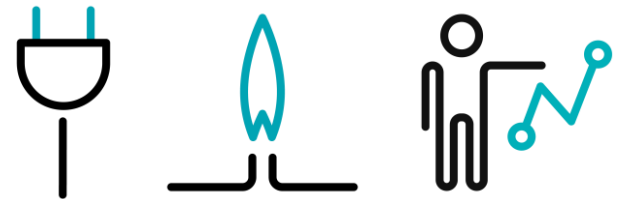


# Analysis of the Core Day-Ahead Flow-Based Market Coupling Project's go-live

**ELIA WG EMD & SO**

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14 October 2022



# 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 3<sup>rd</sup> and 4<sup>th</sup> 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](#))

**13 measures** for the consideration of policymakers,  
**future-proofing** the EU wholesale electricity market design

**ACER**  
European Union Agency for the Cooperation  
of Energy Regulators

 <p><b>1.</b> Speed up electricity market integration, implementing what is already agreed</p>	 <p><b>2.</b> Improve access to renewable Power Purchase Agreements (PPAs)</p>	 <p><b>3.</b> Improve the efficiency of renewable investment support schemes</p>
 <p><b>4.</b> Stimulate 'market making' to increase liquidity in long-term markets</p>	 <p><b>5.</b> Better integrate forward markets</p>	 <p><b>6.</b> Review (and potentially reduce, if warranted) collateral requirements</p>
 <p><b>7.</b> Preserve the wholesale price signal and remove barriers to demand resources providing flexibility</p>	 <p><b>8.</b> Shield those consumers that need protection the most from price volatility</p>	 <p><b>9.</b> Tackle avoidable supplier bankruptcies, getting the balance right</p>
 <p><b>10.</b> Tackle non-market barriers, ensuring generation and infrastructure is built at pace</p>	 <p><b>11.</b> Consider prudently the need for market interventions in situations of extreme duress; if pursued, consider tackling 'the root causes'</p>	 <p><b>12.</b> Consider public intervention to establish hedging instruments against future price shocks</p>
 <p><b>13.</b> Consider a 'temporary relief valve' for the future when wholesale prices rise unusually rapidly to high levels</p>	 <p><b>Want to learn more?</b> Check out the full report on ACER's Final Assessment of the EU Wholesale Electricity Market Design.</p>	

[www.acer.europa.eu](http://www.acer.europa.eu) [in linkedin.com/company/eu-acer/](https://www.linkedin.com/company/eu-acer/) [twitter.com/eu\\_acer](https://twitter.com/eu_acer)

*Sidenote: current context of sustainedly high electricity prices*

— **C REG** —

# ANALYSIS OF THE CORE DA FBMC

NET POSITIONS AND EXCHANGES

PRICES AND CONVERGENCE


AVAILABLE CAPACITIES, REFERENCE FLOWS AND SECURITY MARGINS

SHADOW PRICES



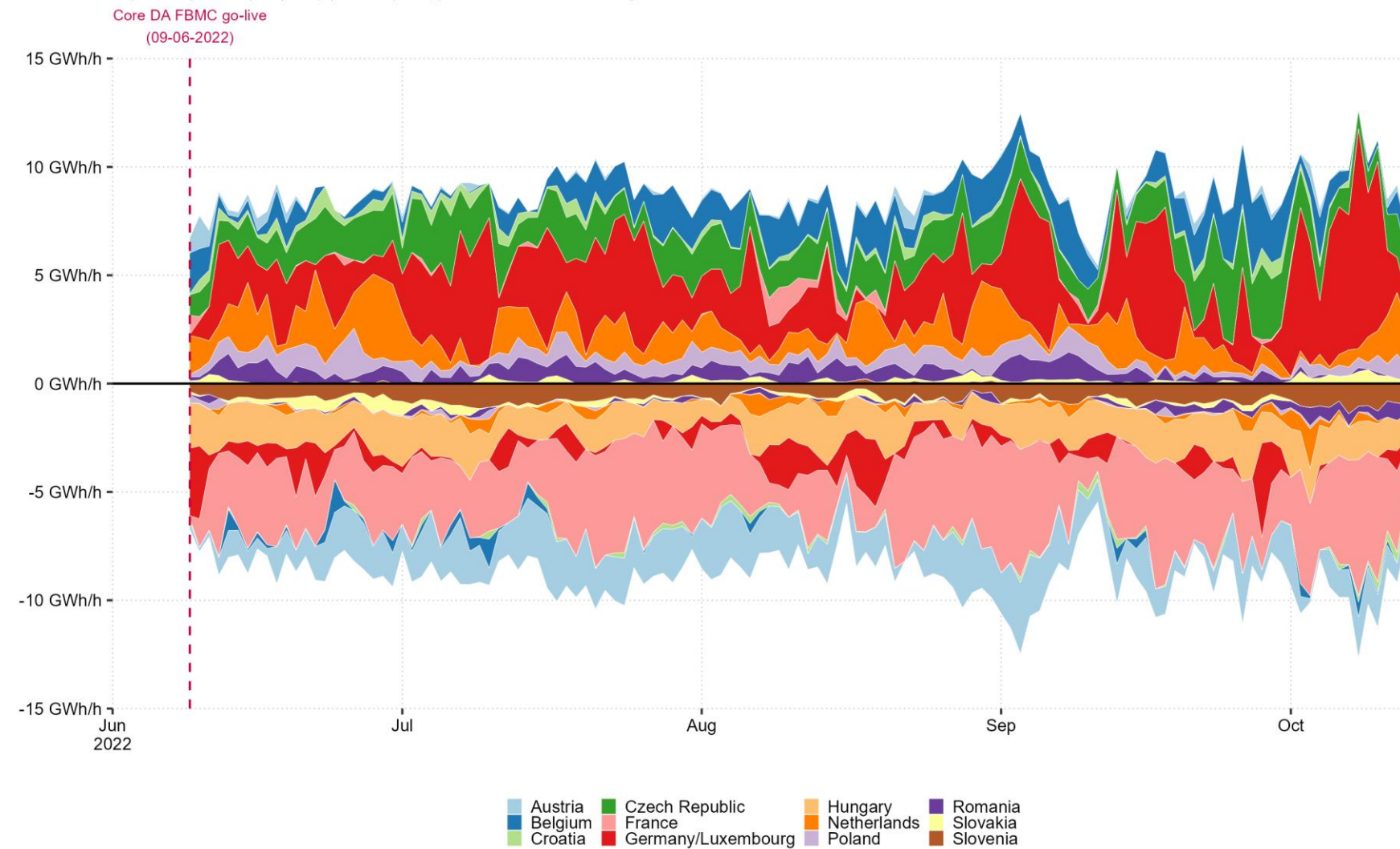
## Some words on the data...

