

Long-Duration Energy Storage: Regulatory environment and business models in Germany, France and Italy

Supporting the SPRIND LDES Challenge

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SPRIND – enabling disruptive innovations

- Bridging the gap between research and market entry
 - Focused on disruptive innovations
 - Supporting our teams financially, with expertise, and through ecosystem building
- SPRIND LDES Challenge
 - Storage of renewable energy enables energy resilience and energy independence
 - Motto: betting on the race, not the horse
 - 2.5 years, 2 stages, coopetition encouraged
 - Goals: discharge electricity for >10h, no critical raw materials, at scale cost competitive, scalability towards GWh, independent of geography
- More information about the SPRIND and the LDES Challenge
 - [SPRIND](#)
 - [LDES Challenge](#)

The study

- Presentation results today for Italy, France and Germany
- Relevant regulatory challenges for LDES deployment
- Which business models are currently feasible
- The full study is accessible [here](#)



Regulatory overview

	Germany	France	Italy
Access to Day-ahead and Intraday Markets			

	Germany	France	Italy
Co-location of RES and storage allowed			

Ancillary Services Frequency-related

Country	Balancing Services (BS)	Frequency Services (FS)
Germany		
France		
Italy		

Ancillary Services Non-Frequency-related

Country	Access rating
Germany	
France	
Italy	

Capacity markets

Country	Market access rating
Germany	
France	
Italy	

Policies and Regulations

	Germany	France	Italy
Grid Charges	Yes, exceptions for assets built 2011 – 2026* (extension till 2029 under discussion)	Yes, both withdrawal and injection charges (transmission grids), only withdrawal (distribution grids)	No, exceptions from grid tariffs and charges for withdrawing and re-injection
Taxes & Levies	Yes, exceptions for assets built 2011 – 2026*	Partially, only on withdrawn electricity, not injected	Yes, consumption tax; self-consumption is exempt
Energy Storage Strategy	Announced, not published	No dedicated strategy, but NECP	Yes, in 2021
Build-out targets	Not defined	No dedicated deployment target beyond 1-2 GW/y PHS expansion	Yes, 15 GW till 2030, 9 GW for 8h
Subsidy schemes for energy storage	EEG, tenders for with renewable power generation coupled with local hydrogen storage	Electricity storage tender mechanism in preparation	Dedicated auction for storage assets with 8h storage time

Best practices to LDES deployments

- Remove disadvantages for LDES (grid charges etc.)
- Deployment targets for LDES
 - Differentiated targets for different storage durations
- Creation of capacity markets for revenue certainty
- Liberalization and harmonization for the procurement of ancillary services
- Favorable regulation of revenue stacking

Business models for LDES

1 Stand-alone grid scale storage

Wholesale Market
arbitrage

Participation on the
Capacity Market

Balancing and frequency
ancillary services

Provision of other ancillary
services

2 Co-location with renewable plants

Capacity firming

Curtailment minimisation

Overcoming grid
connection restraints

Enabling the provision of
ancillary services

3 Customer energy management

Maximise self-
production/consumption

Load shifting

Continuity of electricity
supply and quality

Arbitrage on wholesale and
ancillary services markets

4 Storage-as-transmission asset

Congestion management

Grid upgrade cost deferral

Modeling of IRR

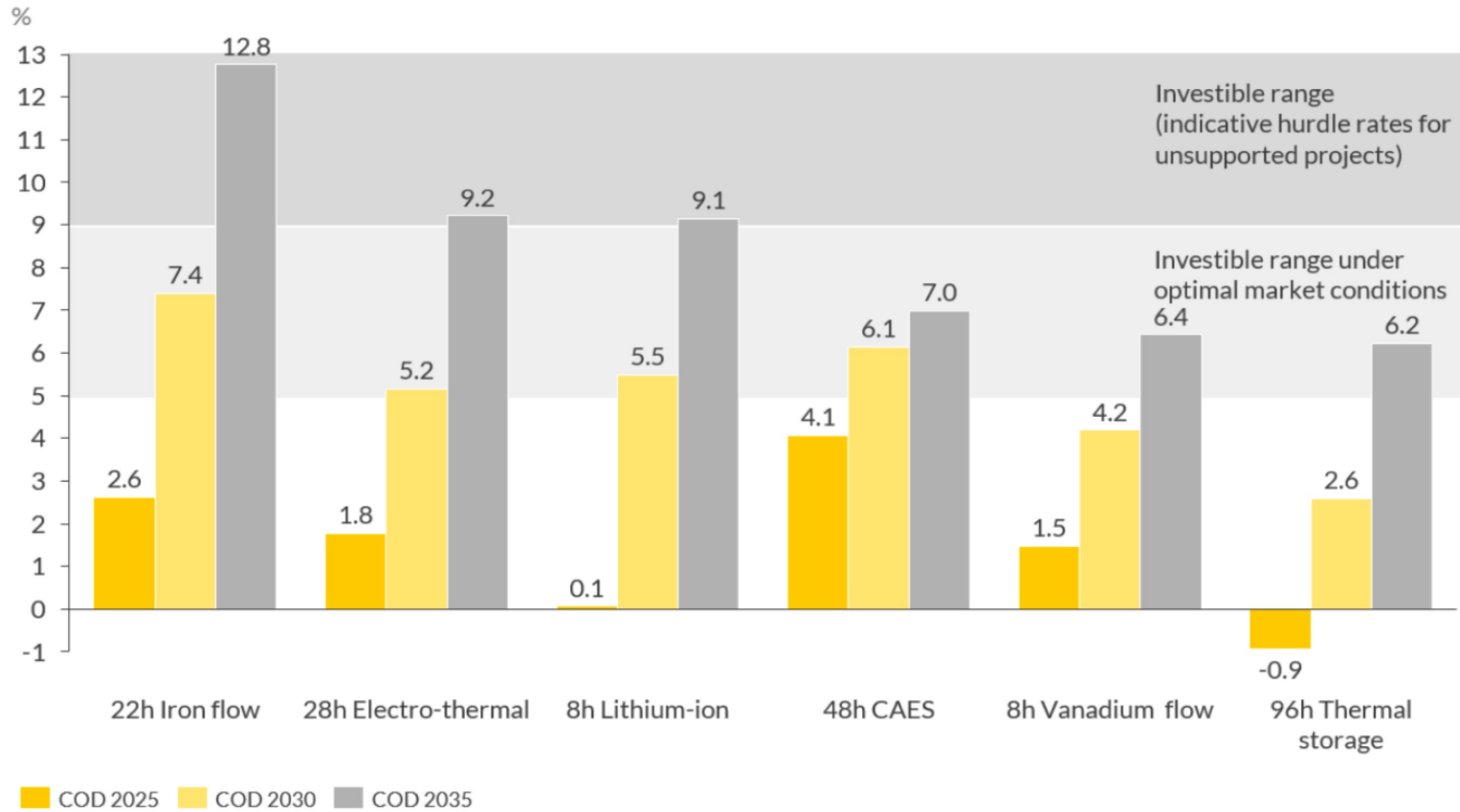


Figure 21: Internal rate of returns forecast for six selected LDES technologies and three commercial operation dates (COD) in Germany

“By creating a market design that provides multiple revenue streams for LDES and introducing policies aimed at promoting energy storage,
WE can strongly influence the attractiveness of LDES business models and thereby encourage deployment“