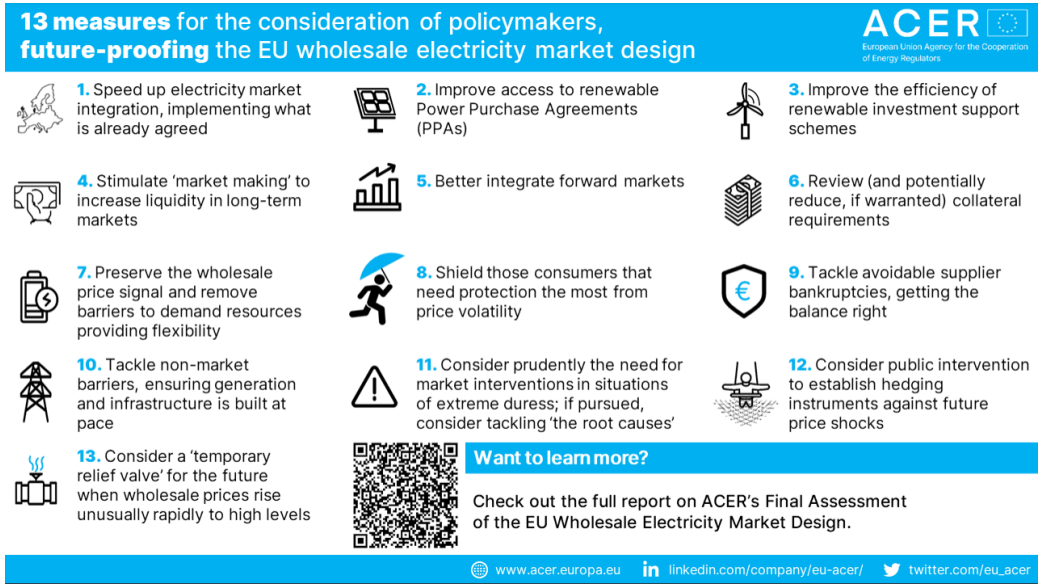
- Key elements in the methodology consist of:
  - a simplified network representation (consumption, generation and transmission availability);
  - an overview of which network elements are affected by cross-zonal exchanges, including their available margins and how these are impacted by a change in a zone's net position;
  - optimizing the cross-zonal exchanges, taking into account the supply and demand bids from market participants and the available transmission capacities;
  - resulting in zonal prices and net positions.

- Benefits of a flow-based approach over the old, NTC-based approach lie in increased coordination, a better representation of the grid, higher transparency and an increase of the operational security standards.

More information on the functioning of FBMC in CREG's "Energy Market Topics":
https://www.linkedin.com/pulse/flow-based-market-coupling-creg-belgium/

Why do we couple and integrate markets?

*"Day-ahead market integration delivers **cheaper electricity** across Europe and facilitates the **growth of renewables** while **increasing overall welfare**. In particular, market coupling ensures that electricity generally flows from areas with low prices to areas with high prices."*
(ACER's Final Assessment of the EU Wholesale Electricity Market Design: link)



