



European Union Agency for the Cooperation
of Energy Regulators

Evolving energy markets across Europe, calling for enhanced flexibility – *though will such calls be heeded in the end?*

Funseam seminar – 03 July 2025 – Madrid, Spain

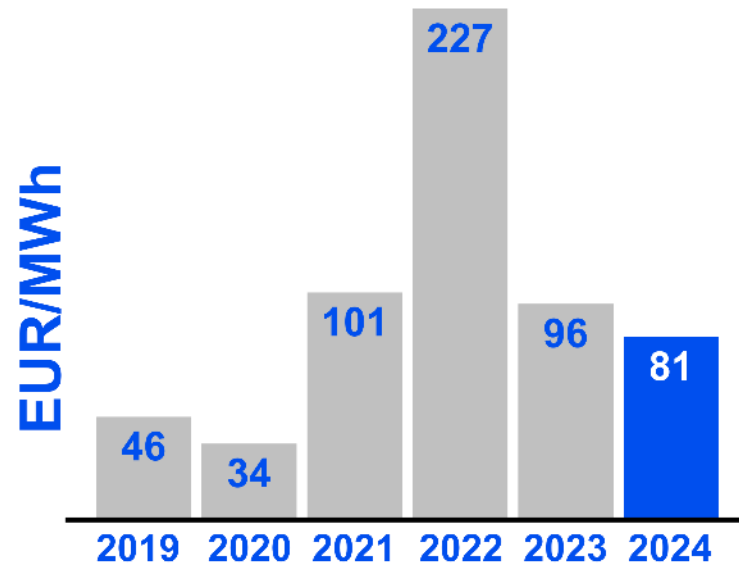
Christian Zinglensen, *ACER Director*

What is the market showing us?

Starting with the good news

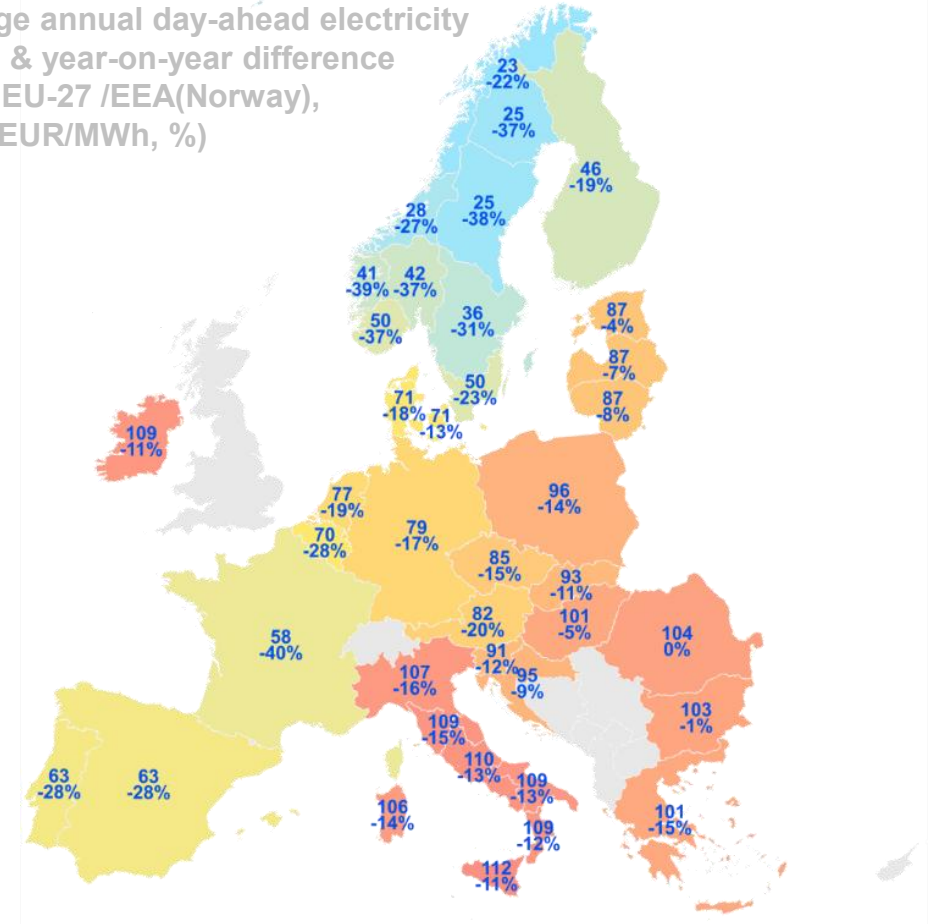
Day-ahead prices at their lowest since 2021 ...

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



... but with notable regional and seasonal variations

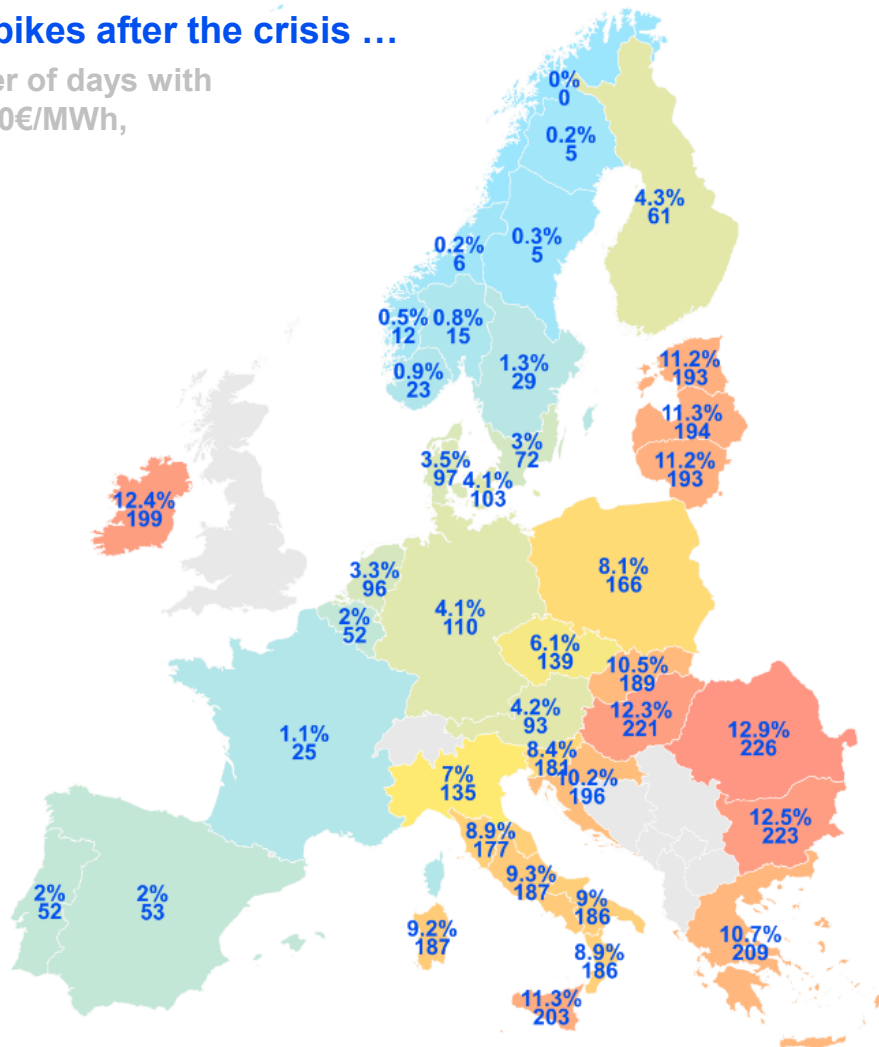
Average annual day-ahead electricity prices & year-on-year difference in the EU-27 /EEA(Norway), 2024 (EUR/MWh, %)



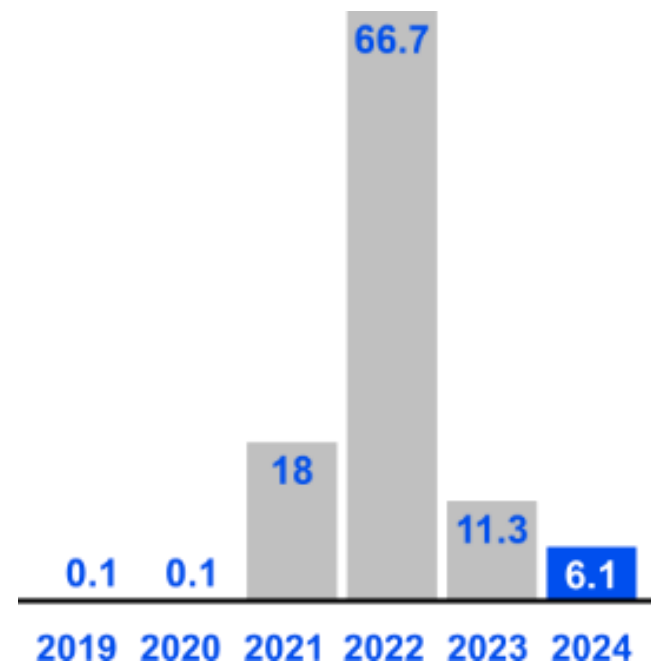
Electricity prices reveal a need for short-term flexibility