- 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

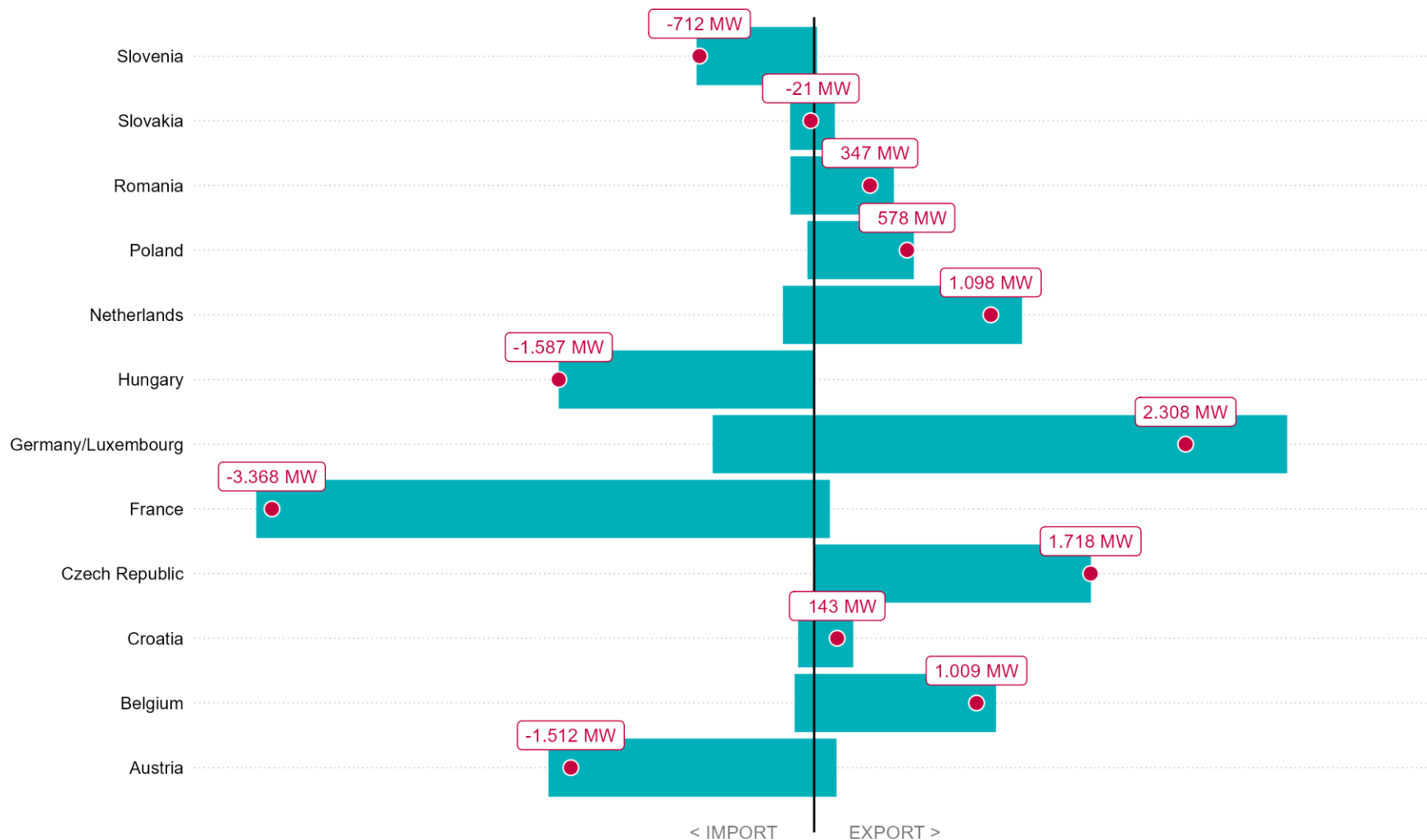
Evolution of daily average hourly export (+) and import (-) from and to Core bidding zones, in GWh/h