Sidenote: current context of sustainedly high electricity prices

ANALYSIS OF THE CORE DA FBMC

NET POSITIONS AND EXCHANGES

PRICES AND CONVERGENCE

AVAILABLE CAPACITIES, REFERENCE FLOWS AND SECURITY MARGINS

SHADOW PRICES

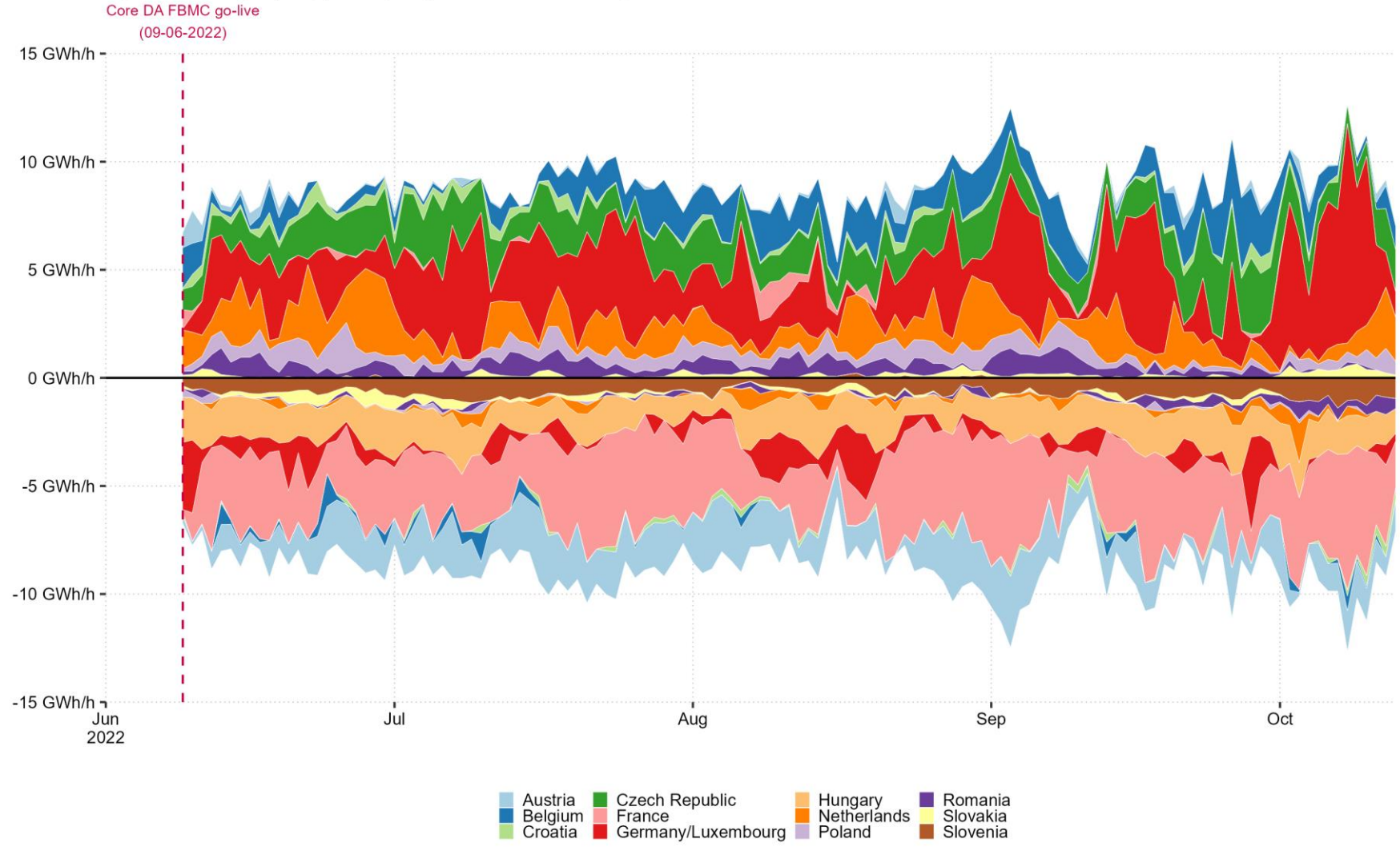
Some words on the data…

- In line with the requested transparency requirements, Core TSOs publish a wealth of available data on the "JAO Publication Tool" (🔗 link), available for download and analysis of all stakeholders.
- Information on prices and (SDAC) net positions (so-called *"market coupling data"*) are available through the Entso-E Transparency Platform (🔗 link)
- Where possible, comparison with the period before go-live (exact or as order of magnitude) is provided as a counterfactual baseline.
- Nevertheless, interpretation of the results need to be carefully assessed against the current tense situation in the European electricity markets.

📅 Period under consideration: 9 June 2022 – 16 September 2022 (delivery dates)
(100 business days or 2.400 hours)

Exchanges between Core bidding zones

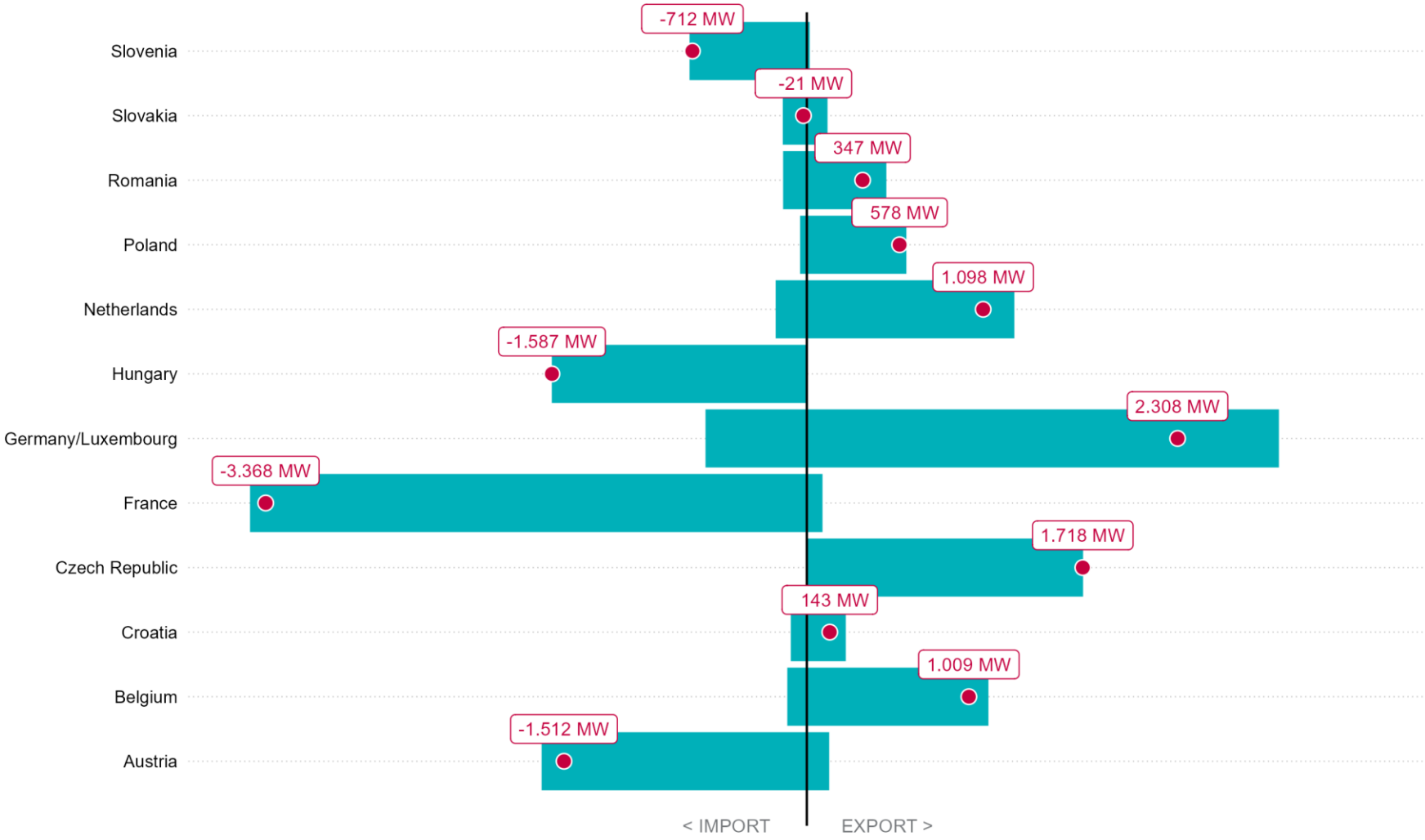
Evolution of daily average hourly export (+) and import (-) from and to Core bidding zones, in GWh/h



