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European Union Agency for the Cooperation of Energy Regulators

Key developments in European electricity and gas markets

- Why Europe is short on 'easy answers' and what possibly to do about it

TTE Council Ministerial – Council Presidency of Poland

Brussels, 17 March 2025

Christian Zinglersen, *ACER Director*

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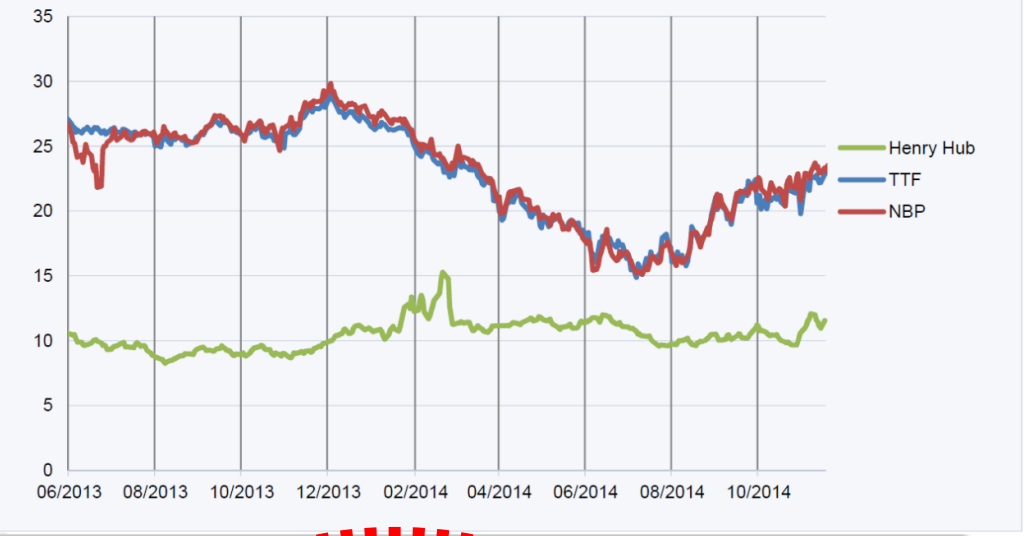
A brief ‘competitiveness snapshot’

Our competitiveness challenges are recent … or are they?

European and US wholesale gas prices

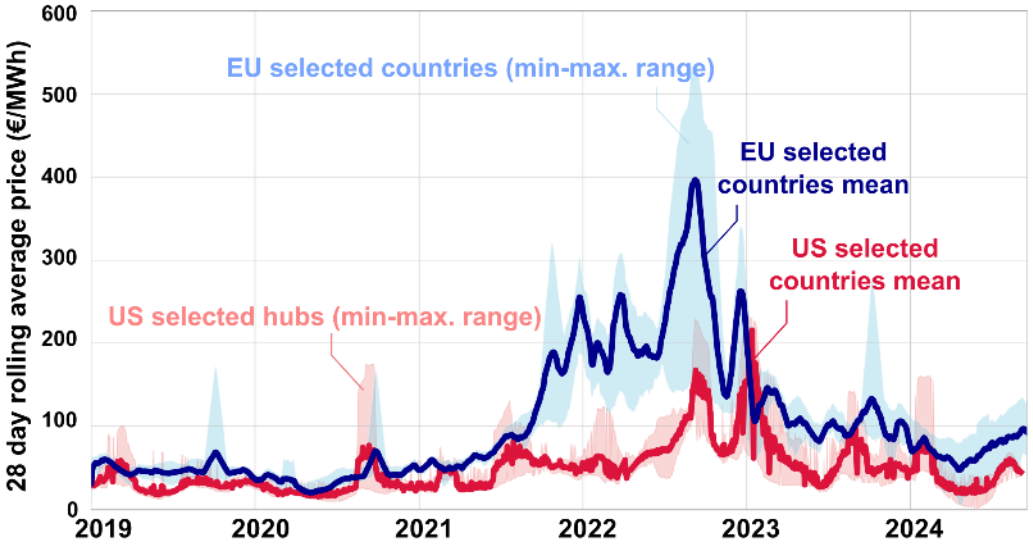
Europe is at a serious competitive disadvantage compared to North America and areas of the Middle East

Spot market gas prices in Europe and the USA (EUR/MWh)



Launch of the updated GTM, 16 January 2015, Brussels

EU and US wholesale electricity prices (€/MWh)



Source: ACER (left), Bruegel (right).

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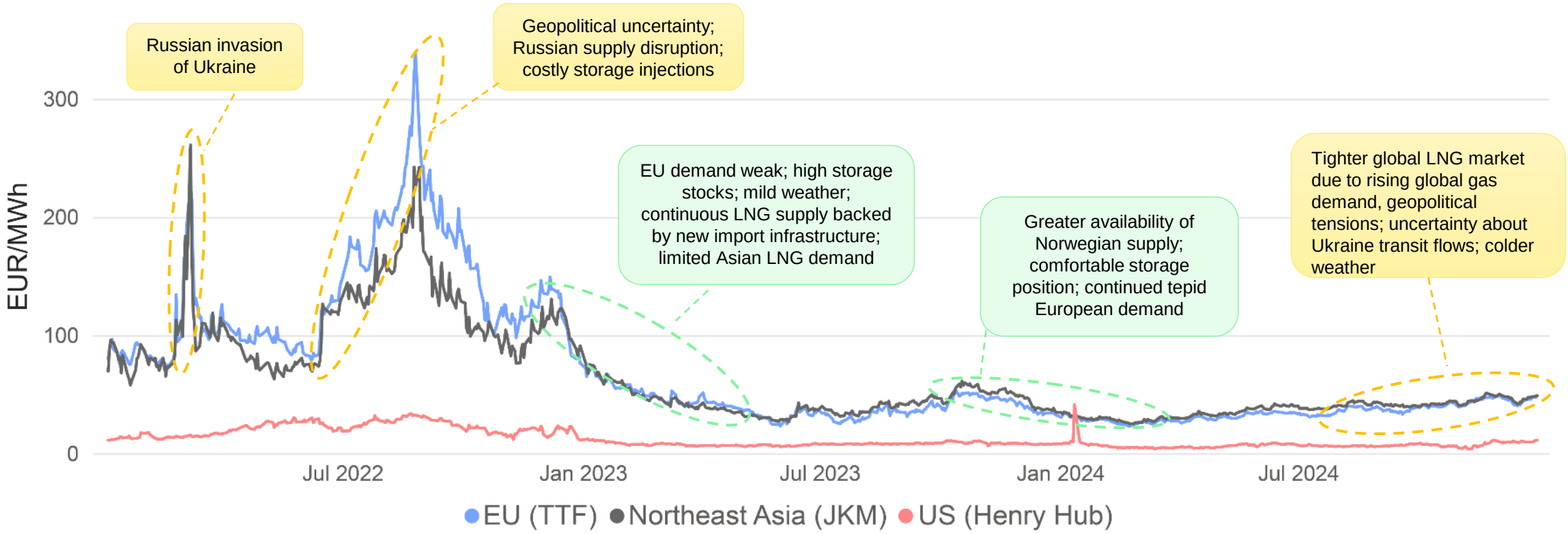
Gas markets are evolving & increasingly global

Price evolution of global gas benchmarks, 2021 - 2024 (EUR/MWh)



The EU has largely returned to a more stable gas supply, supported by reducing demand, ample LNG import capacity and adequate storage levels. However, this balance remains fragile.
An anticipated surge in LNG supply from late 2026 is expected to drive prices down.

Source: ACER based on ICIS Heren.
Note: The Dutch Title Transfer Facility gas hub (TTF) and the United States Henry Hub are used as benchmarks for European and American gas prices respectively.

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Recent market monitoring insights

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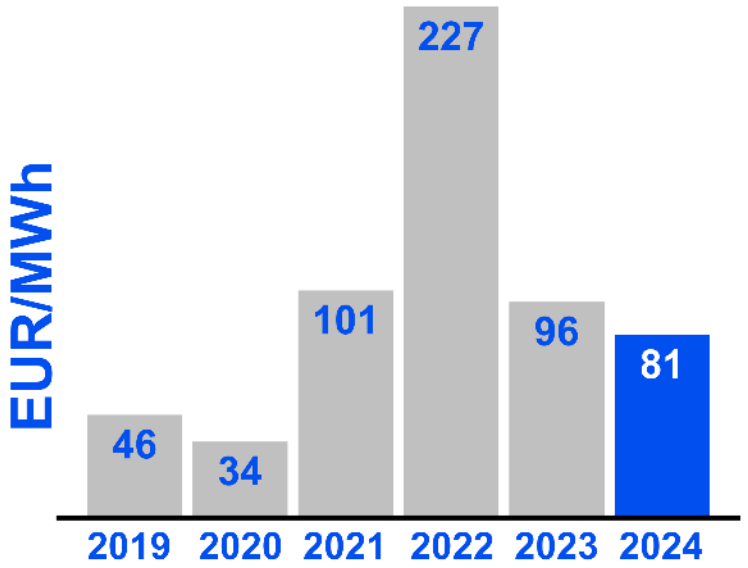
Starting with the good news

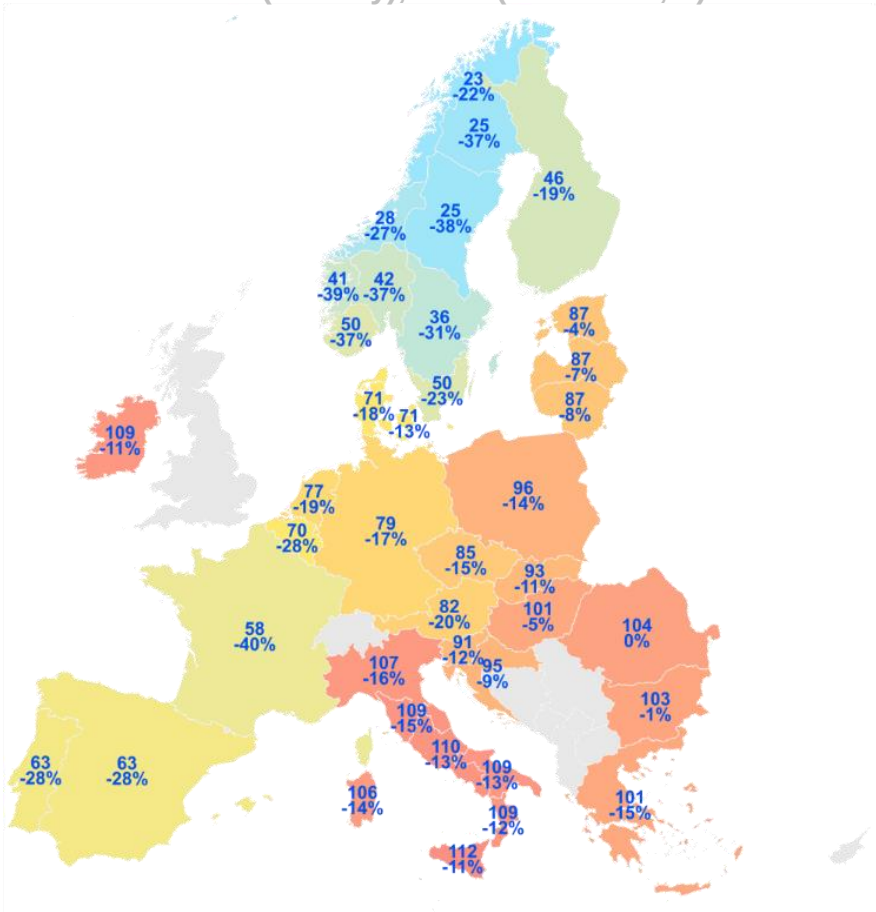
Day-ahead prices at their lowest since 2021…

Average annual day-ahead electricity prices, EU-27 /EEA(Norway), 2019-2024 (EUR/MWh)



… but with notable regional and seasonal variations

Average annual day-ahead electricity prices & year-on-year difference in the EU-27/EEA(Norway), 2024 (EUR/MWh,%)

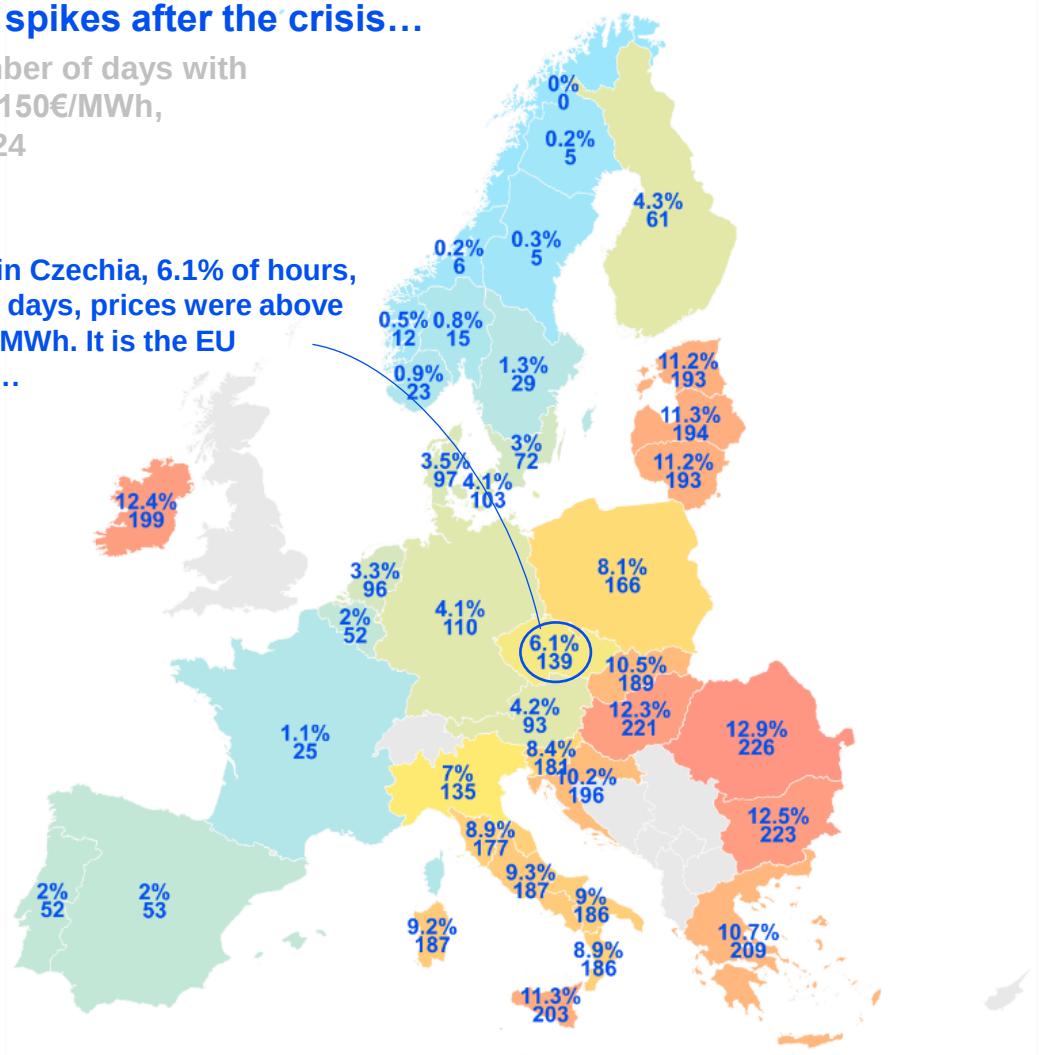


Electricity prices reveal a need for short-term flexibility

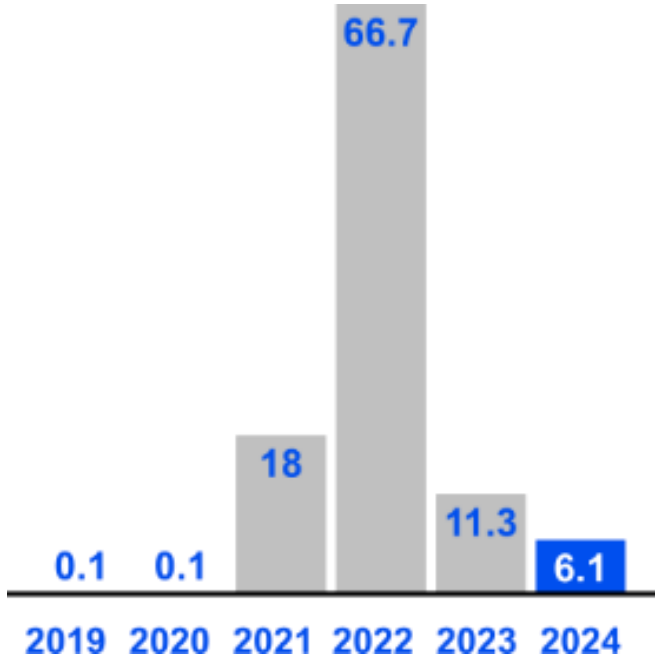
Fewer extreme price spikes after the crisis…