Source: calculations CREG based on data JAO Publication Tool

## Core net positions per bidding zone

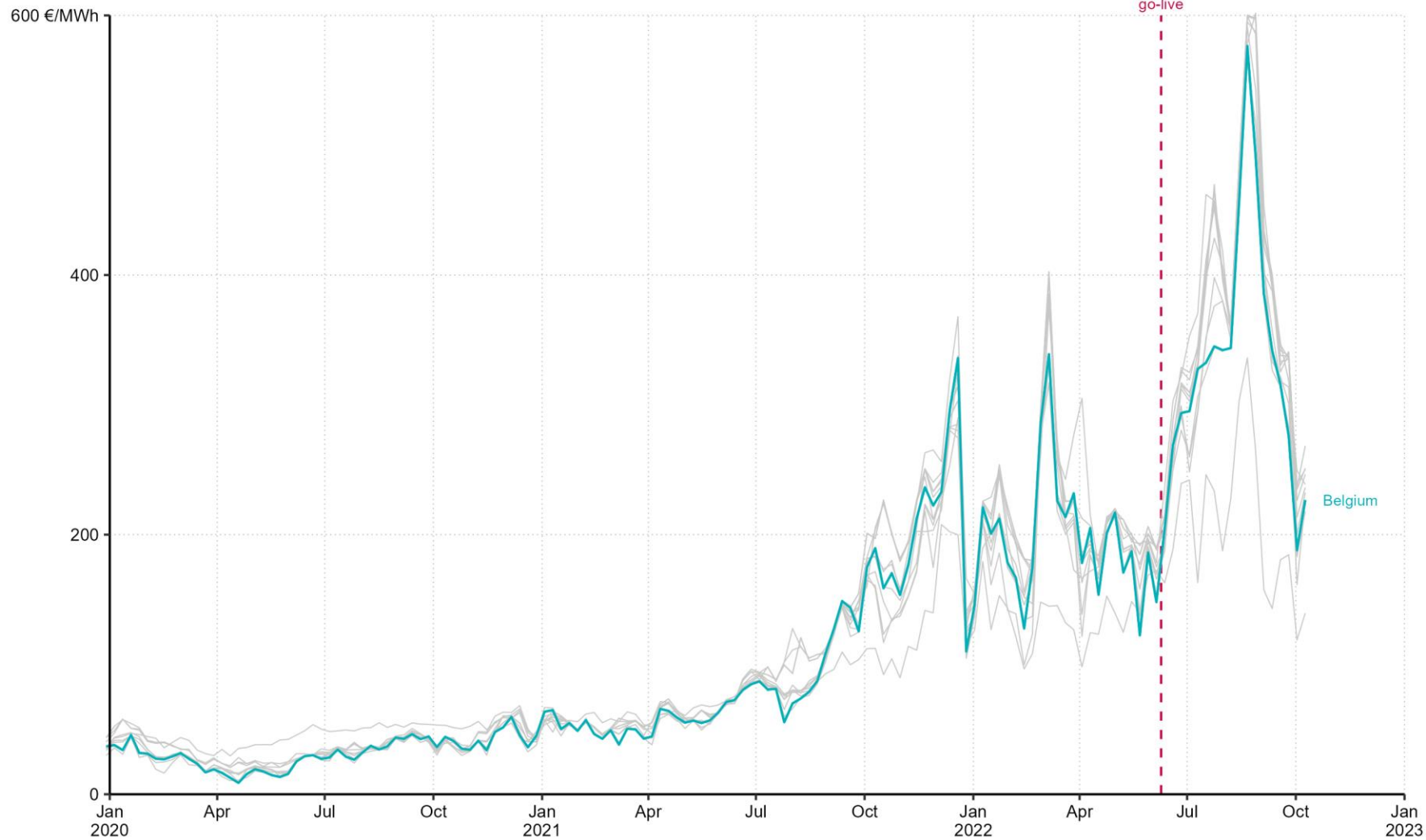
Average export (+), import (-) and net export (red) for Core bidding zones between 09 June and 13 October 2022



Source: calculations CREG based on data JAO Publication Tool

## Clearing prices in Core bidding zones

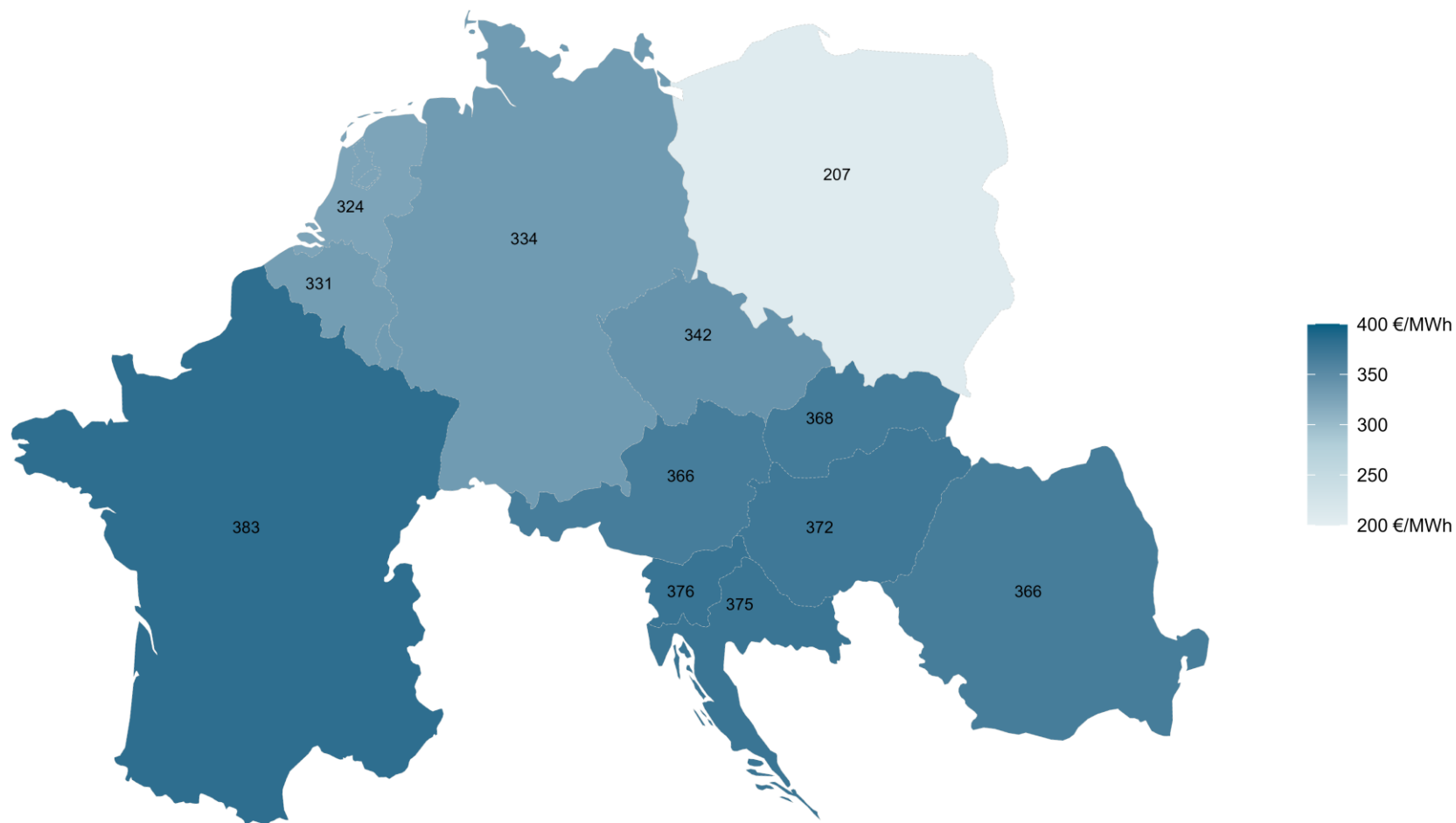
Evolution of weekly average clearing price in selected bidding zones, in €/MWh