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



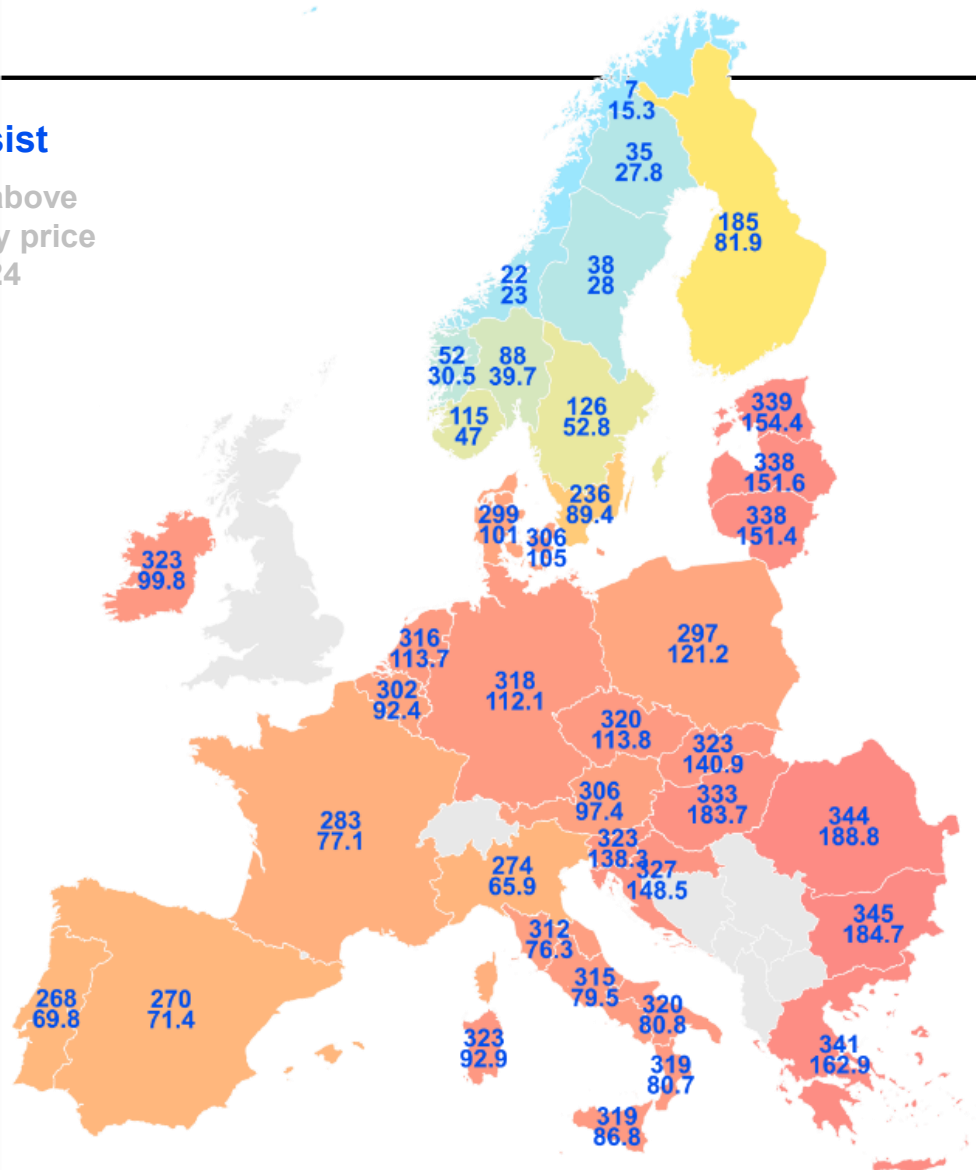
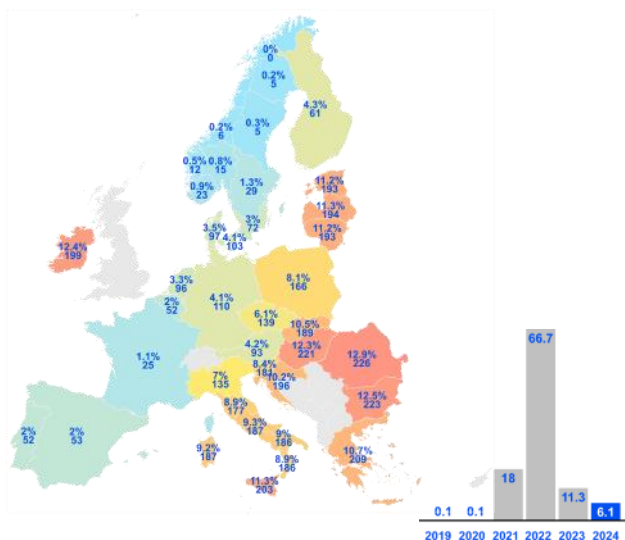
Annual percentage of the time when
prices were above 150 EUR/MWh,
EU-27/EEA(Norway), 2019-2024 (%)



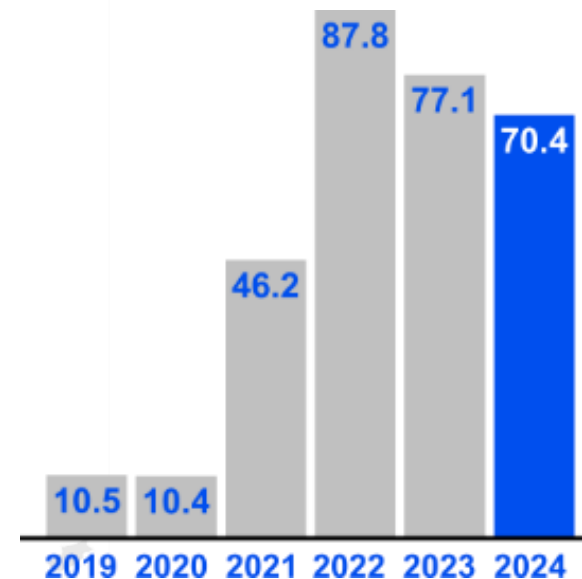
Electricity prices reveal a need for short-term flexibility

...but strong price swings persist

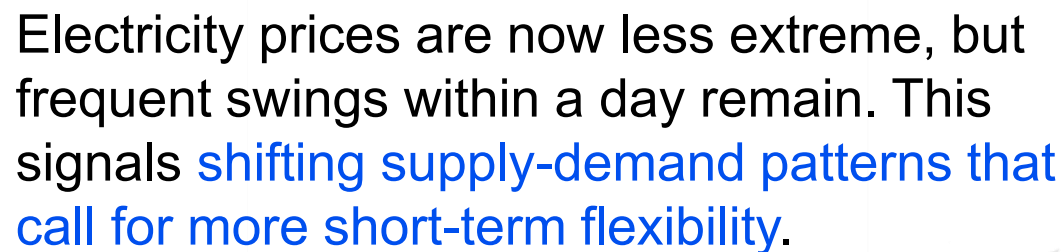
Number of days with price swings above
50EUR/MWh and average within-day price
difference, EU-27/EEA(Norway), 2024



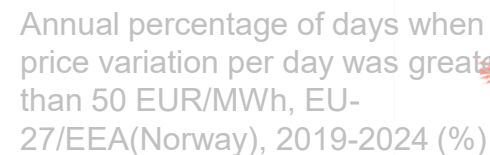
Annual percentage of days when price
variation per day was greater than 50
EUR/MWh, EU-27/EEA(Norway), 2019-2024 (%)



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

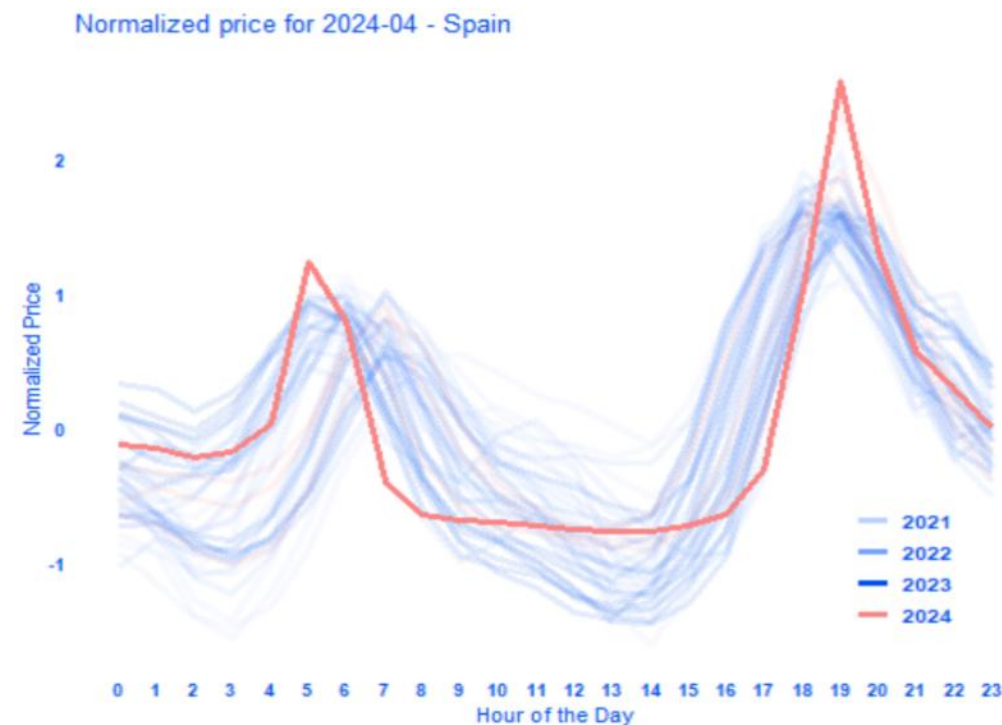


Number of days with price swings above 50EUR/MWh.and average within-day price difference, EU-27/EEA(Norway), 2024





While in the USA, natural gas makes up 42% of the electricity generation mix ...



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 response¹, battery deployment, and cross-border trade through interconnections².

Note 1: See the [ACER report on unlocking flexibility and no-regret actions to remove barriers to demand response](#), April 2025.

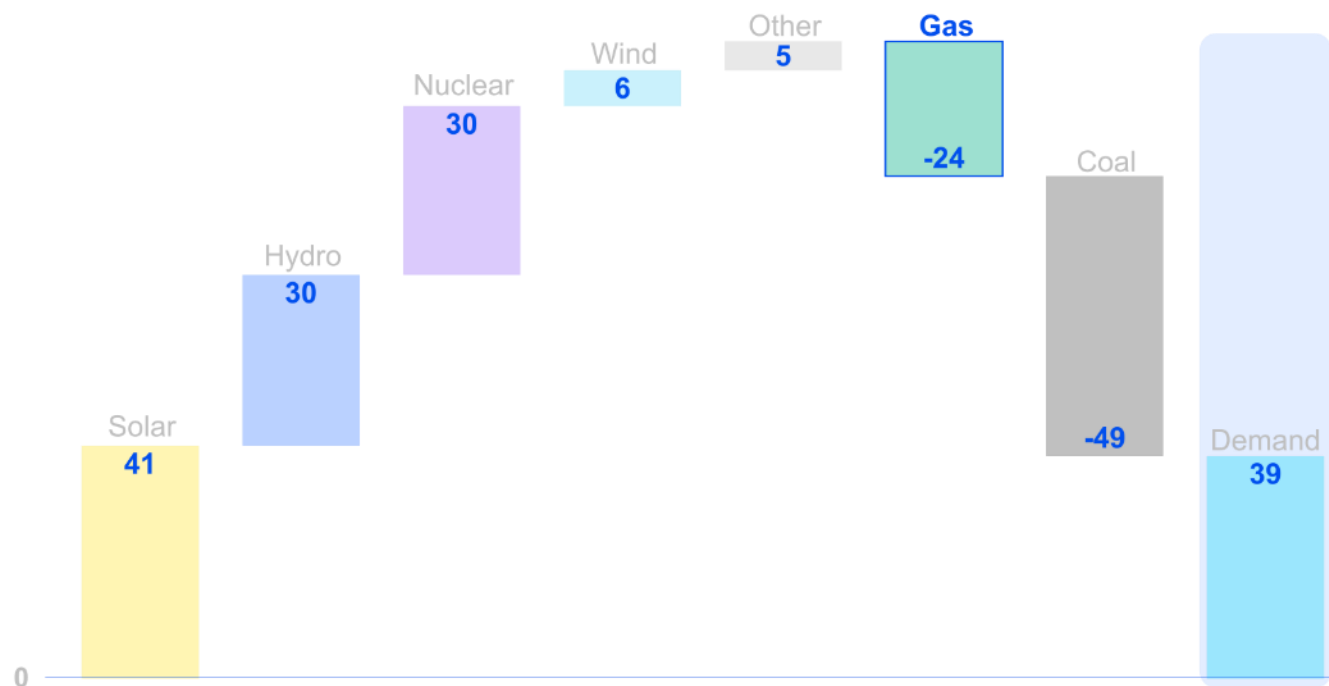
Note 2: See the [ACER report on capacities for cross-zonal electricity trade and congestion management](#), July 2024.

Source (right): ACER.