Share of hours and number of days with electricity prices above 150€/MWh, EU-27/EEA(Norway), 2024

In 2024, in Czechia, 6.1% of hours, over 139 days, prices were above 150EUR/MWh. It is the EU average…



Annual percentage of the time when prices were above 150 EUR/MWh, EU-27/EEA(Norway), 2019-2024 (%)

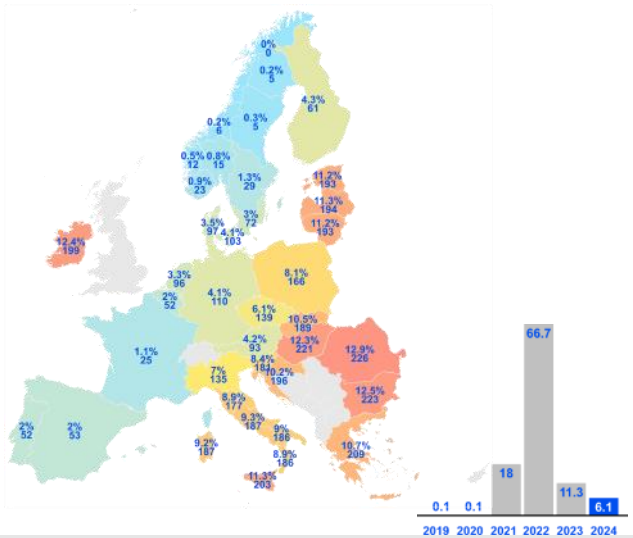


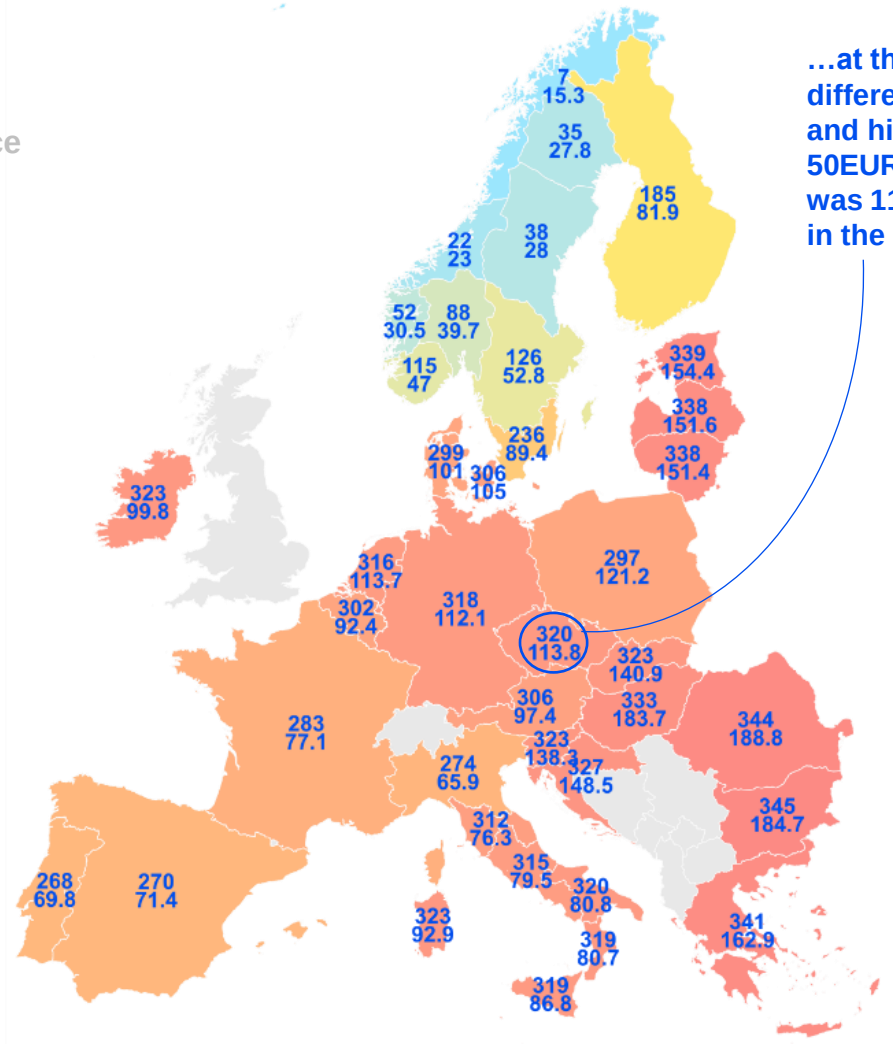
Source: ENTSO-E Transparency Platform.

Electricity prices reveal a need for short-term flexibility

…but strong price swings persist

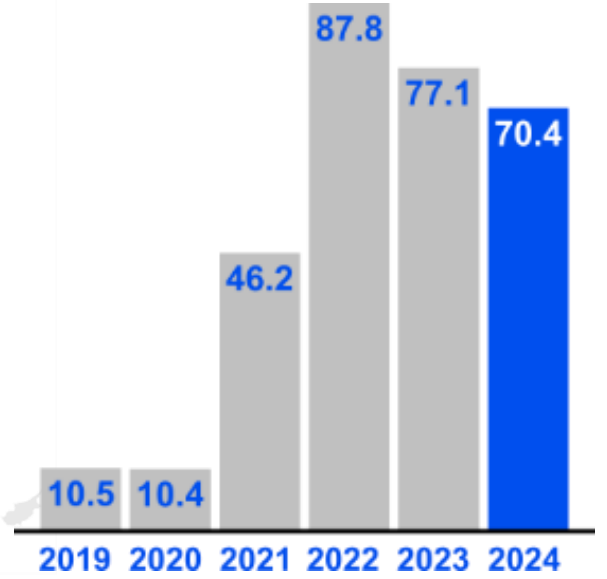
Number of days with price swings above 50 EUR/MWh and average within-day price difference, EU-27/EEA(Norway), 2024





…at the same time, in Czechia, for 320 days, the difference between hours presenting the lowest and highest day-ahead price was above 50EUR/MWh. The daily average price variation was 114 EUR/MWh in 2024, against 117EUR/MWh in the EU.

Annual percentage of days when price variation per day was greater than 50 EUR/MWh, EU-27/EEA(Norway), 2019-2024 (%)



Source: ENTSO-E Transparency Platform.

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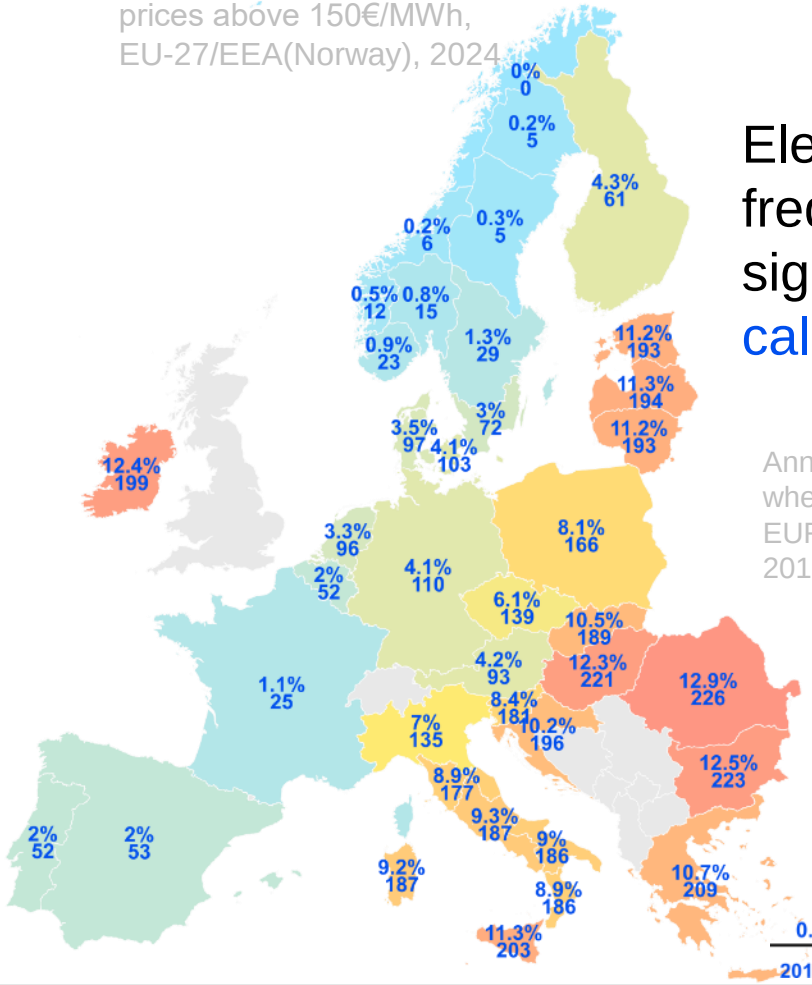
Electricity prices reveal a need for short-term flexibility

Fewer extreme price spikes after the crisis…

Share of hours and number of days with electricity prices above 150€/MWh, EU-27/EEA(Norway), 2024



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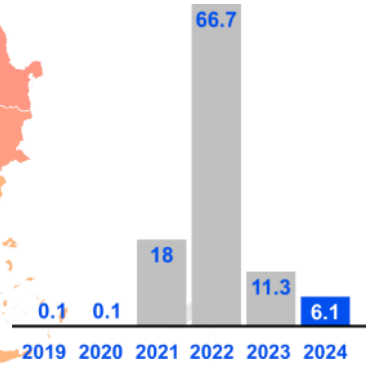
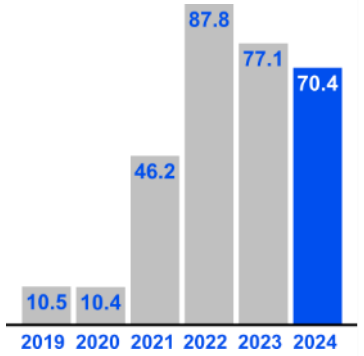


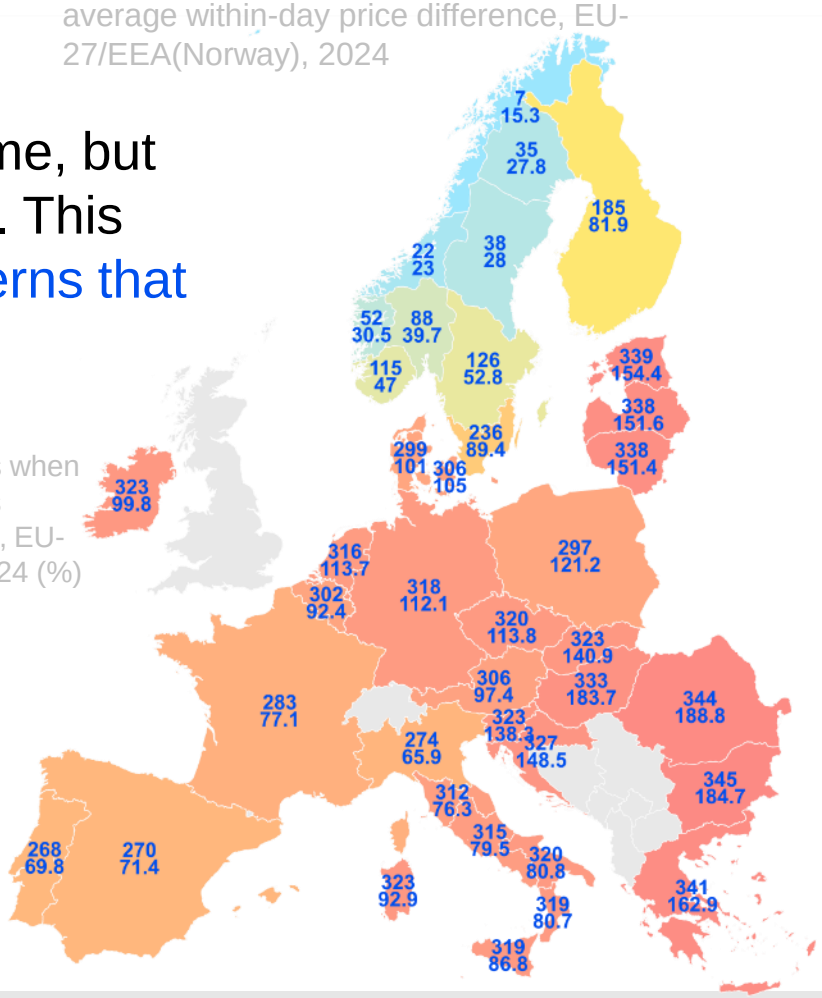
Electricity prices are now less extreme, but frequent swings within a day remain. This signals shifting supply-demand patterns that call for more short-term flexibility.

Annual percentage of days when price variation per day was greater than 50 EUR/MWh, EU-27/EEA(Norway), 2019-2024 (%)



…but strong price swings persist

Number of days with price swings above 50€ and average within-day price difference, EU-27/EEA(Norway), 2024

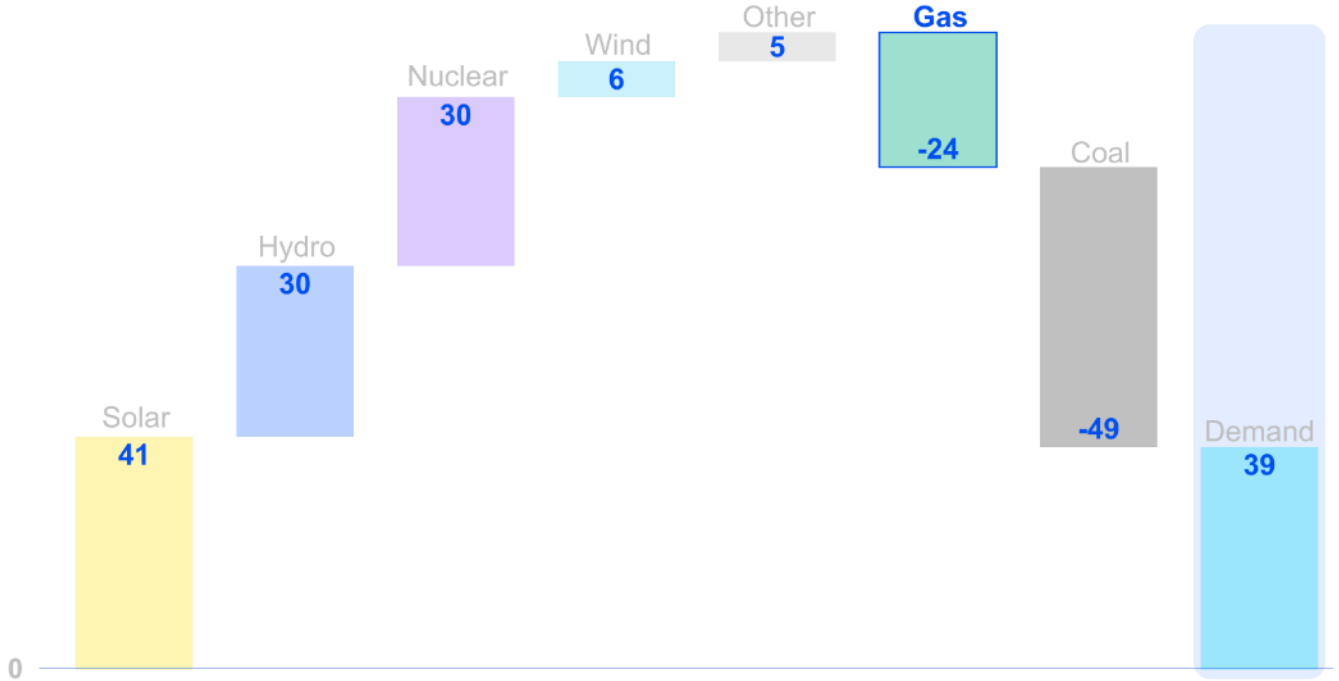


Source: ENTSO-E Transparency Platform.

