



Policy Options to Anticipate Europe's Long-Duration Energy Storage Deployment

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Position Paper

Executive Summary

Europe's energy transition has entered a decisive phase. With renewable generation already exceeding [70% of supply in some Member States during certain hours or seasons](#), the core challenge is shifting from capacity expansion to system integration. This requires flexibility resources that can manage variability while maintaining reliability, and policy frameworks that accurately value assets capable of delivering extended firmness, fast response, and controllability under system stress.

Long-duration energy storage (LDES) is one of the solutions that can provide these capabilities, alongside other storage and flexibility resources. By storing renewable electricity over multi-hour to multi-day periods and dispatching it during supply shortfalls, LDES converts variable generation into firm, zero-emission supply. In doing so, it supports system reliability, reduces curtailment and external dependencies, improves congestion management and balancing efficiency, maximises renewable integration, and strengthens industrial competitiveness by enabling stable clean power for energy-intensive industries, electrified industrial processes, and large consumers such as data centres.

Despite its strategic value, long-duration energy storage remains marginal in many European Union planning and market frameworks. While some Member States are beginning to recognise its role—particularly within capacity mechanisms—current approaches often fail to distinguish between nominal duration and effective system contribution. As a result, LDES is frequently absent or underrepresented in key instruments such as National Energy and Climate Plans, resource adequacy assessments, and grid development plans, leading to systematic undervaluation of solutions that provide extended firmness and operational flexibility.

This lack of recognition reinforces investment barriers. The absence of predictable, long-term revenue frameworks for capital-intensive assets increases investor risk, especially for projects reliant on multi-service revenue streams. Procurement designs based on rigid duration thresholds rather than performance-based adequacy metrics further weaken bankability, raise the cost of capital, and slow deployment, increasing system costs and prolonging reliance on fossil backup capacity.

Europe therefore faces a strategic choice: continue relying primarily on conventional flexibility—accepting higher costs and volatility—or adopt a portfolio-based approach that recognises extended-duration, fast-responding, and highly controllable storage assets, alongside multi-day solutions, as critical energy infrastructure. Such an approach would strengthen security of supply and system resilience, enable efficient integration of high shares of renewables, and support Europe's clean industrial competitiveness over the long term.

This paper assesses the system value of long-duration energy storage, identifies the barriers to its deployment, reviews existing support options, and proposes recommendations to better align European energy, industrial, and financing frameworks with the long-term flexibility needs of a fully decarbonised power system, while ensuring technology-neutral recognition of firm contribution across storage durations and operating profiles.