

Cross-Border Integration of European Short-Term Electricity Markets: An Empirical Approach.

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Extended Abstract

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Abstract Summary

This study analyzes the cross-border integration of European short-term electricity markets, covering the day-ahead market, intraday auctions, intraday continuous trading, and balancing markets. While European market coupling is well established in the day-ahead market and has progressed in the intraday stage through the Single Intraday Coupling (SIDC), the cross-border integration of balancing markets via the PICASSO and MARI platforms remains less transparent and less studied academically. This gap is increasingly relevant as higher shares of variable renewable energy amplify forecast uncertainty and the need for efficient short-term coordination.

The paper combines a qualitative assessment of market design with quantitative empirical analysis. The qualitative part reviews the clearing mechanisms, price formation, and cross-border capacity usage across short-term markets, highlighting structural assumptions and bottlenecks that complicate interpretation and consistent modeling across timeframes. The quantitative part investigates price convergence and correlations between day-ahead, intraday, and balancing markets, focusing on Belgium as a case study and extending to cross-country comparisons. It also evaluates the impact of cross-border balancing platforms on price convergence, congestion, and the efficiency of balancing asset dispatch.

The qualitative analysis identifies key drivers of price formation, including cross-border capacity availability, elastic balancing demand, and local reserve bid volumes. It further highlights interesting features of the integrated European short-term markets, such as priority netting in the PICASSO balancing platform and its effects on cross-border flows and price signals. Empirical results show correlations between short-term market prices, reflecting both the reduction of forecast uncertainty as real time approaches and the incentives of market participants to shift trading across timeframes to seek most favorable prices. Also, the quantitative analysis shows the influence of the introduction of PICASSO and MARI platforms on price convergence across short-term markets and between countries.

Presenting Author Biography

Elise Chambard is a PhD researcher affiliated with KU Leuven (ESIM research group) and EnergyVille. Her research focuses on the design of short-term electricity markets and their implications for price formation, operational strategies, and risk exposure of different market participants, with a particular emphasis on the efficient integration of offshore wind power. She employs empirical analysis alongside a dedicated modeling framework to compare alternative market designs, quantify their welfare effects, and assess their impact on market outcomes. Prior to starting her PhD, Elise obtained an MSc in Energy Engineering from KU Leuven.