Relationship between gas and electricity is evolving

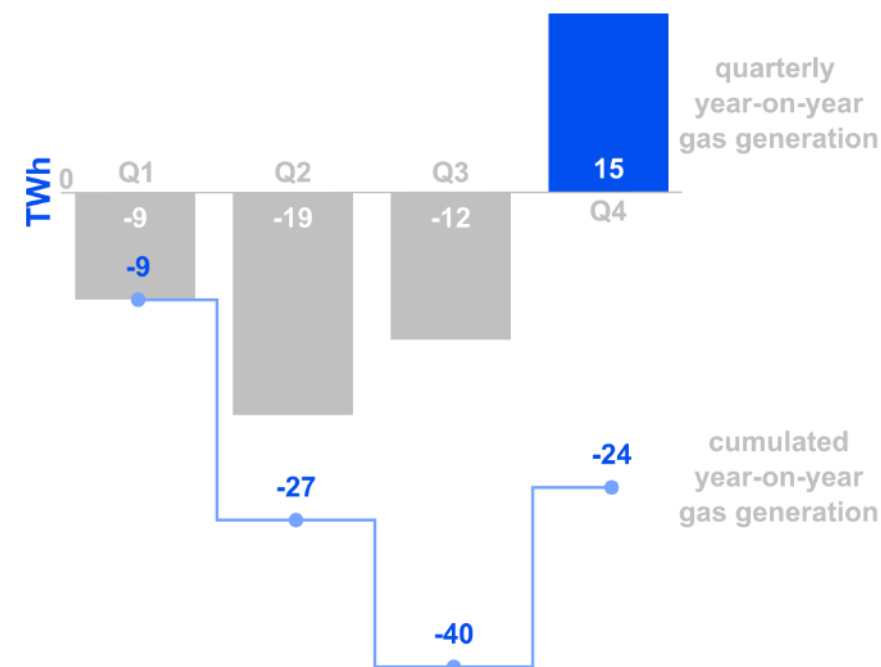
Electricity generation in 2024: Solar confirmed its leading role in the transition, whilst nuclear and hydro come back

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



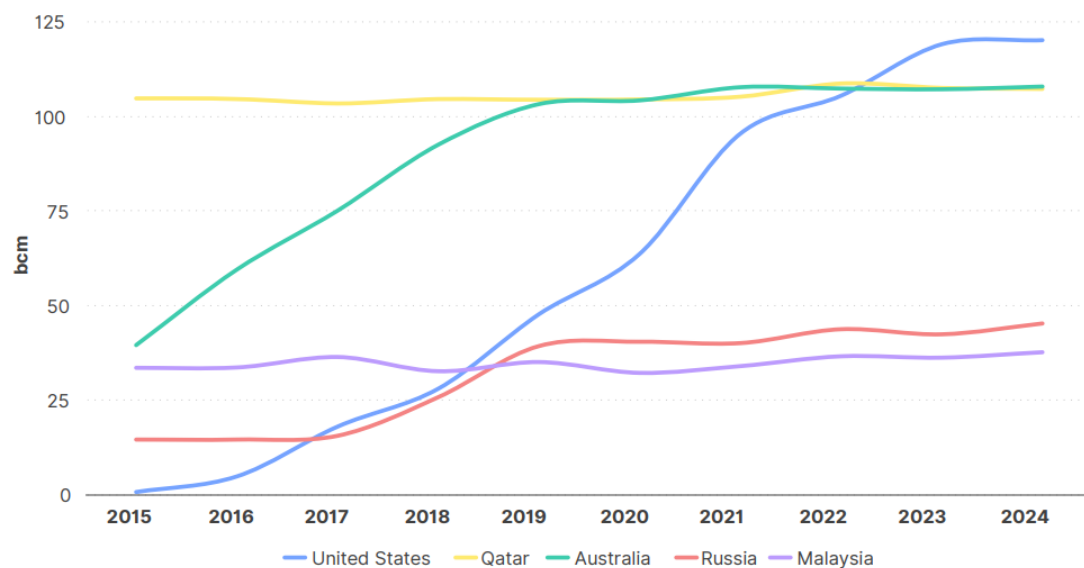
Adverse weather in last months of 2024 limited the decline in gas-generated electricity

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

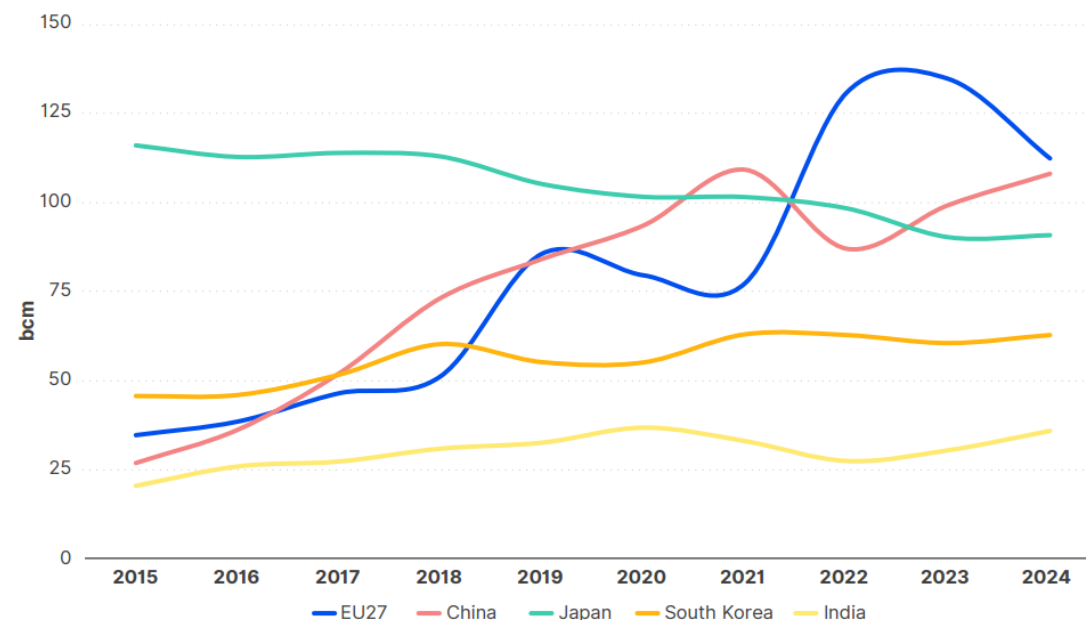


Main changes in global LNG dynamics over the last decade

Top 5 global largest LNG producers (bcm), 2015-2024



Top 5 largest global LNG importers (bcm), 2015-2024

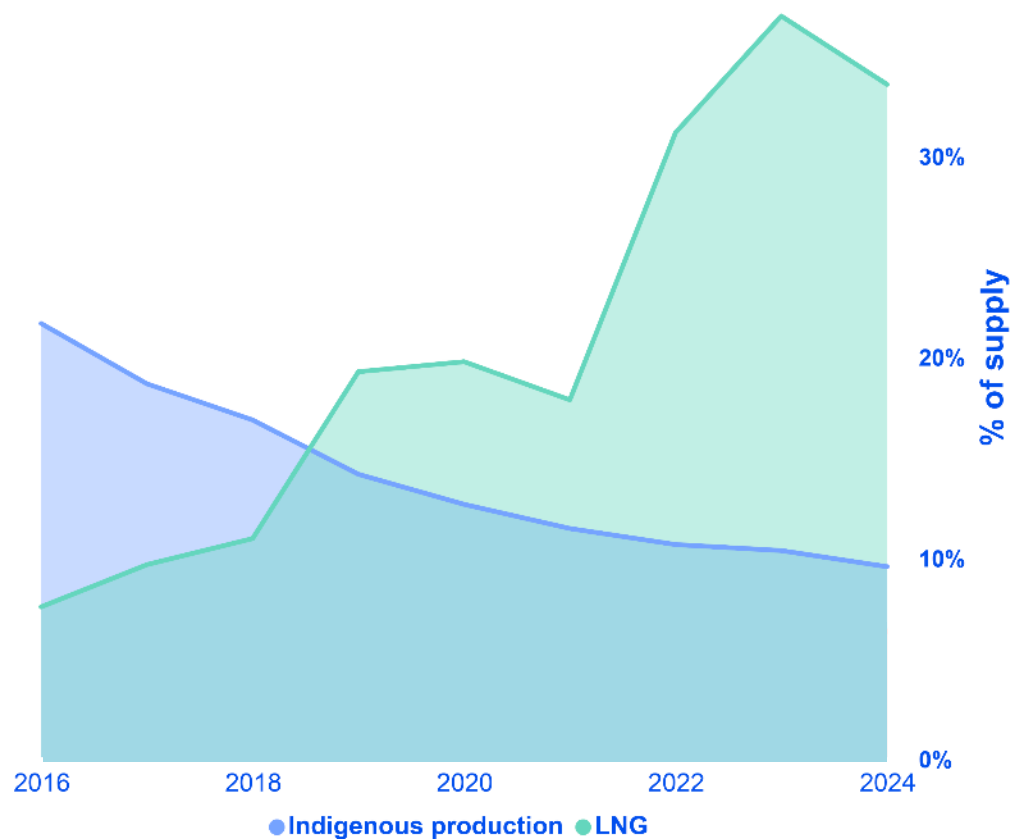


Despite a 17% drop in LNG imports (22 bcm), the European Union remains the largest global LNG importer in 2024, outpacing China. United States has emerged as the world's largest LNG producer over the past decade (30% of global production), ahead Qatar and Australia.

Global LNG market set to move from tight to well supplied

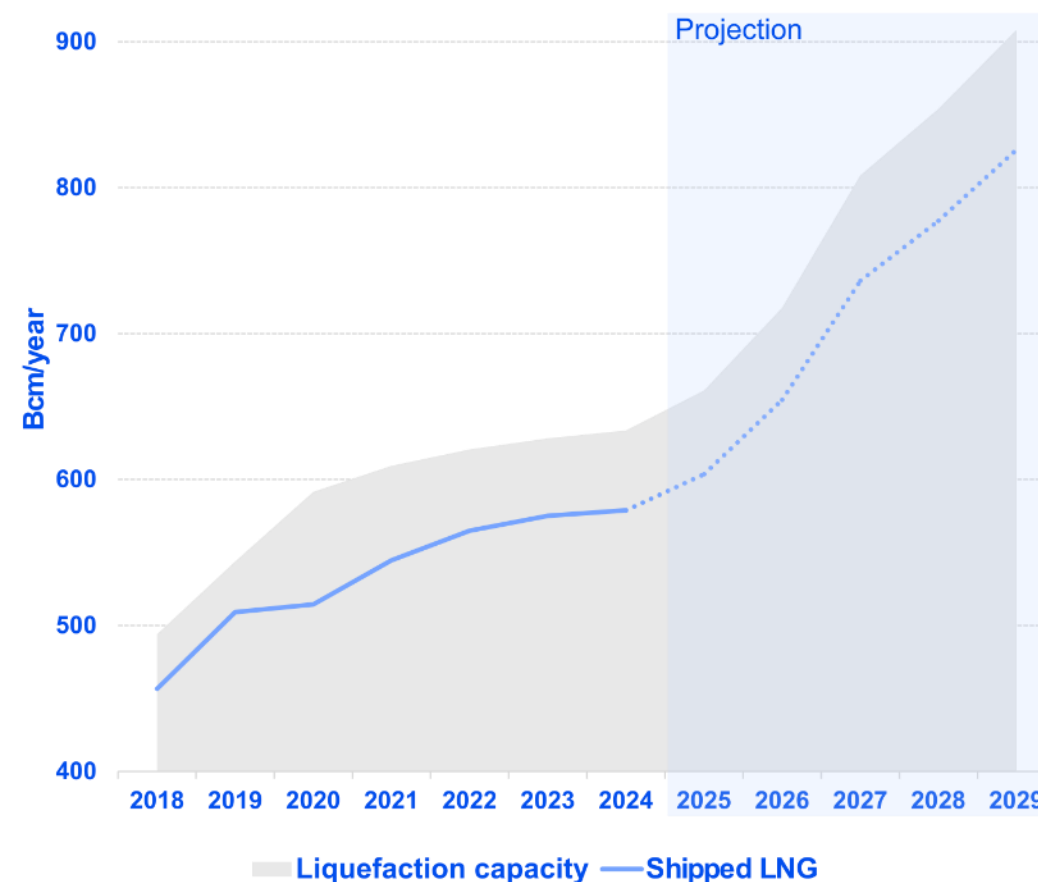
Exposure to global LNG dynamics is the new reality for EU gas markets...

