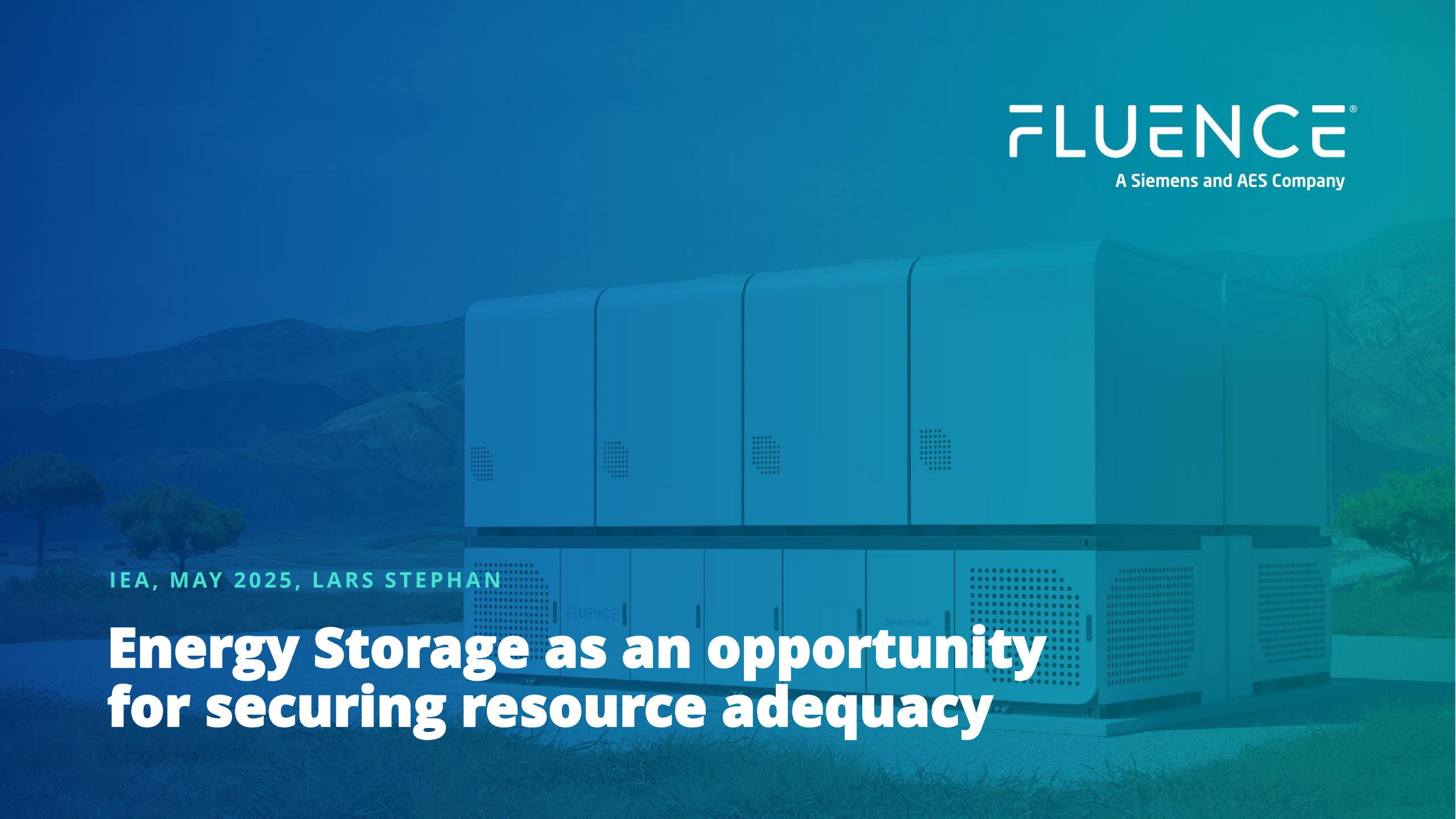
FLUENCE®
A Siemens and AES Company



IEA, MAY 2025, LARS STEPHAN

Energy Storage as an opportunity for securing resource adequacy

OUR MISSION

Transform the way we power our world to create a more sustainable future.

