

Is BESS the panacea for curtailment & negative spot prices in the Nordics?

15th of September 2026

Solarplaza Nordics Summit Renewables and Storage

Agenda

- I. CLEAN HORIZON INTRODUCTION
- II. MARKET DYNAMICS & VOLATILITY
- III. THE BUSINESS MODEL FOR ENERGY STORAGE IS SHIFTING TOWARDS TRADING
- IV. IMPACT ON CURTAILMENT AND NEGATIVE SPOT PRICES

Since 2009, Clean Horizon has been a one-stop shop energy storage intelligence company

MARKET ADVISORY



Deep expertise in providing energy storage market studies worldwide.



Our experts have technical, economic and regulatory knowledge, covering different geographies and constantly tracking market evolutions.

TECHNICAL ADVISORY



We act as owners' engineers and lenders' technical advisors for IPPs, utilities and lenders worldwide.



We support our clients at all stages of development, from feasibility studies and design, to procurement, construction and commissioning.

BANKABLE BUSINESS MODELS BASED ON OUR PRICE FORECAST



Clean Horizon's price forecast reports cover 16 geographies, with expansion into the UK and Bulgaria planned by year-end

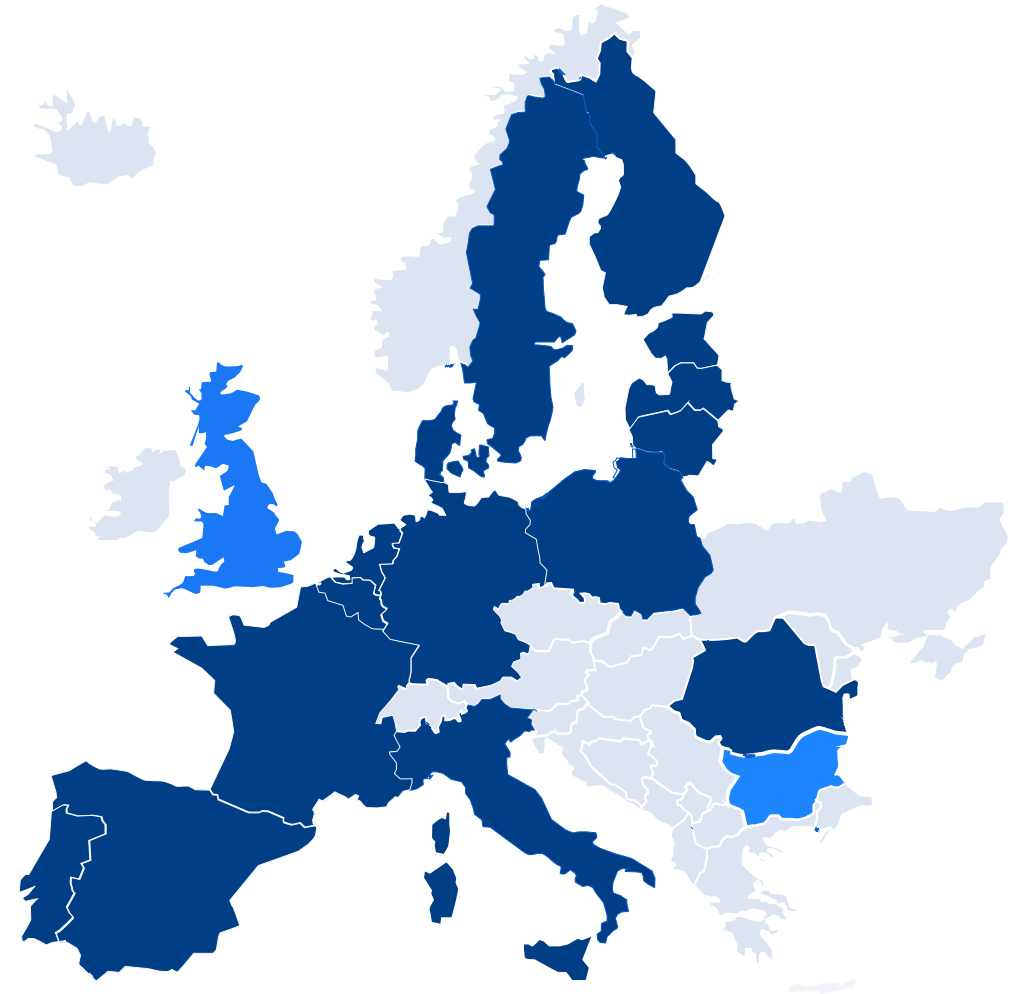
PRICE FORECAST



Countries covered
as of S1 2026



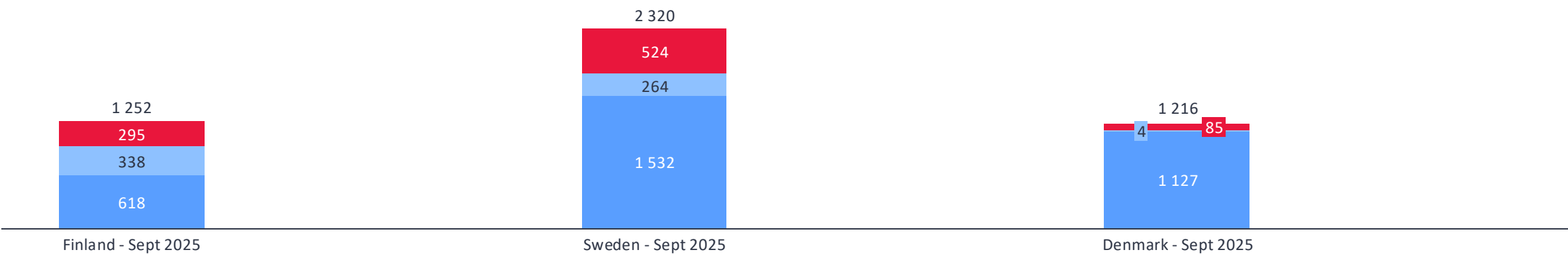
Countries covered
as of S2 2026



The Nordics storage market as of September 2025: 900 MW of operational batteries

Energy storage capacity installed and PUBLICLY announced in the Nordics
In MW

- Operational
- Under construction
- Announced



*In Sweden, estimated operation storage capacity is 1.5 GW based on prequalified power on ancillary services. 809 MW are publicly operational.