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

## Clearing prices in Core bidding zones

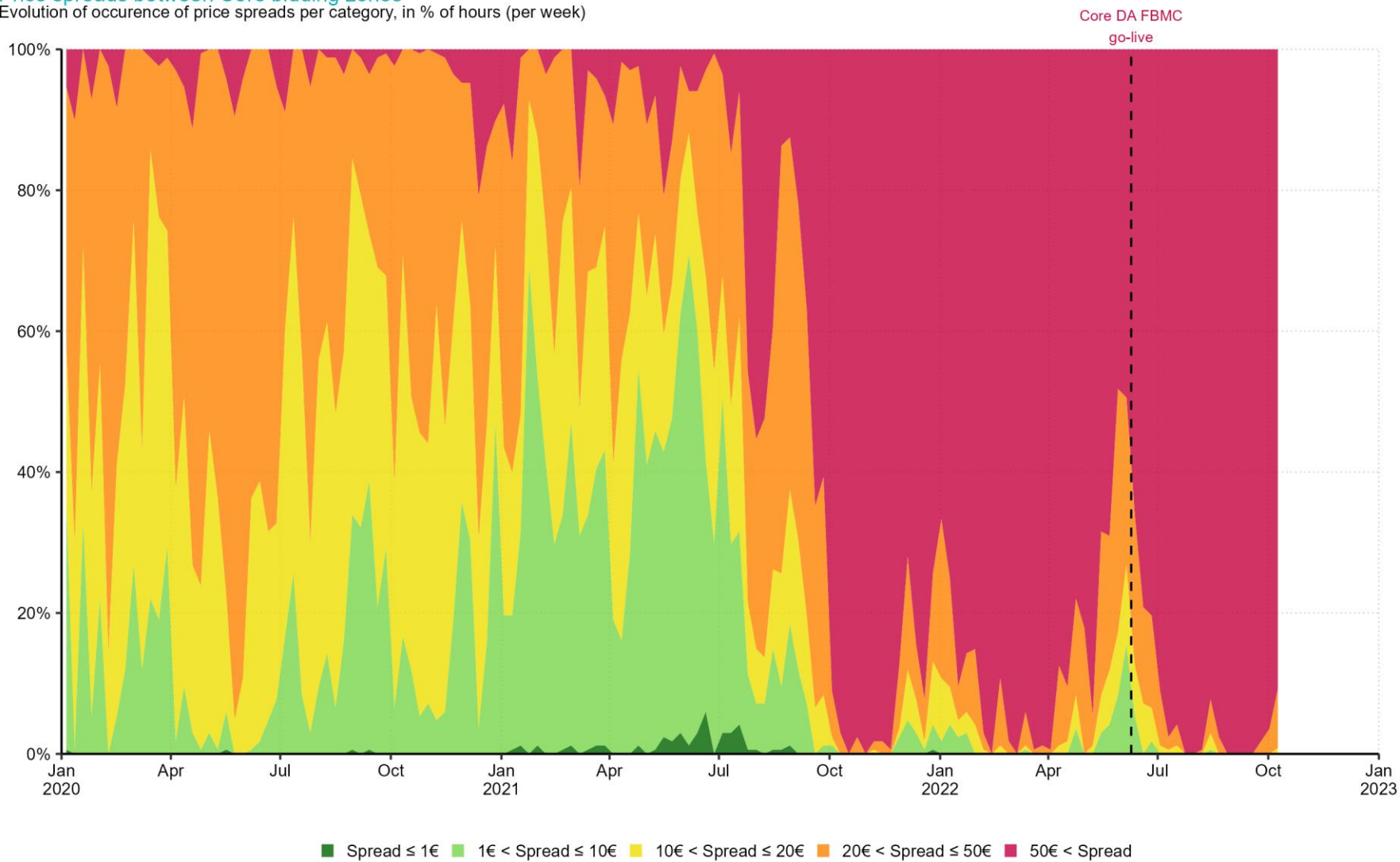
Average clearing price in selected bidding zones, between 9 June and 13 October 2022, in €/MWh



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

## Price spreads between Core bidding zones

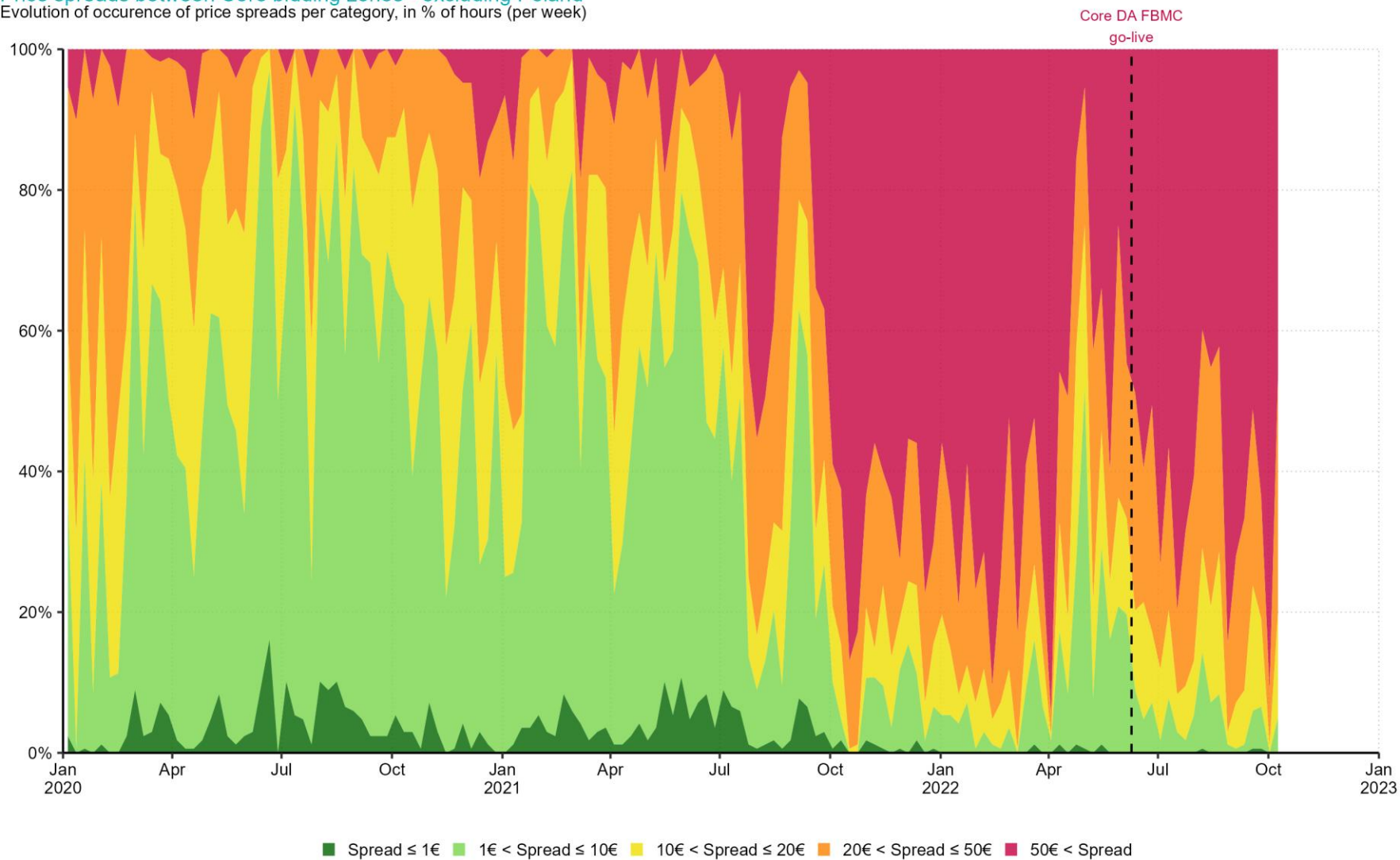
Evolution of occurrence of price spreads per category, in % of hours (per week)