PURPOSE-BUILT PURPOSE-DRIVEN

ENERGY STORAGE SOLUTIONS (1)

38
TOTAL GWh

260
PROJECTS

SERVICES (2)

9
TOTAL GW

OPTIMIZATION SOFTWARE (2)

MOSAIC

14+
GW OF AI-OPTIMIZED BIDDING OF RENEWABLES AND STORAGE

NISPERA

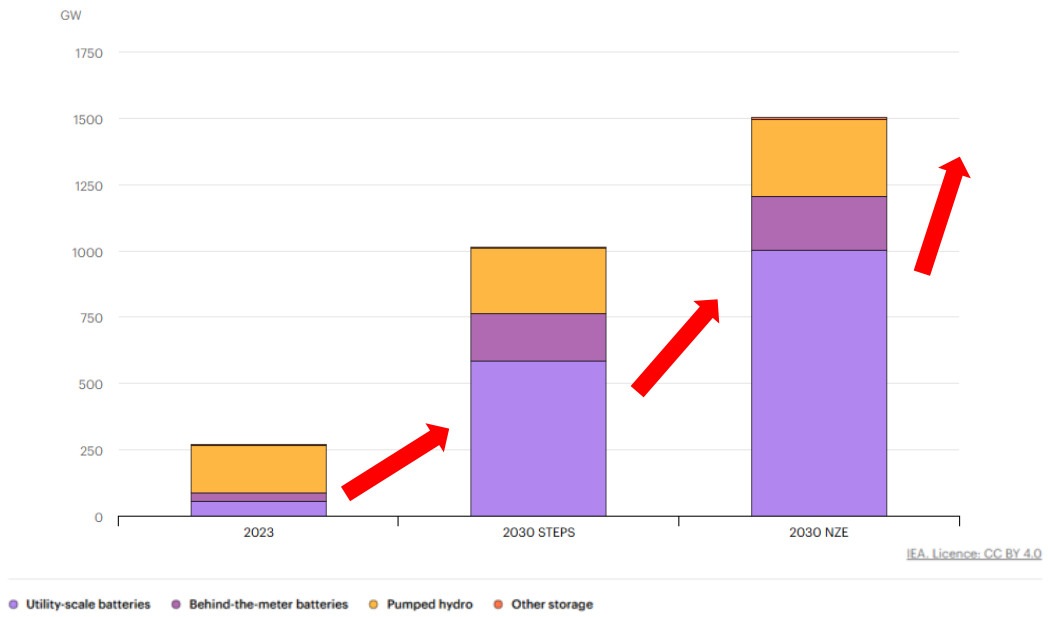
18+
GW OF RENEWABLE AND STORAGE ASSETS UNDER MANAGEMENT

(1) Deployed or contracted as of Dec 31, 2024

(2) Contracted or assets under management as of Dec 31, 2024

The Global Energy Storage Opportunity

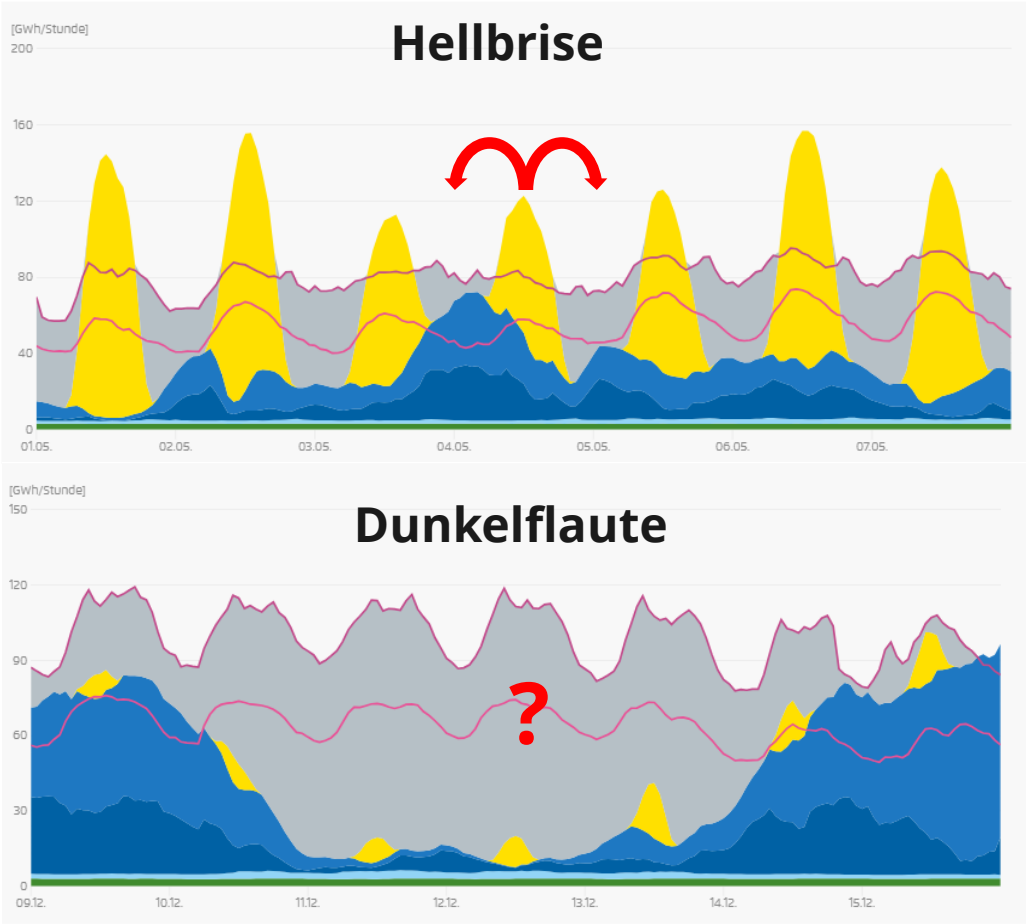
GLOBAL STORAGE DEPLOYMENT TO GROW BY FACTOR 18 BY 2030