The Nordics storage market has grown significantly over the past year, particularly in Finland

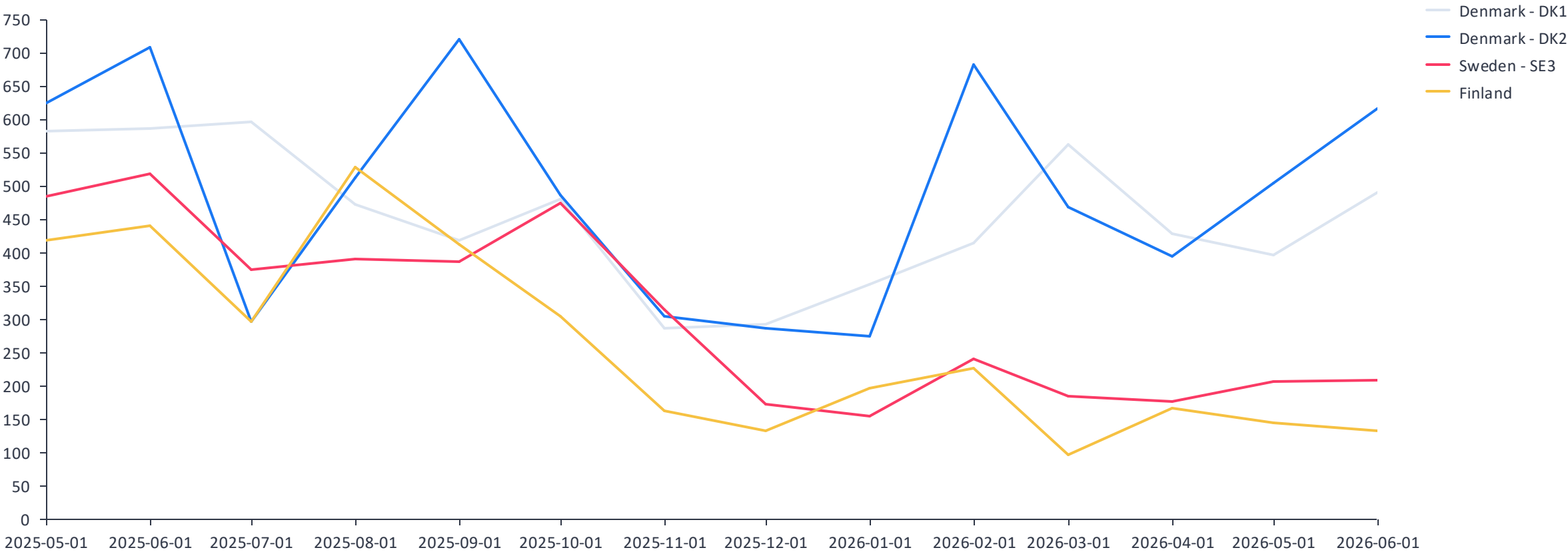
Energy storage capacity installed and PUBLICLY announced in the Nordics
In MW



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Revenues have decreased sharply in Finland and Sweden while remaining stable in Denmark

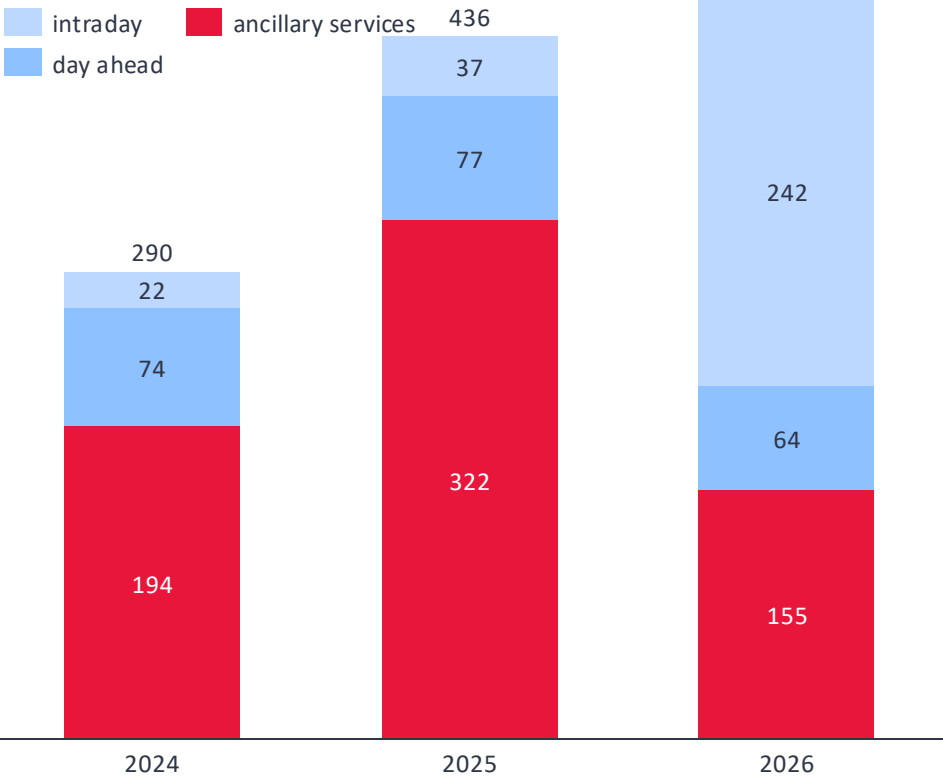
Nordics 4-h BESS index (May-2025 to June-2026)
In k€/MW - annualised revenue