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

## Price spreads between Core bidding zones - excluding Poland

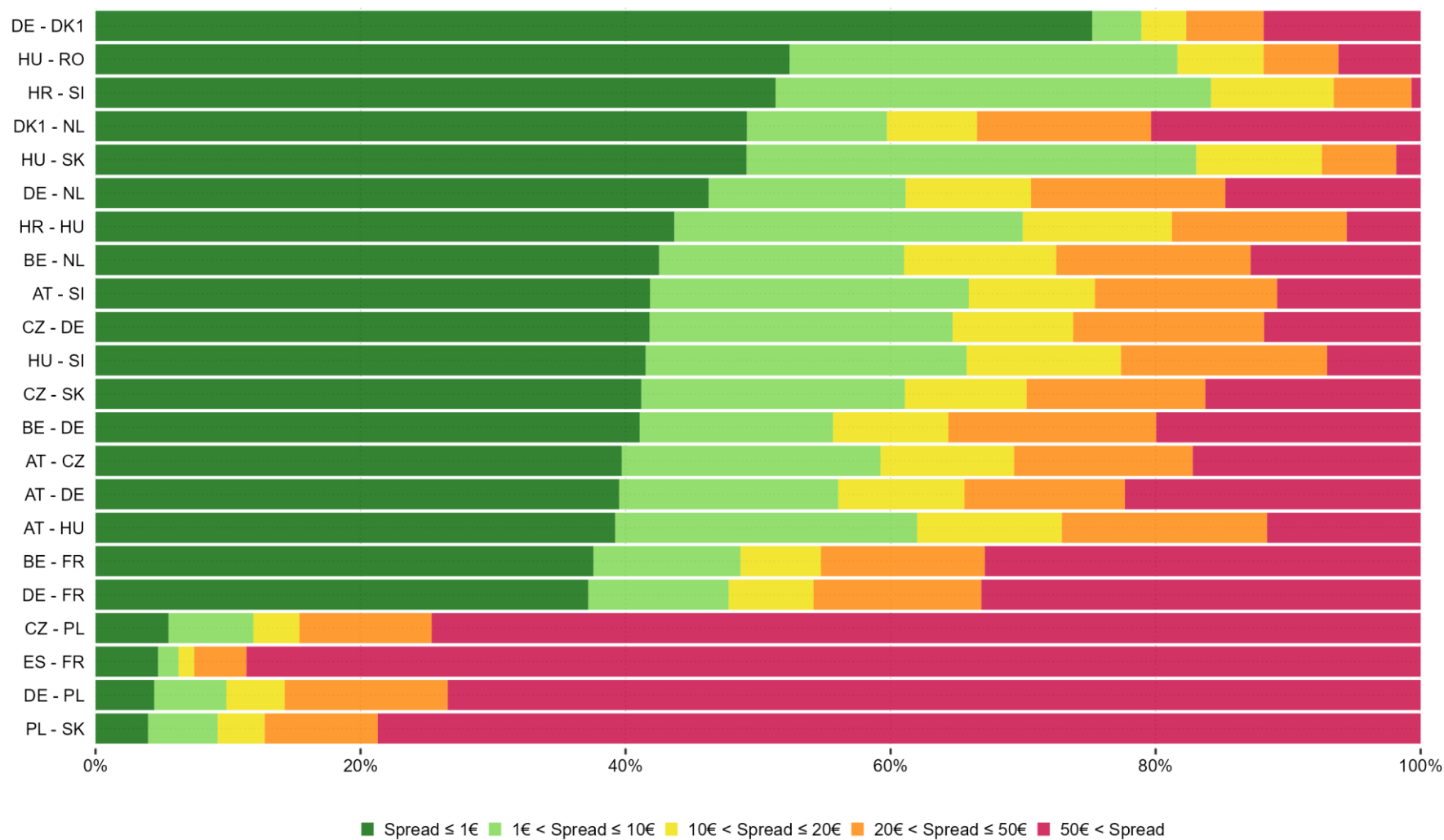
Evolution of occurrence of price spreads per category, in % of hours (per week)