Relationship between gas and electricity is evolving

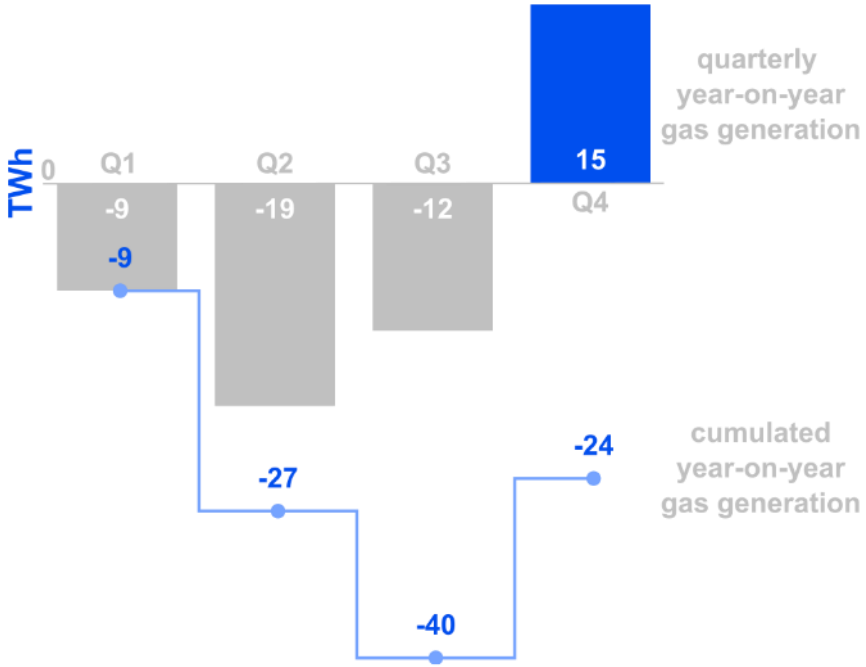
Electricity generation in 2024: Solar confirmed its leading role in the transition, whilst nuclear and hydro come back

Year-on-year changes for the main generation technologies in the EU-27/EEA(Norway), 2024 (TWh)



Adverse weather in last months of 2024 limited the decline in gas-generated electricity

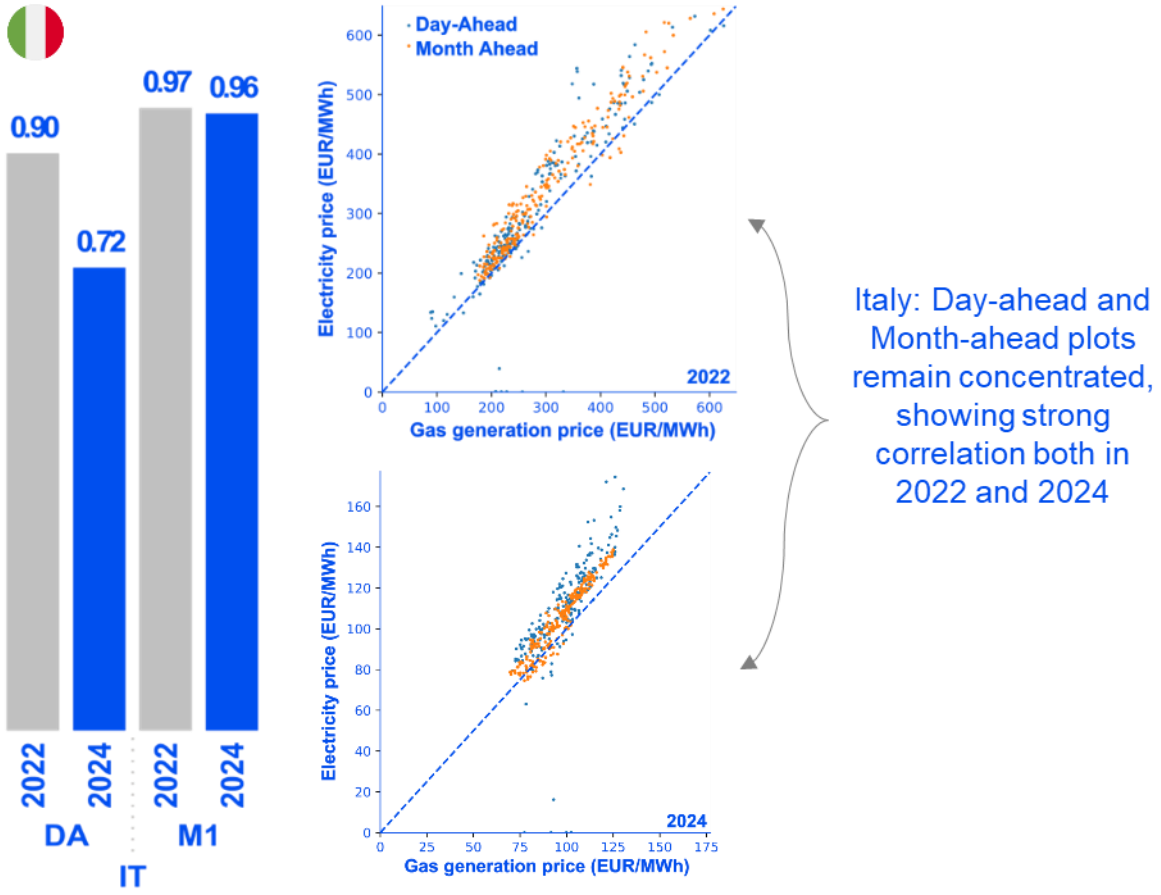
Year-on-year changes for gas generation in the EU-27/EEA(Norway), 2024 (TWh)



Source: ACER calculations based on ENTSO-E Transparency Platform.

Impact on Member States differ per varying electricity mix

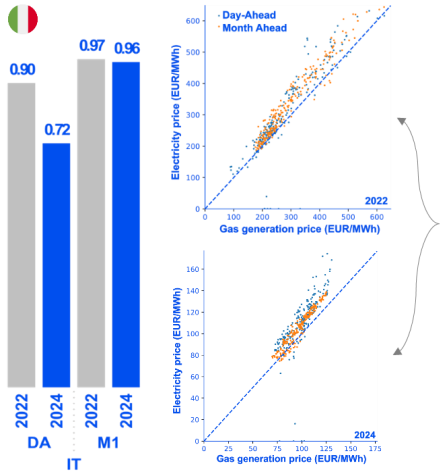
In 2024, the link between gas and electricity prices in Italy remained similar to 2022.



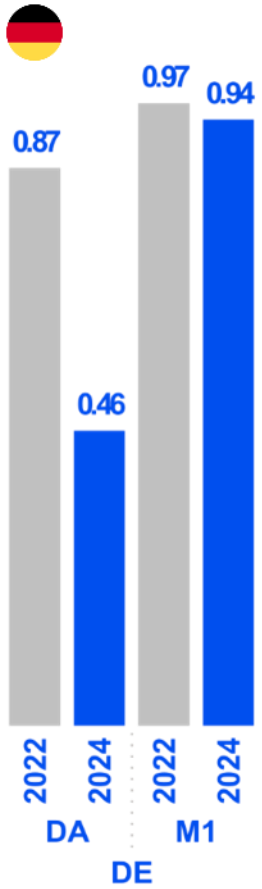
Source: ACER calculations based on ENTSO-E Transparency Platform.

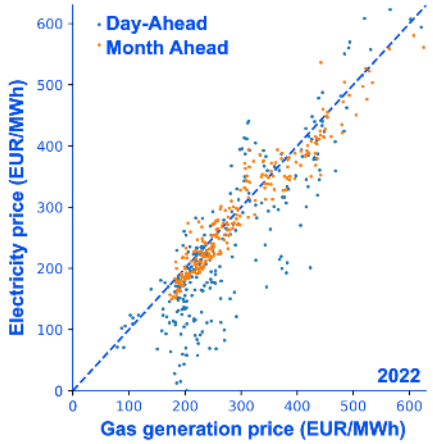
Impact on Member States differ per varying electricity mix

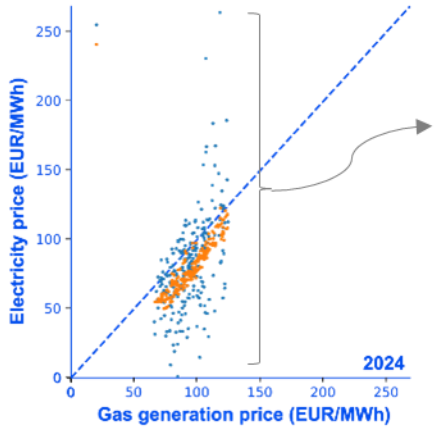
In 2024, the link between gas and electricity prices in Italy remained similar to 2022. In Germany, long-term electricity and gas prices remained closely linked, but renewable deployment has reduced gas influence on short-term electricity prices.



Italy: Day-ahead and Month-ahead plots remain concentrated, showing strong correlation both in 2022 and 2024





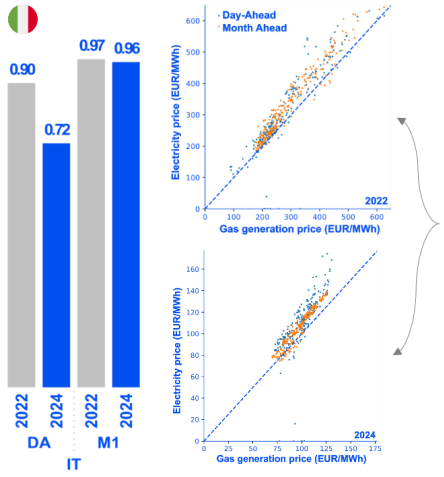


Germany: Day-ahead scattered plot in 2024 shows the impact of renewable energy sources

Source: ACER calculations based on ENTSO-E Transparency Platform.

Impact on Member States differ per varying electricity mix

In 2024, the link between gas and electricity prices in Italy remained similar to 2022. In Germany, long-term electricity and gas prices remained closely linked, but renewable deployment has reduced gas influence on short-term electricity prices. In France, gas had significantly less impact on electricity prices, with the return of nuclear capacity.



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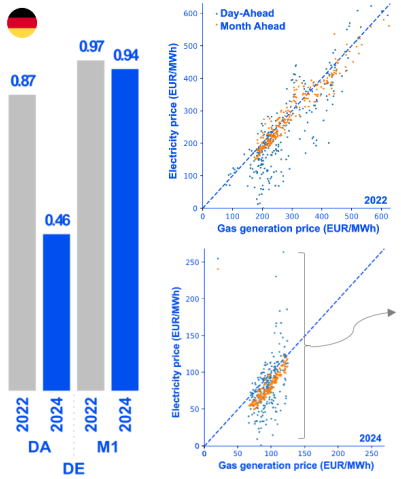

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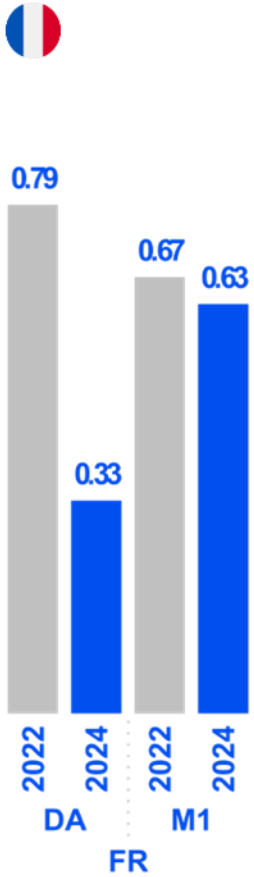
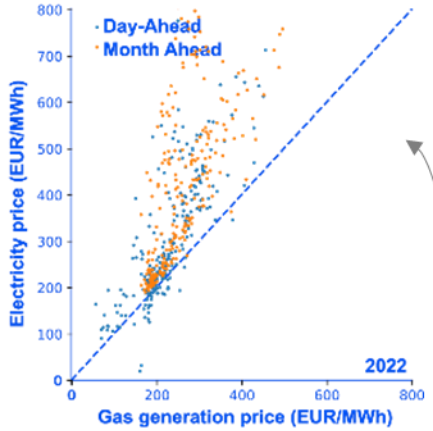
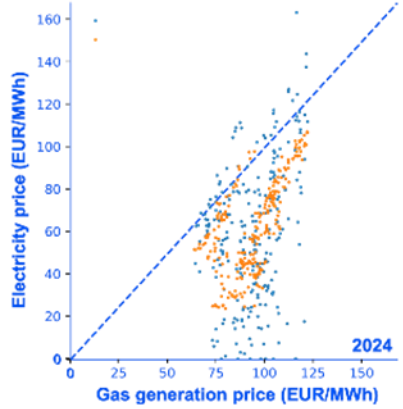






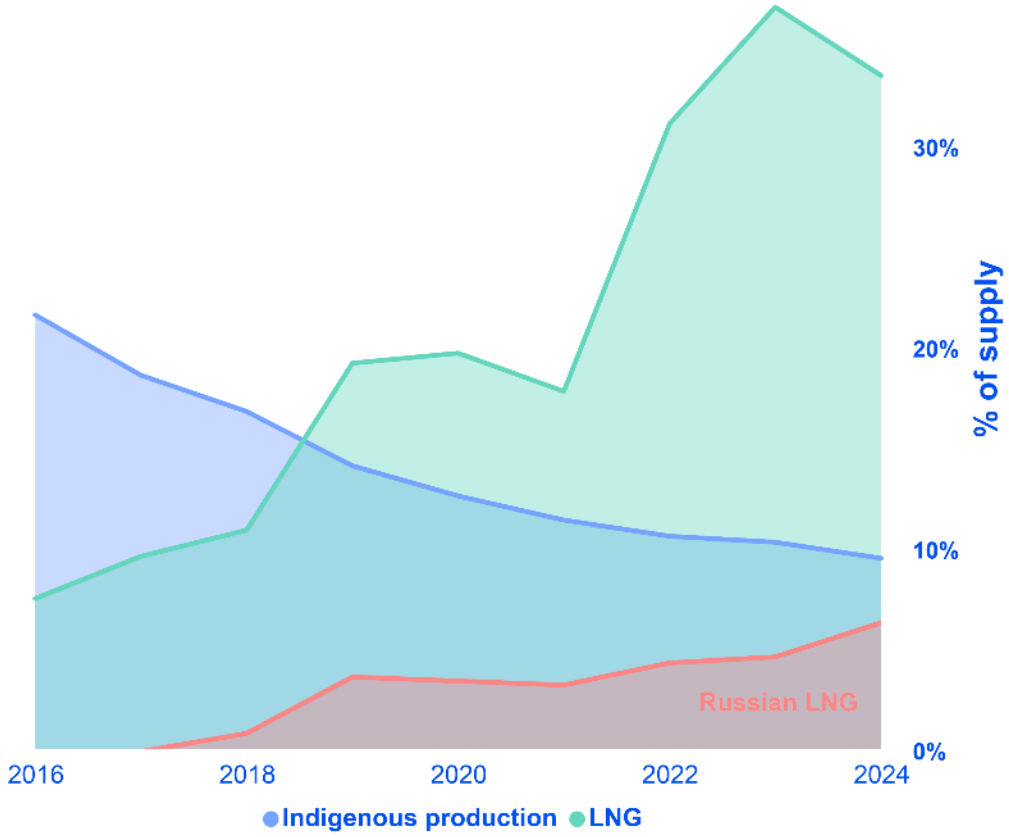
France: Day-ahead and Month-ahead plots show moderate correlation both in 2022 and 2024, revealing the importance of low carbon sources in the energy mix.

Source: ACER calculations based on ENTSO-E Transparency Platform.