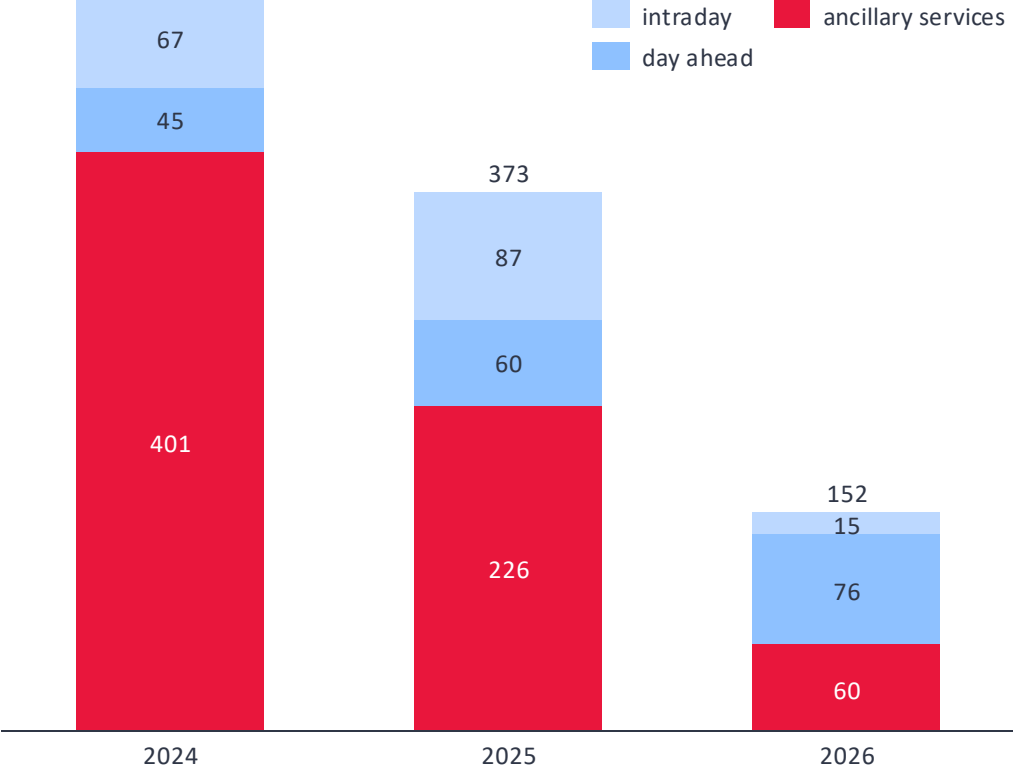
Sources: Clean Horizon Index

Revenues in the Nordic markets have shifted from ancillary services toward energy trading, as ancillary service markets become increasingly saturated

DK1 4-h BESS index (2024 to July-2026)
In k€/MW - annualised revenue



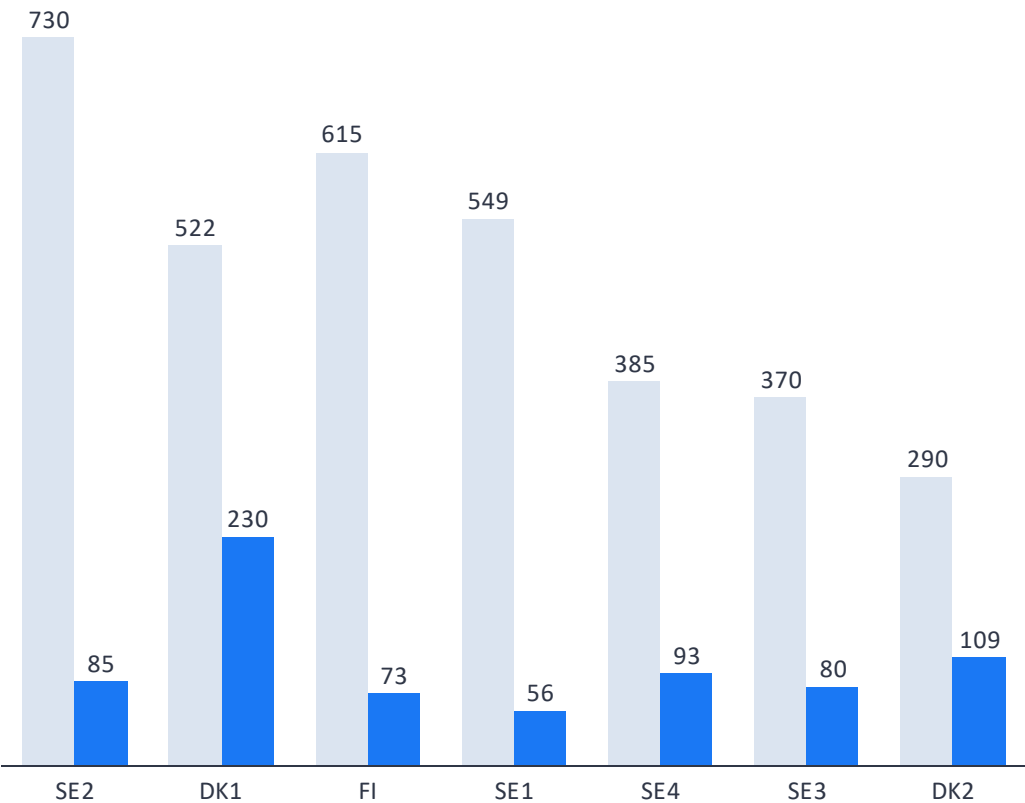
Finland 4-h BESS index (2024 to July-2026)
In k€/MW - annualised revenue