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

## Price spreads per Core bidding zone border

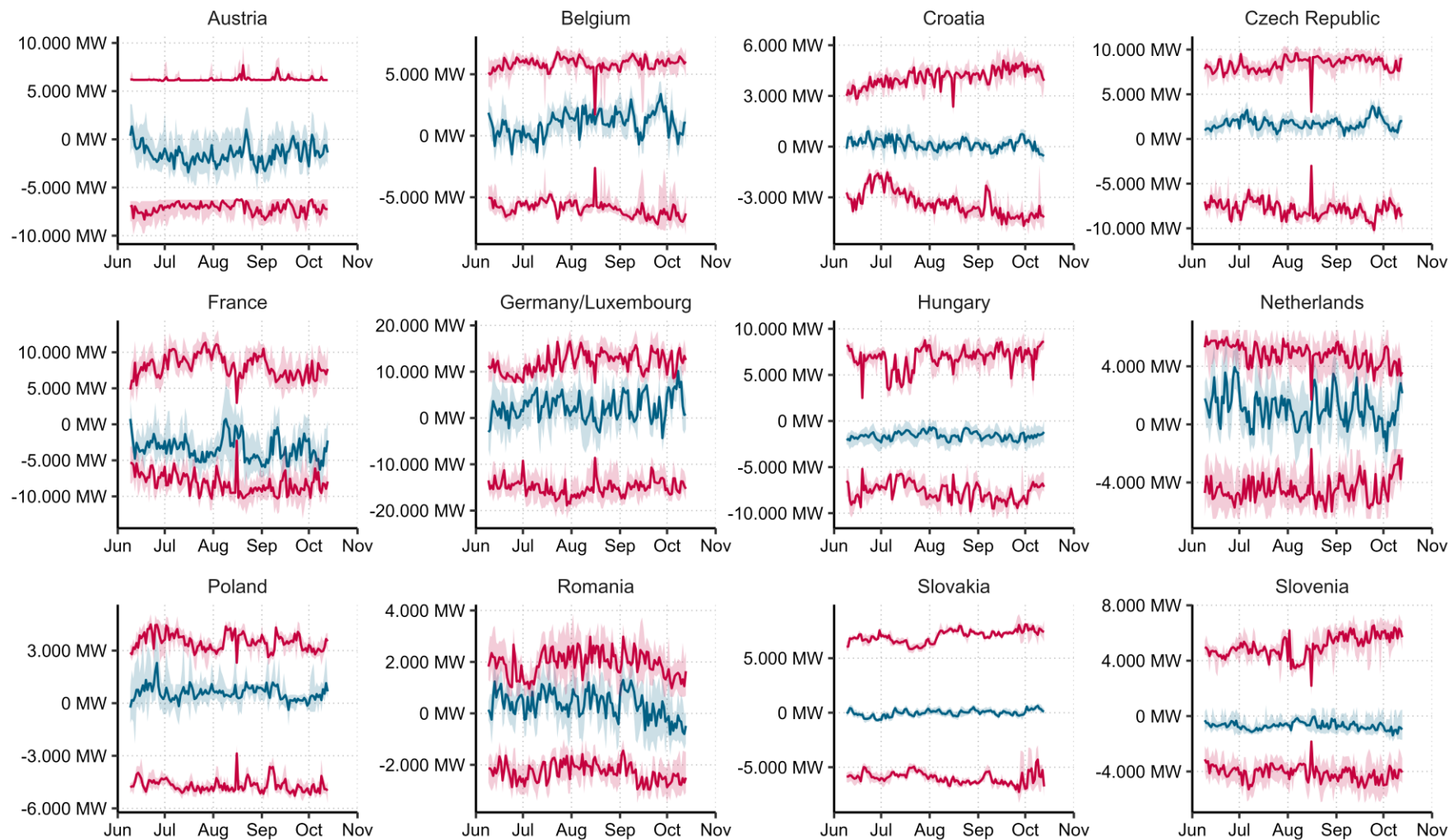
Occurrence of price spreads per category for each border (Core + non-Core), in % of all hours between 9 June and 6 Oct 2022



Source: calculations CREG based on data JAO Publication Tool

## Maximum import and export net positions for Core bidding zones

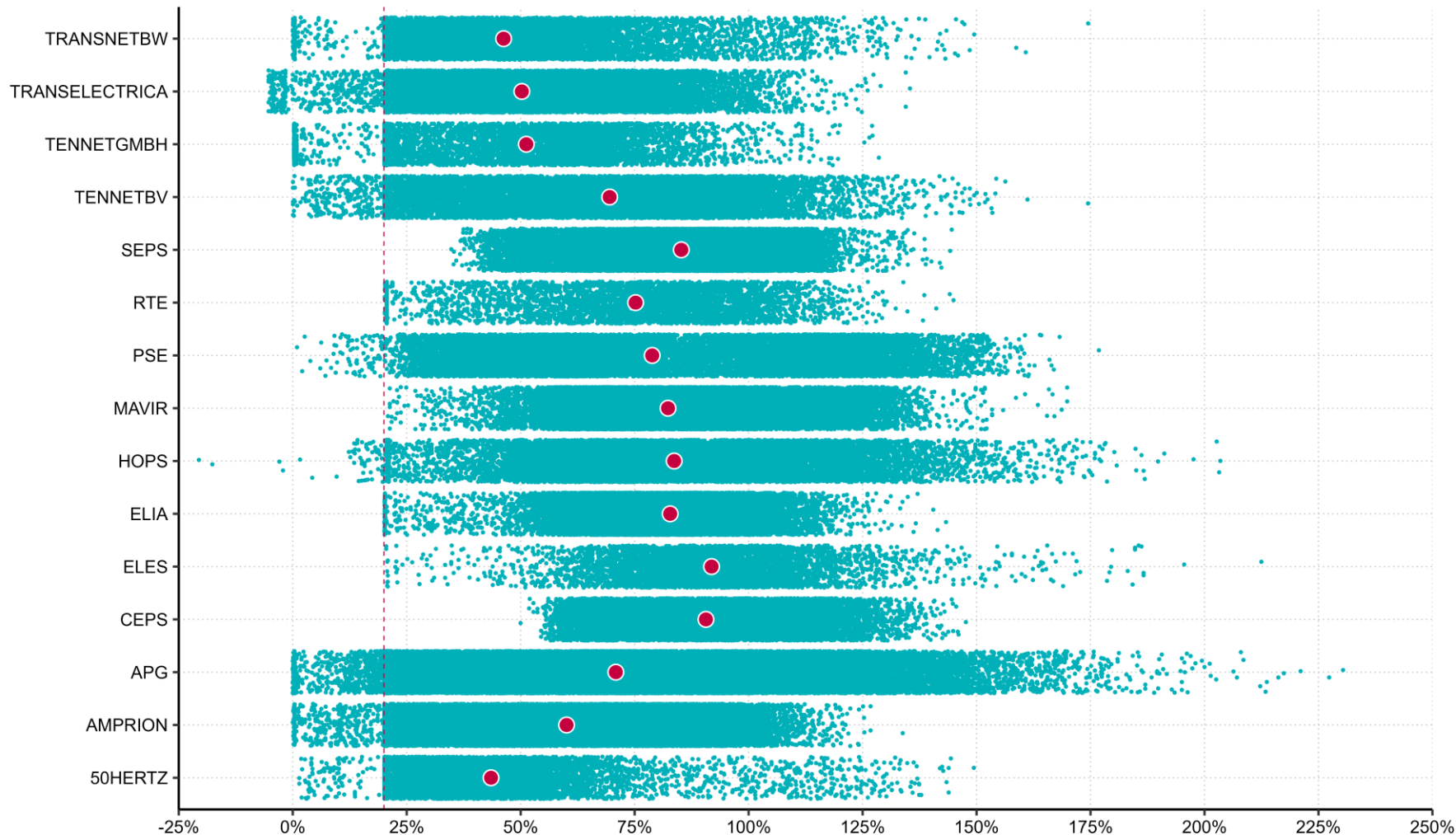
Evolution of daily **average maximum import (-) and export (+) positions** and **realized net position** for each Core bidding zone, in MWh/h