Global LNG market set to move from tight to well supplied

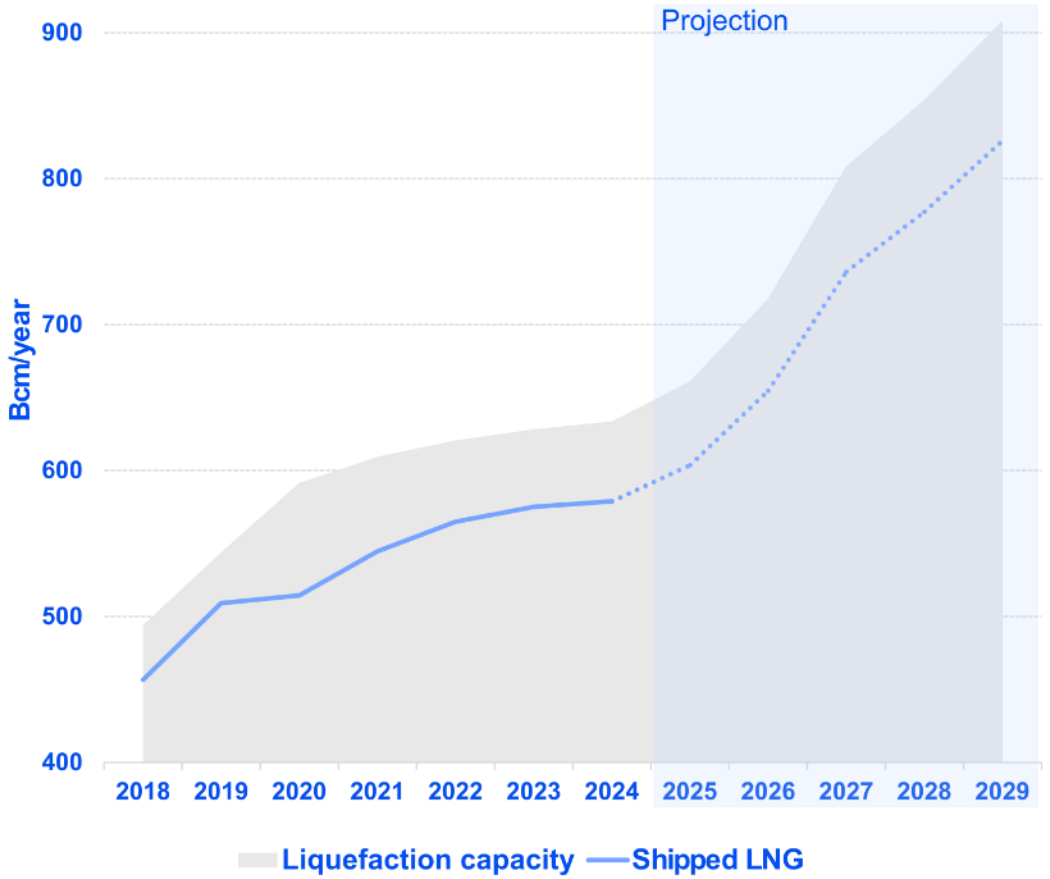
Exposure to global LNG dynamics is the new reality for EU gas markets…

Share of LNG and indigenous production in total supply, EU-27, 2016-2024 (%)



…but a significant expansion in LNG production is expected to loosen markets in the coming years

Global liquefaction capacity and LNG production, 2018-2029 (Bcm)



Source: ACER based on S&P Global.

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What to make of these insights ~ any ‘easy answers’ for Europe?

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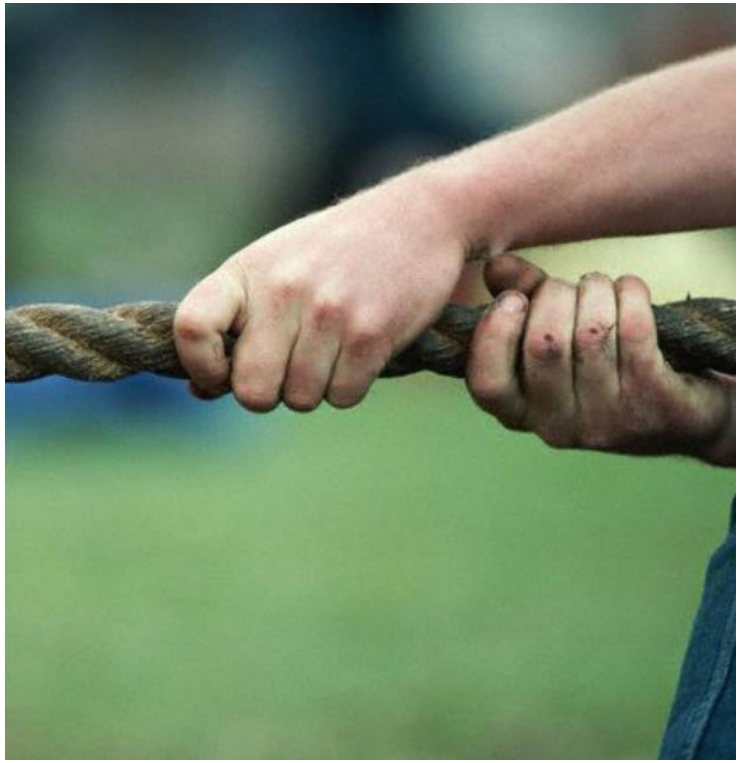
In the very near-term …



Let's be honest, it's either redistribution or socialisation

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So, targeting *what exactly* from now on?

four Weddings and a Funeral

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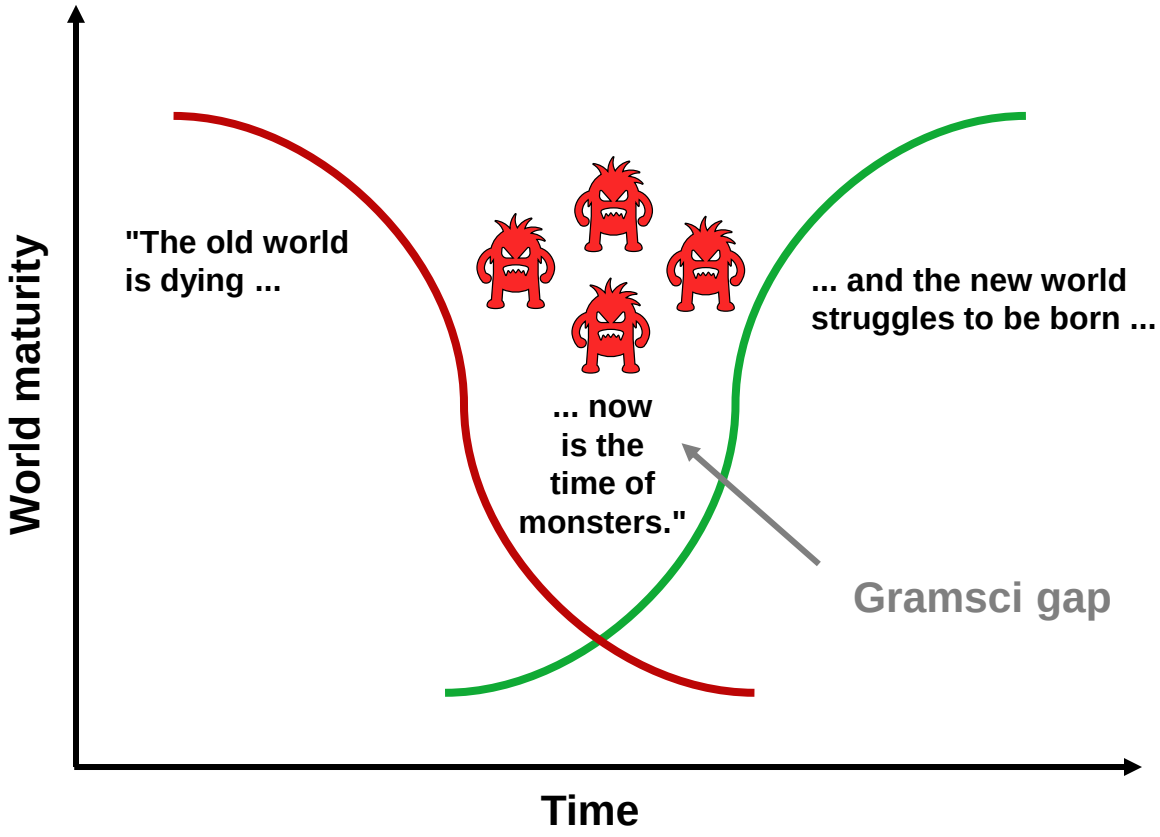
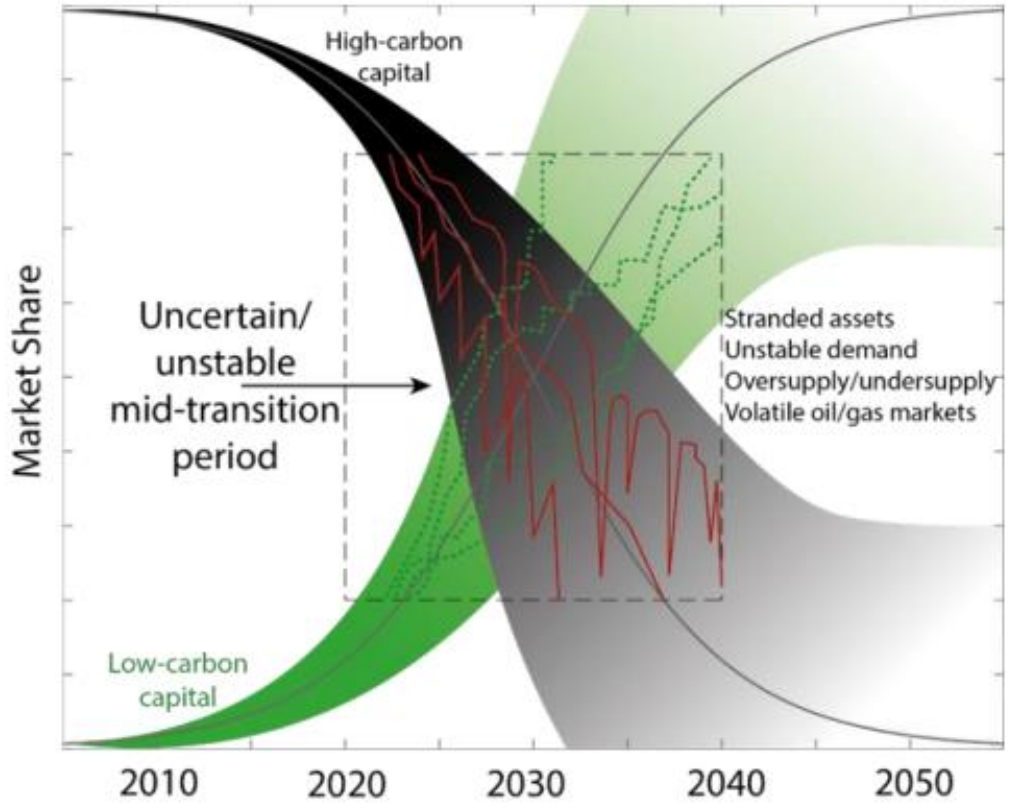
This version, however, starts in reverse …

a Funeral and four Weddings

‘The funeral’: A difficult mid-transition period





Source: Espagne, E., W. Oman, J.-F. Mercure, R. Svartzman, U. Volz, H. Pollitt, G. Semieniuk, and E. Campiglio: Cross-Border Risks of a Global Economy in Mid-Transition. IMF Working Paper No. 2023/184.

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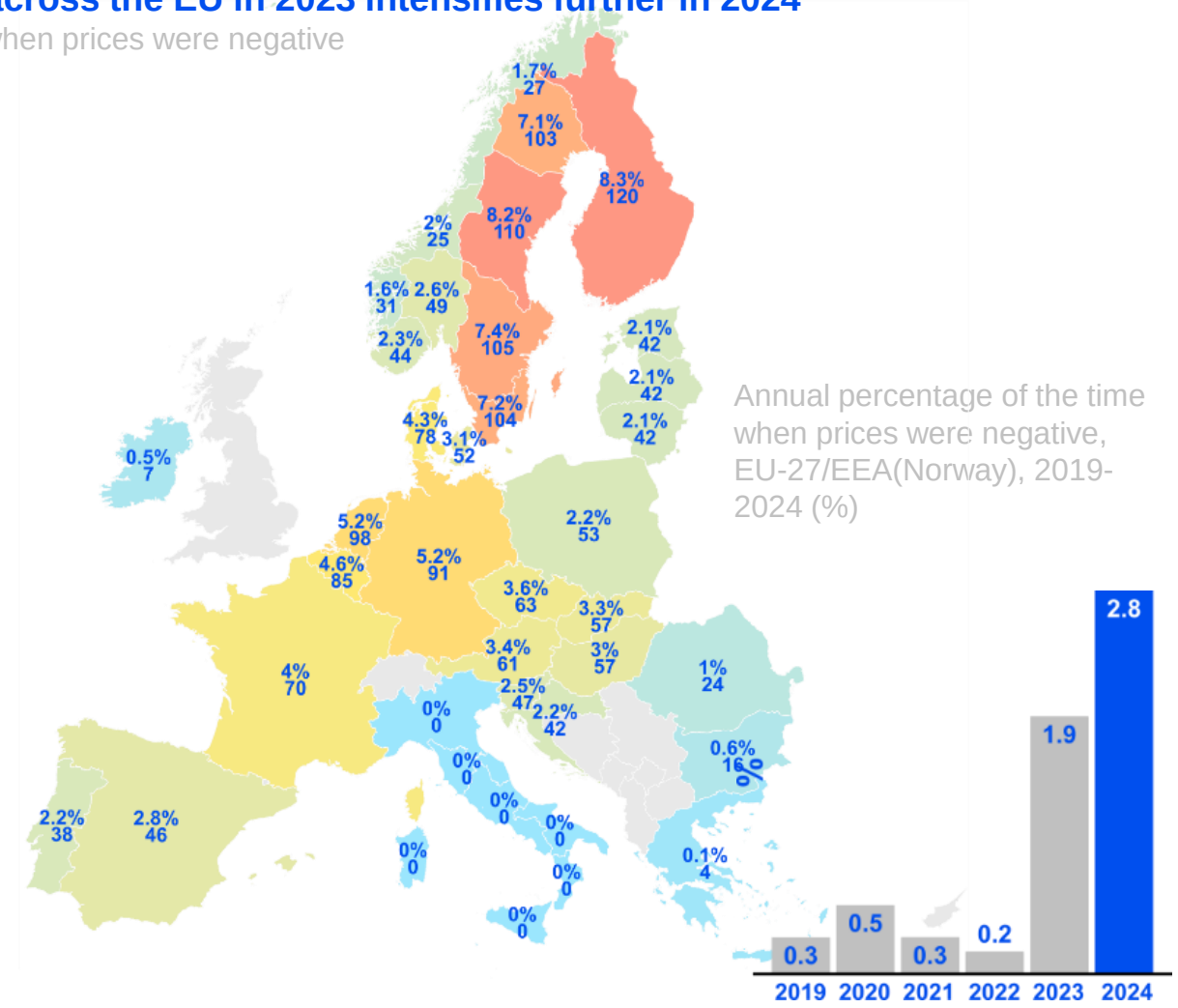
‘Weddings’ ahead? Consider the following …

- Flexibility becomes an imperative to moderate price volatility
- Taking a fresh look at future cost drivers
- Consider ‘doing more together’ on infrastructure and security of supply
- A relationship test ahead: Key policy choices for the Energy Union

In 2024, negative and very-low electricity prices increased

Surge in negative electricity prices across the EU in 2023 intensifies further in 2024

Percentage of the time and number of days when prices were negative
EU-27/EEA(Norway), 2024



Annual percentage of the time when prices were negative, EU-27/EEA(Norway), 2019-2024 (%)

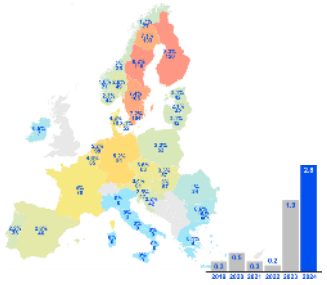
Source: ACER calculations based on ENTSO-E transparency platform.