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)

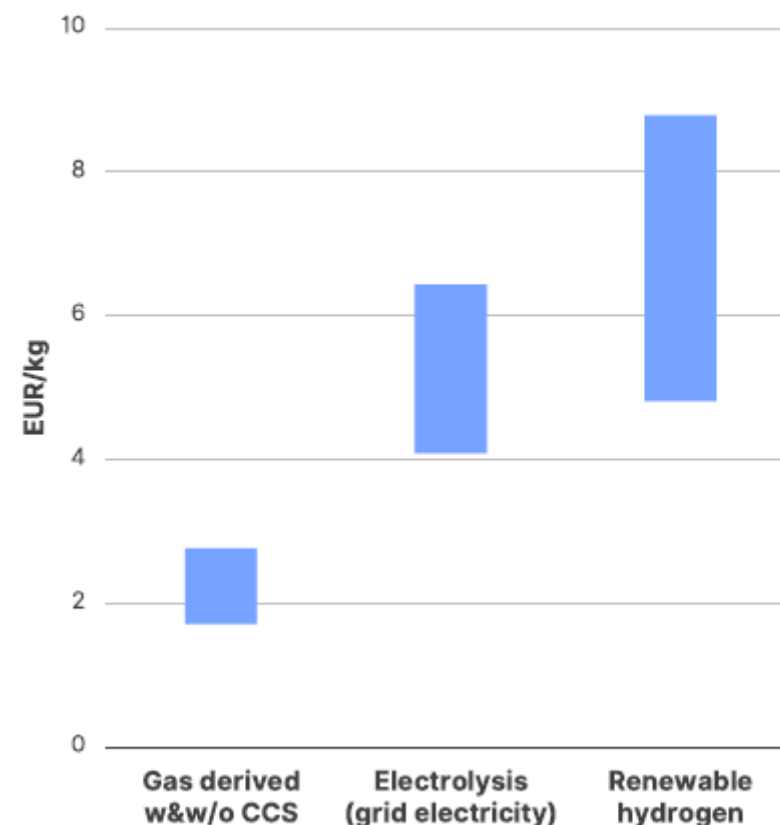




Renewable hydrogen is largely ‘out of the money’

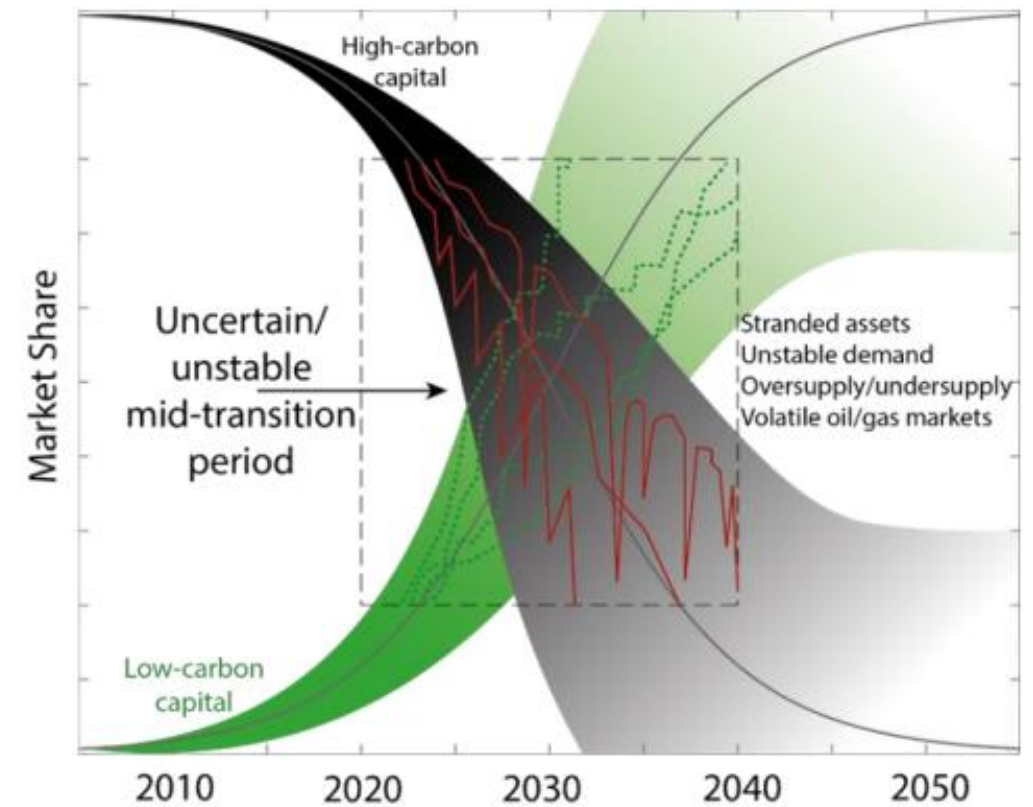
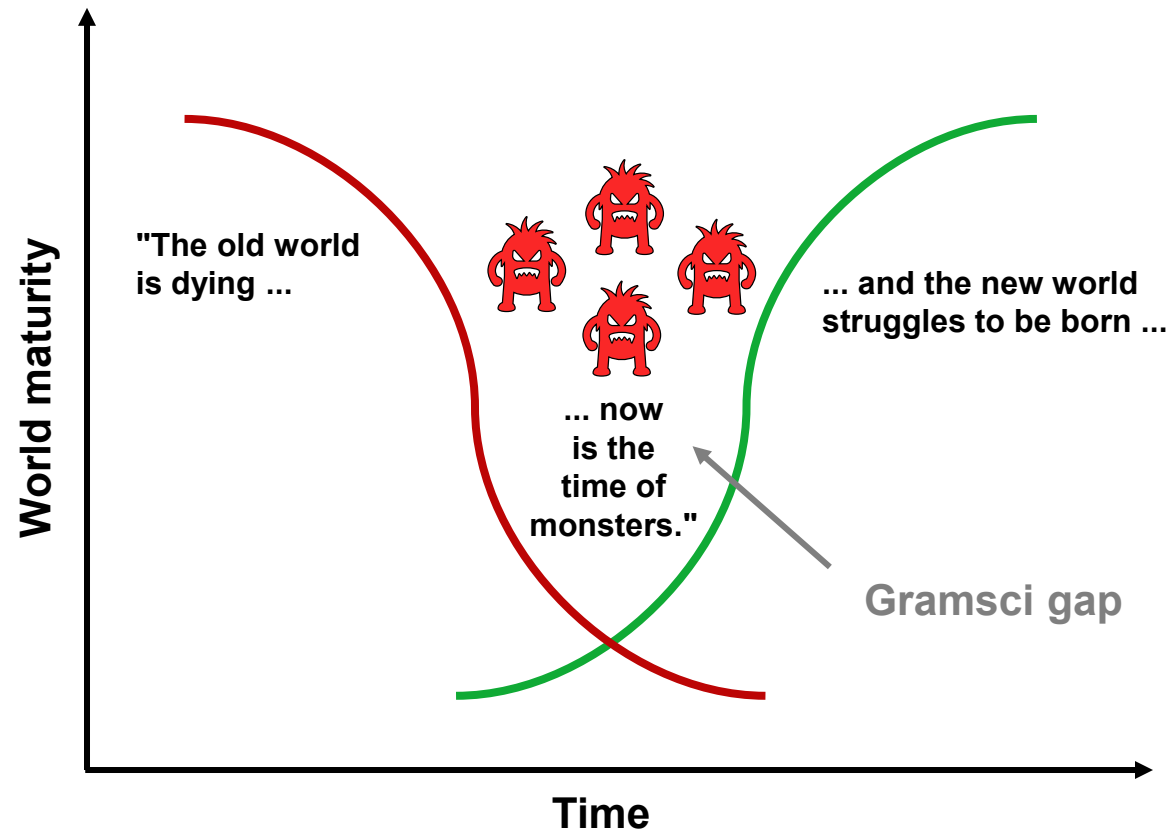
- Renewable hydrogen is 3-4 times more expensive to produce than fossil-based hydrogen
 - Current gap is too large to enable rapid deployment
 - Cost reduction expectations may discourage first-movers
- Yet, European Hydrogen Bank’s first auction results indicate instances of both very low production cost and high-enough willingness to pay for renewable hydrogen
- Clarifying low-carbon hydrogen’s role is key for market development and long-term climate goals
- Scaling electrolyser deployment and continuing the rapid decarbonisation of electricity is essential for renewable hydrogen competitiveness

Cost ranges of hydrogen by production method

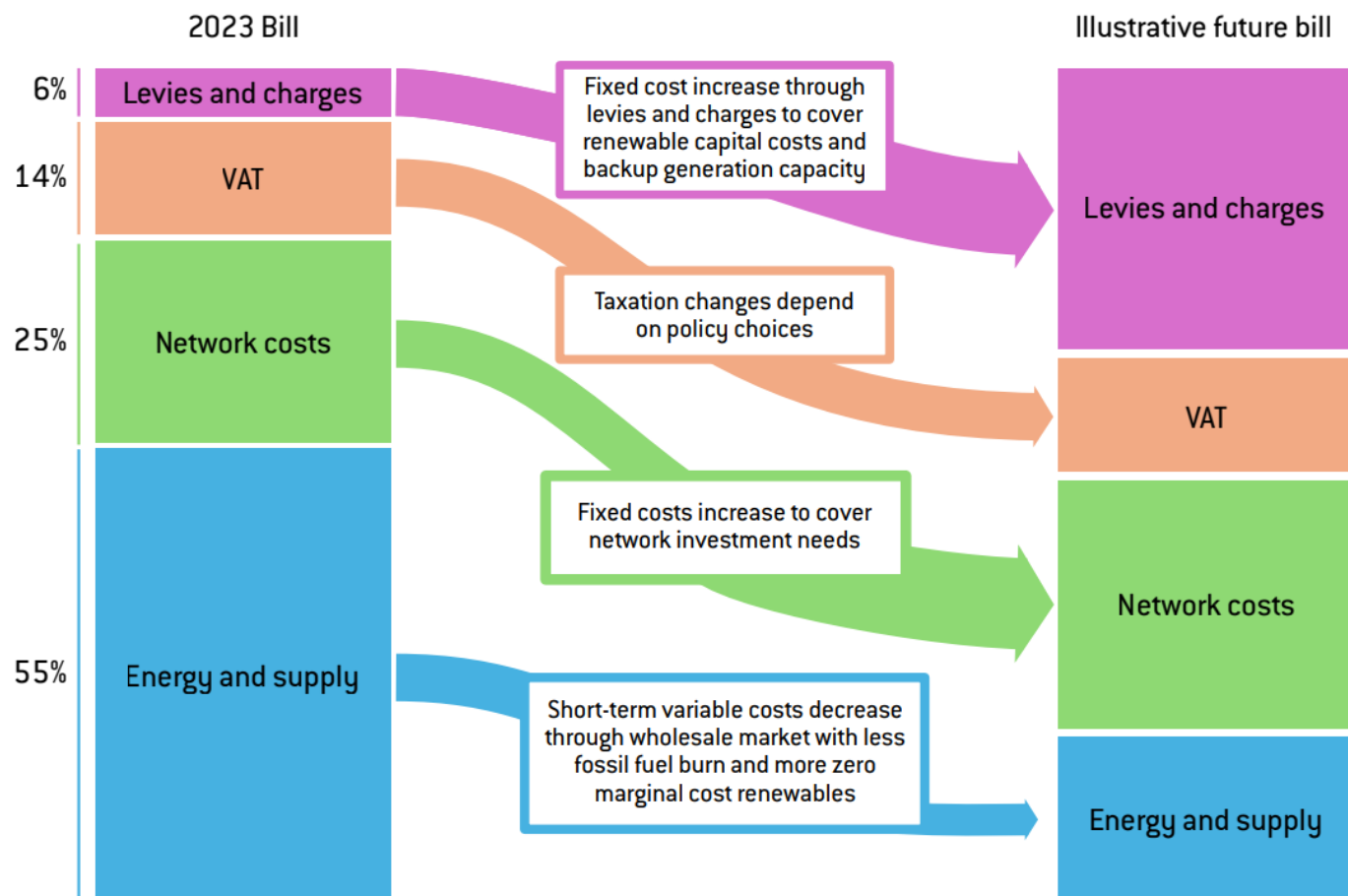


What to make of these insights ~ any 'easy answers' for Europe?