!!! Only 10-15 % of battery cells produced go into stationary energy storage!!!

Source: IEA

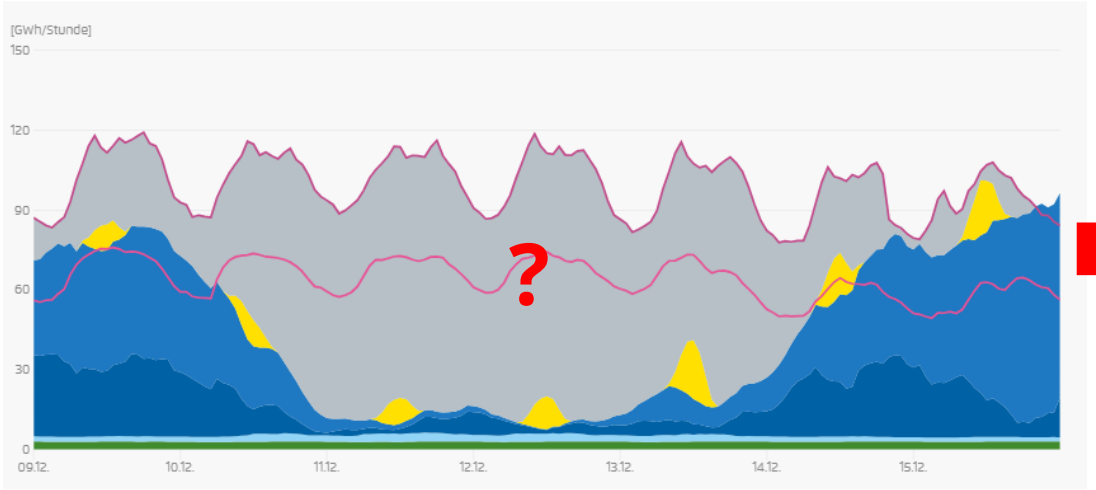
ROLL OF ENERGY STORAGE GERMANY POWER SYSTEM IN 2030