Source: calculations CREG based on data JAO Publication Tool

Core net positions per bidding zone

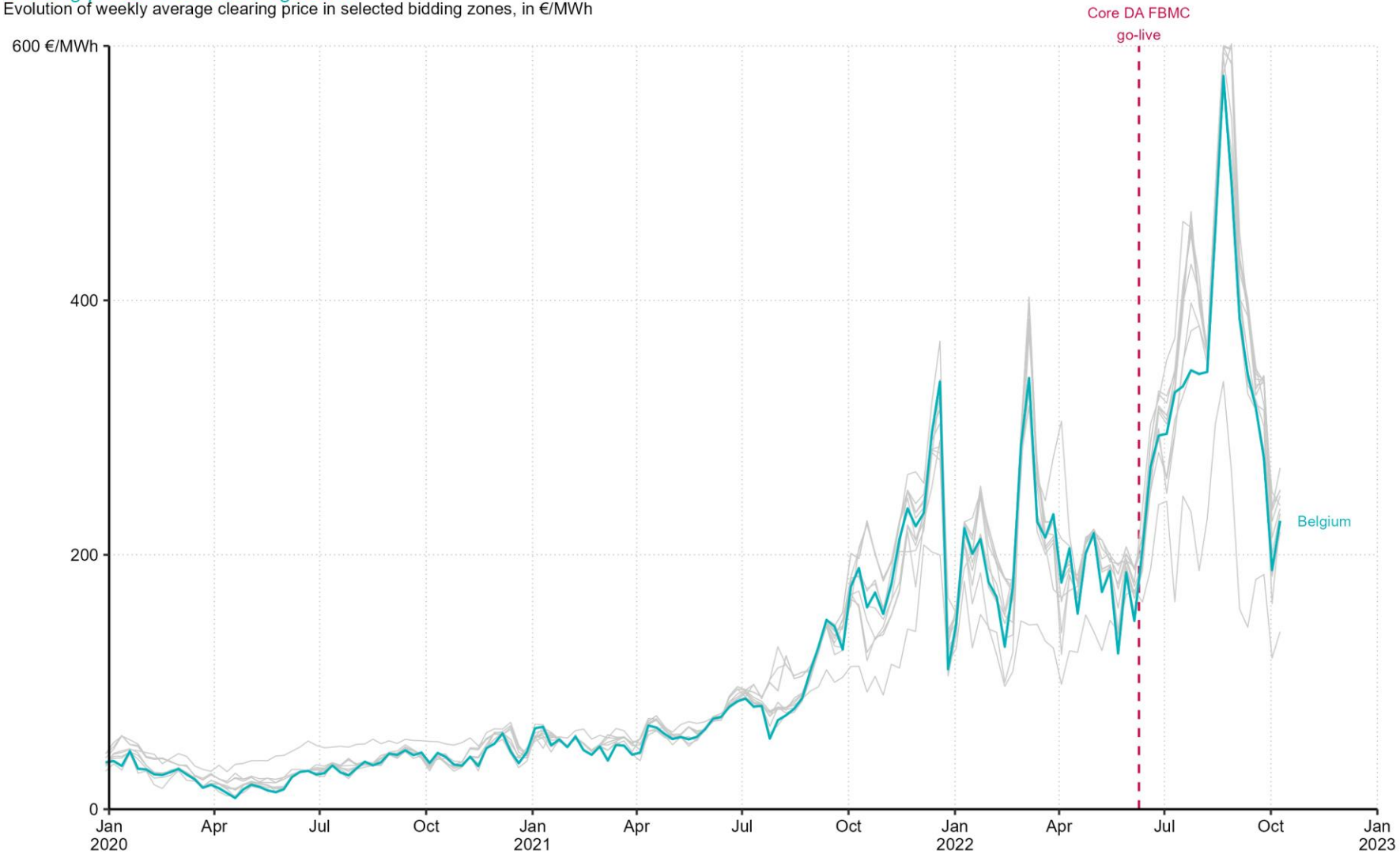
Average export (+), import (-) and net export (red) for Core bidding zones between 09 June and 13 October 2022



Source: calculations CREG based on data JAO Publication Tool

Clearing prices in Core bidding zones

Evolution of weekly average clearing price in selected bidding zones, in €/MWh



Source: calculations CREG based on data Entso-E Transparency Platform

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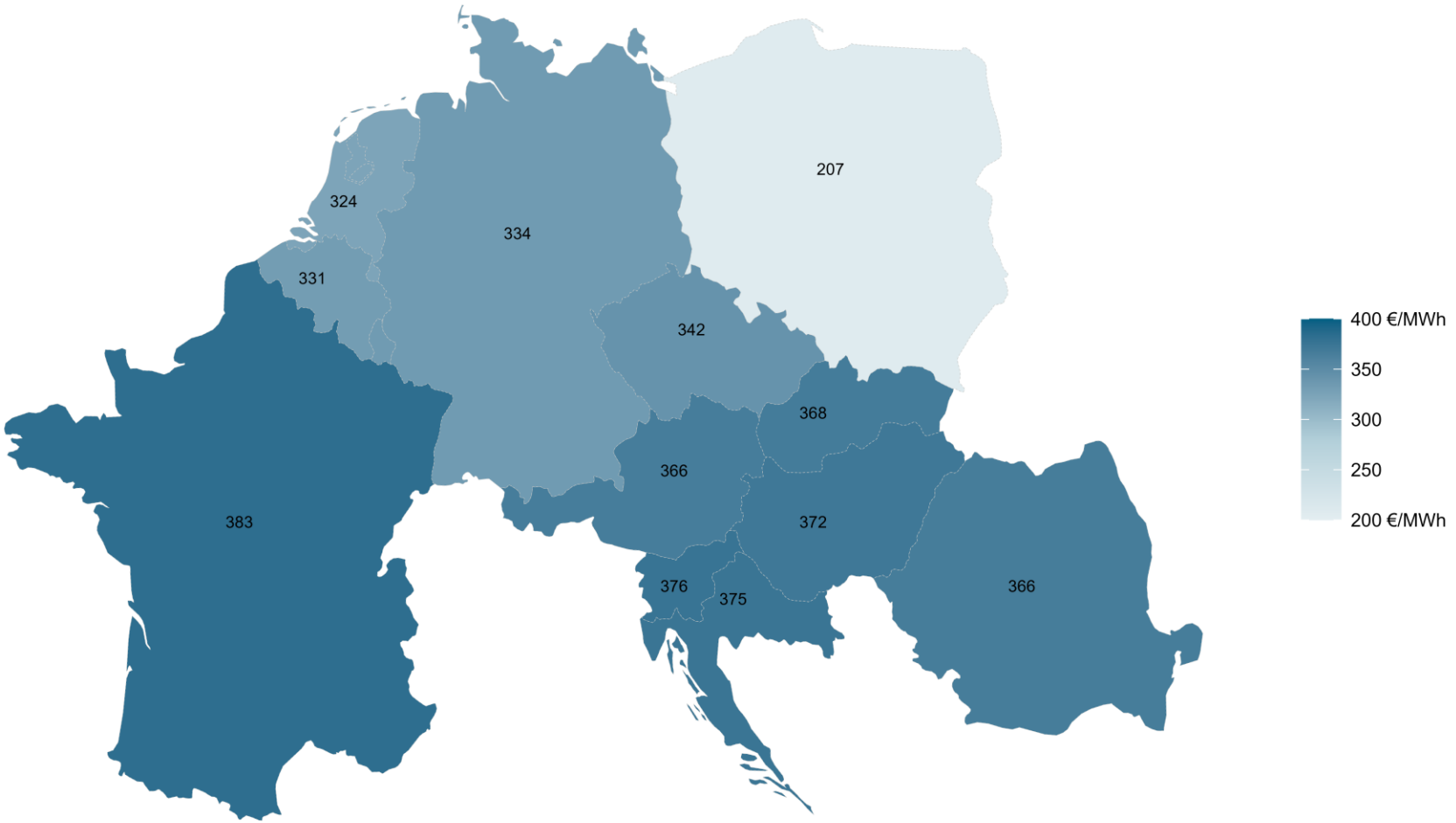
Clearing prices in Core bidding zones