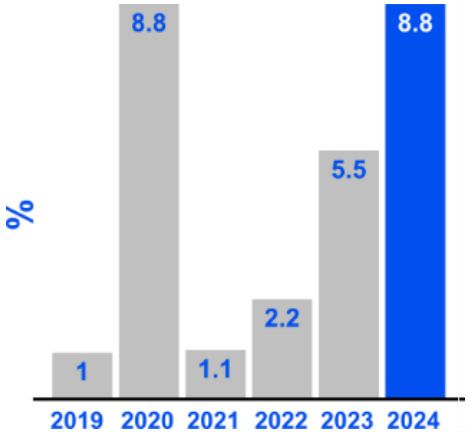
In 2024, negative and very-low electricity prices increased

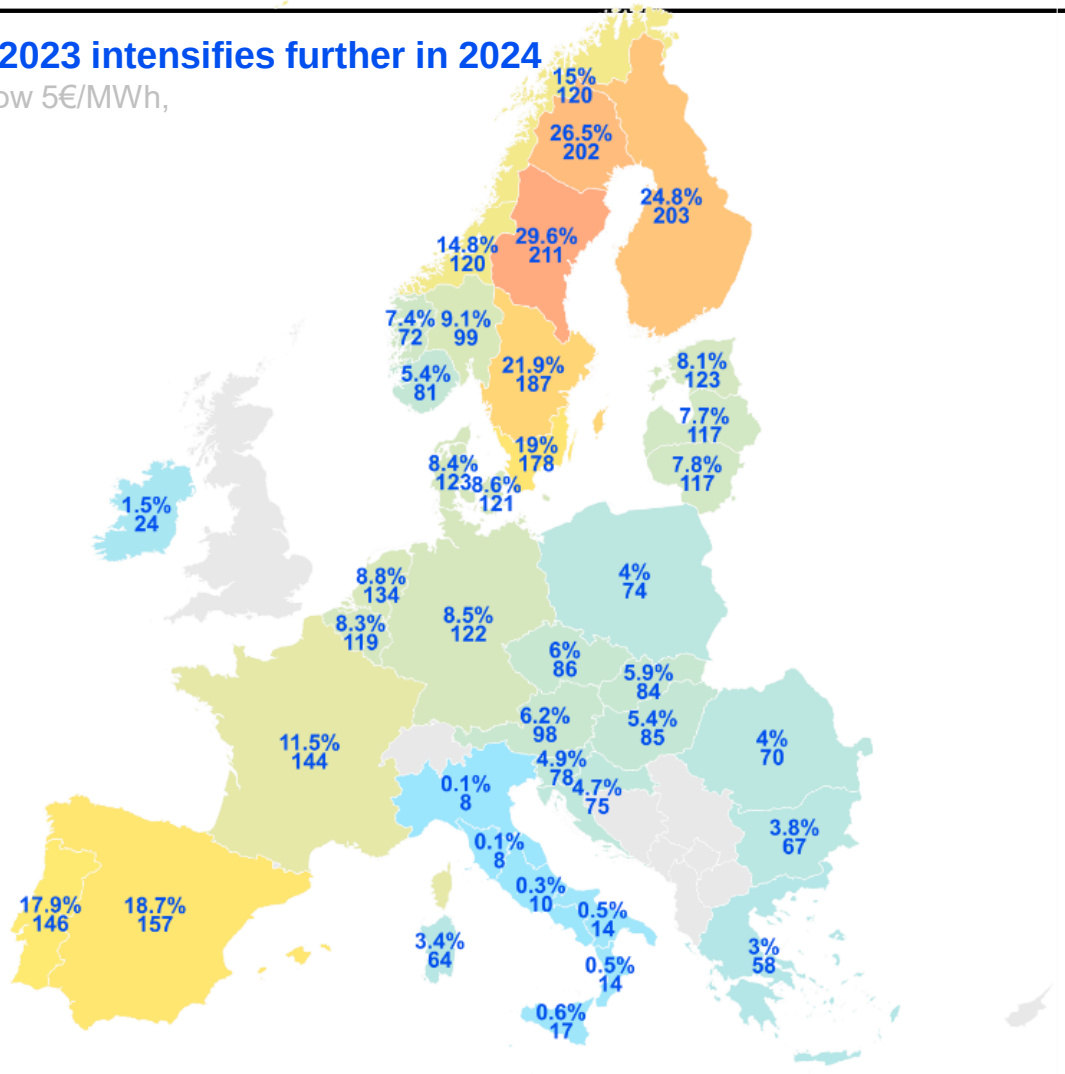
Surge in negative electricity prices across the EU in 2023 intensifies further in 2024

Percentage of the time and number of days when prices were below 5€/MWh, EU-27/EEA(Norway), 2024

Annual percentage of the time when prices were <5EUR/MWh, EU-27/EEA (Norway), 2019-2024 (%)







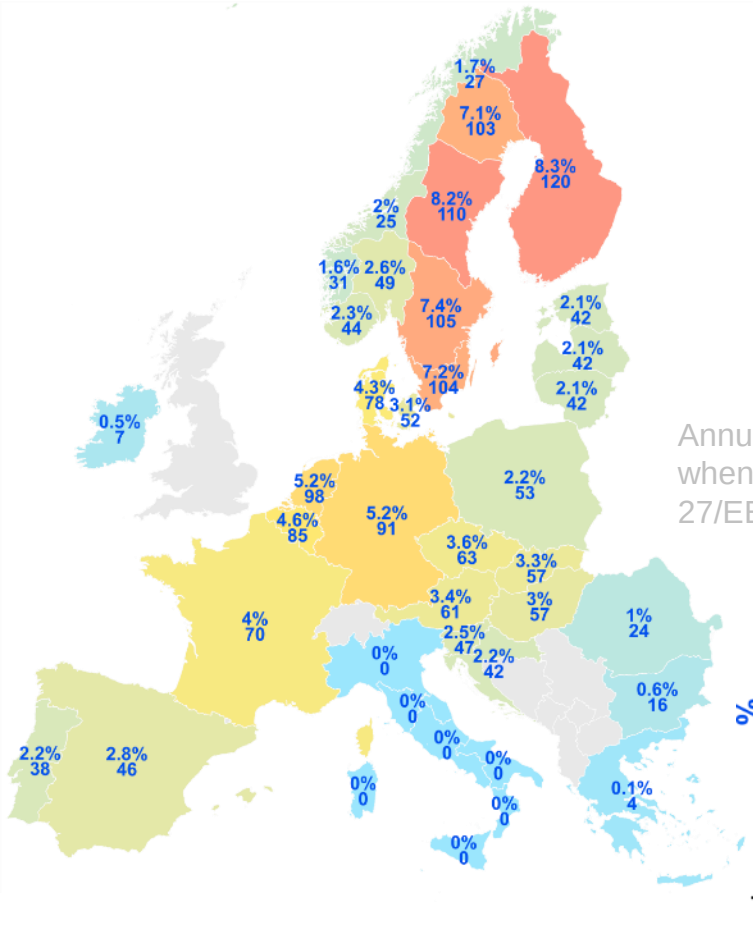
Source: ACER calculations based on ENTSO-E transparency platform.

In 2024, negative and very-low electricity prices increased

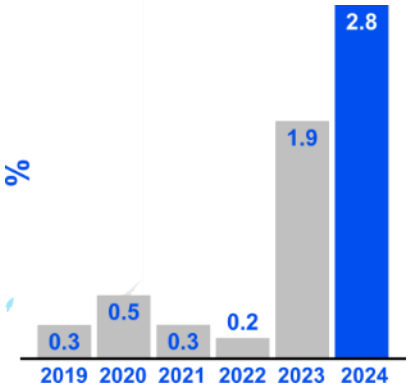
Surge in negative electricity prices across the EU in 2023 intensifies further in 2024

Percentage of the time and number of days when prices were negative (left) and below 5€/MWh (right), EU-27/EEA(Norway), 2024

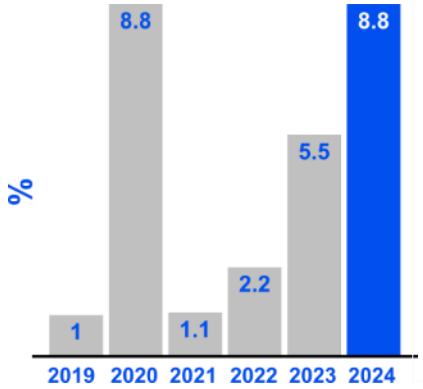
Occurrences of negative prices had risen by 12 times in 2023; they increased further by half in 2024. Better subsidy designs and overall tariffs reflecting local constraints could encourage renewable producers to align output with system needs, reducing negative price episodes.

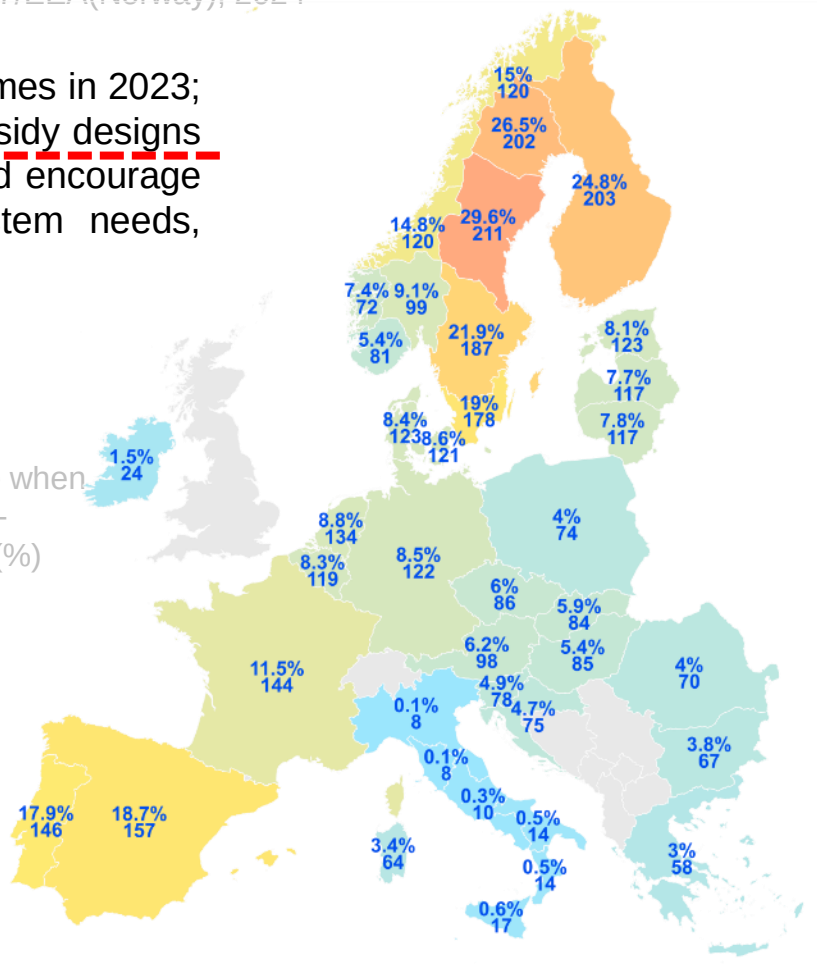


Annual Percentage of the time when prices were negative, EU-27/EEA(Norway), 2019-2024 (%)



Annual percentage of the time when prices were <5EUR/MWh, EU-27/EEA(Norway), 2019-2024 (%)





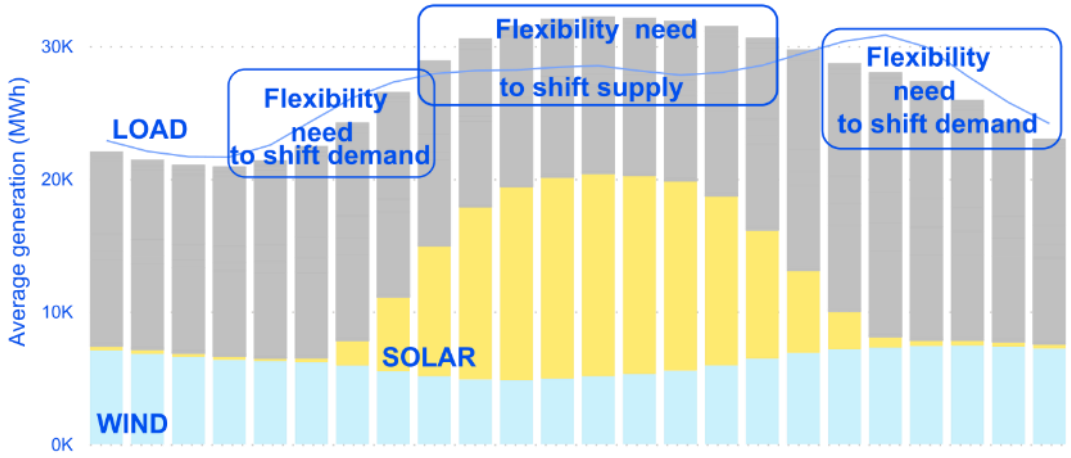
Source: ACER calculations based on ENTSO-E transparency platform.

Short-term flexibility solutions exist; uptake must grow

The gap between midday solar oversupply and evening demand is growing.

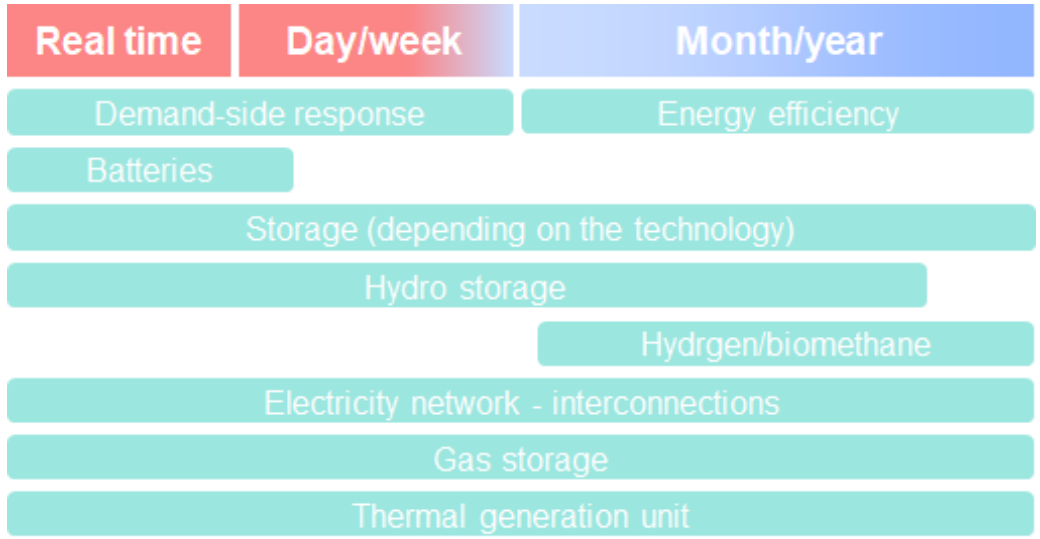
Renewables induce short-term flexibility needs

Hourly averages of energy generation in Spain, 2024 (MWh)



Demand-response, interconnections and batteries are key

Flexibility services provided by various technologies, sorted according to their duration[1]



In real time, the gap between midday solar oversupply and evening demand is growing. Solutions exist to manage this gap e.g. access to demand-side response[1], battery deployment, and cross-border trade through interconnections[2]. For longer-term flexibility, the role of gas storage remains central.

Note: 1. See the ACER report on Demand response and other distributed energy resources (December 2023) and the upcoming ACER report on No-regret measures to remove barriers to demand response (April 2025) 2. See the yearly ACER report on Capacities for cross-zonal electricity trade and congestion management.

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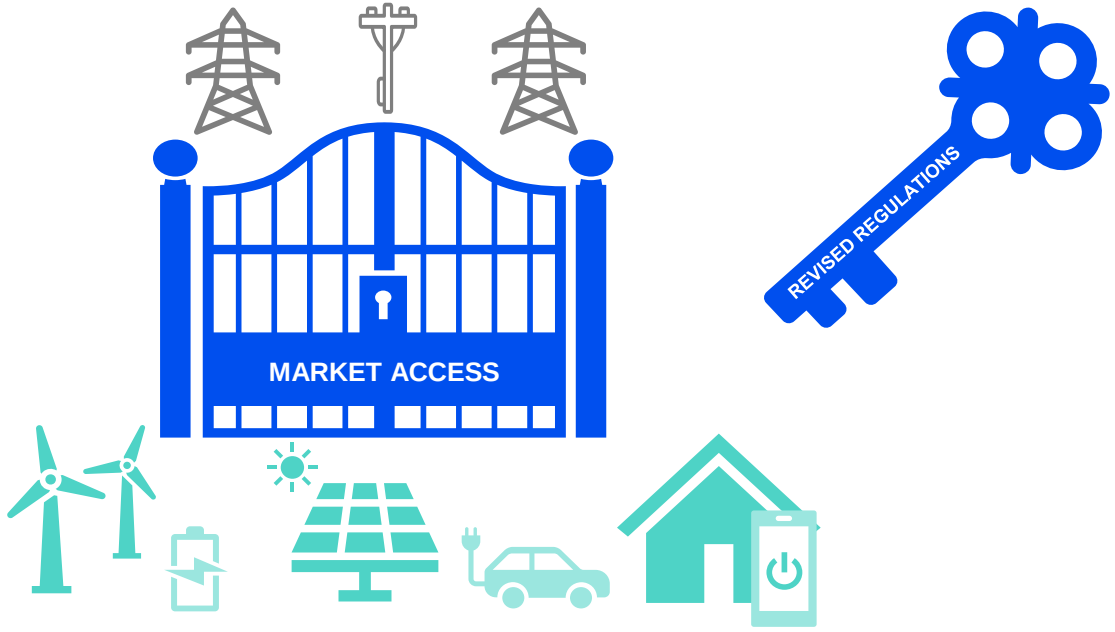
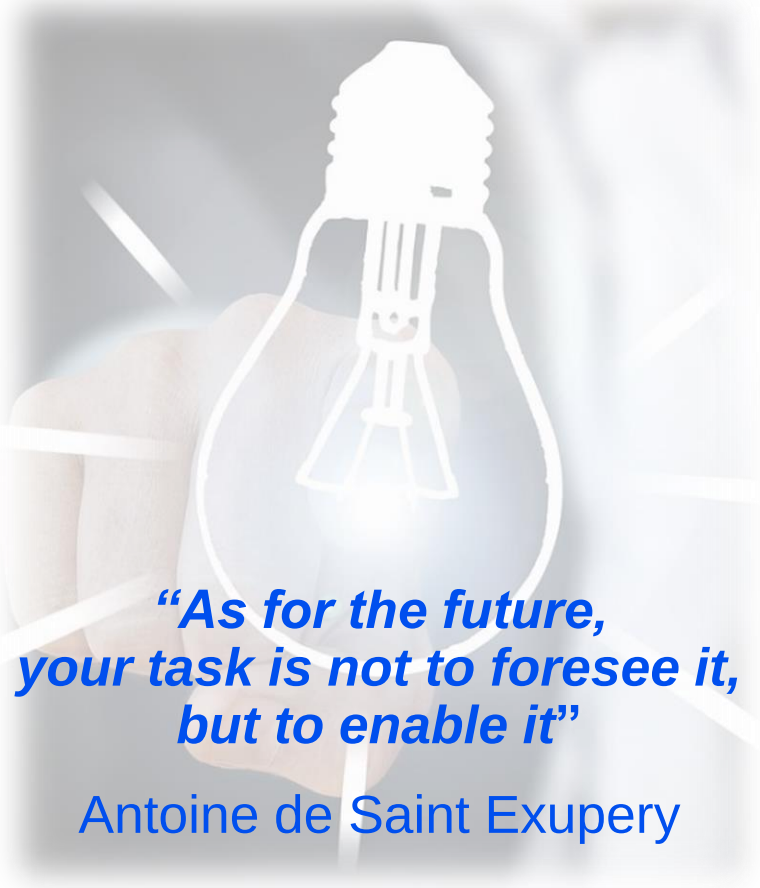
Sneak peek …