A difficult mid-transition period

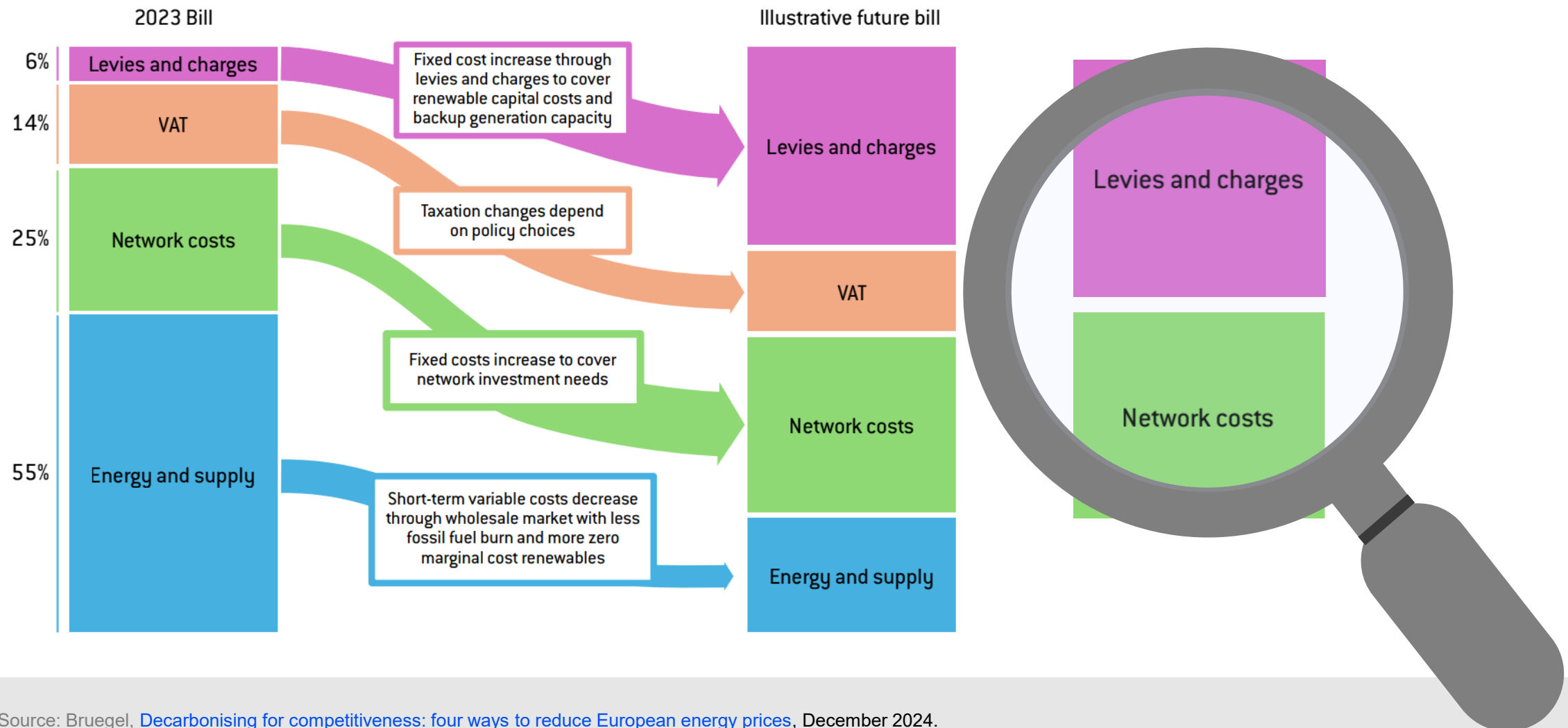


Expected changes in electricity cost components with the energy transition



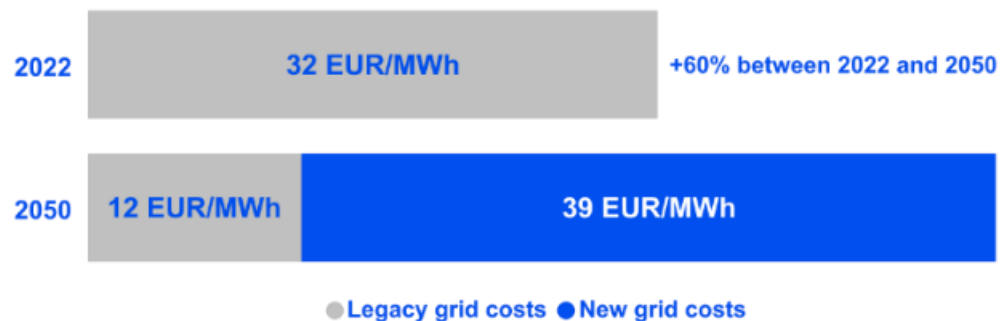
Shift in cost drivers ~ shift in focus?

Expected changes in electricity cost components with the energy transition

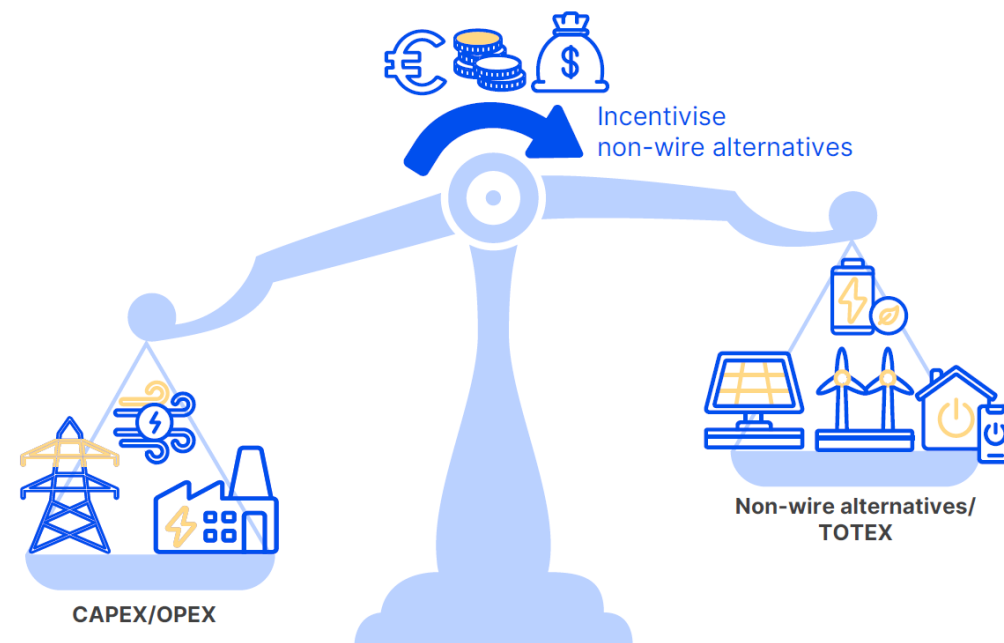


Grid costs are expected to increase considerably by 2050

Evolution of total grid costs (EUR/MWh)



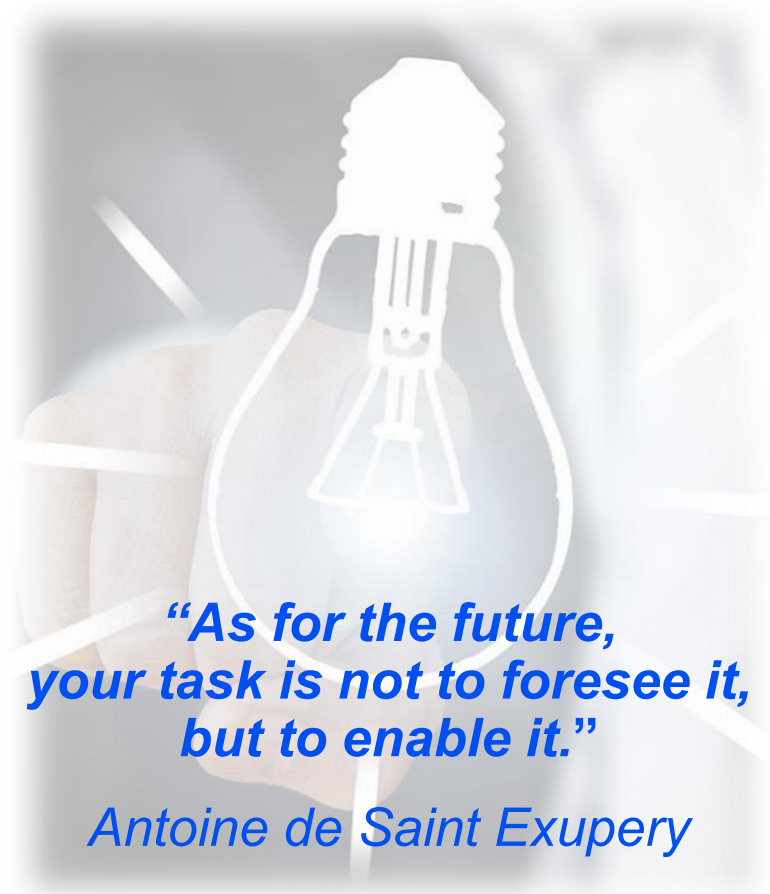
Balance investments in grid expansion with a more efficient use of the existing grid capacity



Grid congestions are expected to cause further bottlenecks in the future, particularly at the distribution level to accommodate growing shares of rooftop solar, battery storage, heat pumps and others.