Sources: Clean Horizon Index

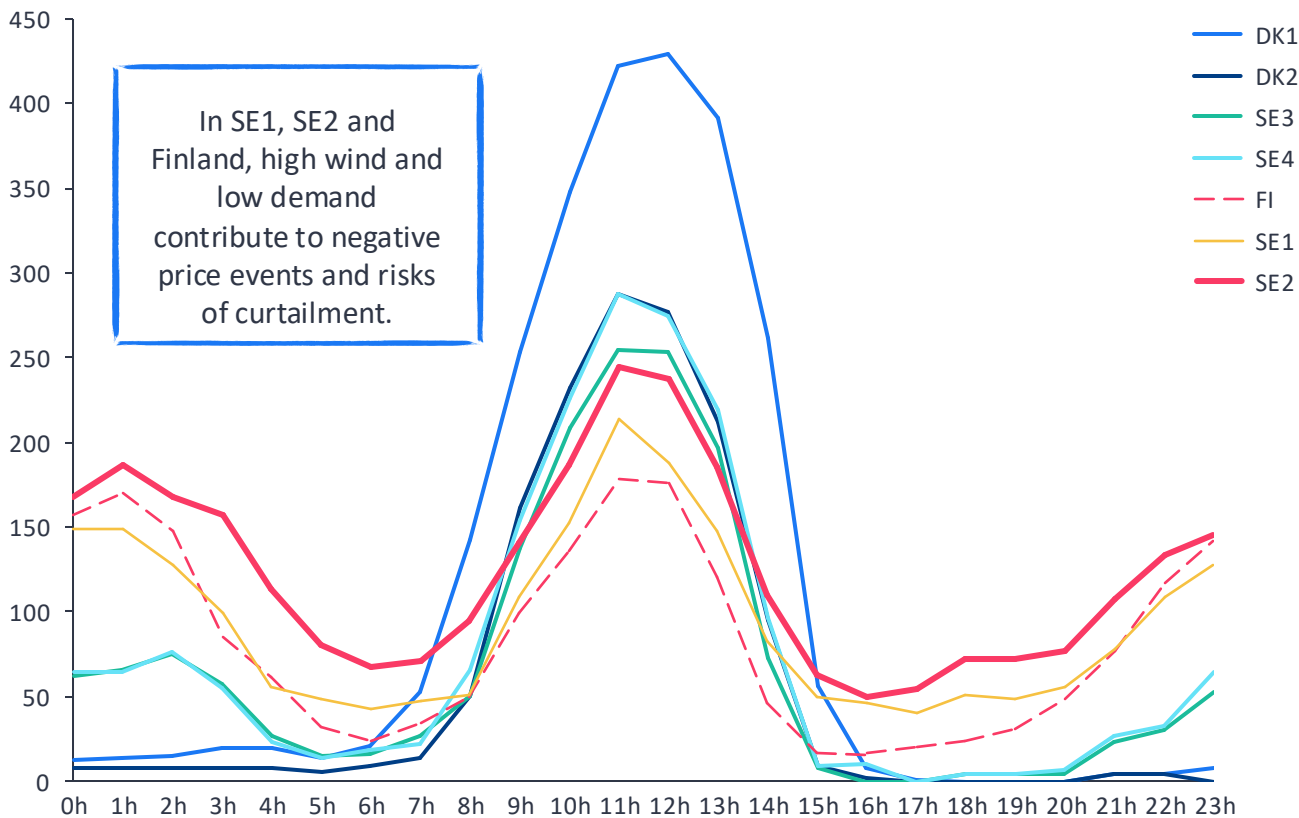
While ancillary services were saturating, the Nordics were particularly exposed to negative price events last year

Negative prices hours (including 0 prices) in the Nordics in 2025 and 2026 (up to July):
In hours



Sources: ENTSO-E

Negative prices hours (including 0 prices) in the Nordics in 2025 and July-2026 :
In hours



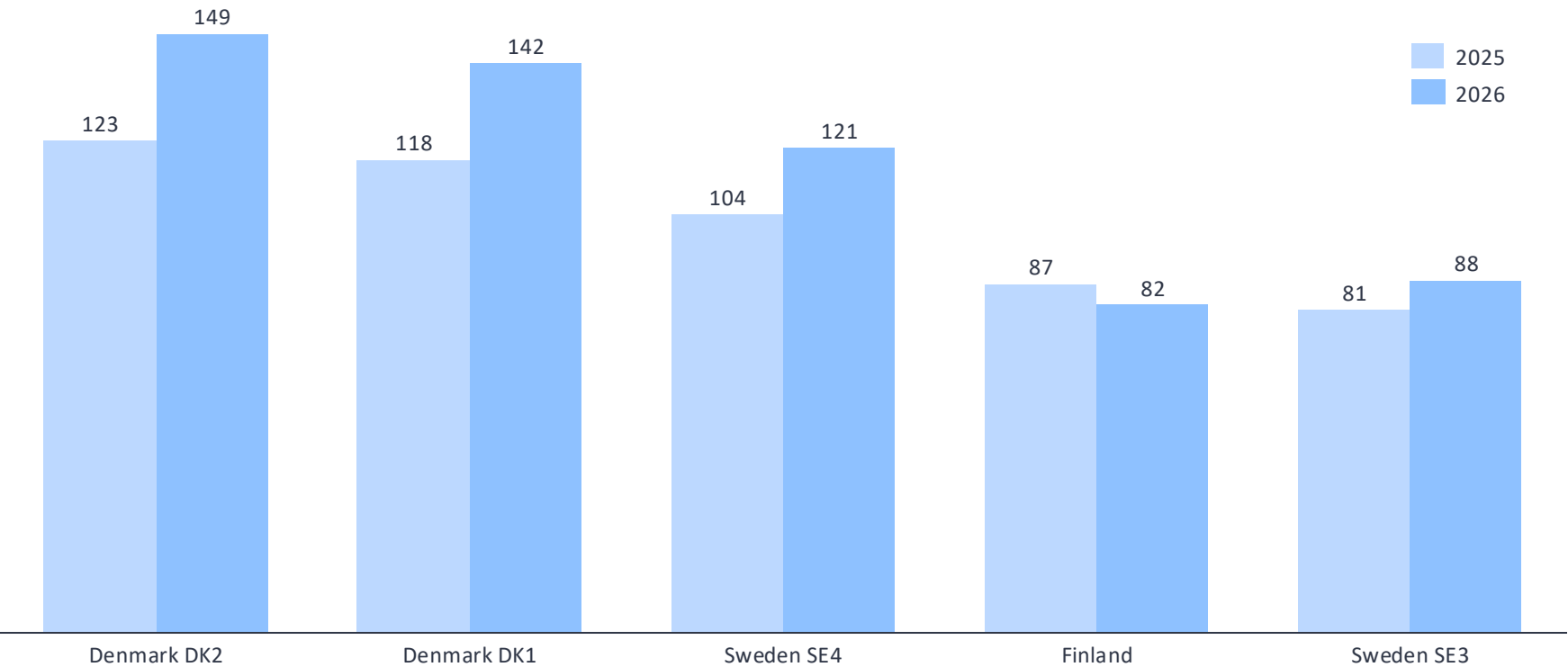
Slido question : How did the decrease in negative prices in 2026 compared to 2025 impact the day ahead spread?