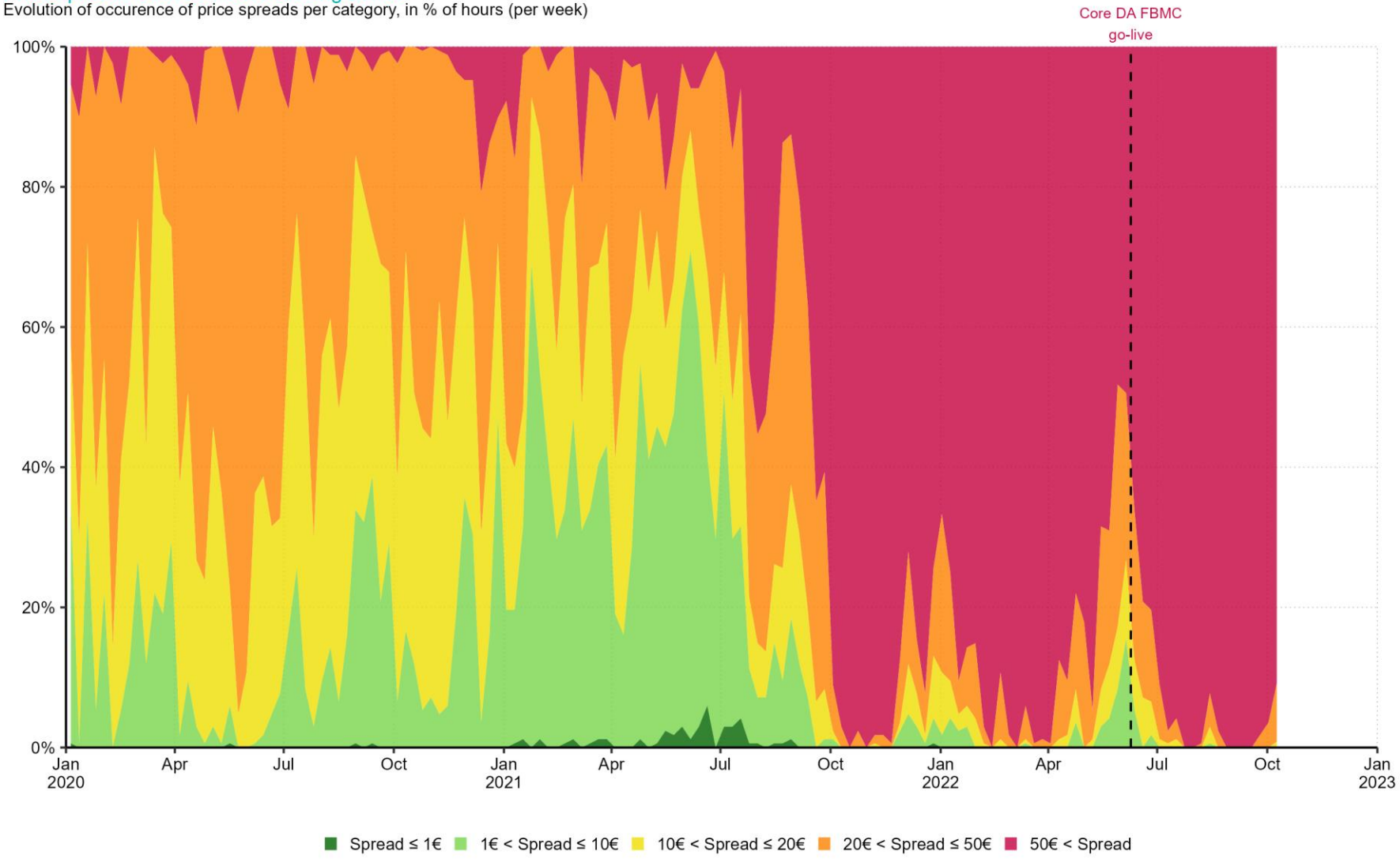
Average clearing price in selected bidding zones, between 9 June and 13 October 2022, in €/MWh



Source: calculations CREG based on data Entso-E Transparency Platform

Price spreads between Core bidding zones

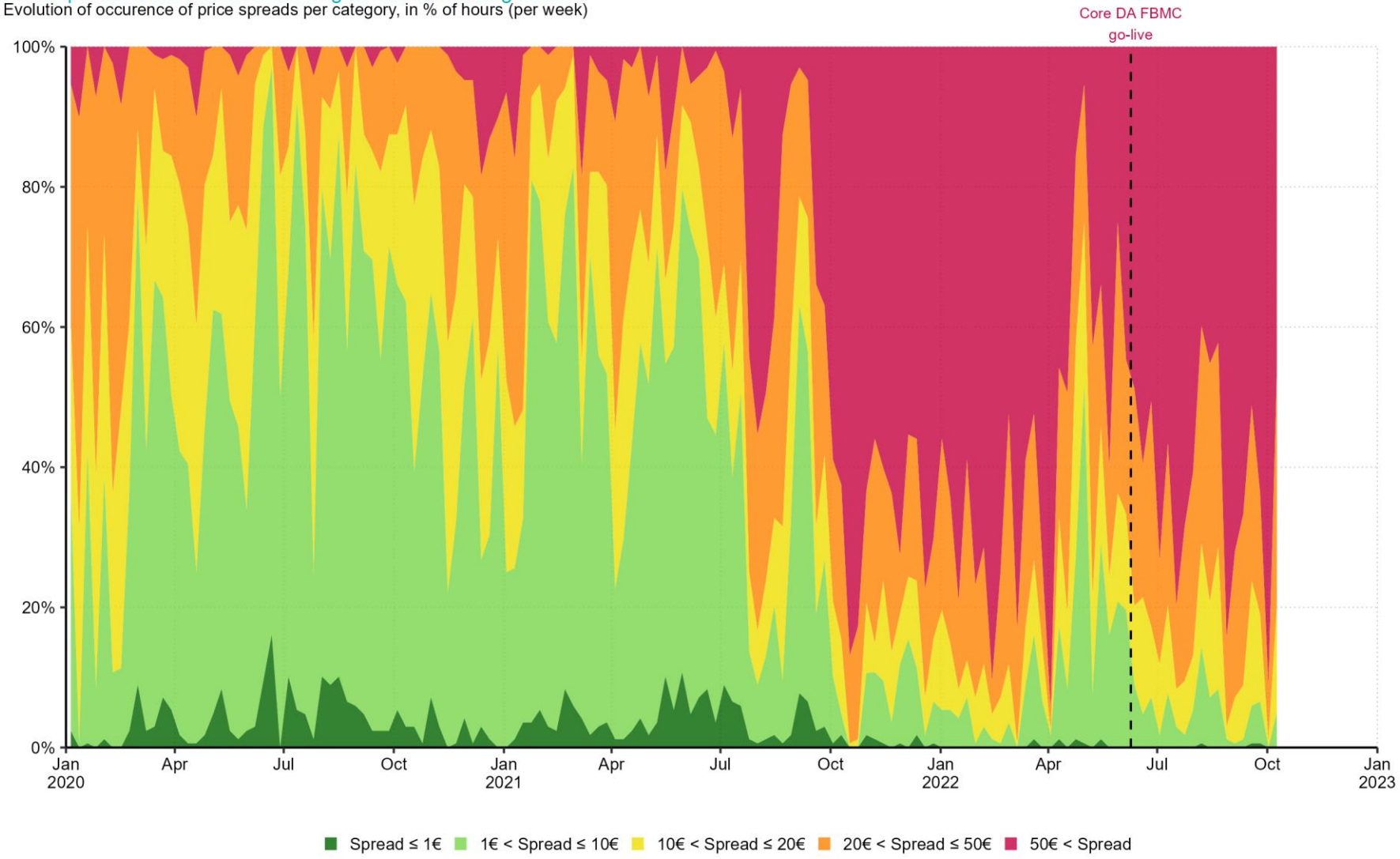
Evolution of occurence of price spreads per category, in % of hours (per week)