ACER proposes 12 actions to unlock flexibility

	Action 1	Recognise the new actors: clarify responsibilities for emerging market players in national laws		Action 7	Give an extra push: implement measures to enhance consumers' participation in demand response
	Action 2	Facilitate market entry: remove obstacles to market access		Action 8	Transform balancing practices: shift from non-market-based to market-based balancing
	Action 3	Let aggregators play their role: remove legal obstacles for aggregators		Action 9	Lower barriers to provide balancing services: simplify the prequalification process
	Action 4	Kick-start the smart revolution: deploy smart meters and ICT services to enable consumers' smart responses		Action 10	Share balancing services across EU borders: ensure balancing products and market structures meet EU requirements
	Action 5	Optimise the energy cost component of electricity bills: offer time-differentiated retail contracts to enable alternative flexible offers		Action 11	Cut through red tape: ease administrative burdens and simplify processes for new entrants and small actors
	Action 6	Optimise the network component of electricity bills: incentivise the uptake of time-of-use tariffs		Action 12	Think outside the wires: encourage non-wire solutions as alternatives to traditional grid investments



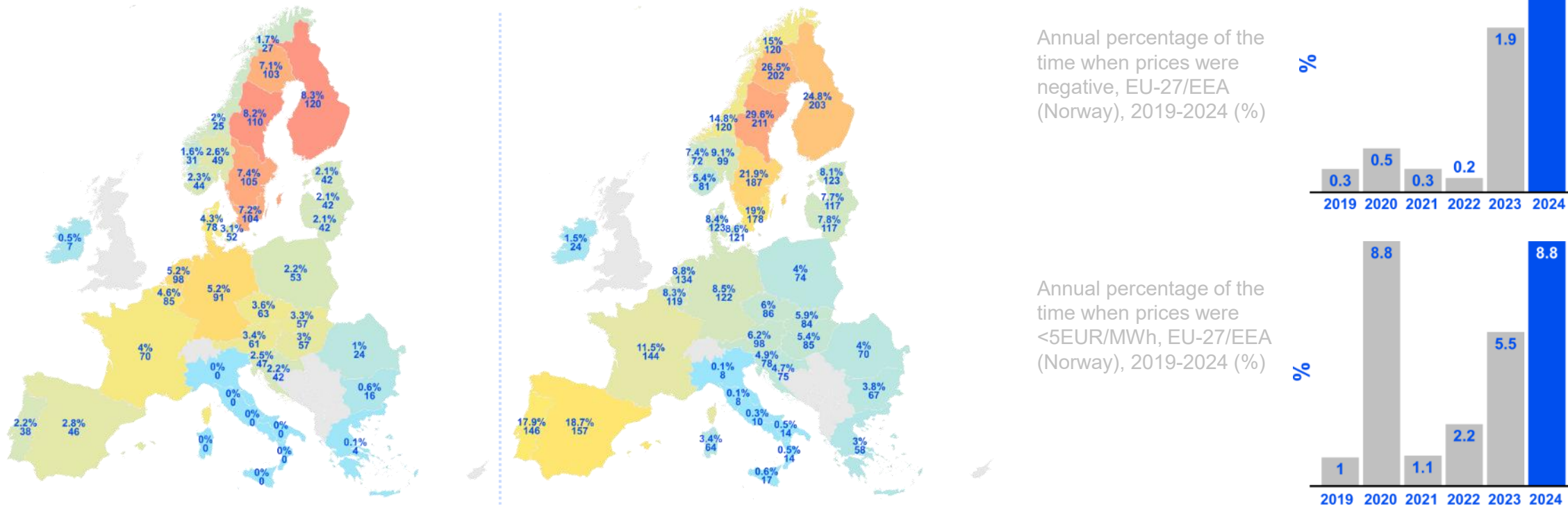
***“As for the future,
your task is not to foresee it,
but to enable it.”***

Antoine de Saint Exupery

Negative & very-low electricity prices on the increase

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.

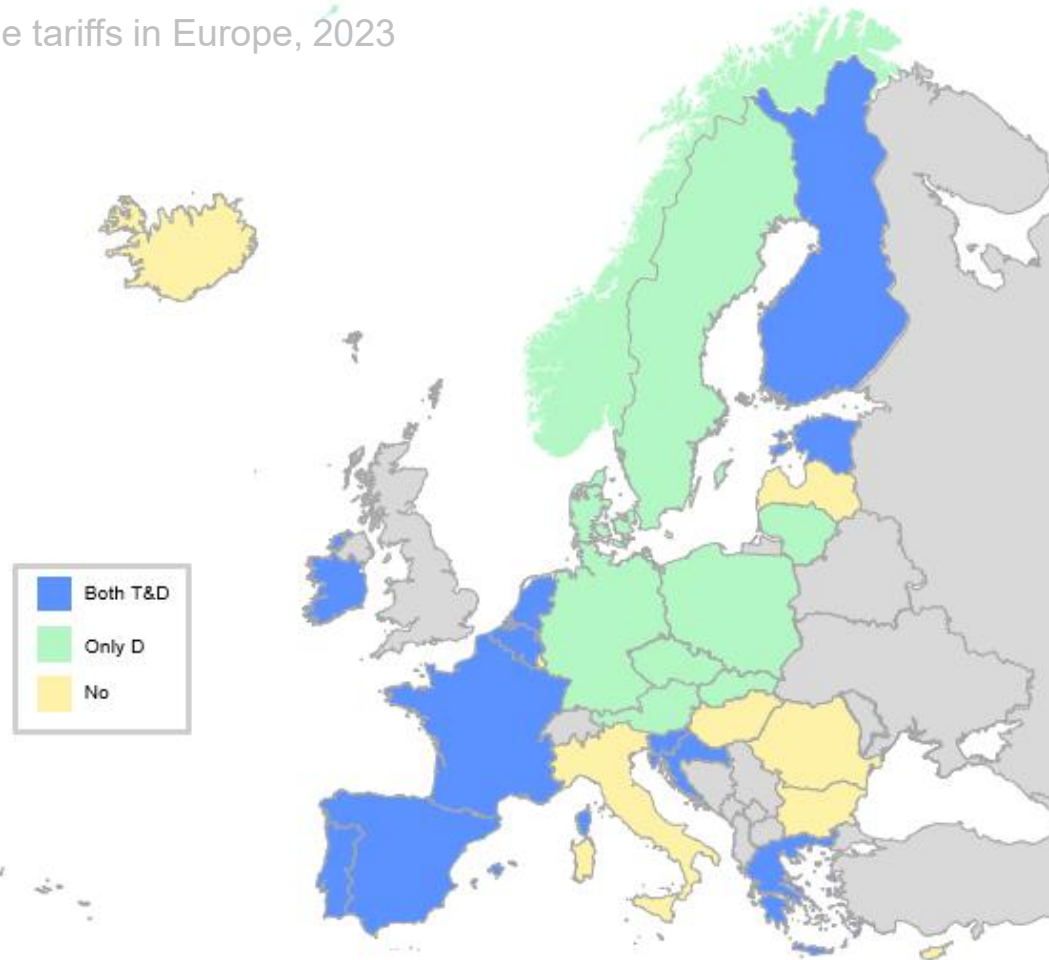
Taking cues from the best ...



Grid tariffs play a role, too

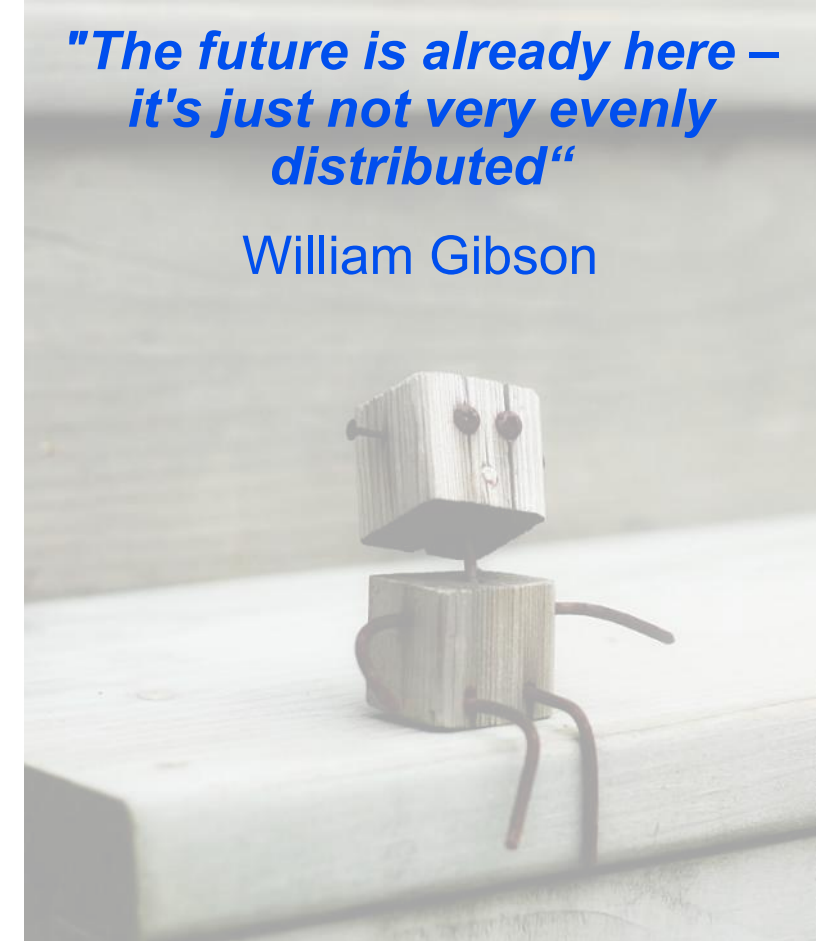
Flexibility needs make flat grid tariffs costly, pushing Time of Use forward

Time of use tariffs in Europe, 2023



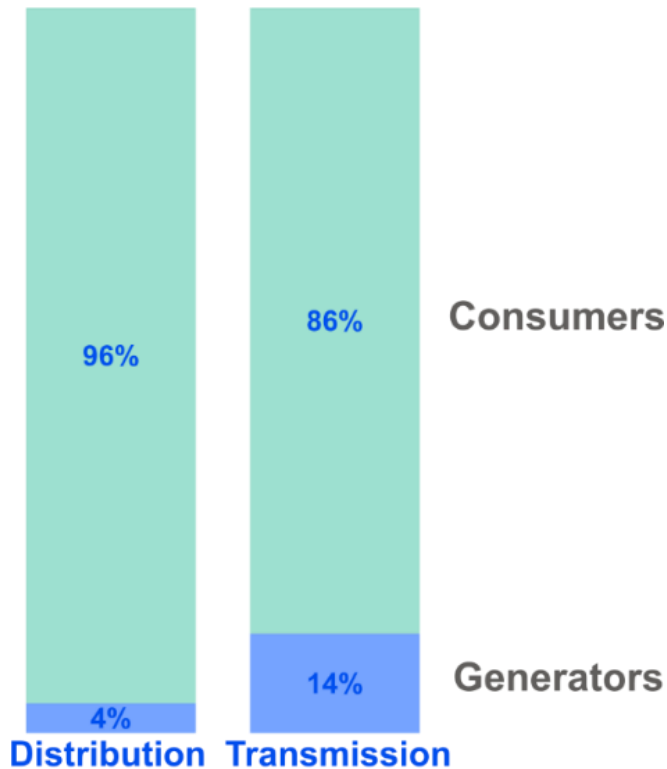
*"The future is already here –
it's just not very evenly
distributed"*

William Gibson



The ‘who pays’ question (for network costs)?