- 1. Decrease in day-ahead volatility: less negative prices means less day-ahead volatility**
- 2. No impact**
- 3. Increase the day ahead volatility: despite less negative prices, day-ahead volatility has increased**

Despite a decrease in negative price, day-ahead volatility has increased in the Nordics in 2026 compared to 2025 due to rising gas prices, 15-min timeslots and renewable penetration

Sweden, Finland and Denmark day-ahead market average daily spreads¹ in 2025 and 2026

In €/MWh



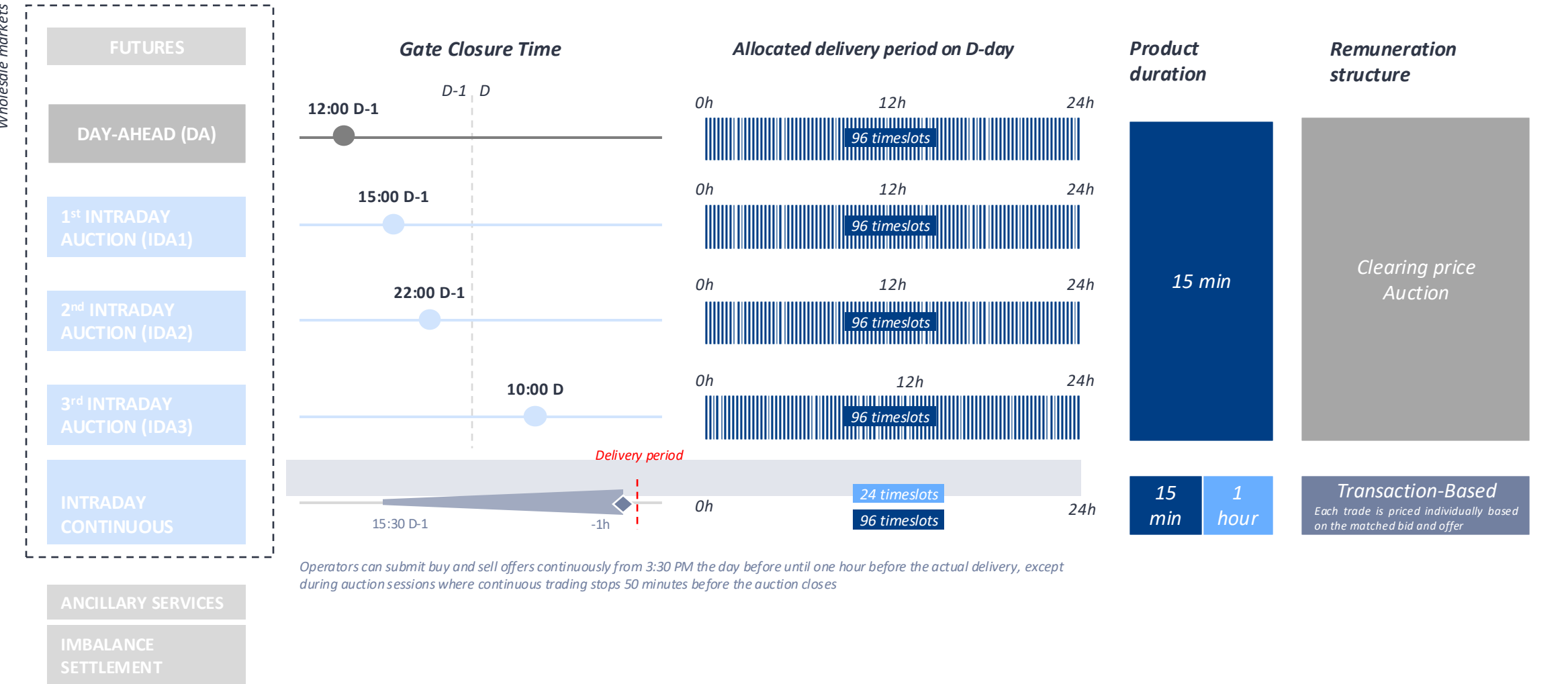
In comparison, the German day ahead spread was 125€/MWh in 2025 and 158 in 2026.

DK2 and DK1, and SE4 are well interconnected with Germany and benefit from the interconnection in terms of volatility.

High wind days result in low volatility days. High solar days result in high volatility days.

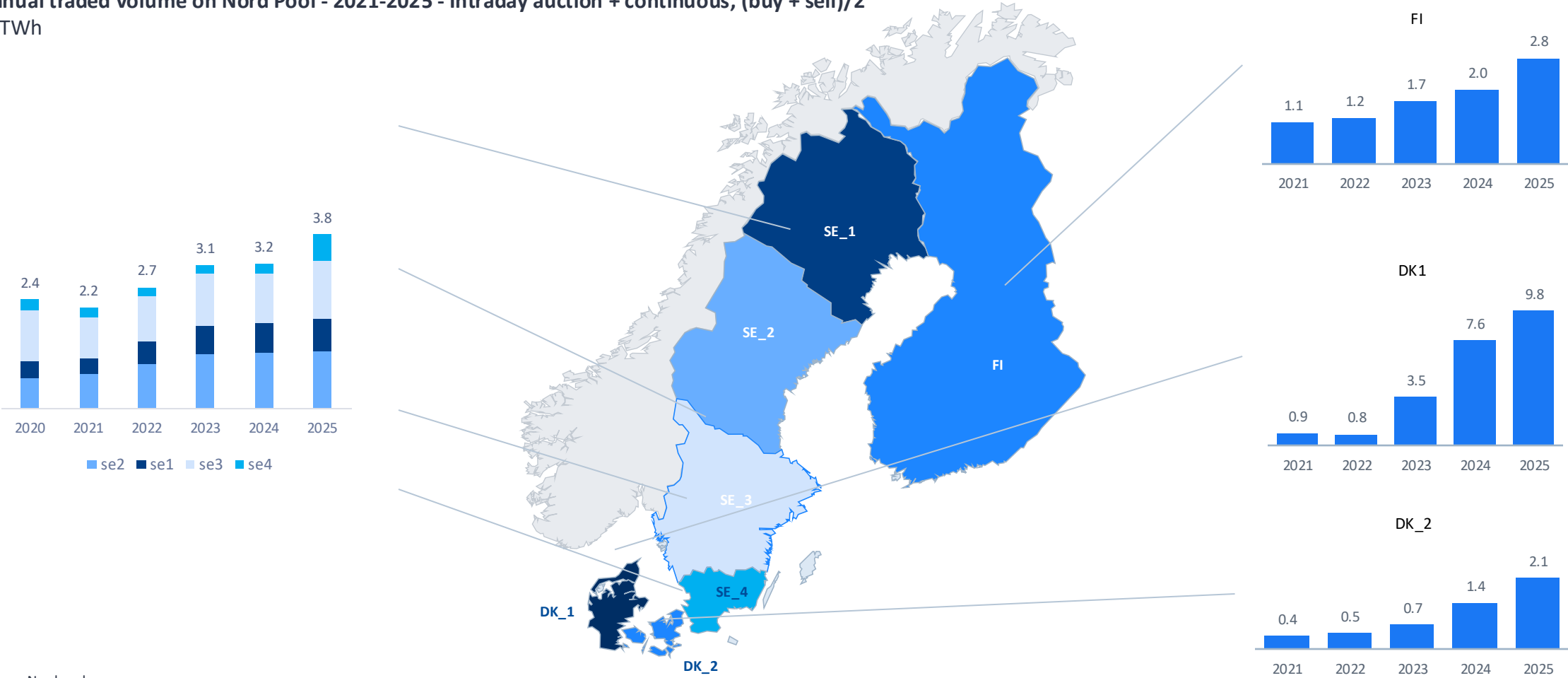
Sources: day-ahead prices at 15-min resolution ENTSO-E; Spread = avg. of 4 highest quarters – avg. of 4 lowest quarters of the day
2026: until July included.