Source: calculations CREG based on data Entso-E Transparency Platform

Price spreads between Core bidding zones - excluding Poland

Evolution of occurence of price spreads per category, in % of hours (per week)



Source: calculations CREG based on data Entso-E Transparency Platform

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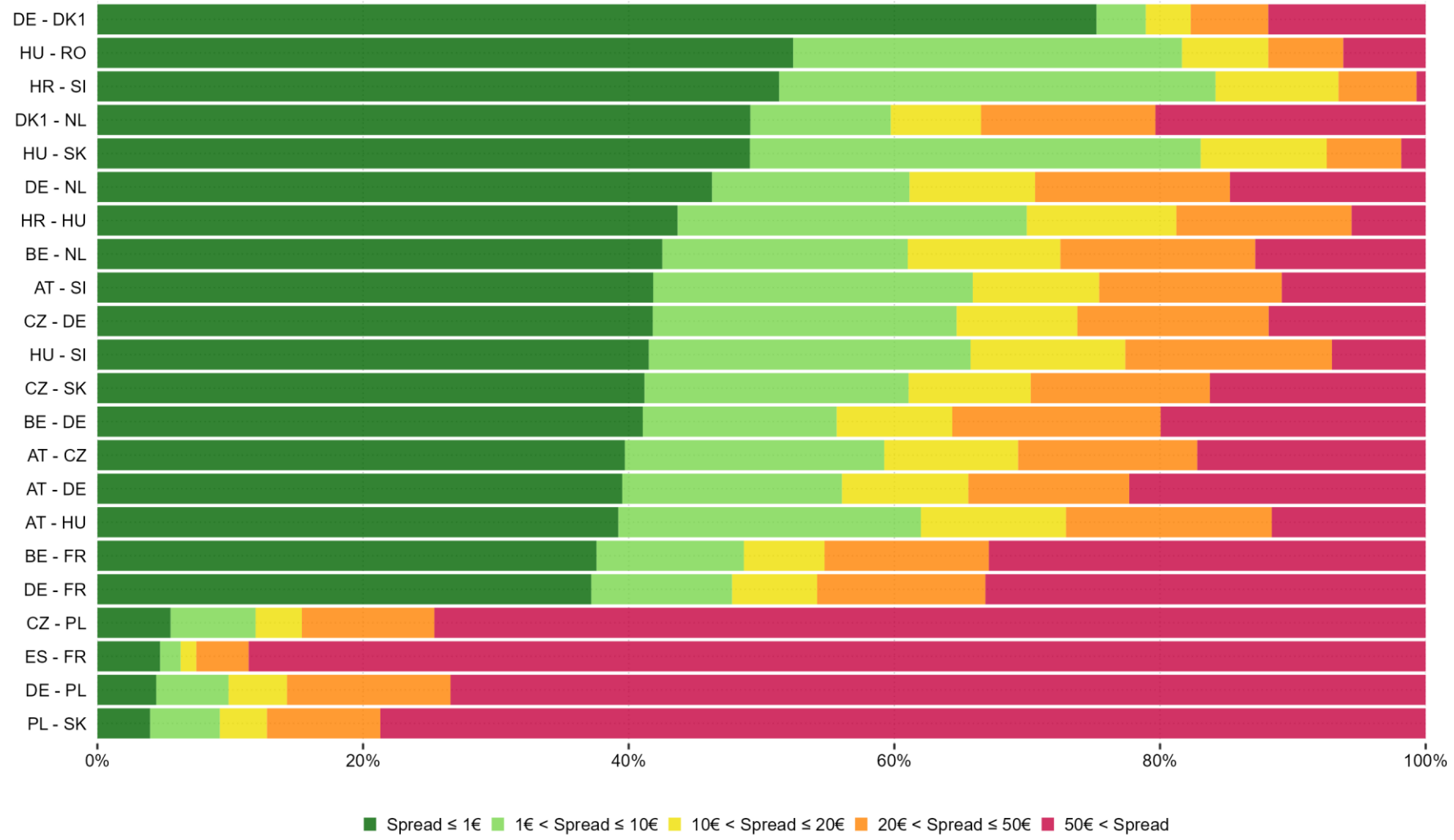
Price spreads per Core bidding zone border