Split of network charges between
generators and consumers

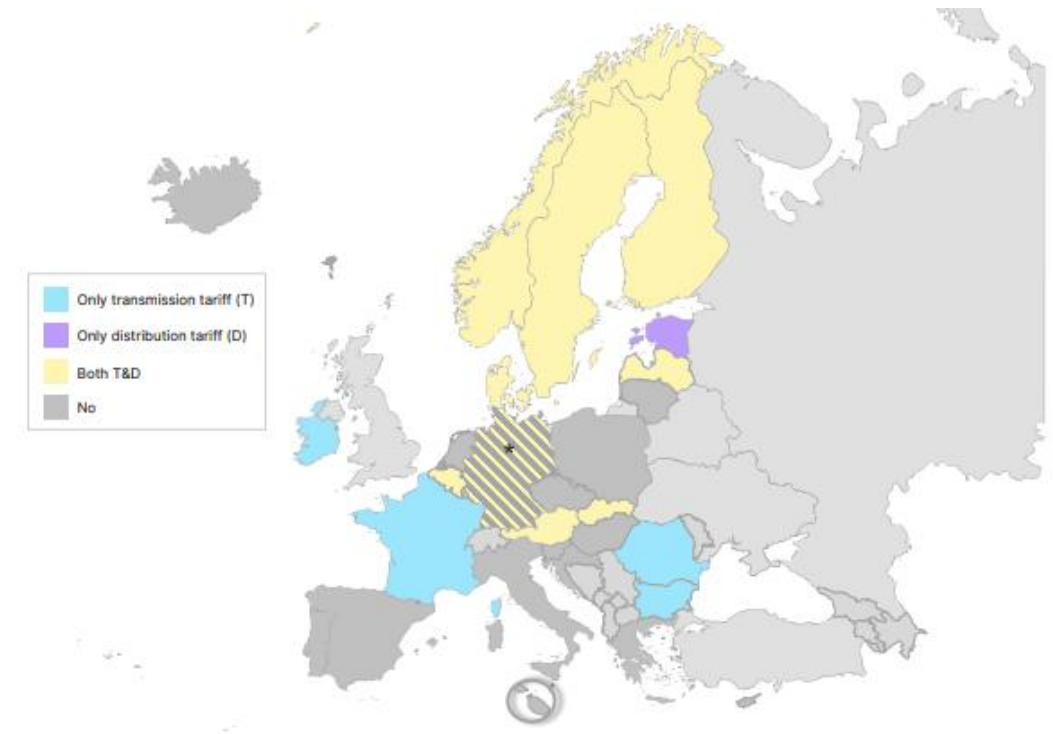


**Expanding the
grid for
production?**

**Producers
may need to
pay more.**

**Network cost burden on generation varies:
Room for alignment of practices to ensure a
level playing field across Member States**

Application of injection charges in Europe



(*) Germany applies negative injection charges

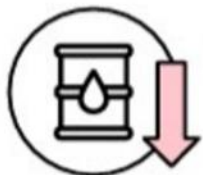
The benefits of integrated markets ~ *day-to-day, for sure; and in crises*

‘Doing more together’ holds benefits

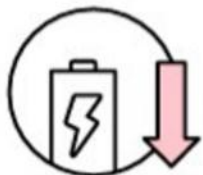
Techno-economic



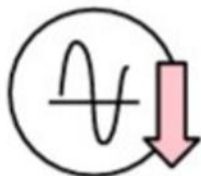
More security
with fewer backup
power plants



Less fuel use
- Less imports
- Less pollution



More flexibility with
fewer storage
investments



Lower price volatility

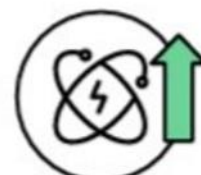


More renewables
generation with less
investment (thanks
to better location)

Managerial-governance



Lower capital cost



More innovation



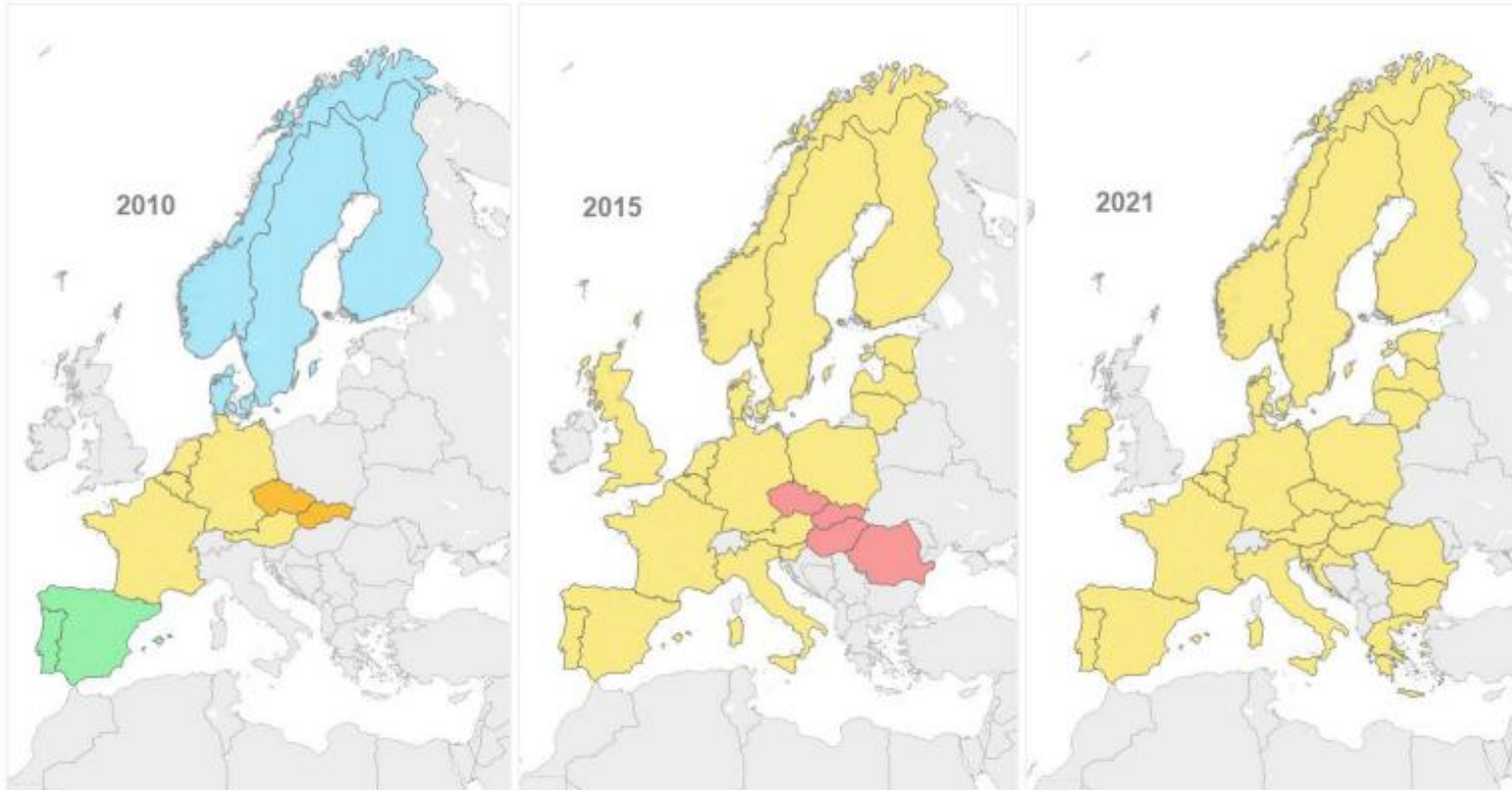
Higher consumer
surplus thanks to
more competition

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% ...**

The benefits of integrated electricity markets

Evolution of EU wholesale electricity day-ahead market coupling, 2010-2021.

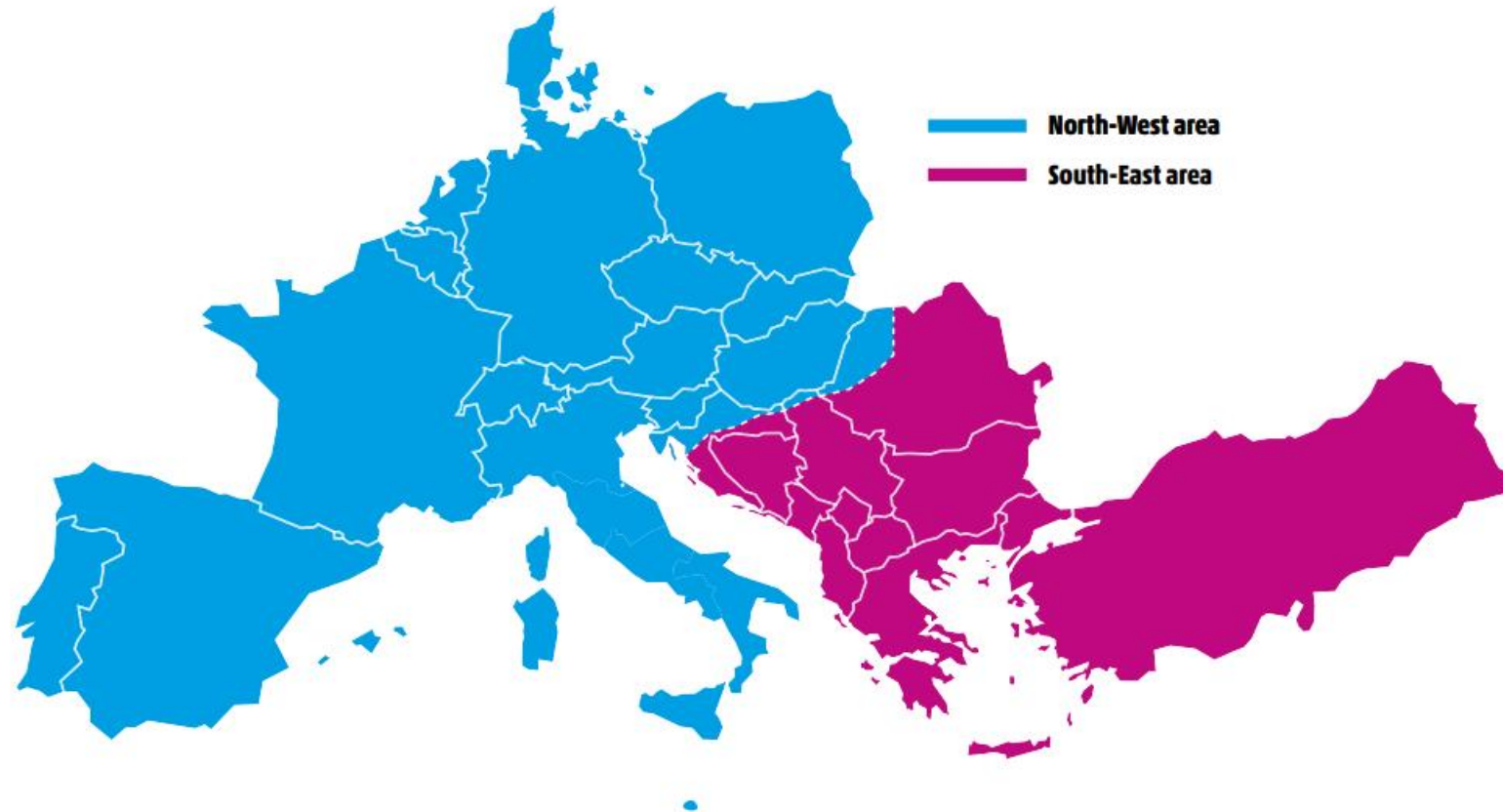


How large are the benefits
from cross-border trade
in the EU?