On top of ancillary services provision, BESS can combine trading on the day ahead with intraday to maximise benefits



The intraday market is also gaining momentum, driven by increasing liquidity and heightened price volatility, namely in Denmark and Finland

Annual traded volume on Nord Pool - 2021-2025 - Intraday auction + continuous, (buy + sell)/2
In TWh

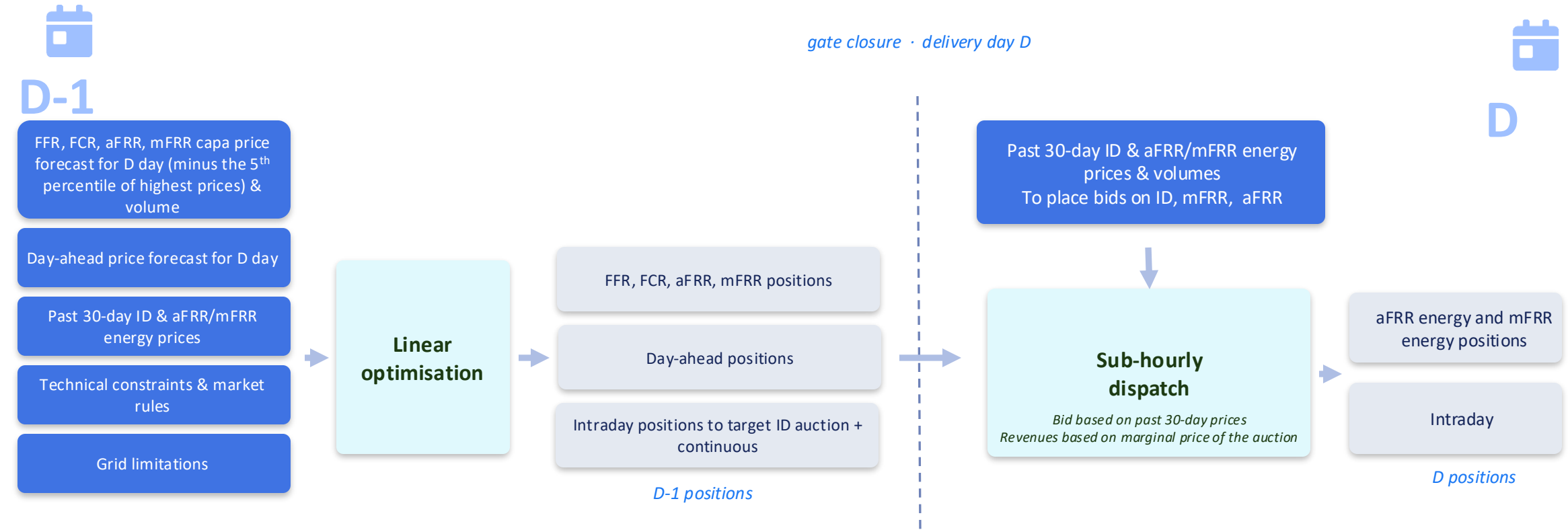


Source: Nordpool

To compute bankable revenue stacks, Clean Horizon has developed COSMOS, a tool designed to simulate realistic market participation decisions and estimate storage revenues

- Inputs
- Calculation
- Positions

COSMOS optimisation tool principle:



By activating on aFRR or mFRR energy, the asset can oppose its own day-ahead positions and captures spreads - without physically charging or discharging.

Building bankable long term revenue stack involves setting key assumptions

Electricity mix

01.

Electricity mix impacts directly electricity prices and ancillary services needs

- Renewables development
- Electricity demand growth
- Thermal assets capacity evolution

Commodity prices

02.

Understanding what will be the marginal cost of thermal powerplants

- Carbon tax prices
- Gas prices
- Coal prices

Neighbouring countries

03.

European countries are interconnected

- Evolution of neighbouring country electricity mixes
- Interconnection capacity changes

Energy storage and flexibility

04.

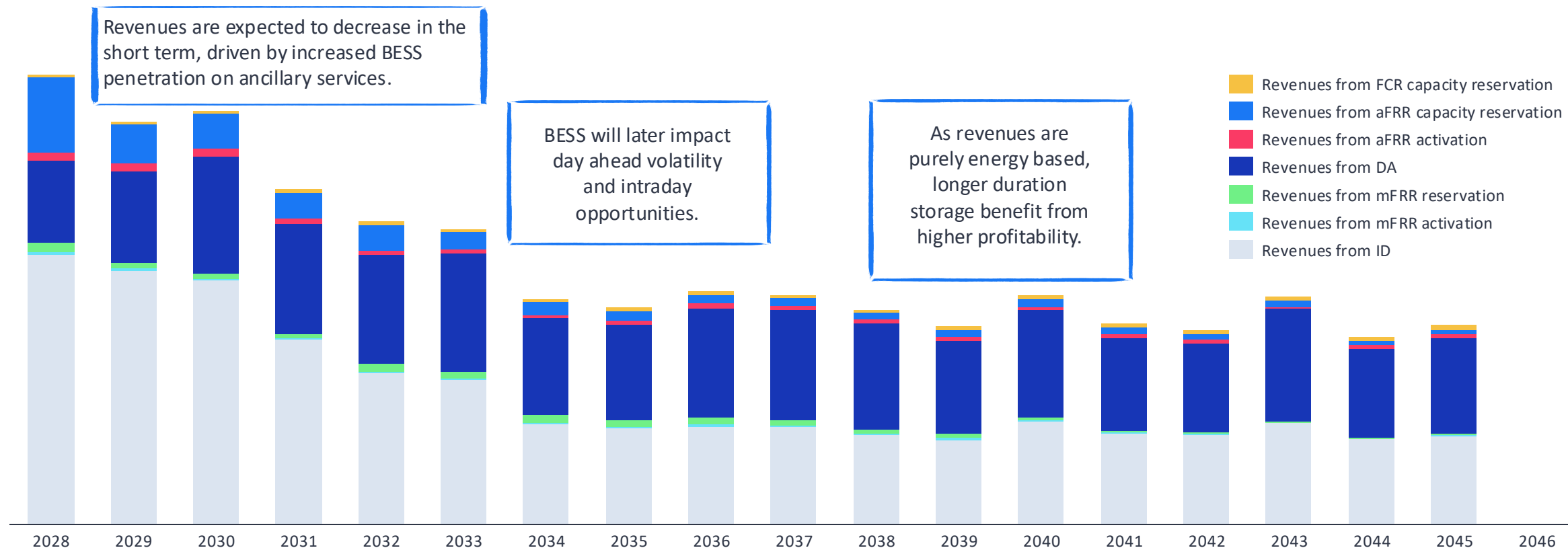
Impact on ancillary services and wholesale electricity prices