Source: calculations CREG based on data JAO Publication Tool

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

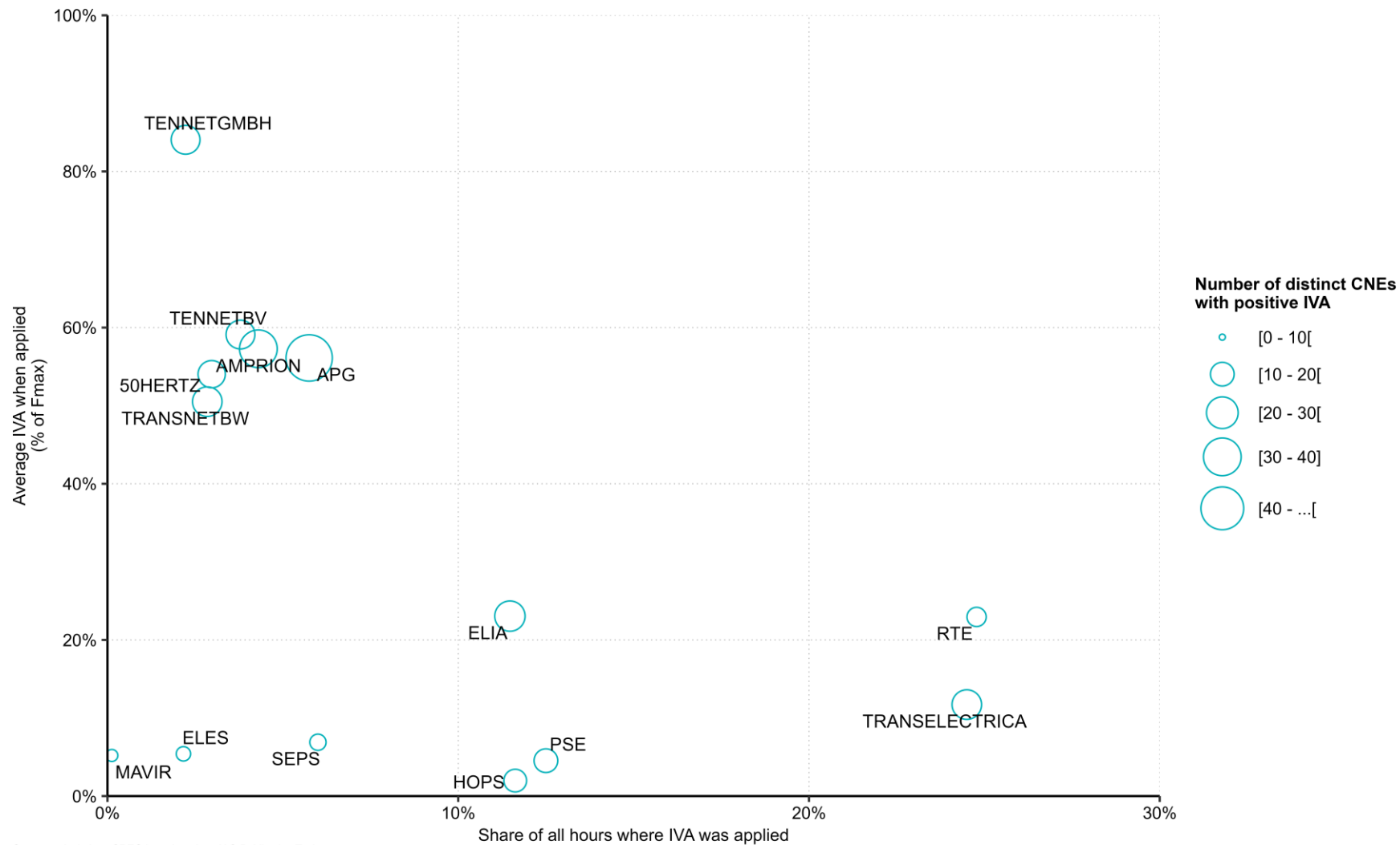
Margins on every CNEC and averages across all Core TSOs (in % of Fmax)