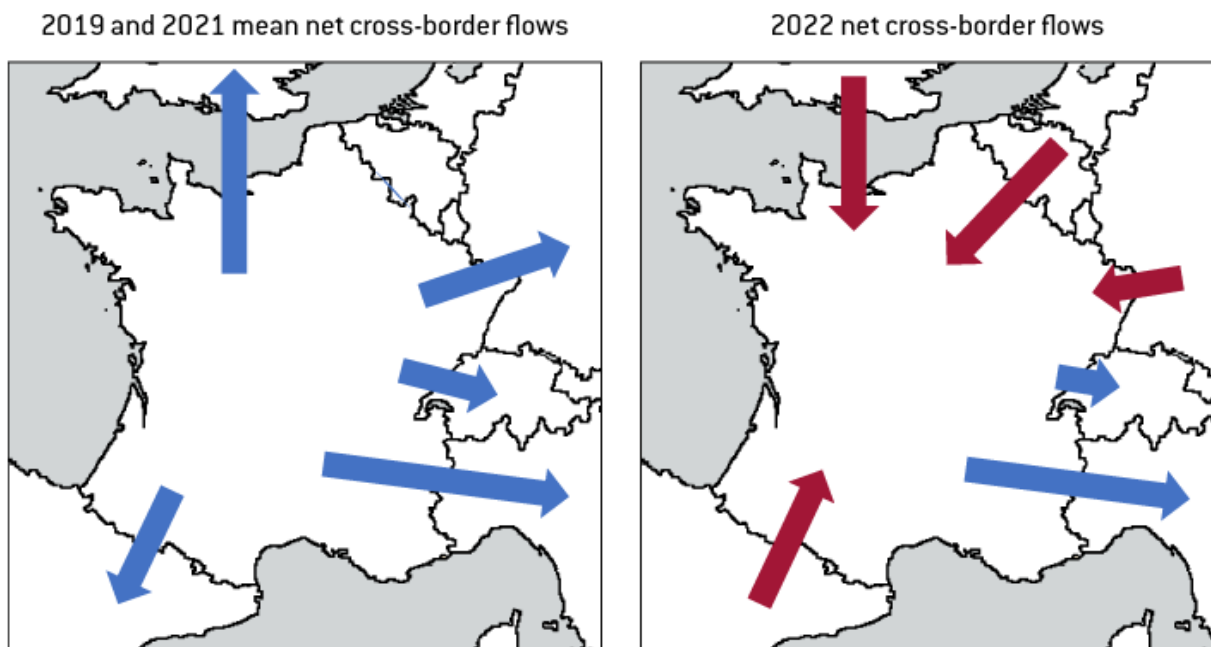


Tackling security of supply together

In 2021, a major operational incident split Continental Europe into two parts



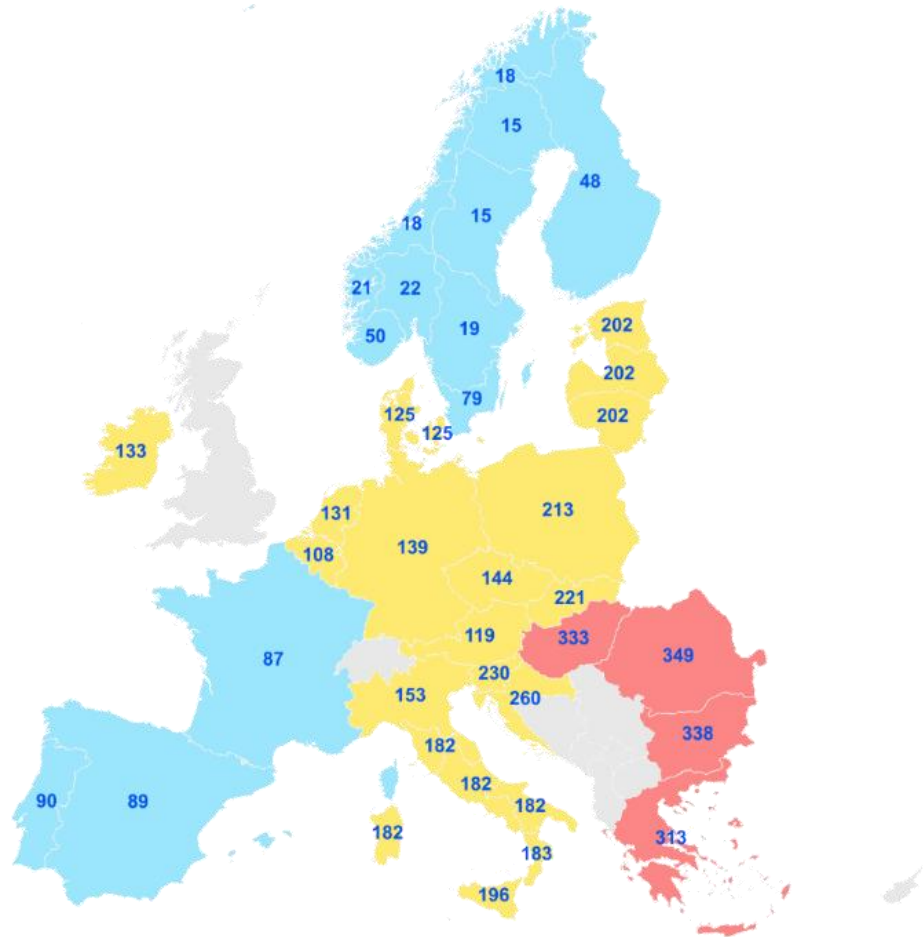
France became a huge importer of electricity during the energy crisis



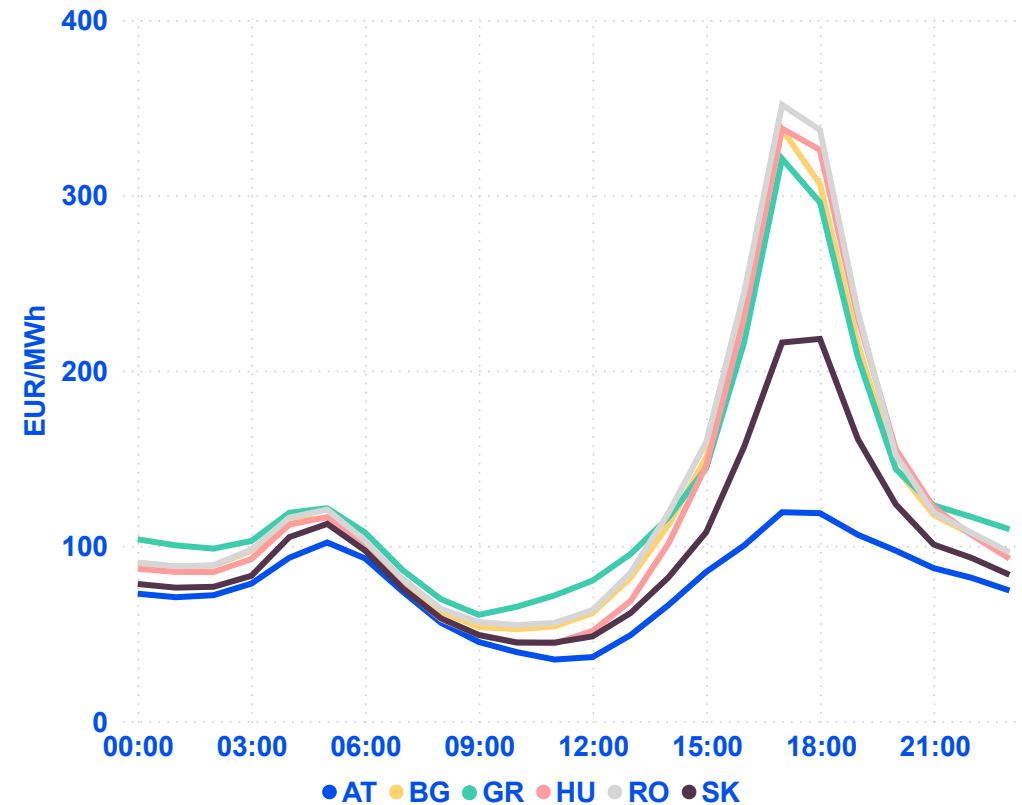
Note: The length of the arrow is directly proportional to the amount of electricity imported or exported.

Zooming in on Summer '24 developments

Average day-ahead prices, EU-27/EEA(Norway),
July to September 2024 at 17:00 UTC (EUR/MWh)



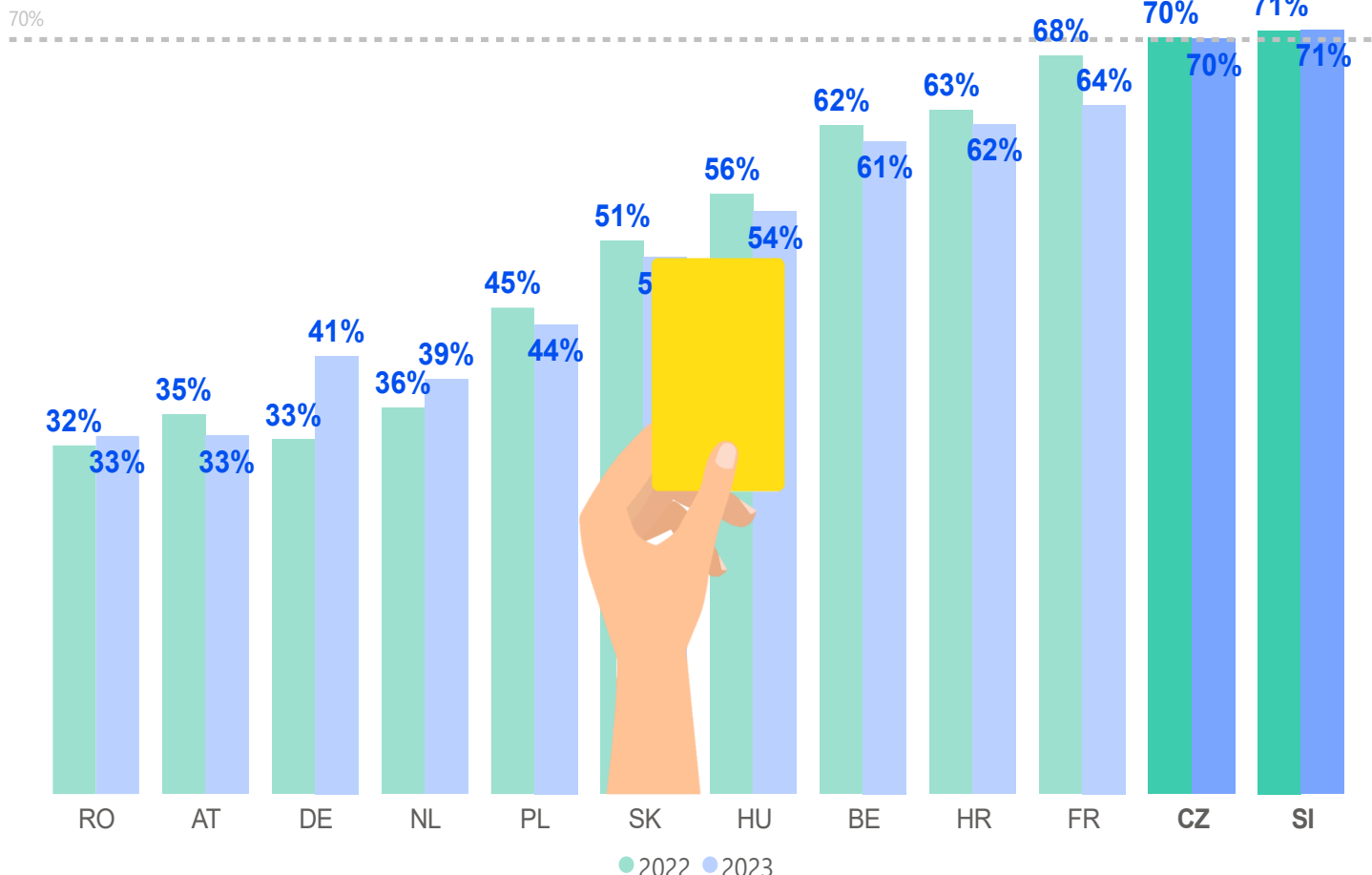
Evolution of average day-ahead prices in select EU
bidding zones, July to September 2024 (EUR/MWh)



More interconnector capacity needs 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)



*“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].”*

‘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?

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



European Union Agency for the Cooperation
of Energy Regulators

ACER is hiring!

Join us in powering Europe's energy future.

Check out our job vacancies (in many areas).



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, **detering 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**.