- Storage deployment
- Other types of flexibility: demand side response, hydro



Clean Horizon's forecast shows that wholesale market revenues will make up to 80% of Danish BESS revenue stack by 2028

100 MW/ 400 MWh BESS revenue stack in the DK1*:
In k€/MW

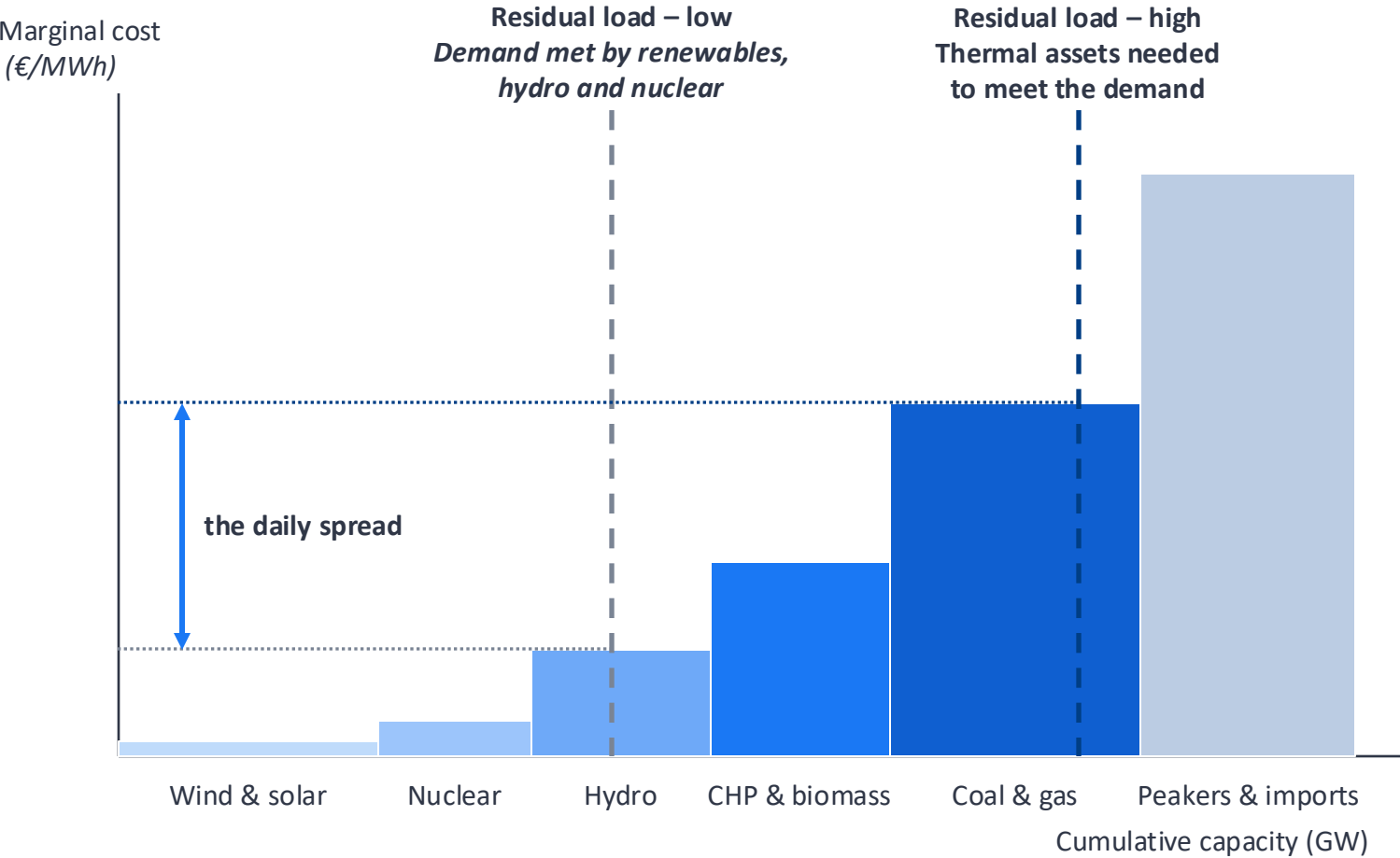


*including degradation and availability (1.5c/day - 18-year lifetime), CH central scenario S1 2026

Sources: Clean Horizon Price Forecast S1 2026 report

As economic rational exists for storage assets to operate on the day-ahead market, storage will impact the residual load shape, which in return impacts the day-ahead volatility

Illustrative day ahead merit order curve:



01 Renewables, nuclear and hydro bid at or near zero

They run whatever the price. What is left to serve (residual load) is what climbs the paying part of the curve. The marginal unit it lands on sets the price for everyone.

02 The curve is convex the level picks the price zone

Flat while hydro is at the margin, steep once thermal and imports take over. That is why the level of residual load drives Finnish spreads ($R^2 = 0.40$).

