

Effects and limits of the Imbalance settlement price mechanism as an incentive instrument in France: an empirical analysis.

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Extended Abstract

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Abstract Summary

Electrical power systems require constant balance between generation and consumption. In decentralized market organizations, this balance emerges from the interaction of multiple stakeholders, in particular Balancing Responsible Parties (BRPs) and Transmission System Operators (TSOs). BRPs and TSOs have distinct perspectives on imbalance: BRPs manage their portfolio with the objective of profit maximization, whereas TSOs treat system imbalance as a physical constraint and ensure system security by activating balancing reserves close to real-time.

As European markets evolve toward greater harmonization and assign increasing balancing responsibilities to BRPs, understanding how imbalance price signal influences market players behavior become essential. This study investigates imbalance incentives during large system imbalances, with a particular focus on the French imbalance price design.

We first review the main imbalance pricing schemes implemented across Europe, identify the conditions under which these schemes provide the intended incentives and examine the literature associated to incentive distortions under these schemes. We then develop an analytical framework, which we apply to the French imbalance mechanism design to evaluate its incentive structure and assess BRPs' responses during extreme imbalance events.

Our analysis suggests that imbalance price signals may fail to align profit-maximizing strategies with the behavior expected from BRPs. Such situations become particularly critical when the system is already under strain. These findings underline the importance of carefully designing imbalance pricing mechanisms.

Presenting Author Biography

Jules is a PhD student at CentraleSupélec (LGI) in collaboration with RTE (le réseau de transport d'électricité). He started his PhD in septembre 2025 after graduating from CentraleSupélec.