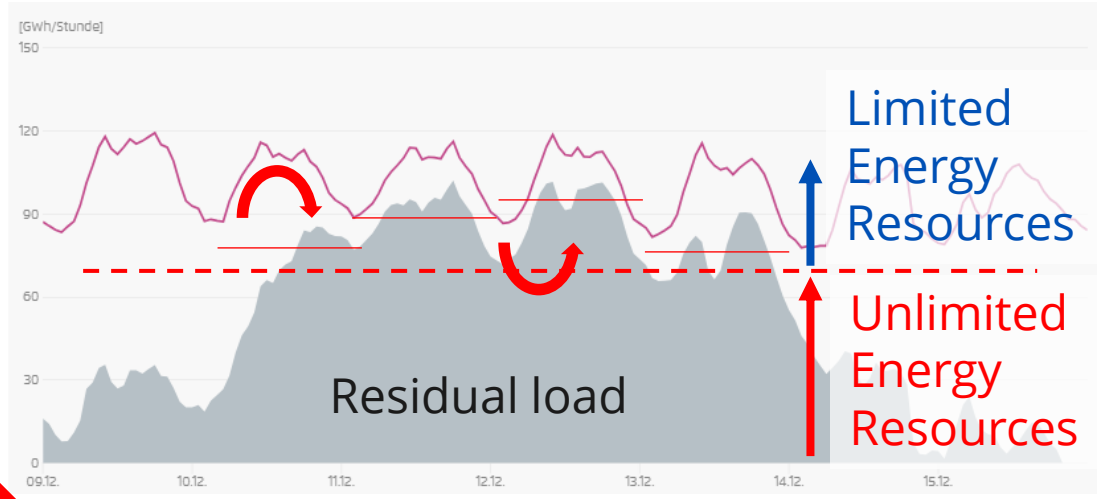
Source: Agora Energiewende

The Role of Energy Storage During a “Dunkelflaute”

GERMANY POWER SYSTEM DURING DUNKELFLAUTE IN 2030



Source: Agora Energiewende



De-rating factors for batteries depend on two main aspects:

Duration

- Battery contribution to security of supply is limited by their ability to respond to stress events as defined in the Resource Adequacy Methodology.
- The shorter the duration, the lower the de-rating factor.

Capacity

- The incremental value of having additional batteries in the system decreases.
- The more batteries are active in the power market, the lower their de-rating factor.

Source: Aurora

Capacity Market Design Considerations for Energy Storage

DURATION OF CAPACITY SHORTAGE EVENTS

National Grid ESO Resource Adequacy Study

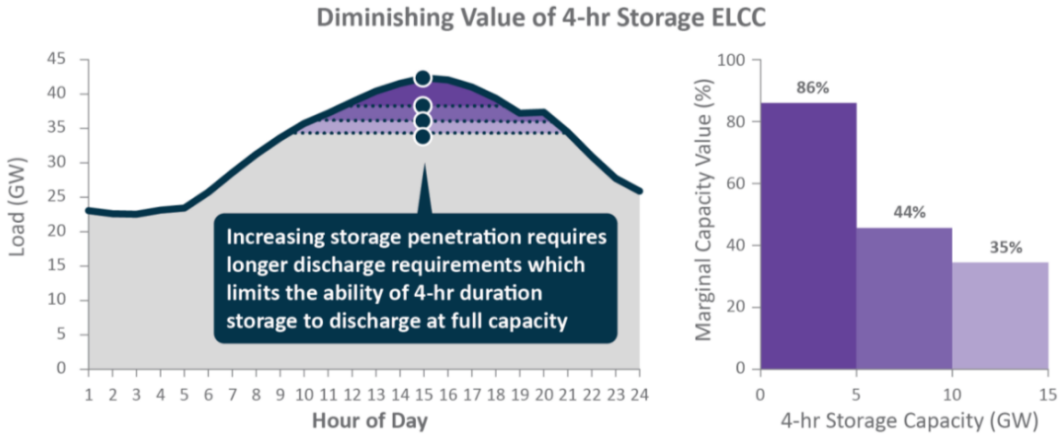
	Year	Distribution of length of hours with unserved energy (hours)							
		<2	2-3	4-5	6-9	10-14	15-22	23-30	31-40
'Consumer Transformation' (reference)	2025	3	26	19	0	3	0	0	0
	2028	2	24	9	1	5	0	0	0
	2030	3	20	8	4	2	0	0	0
	2033	8	12	5	6	2	0	0	0
	2035	3	8	4	5	6	1	0	0
	2038	7	12	5	5	4	2	0	1
	2040	2	16	8	2	3	2	0	1