12 actions to unlock flexibility in the electricity markets at the national level



ACER's "Unlocking flexibility" report: No-regret measures to remove barriers to demand response (April 2025)



"As for the future, your task is not to foresee it, but to enable it"

Antoine de Saint Exupery

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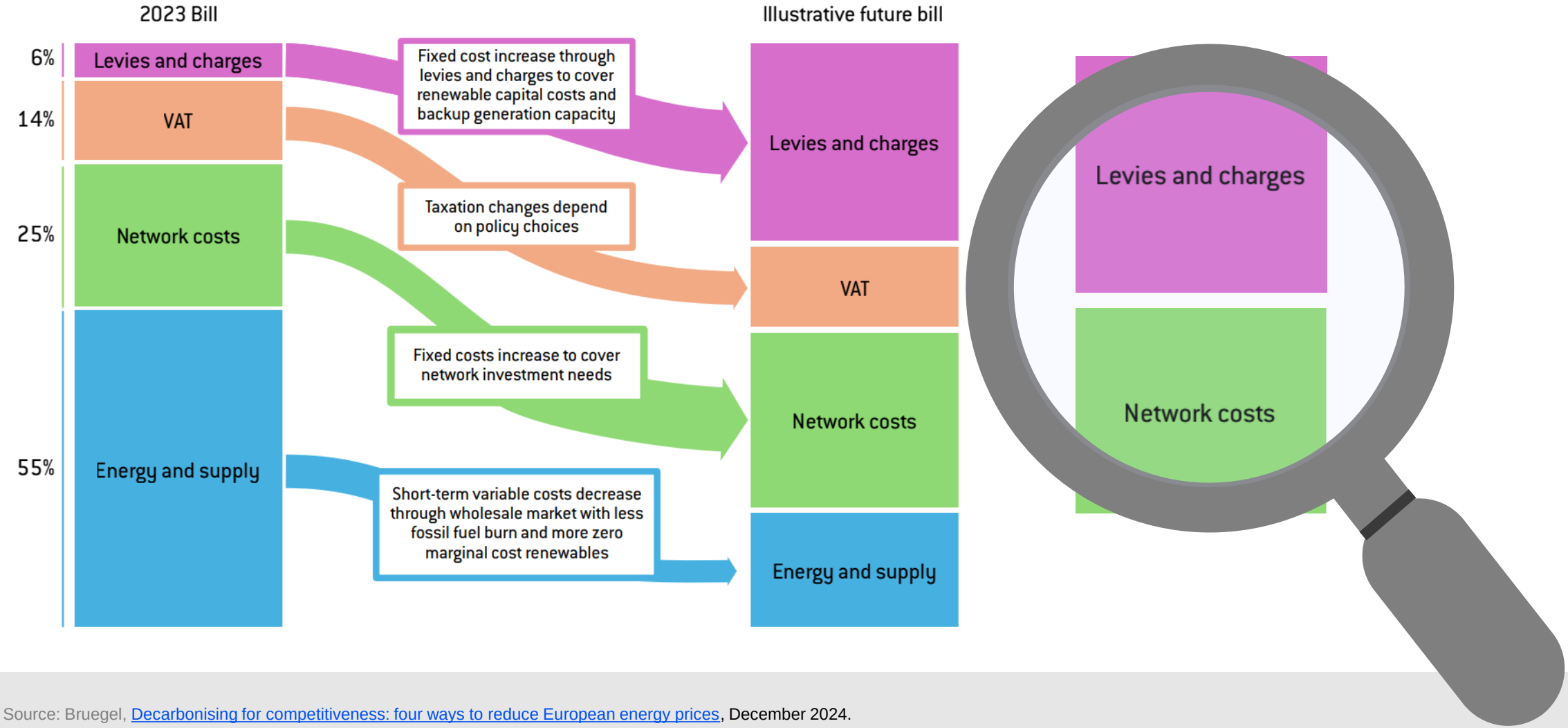
Shift in cost drivers ~ shift in focus?

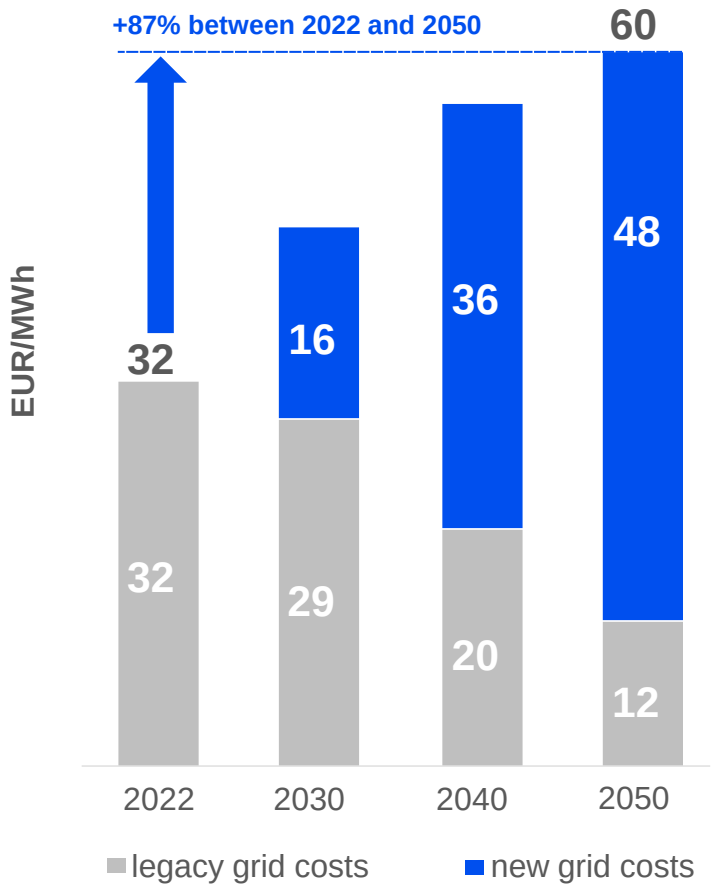
Expected changes in electricity cost components with the energy transition



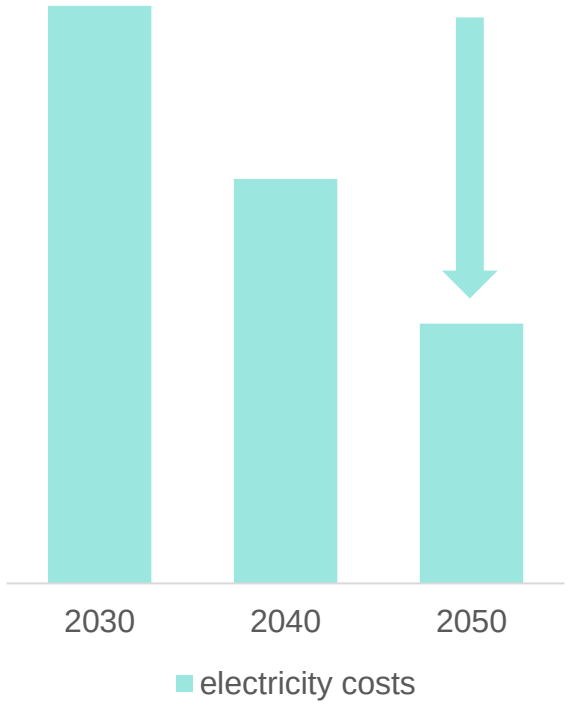
Source: Bruegel, Decarbonising for competitiveness: four ways to reduce European energy prices, December 2024.

Network costs at risk of doubling by 2050

Grid costs are expected to increase …



… while electricity costs should decrease



Innovative grid technologies can help:

20-40 % increase in overall network capacity by 2040

35 % reduction in conventional expansion costs by 2040

Source: ACER's monitoring of electricity infrastructure development to support a competitive and sustainable energy system, 16 December 2024. Numbers (right) from CurrENT and Compass Lexecon: Prospects for Innovative Power Grid Technologies, June 2024

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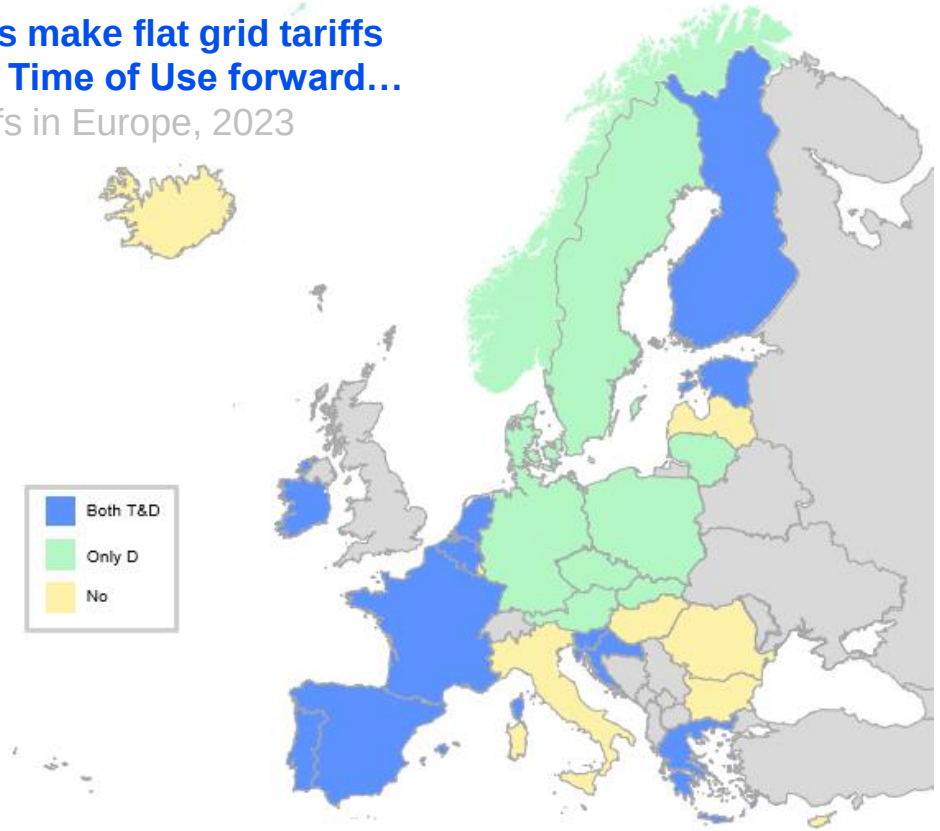
Sneak peek …

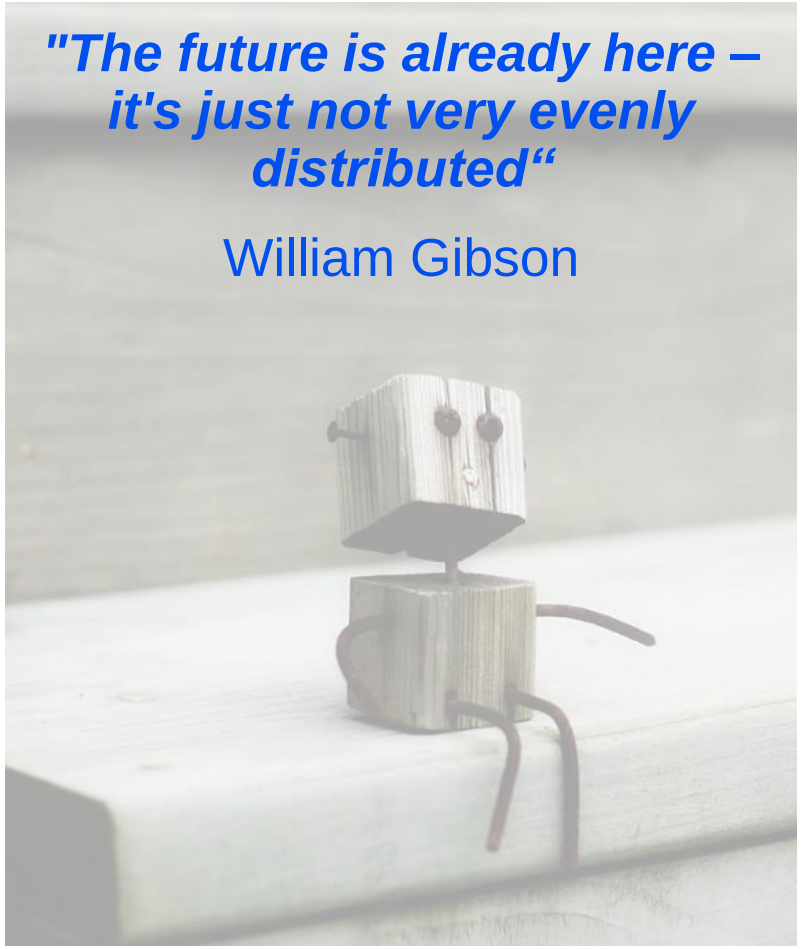
Grid tariffs play a role, too.

Flexibility needs make flat grid tariffs costly, pushing Time of Use forward…

Time of use tariffs in Europe, 2023



ACER's report on network tariff practices: "Getting the signals right: electricity network tariff methodologies in Europe" (March 2025)



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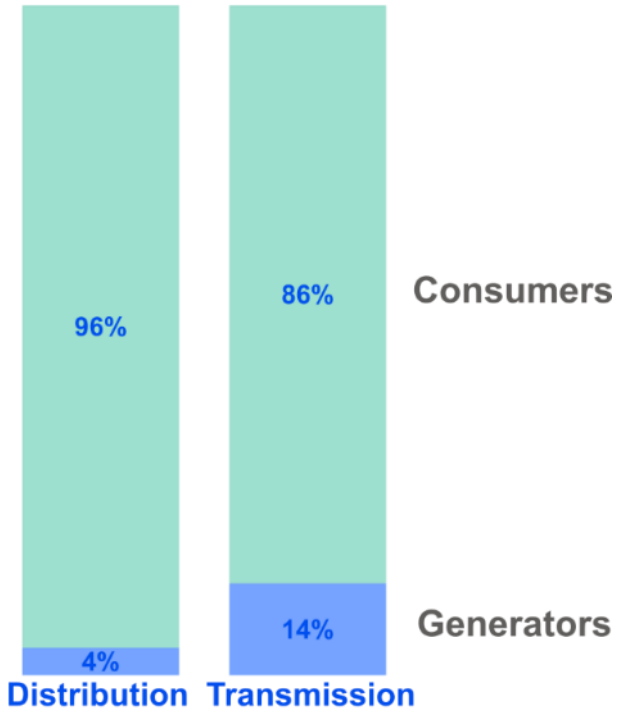
Sneak peek …

Grid tariffs play a role, too.