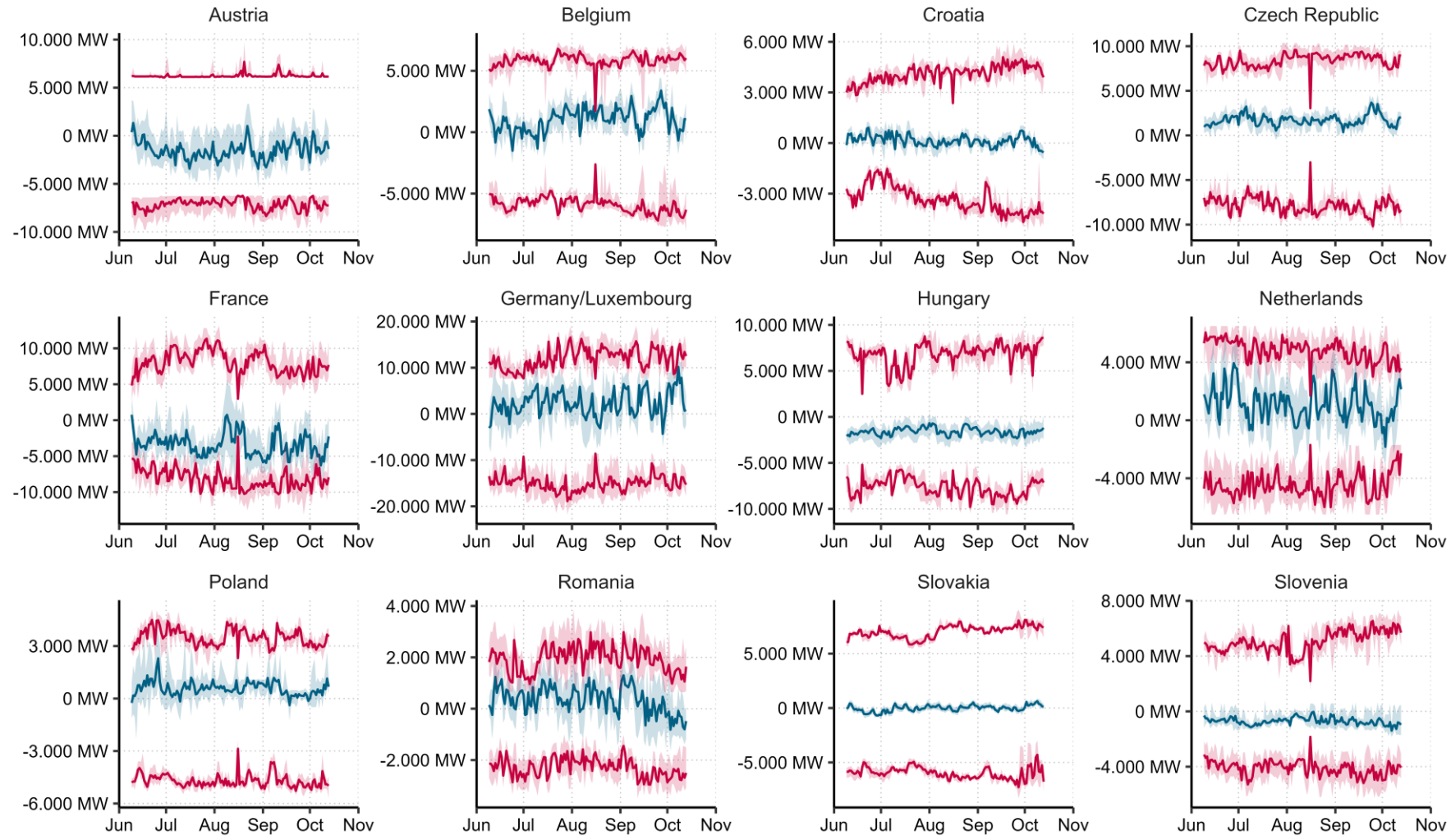
Occurence of price spreads per category for each border (Core + non-Core), in % of all hours between 9 June and 6 Oct 2022



Source: calculations CREG based on data JAO Publication Tool

Maximum import and export net positions for Core bidding zones

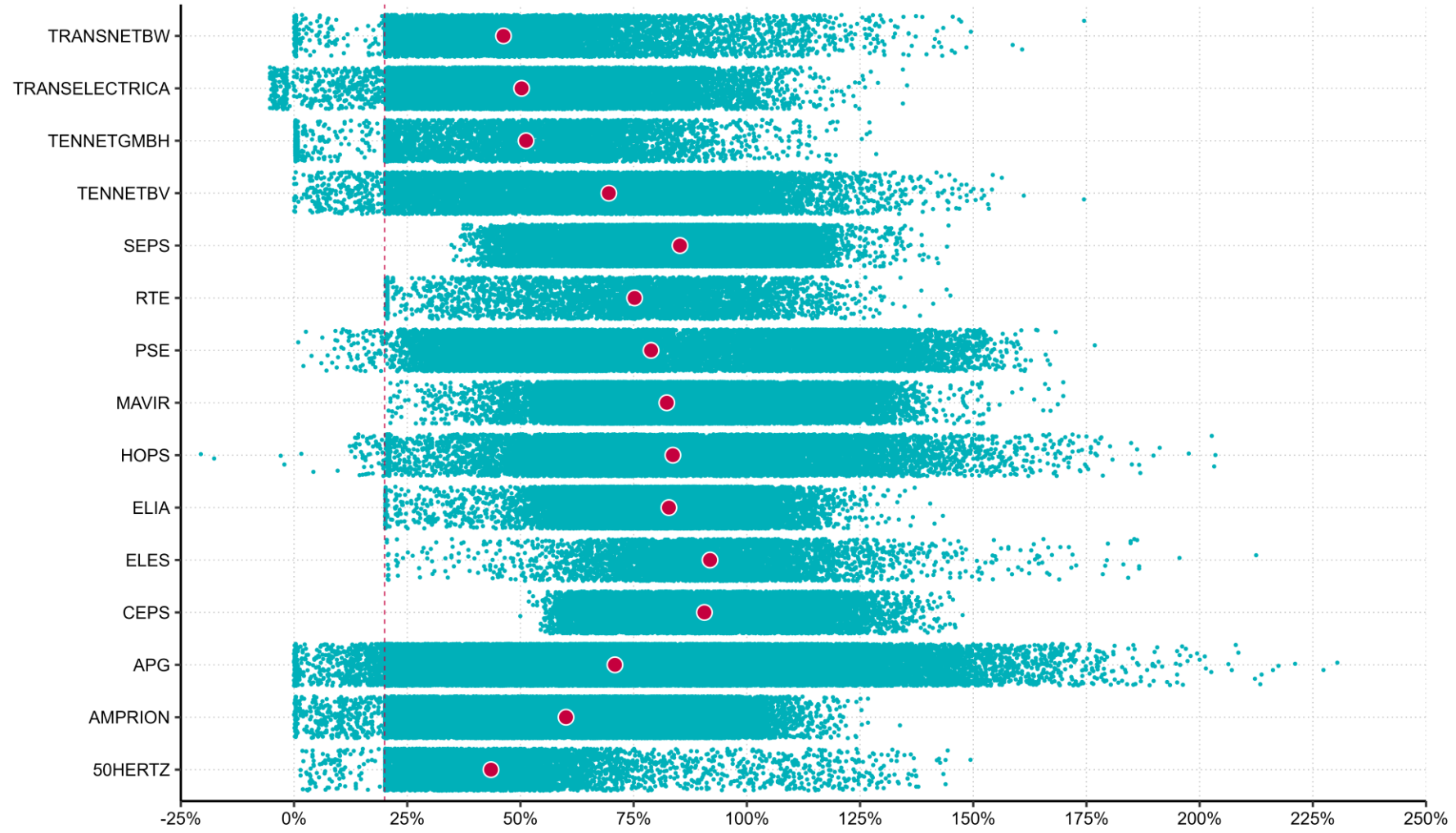
Evolution of daily **average maximum import (-) and export (+) positions** and **realized net position** for each Core bidding zone, in MWh/h