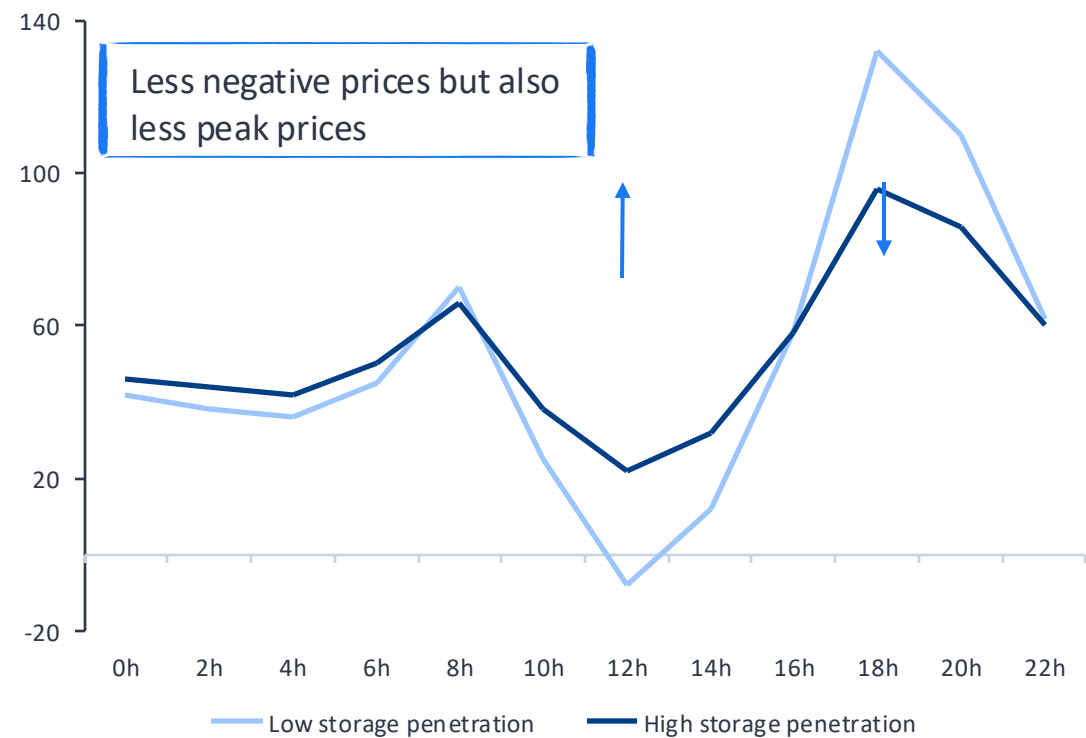
03 The residual load impacts directly day ahead volatility

Between the solar trough and the evening peak, net demand slides along the curve; the wider the swing, the wider the spread.

Storage is well adapted to absorb the surplus that causes curtailment - but by doing so it flattens the very price shape it earns from

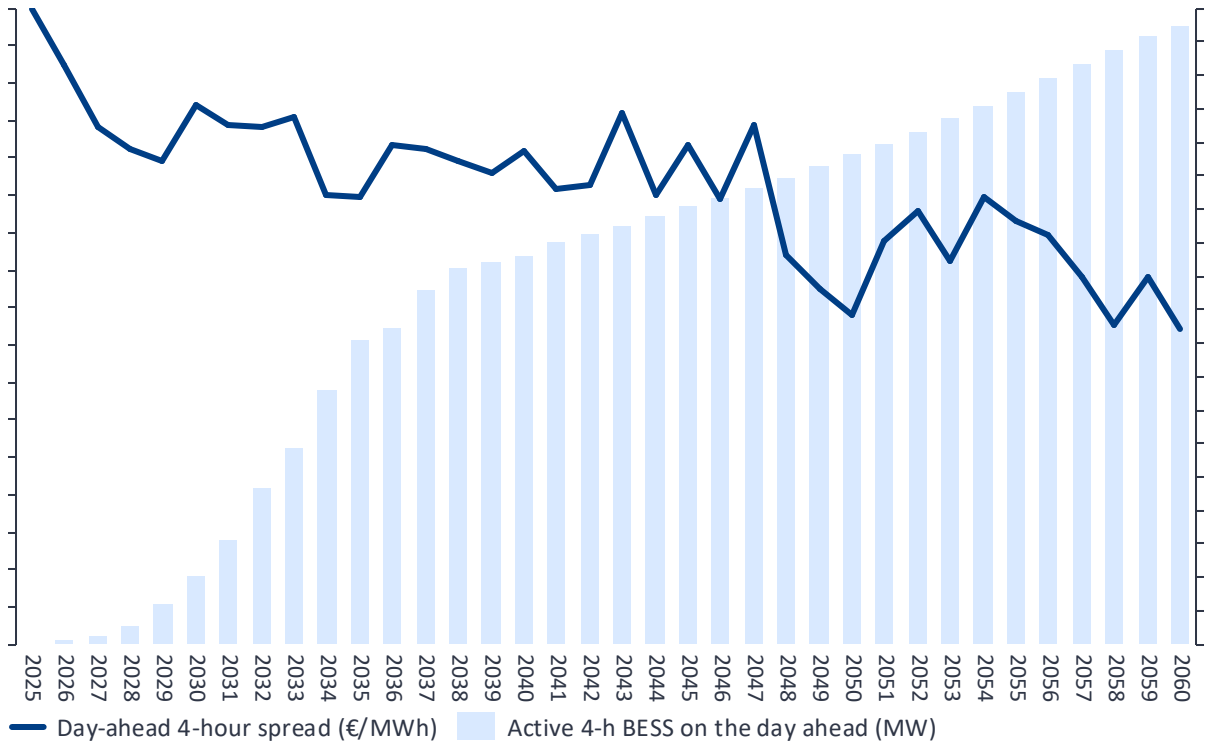
1. What a battery does to the daily price shape

Example of Day-Ahead price curve based on storage penetration
In €/MWh



2. Where that leads over time

DK1 Day-Ahead 4-hour spread (TB4) based on storage penetration
In €/MWh



Storage can help address curtailment and negative prices by absorbing surplus electricity, but its deployment will depend on the economic rationale for BESS and, critically, on grid access.

01 Storage is already reshaping the mix

BESS are increasingly active on the day-ahead market. By adding demand exactly when the system is in surplus, the hours that produce curtailment and negative prices, they change the shape of the residual load and let more renewable energy into the system rather than being curtailed.

02 But flexibility needs both low and high prices

A battery earns on the difference, not on cheap power. Its profitability therefore depends on the future mix: how fast demand grows, how much renewable capacity is added, and how much storage is built alongside it. Storage competes with itself, so the value of a project must take into account the wholesale market volatility evolution over time.

03 The second answer is flexible demand

Data centers, electrolysis and electrified industry can also absorb surplus energy. Finland alone has received 68 GW of consumption connection requests in a year. The binding constraint is the grid capacity and the years required to connect it.



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