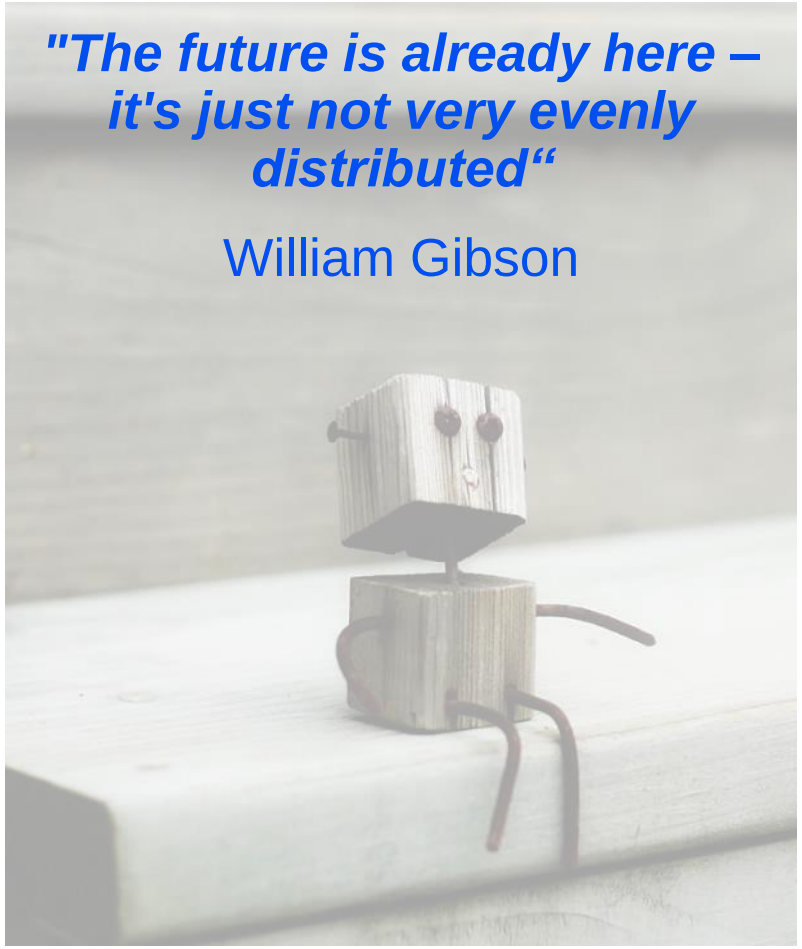
Split of network charges between generators and consumers



Expanding the grid for production?

Producers may need to pay more.

ACER's report on network tariff practices: "Getting the signals right: electricity network tariff methodologies in Europe" (March 2025)



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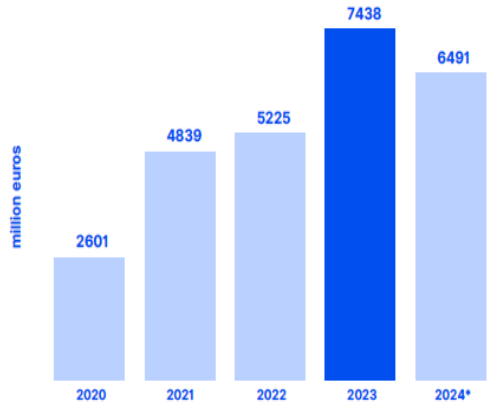
Costs of capacity mechanisms are significant

and possibly flexibility

Costs of capacity mechanisms are on the rise, likely a sign-of-things-to-come

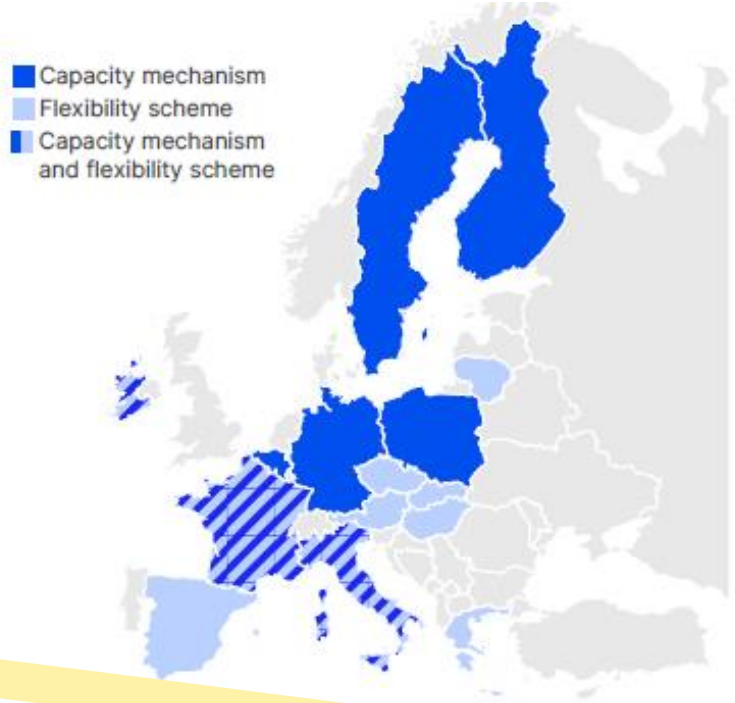


Source: ACER calculations based on data provided by NRAs.

Note: Costs for 2024 are projections. The figure includes the costs of legacy contracts in Spain and Portugal.

Might greater 'resource sharing' mitigate the rise in costs?

A wave of flexibility support schemes may come on top



Source: ACER's monitoring of security of EU electricity supply, 16 December 2024.

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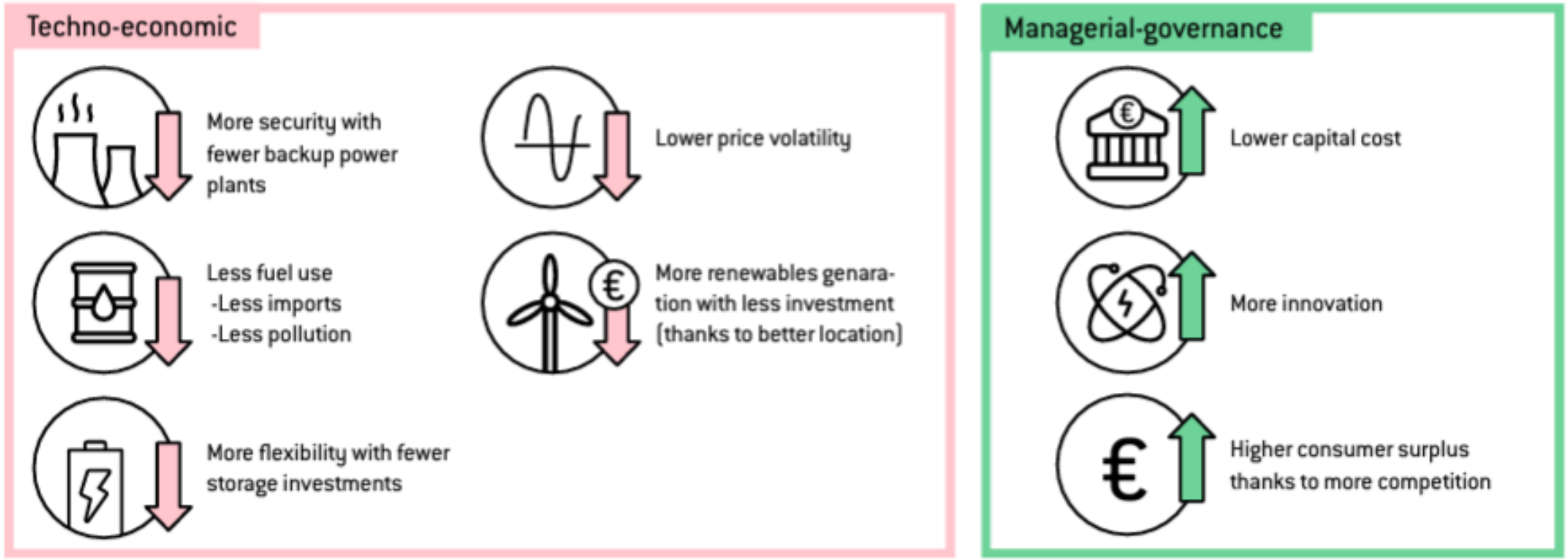
‘Doing more together’ holds benefits



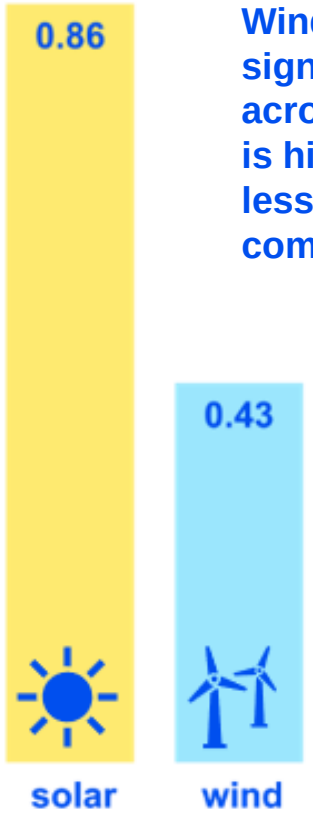
*Further [energy market] integration could increase (…) **benefits to up to EUR 40-43 billion per year** by 2030 …*

*Regional cooperation across Europe, underpinned by better interconnectivity and closer coordination, can **reduce the need for flexibility investments by up to 20%** …*

Source: Zachmann, G., C. Batlle, F. Beaude, C. Maurer, M. Morawiecka and F. Roques (2024) ‘Unity in power, power in unity: why the EU needs more integrated electricity markets’, Policy Brief 2024/03, Bruegel, 14 February 2024.

Example: enhanced regional coordination of renewables

Generation correlation across European capacity calculation regions, 2024



Wind generation offers significant complementarity across regions, while solar is highly correlated, thus less relevant as an import-compensating resource.

Example: The Nordic and Core region show moderate correlation. Surplus wind generation can be exported from one region to the other.

Correlation of on-shore wind generation across European capacity calculation regions, 2024

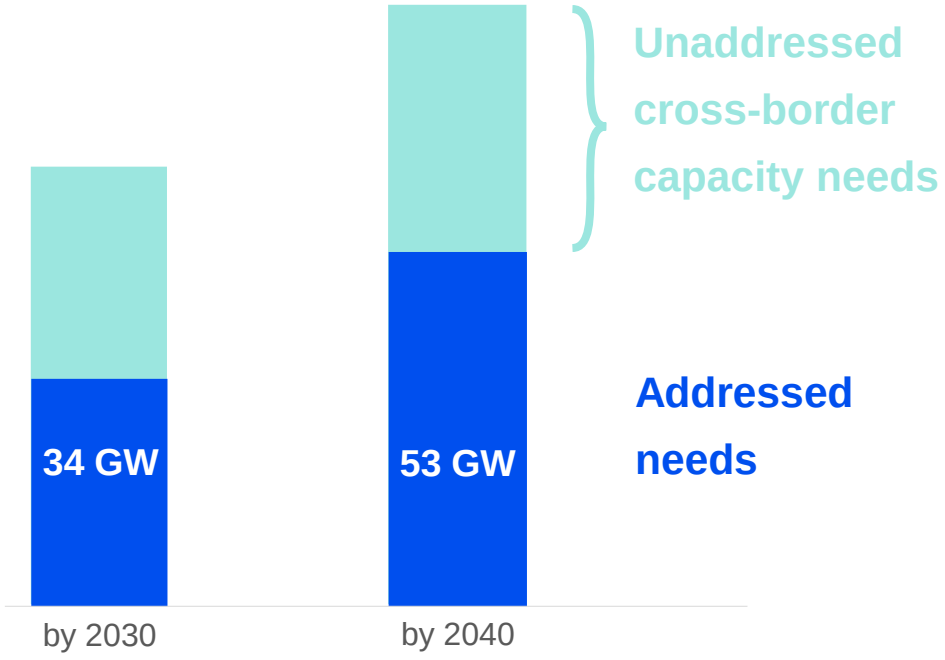
	SEE	SWE	IT. North	Nordic	GRIT	Baltic	Hansa	Core
SEE	1.0	0.2	0.2	0.1	0.4	0.2	0.1	0.4
SWE	0.2	1.0	0.4	0.2	0.4	0.2	0.3	0.5
IT. North	0.2	0.4	1.0	0.2	0.5	0.2	0.2	0.7
Nordic	0.1	0.2	0.2	1.0	0.2	0.7	0.7	0.4
GRIT	0.4	0.4	0.5	0.2	1.0	0.2	0.3	0.6
Baltic	0.2	0.2	0.2	0.7	0.2	1.0	0.6	0.4
Hansa	0.1	0.3	0.2	0.7	0.3	0.6	1.0	0.6
Core	0.4	0.5	0.7	0.4	0.6	0.4	0.6	1.0

Wind generation is more regionally complementary than solar, which relies more on storage uptake in high-solar saturation areas for capturing value. Better coordination of wind and solar across Europe can raise capacity factors and reduce variability.

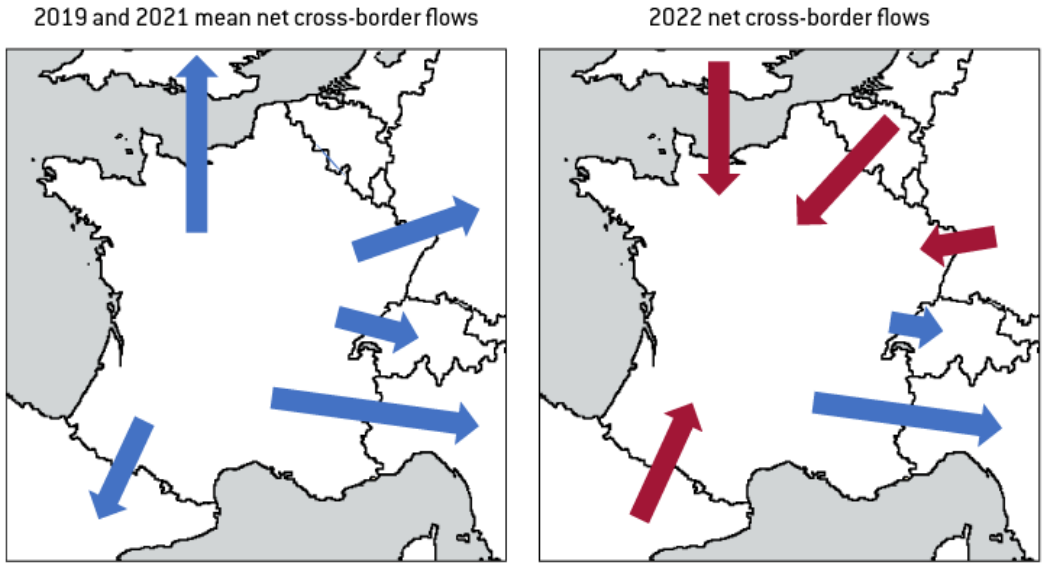
Source: ENTSO-E transparency platform + Bruegel policy brief from 14 February 2024 (previous slide).