Source: calculations CREG based on data JAO Publication Tool

Margins for cross-zonal exchanges and violations of the 20% minRAM requirement

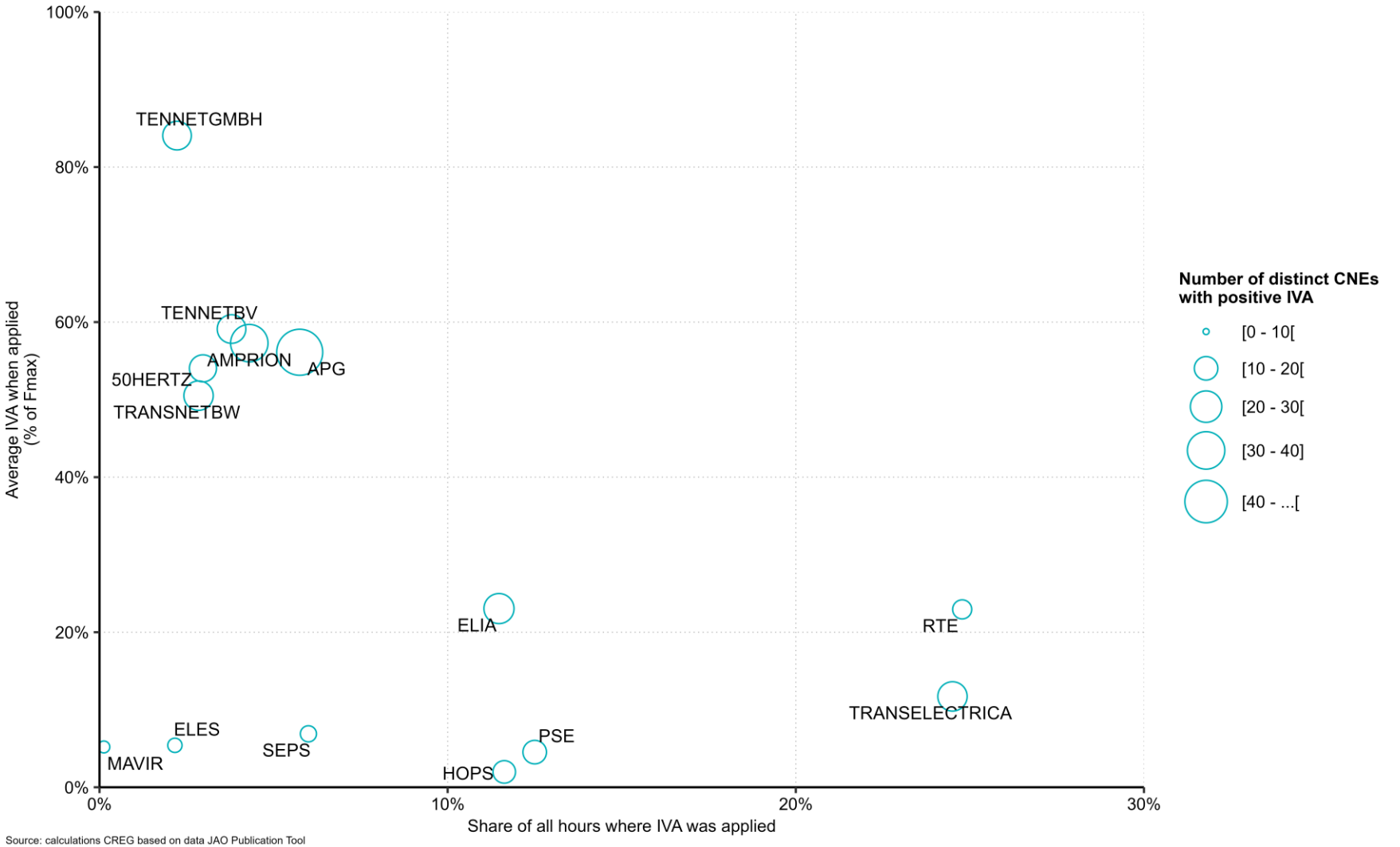
Margins on every CNEC and averages across all Core TSOs (in % of Fmax)



Source: calculations CREG based on data JAO Publication Tool
Note: 20% minRAM violations are evaluated as follows: (RAM + FItn + 3) / Fmax ≤ 20%