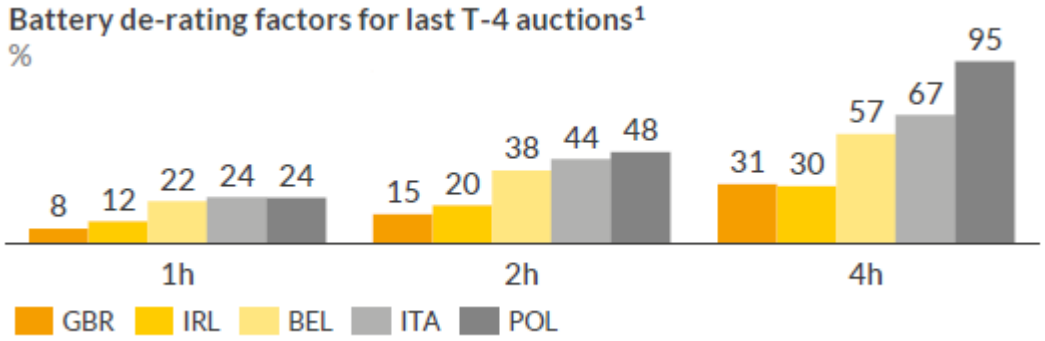
GB CM market in practice

Since 2016 UK ISO published 15 Capacity Market Notices - all for 30 min window - and all were cancelled before CM event occurred

Source: National Grid ESO

CONTRIBUTION OF STORAGE DURING CAPACITY SHORTAGE EVENTS

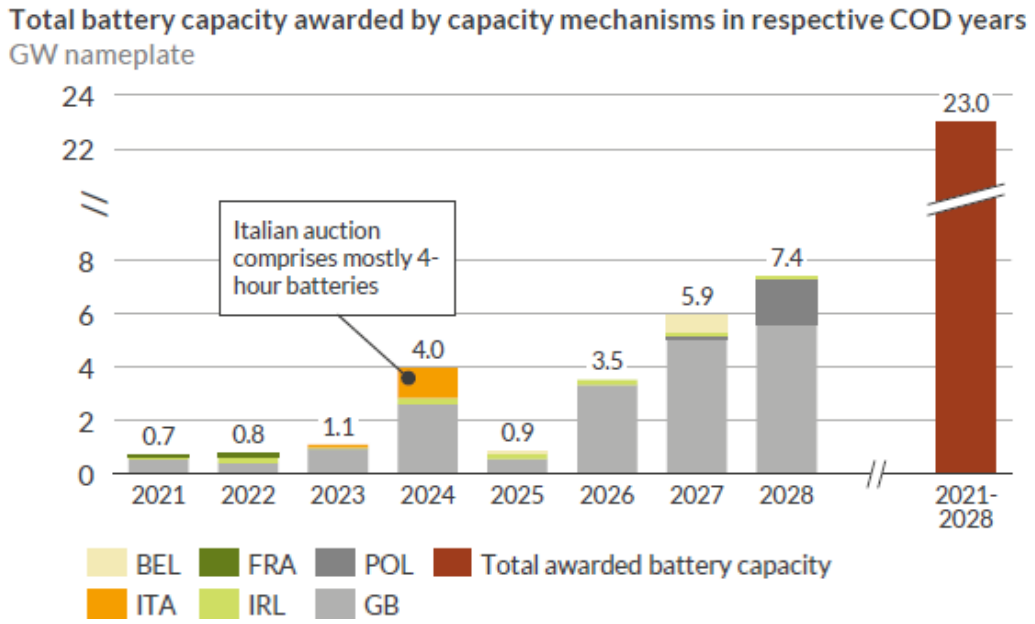




Source: Aurora

Energy Storage in European Capacity Markets - a Matter of Market Design?

ENERGY STORAGE IS DELIVERY RESOURCE ADEQUACY ACROSS EUROPE VIA CMS



Source: Aurora

BUT CAPACITY MARKET DESIGN MATTERS – GERMAN EXAMPLE

In 2024 German government consulted four potential market designs:

1) Resource Adequacy via peak price hedging
2) Decentral Capacity Market
3) Combined (de-central/central) Market
4) Central Capacity Market

Openness to innovation

➔ How can market design incentivize integration of storage and demand response (incl. EVs)

➔ How to combine Flexibility Adequacy with Resource Adequacy in a combined auction (under new EU State Aid rules)

Key Takeaways

Let’s leverage flexibility assets for resource adequacy

- Flexibility options will grow exponentially going forward
- BESS acts as price taker in CM auctions, lowering cost of resource adequacy
- Market design for energy-limited resources in Capacity Markets is key
- Bad CM market design can hamper flexibility deployment with resulting consequences and cost for lower power system efficiency

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Thank You