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

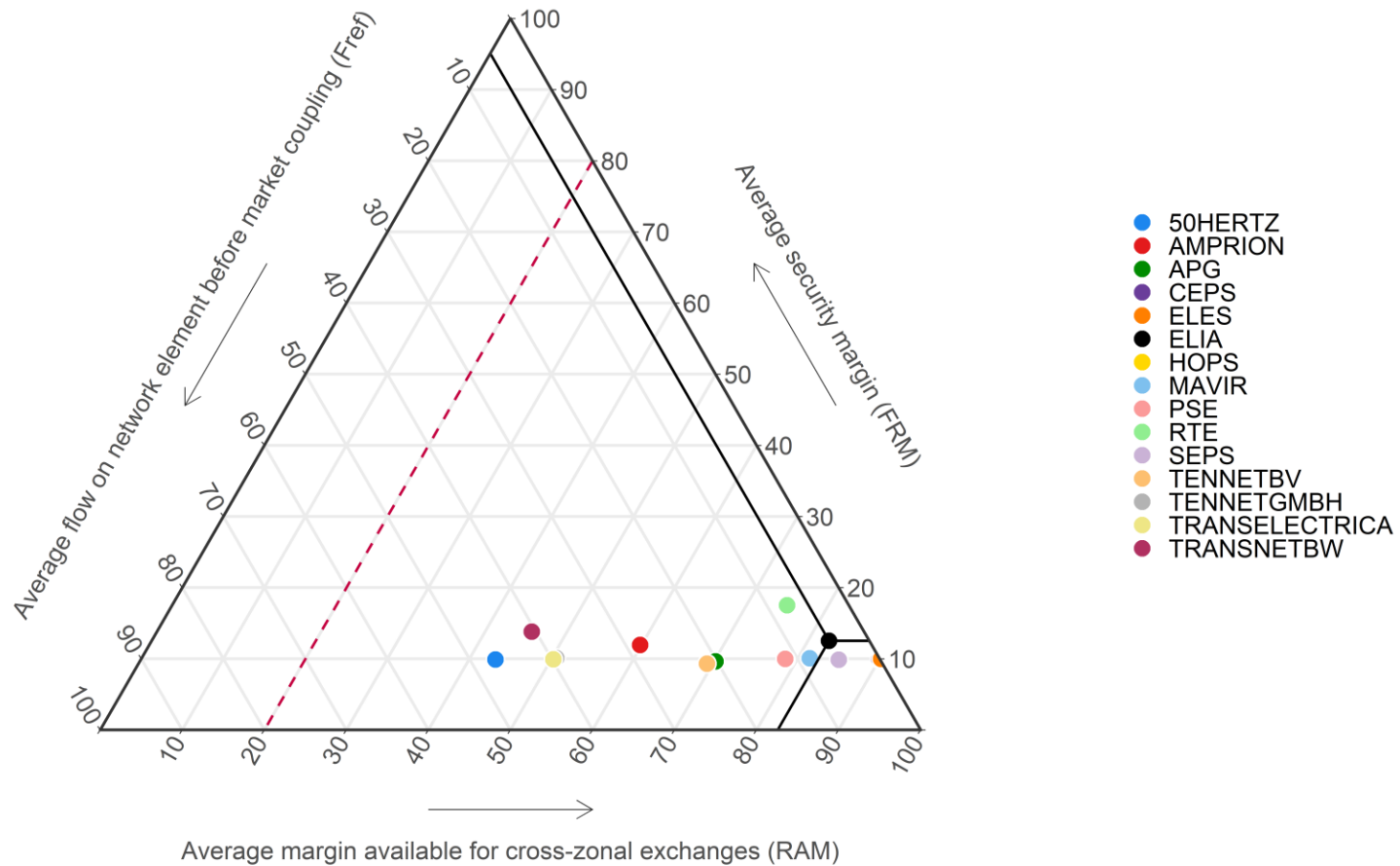
## Validation reductions on critical network elements

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



## 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

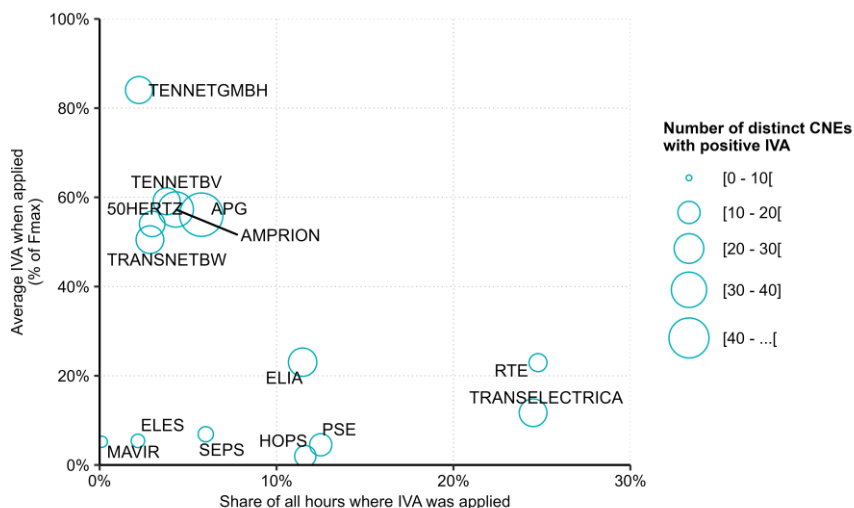
# CREG's study on individual validation reductions and allocation constraints

<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,...)

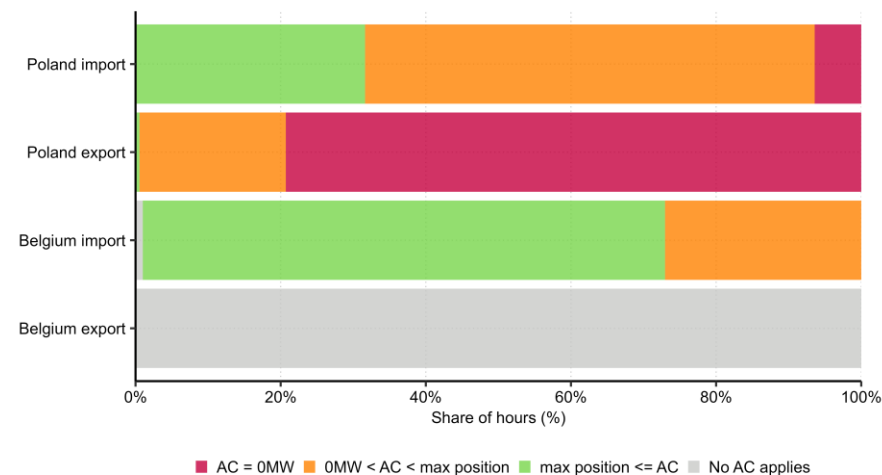
## Validation reductions on critical network elements

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



## Allocation constraints

Share of hours where allocation constraint is active, zero, lower or higher than max export or import position of a bidding zone between 9 June and 16 September 2022



# CREG



**Thanks for your attention!**

Questions?

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Commission for Electricity and Gas Regulation

## 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](http://www.creg.be) or ✉️ [Nico.Schoutteet@creg.be](mailto:Nico.Schoutteet@creg.be)