Validation reductions on critical network elements

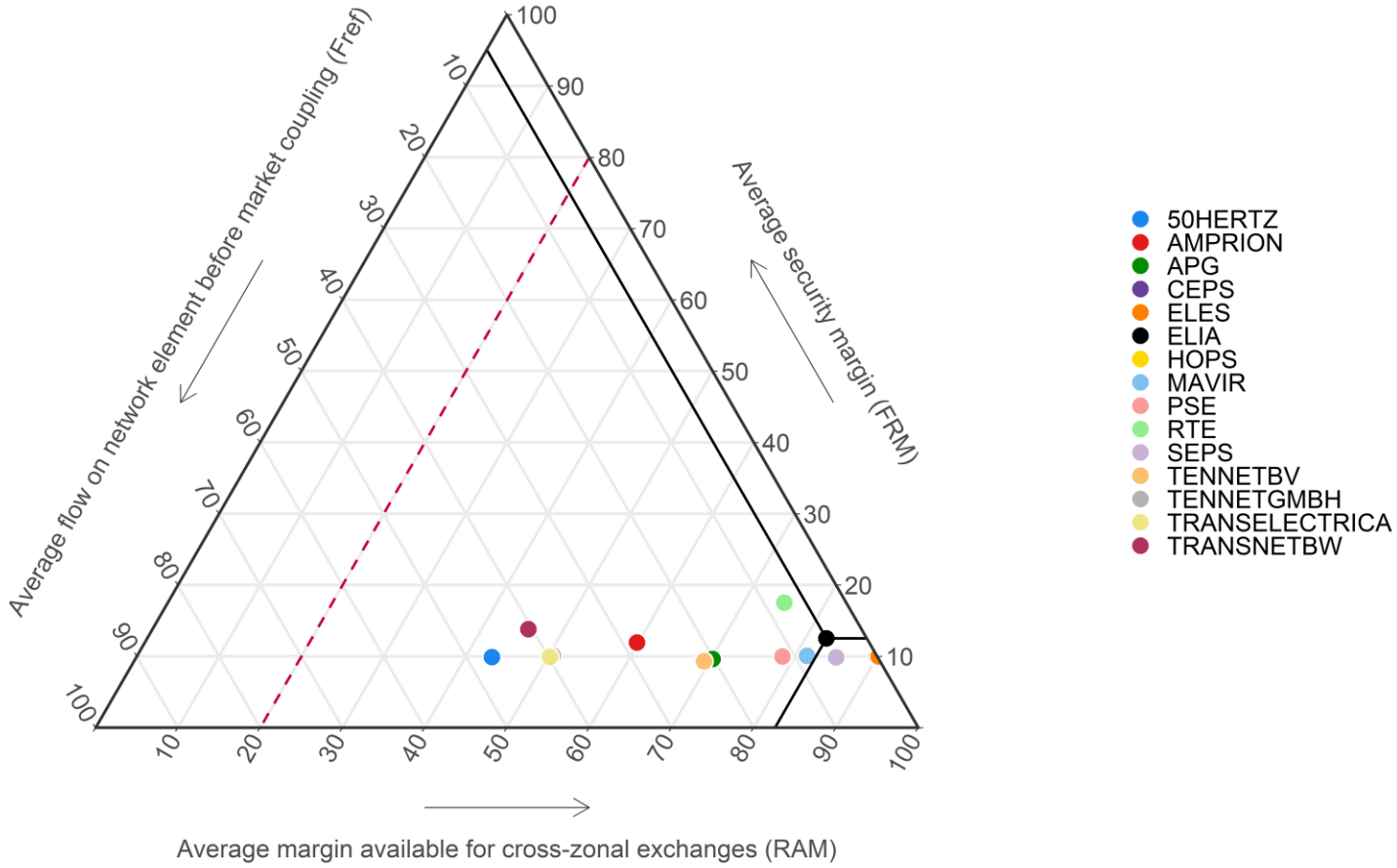
Share of hours with positive IVA, average IVA when applied and number of distinct CNEs with positive IVAs per TSO



Source: calculations CREG based on data JAO Publication Tool

Decomposition of margins on network elements

Average RAM, FRM and Fref per TSO on all network elements in presolved final domains, in % of Fmax

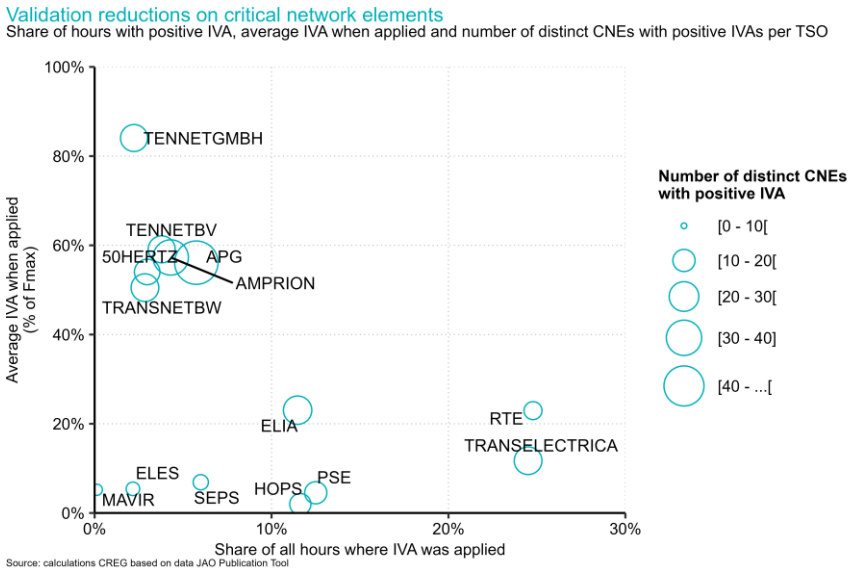


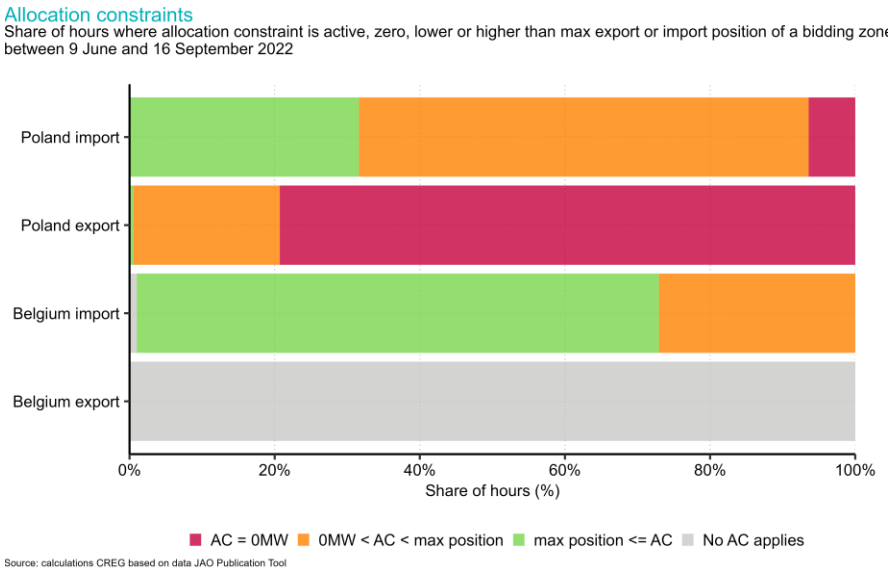
Source: calculations CREG based on data JAO Publication Tool

CREG's study on individual validation reductions and allocation constraints

https://www.creg.be/nl/publicaties/studie-f2458

- Describes the impact of individual adjustments to the outcome of the coordinated flow-based market coupling process, by means of **Individual Validation Reductions** (left) and **Allocation Constraints** (right)
- 2 case studies, describing the impact of the reductions on cross-zonal exchanges and price peaks
- Call for deleting allocation constraints and maintaining 20% as an **absolute** minimum
- Confirmation of earlier observations (CWE, Core // runs,…)





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Thanks for your attention!

Questions?

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Want to learn more?

Some links with useful materials, elaborating further on the details of the (Core) flow-based market coupling processes:

- CREG's study on the Core DA FBMC's external parallel run results: link
- CREG's investigation into the Core DA FBMC's go-live delay: link
- CREG's study on the impact of low RAM values: link

Monthly reports including Key Performance Indicators for the Core DA FBMC are published on the JAO web page: link

The decision from ACER which constitutes the legal basis for the Core DA FBMC's implementation can be accessed here: link

www.creg.be or Nico.Schoutteet@creg.be