Example: further coordinating planning and operation

There are more cross-border needs than planned cross-border investments



France became a huge importer of electricity during the energy crisis



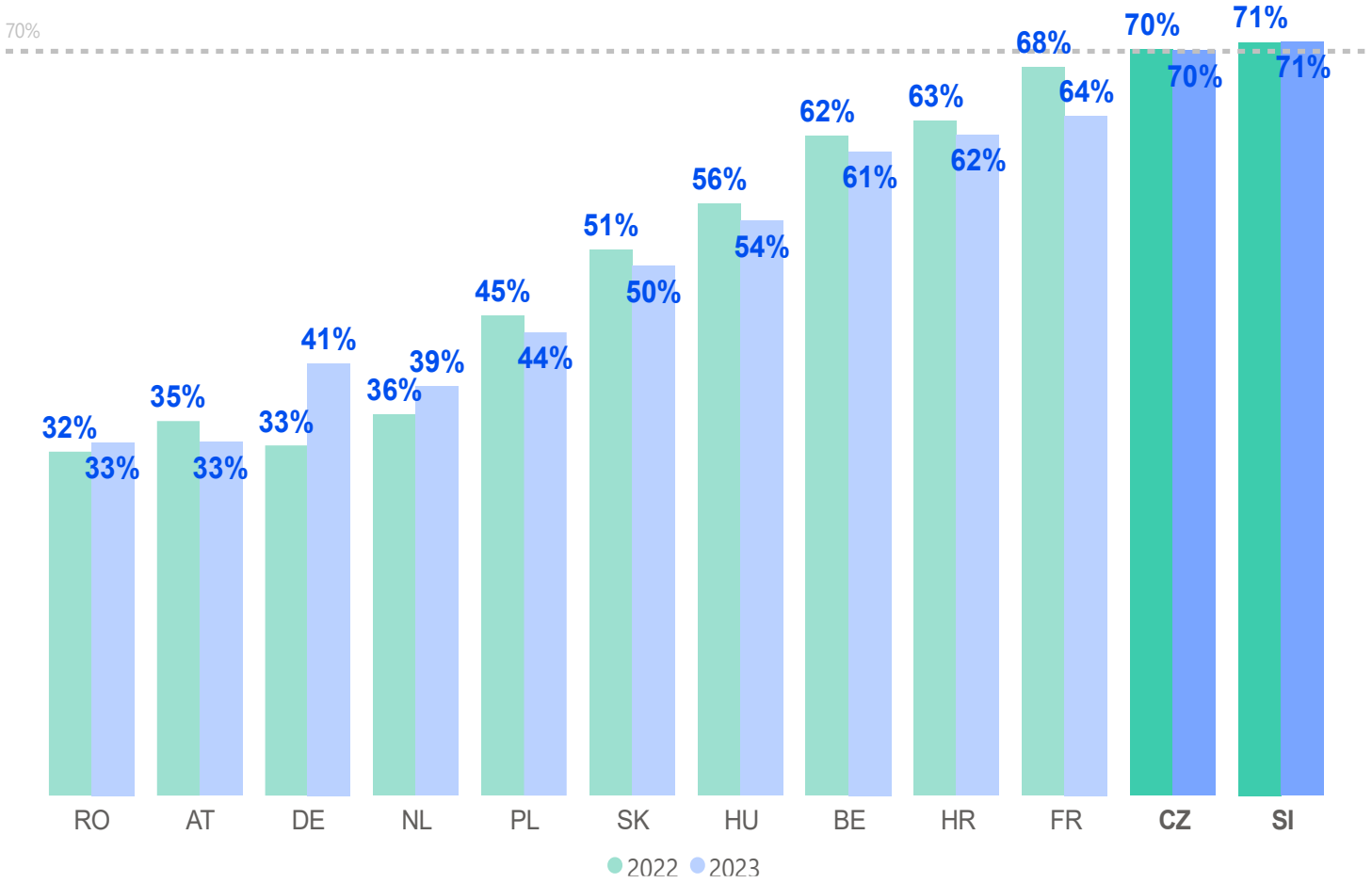
Note: The length of the arrow is directly proportional to the amount of electricity imported or exported.

Source: ACER's monitoring of electricity infrastructure development to support a competitive and sustainable energy system, 16 December 2024.

Example: interconnector capacity to be made available

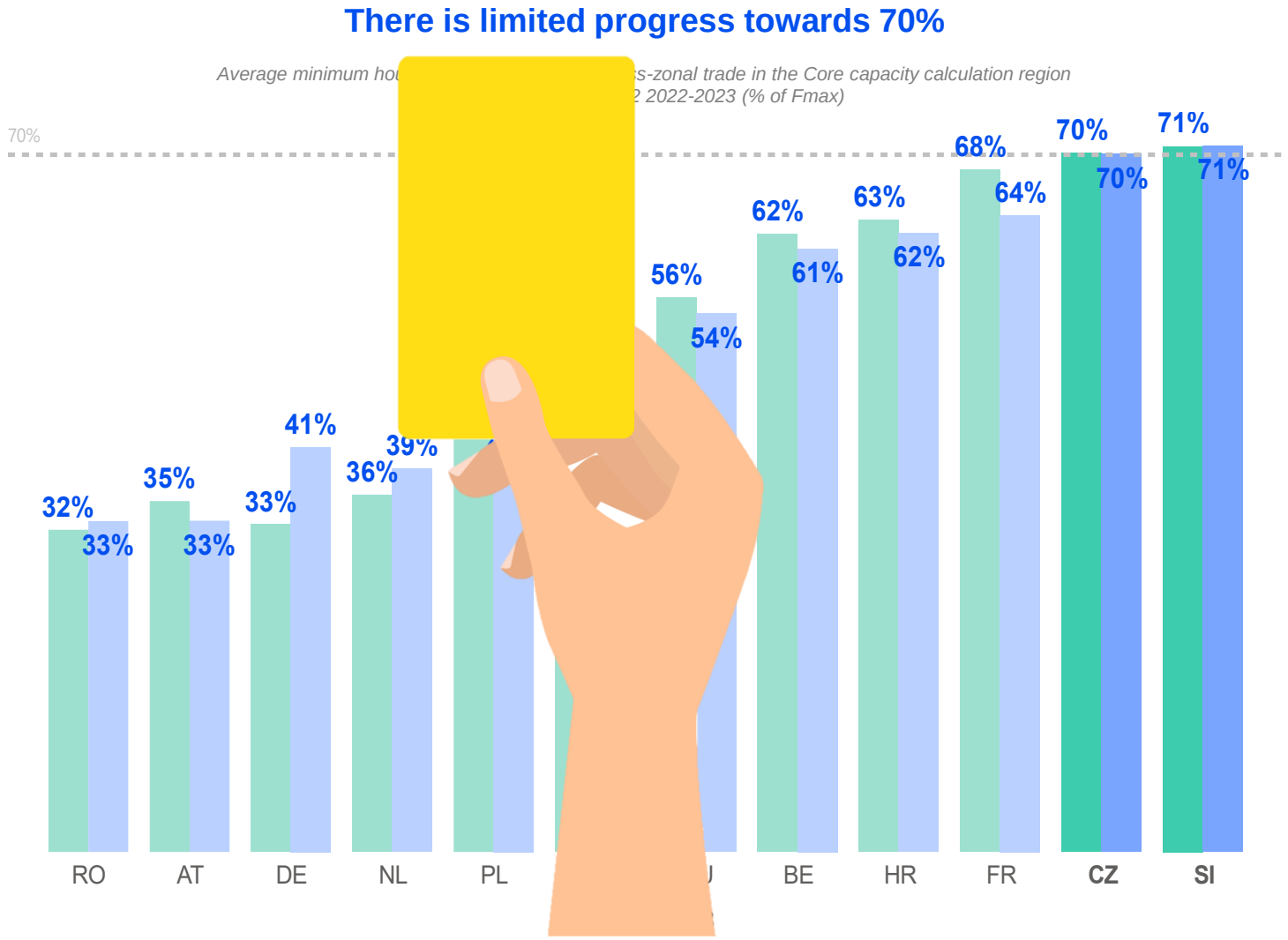
There is limited progress towards 70%

Average minimum hourly margin available for cross-zonal trade in the Core capacity calculation region per Member State – H2 2022-2023 (% of Fmax)



Source: ACER's report on capacities for cross-zonal trade of electricity and congestion management, July 2024. ACER Opinion issued on 10 April 2024. Background note for TTE Council of 16 December 2024.

Example: interconnector capacity to be made available



*"ACER estimates that, during the summer of 2024, meeting the 70% requirement would have yielded **between 10 and 25% of additional margin of capacity** in the most relevant bottlenecks [affecting Central Eastern Europe]."*

Source: ACER's report on capacities for cross-zonal trade of electricity and congestion management, July 2024. ACER Opinion issued on 10 April 2024. Background note for TTE Council of 16 December 2024.

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‘Doing more together’ invariably links to ‘trust’

1. **It starts & ends with political will**: Commitment to structurally integrate energy markets; a commitment that is anchored institutionally.
2. Coordinated infrastructure planning and cost-/benefit-sharing across borders, done or verified by public authorities.
3. Coordinated renewable and flexibility deployment across borders.
4. Closer integration of real-time operation (especially offshore).
5. Rigorous enforcement by public authorities to ensure trust in the whole framework; why else accept increased interdependence?

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So, might it be time to renew (or revisit) those initial vows?

Four Weddings and a Funeral

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So, might it be time to renew (or revisit) those initial vows?

- Flexibility becomes an imperative to moderate price volatility
- Taking a fresh look at future cost drivers
- Consider ‘doing more together’ on infrastructure and security of supply
- A relationship test ahead: Key policy choices for the Energy Union

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Stay tuned for more …

	Informing policy considerations	Monitoring
ELECTRICITY	• Recommendations: Demand response rules; improving the monitoring, investigation and enforcement framework (December) • Implementation of 15 min market time unit trading in EU-wide day-ahead and intraday markets (June) • Assessment of peak shaving products in normal conditions (June) • Opinion on the bidding zone review study (July) • Policy Paper on infrastructure cost benefit sharing (December)	• No-regret measures to remove barriers to demand response (April) • Network codes implementation delays (ad-hoc updates) • Market integration and cross-zonal capacity report (July) • Regional coordination centres report (March) • Balkan black-out investigation
GAS, HYDROGEN AND RETAIL	• Recommendation on intertemporal cost allocation (July) • Network codes 2.0 (CAM and CMP guidelines amendments) • LNG methodology update	• Gas monitoring quarterly • LNG (May) • Capacity/congestion (June) • Hydrogen market (October) • Retail gas country sheets (July)
ENERGY SYSTEM NEEDS	• Adoption of the flexibility needs methodology (July) • Guidance on Distribution Network development plans (July)	• Implementation of the ITC mechanism (March) • Best practices network tariffs report (March) • PCI monitoring (April) • Security of supply report (November)


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ACER is hiring!
Join us in powering Europe's energy future.
Check out our job vacancies (in many areas).

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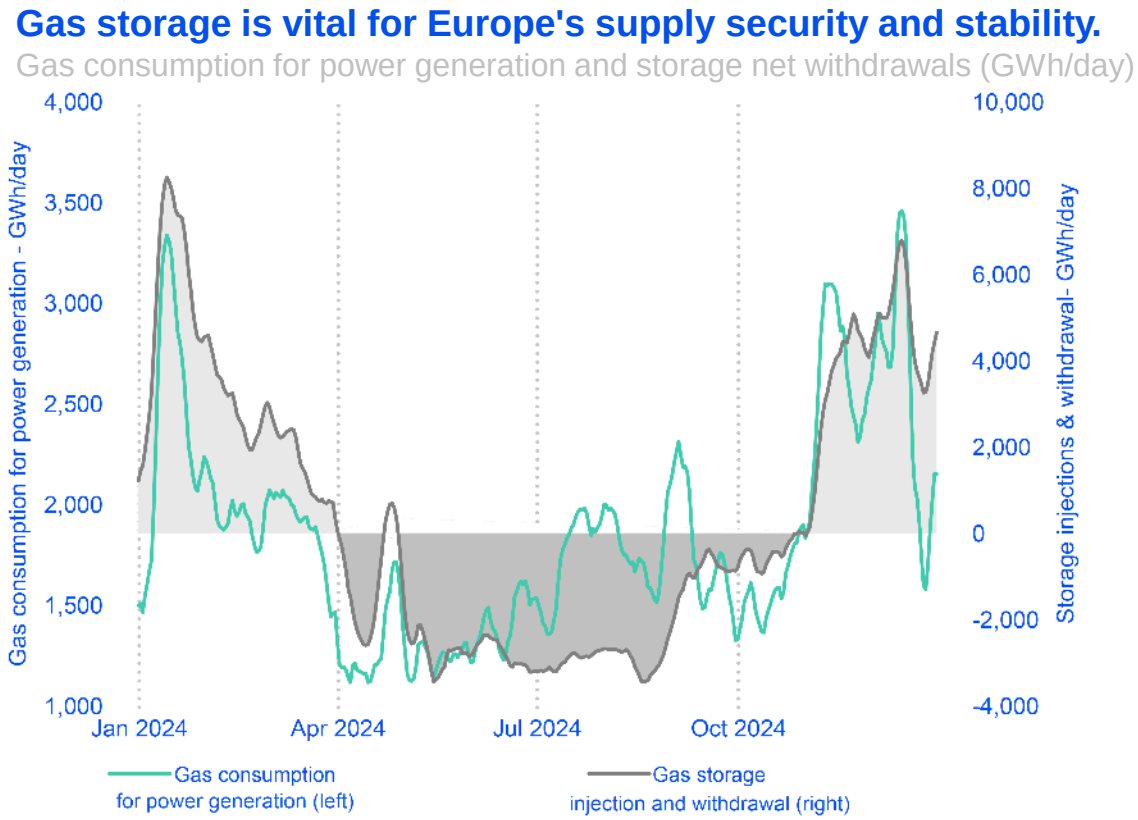
ACER role and governance

- **Supporting the integration of energy markets in the EU** (by common rules at EU level). Primarily directed towards transmission system operators and power exchanges.
- **Contributing to efficient trans-European energy infrastructure**, ensuring alignment with EU priorities.
- Monitoring energy markets to ensure that they function well, **deterring market manipulation and abusive behaviour**.
- Where necessary, **coordinating cross-national regulatory action**.
- Governance: **Regulatory oversight is shared** with national regulators. **Decision-making** within ACER is collaborative and joint (formal decisions requiring 2/3 majority of national regulators). **Decentralised enforcement** at national level.
- Headquartered in Ljubljana, Slovenia. **Engaged across the EU**.

EU gas system remains a relevant backstop for energy markets

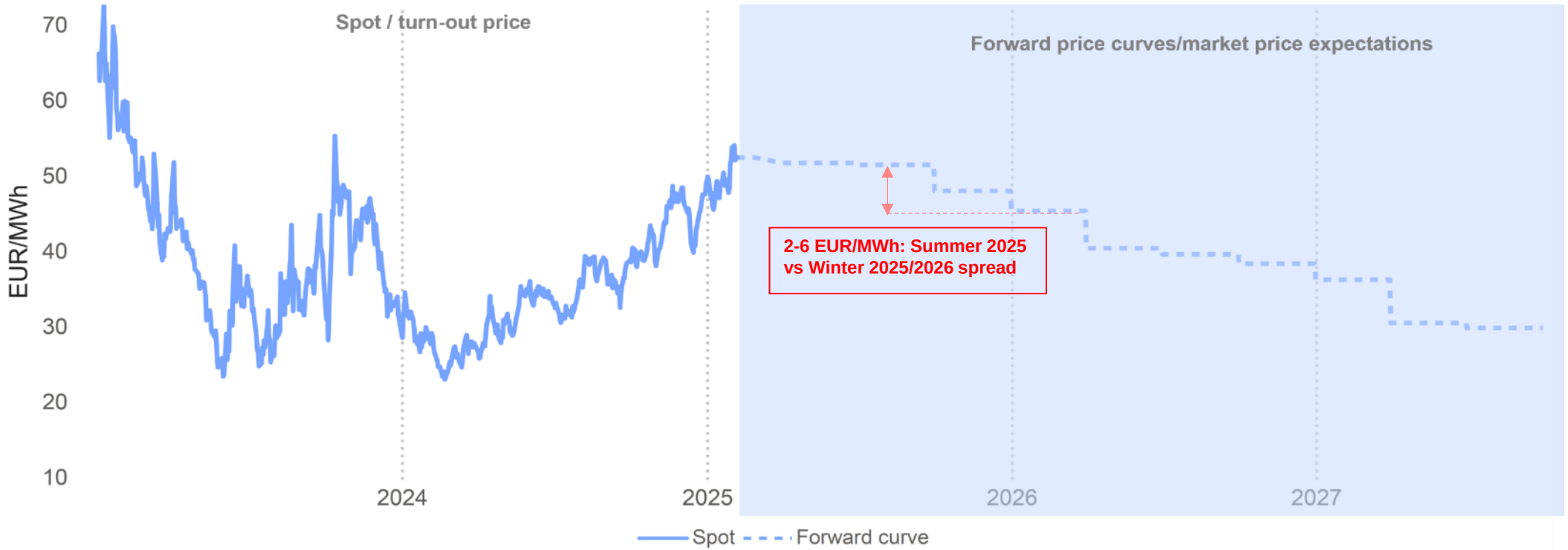
Even as the decarbonisation and the electrification of the energy system progress, alternatives to gas storage for the provision of seasonal flexibility have yet to mature and scale.



Source: ACER based on Gas Infrastructure Europe and ENTSOE data.

Near-term: Are summer 2025 prices inflated by storage targets?

Natural gas price turn-out (TTF day-ahead) and market price expectation (TTF basket of forward products), April 2023-October 2025 (EUR/MWh)



- While the market is highly volatile in recent months, higher prices are observed in summer 2025 than in winter 2025–2026, an atypical backwardation[1].
- From mid-2026, prices are expected to drop meaningfully. The decline is projected to be driven by increased LNG imports, as well as further growth in renewable energy and efficiency measures that continue to reduce gas demand.
- The reasons for this are debated; while **linked to supply tightness, possibly rigid storage targets and possibly inefficient subsidies** could be impacting prices.

Source: ACER based on ICIS.
Note: Backwardation occurs when the spot / short-term price of gas surpasses its futures market prices. This is often due to higher demand in the present compared to contracts maturing later. Backwardation often arises in markets experiencing supply shortages. The summer-winter spreads have eased in recent weeks and stay now 2 EUR/MWh above winter prices, amid warmer and windier predictions.