

# ACER



European Union Agency for the Cooperation  
of Energy Regulators

## CEER

Council of European  
Energy Regulators



# Wholesale Electricity Market Monitoring 2021

## Progress of European electricity market integration



ACER monitors internal markets for electricity and gas as mandated by the [Third Energy Package](#). In doing so, ACER provides guidance and evidence on how energy markets can perform more efficiently, to the benefit of consumers.

Further benefits for the electricity consumers will result from:

**1. TSOs making further cross-zonal capacity available for trade.**

**40 %**

of additional cross-zonal capacity on interconnectors, expressed as a percentage of physical capacity, is needed to meet the minimum 70% target. Such additions should be made for the 69% of the hours when the target is not met. The values represent average fulfilment across EU borders.

**2. Further short-term markets (day-ahead, intraday and balancing) integration,**

**€ 1 billion**

of additional yearly welfare gains from finalising the integration of short-term electricity markets.

**3. Overall sustained and enhanced market integration.**

**€ 300 billion**

of potential welfare gains for the next decade from keeping market integration at pace, including coordinated security of supply and increased cross-border capacity.



In 2022, unlike during previous years, ACER will not publish a single report gathering all aspects monitored during 2021 but a series of brief and topical overviews.

This document is the **third** of these publications. It follows an overview of the [key developments](#) and [security of supply](#) in wholesale electricity markets in 2021<sup>1</sup>. The document focuses on the development of the internal energy market in 2021. It assesses these trends against the current EU goals. Namely, the document assesses:

1. How much capacity is available for electricity trade across borders;
2. How efficiently this capacity is used; and
3. The liquidity of electricity markets in various timeframes.

In 2022, part of the monitoring findings were included in [ACER's document on market design](#), requested by the European Commission, and released in April.



To learn more about gas and electricity markets, [access here](#) the latest ACER publications monitoring gas and electricity markets.



The integration of electricity wholesale markets via an optimal amount of interconnector capacity and the efficient use of this capacity allow competition that benefits all consumers and contributes to long-term security of supply at a lower cost.

→ *The performance largely depends on how efficiently the European electricity network is used and on how the wholesale markets perform in all timeframes.*

Key elements of the legal framework are :

- **the Regulation establishing a Guideline on Capacity Allocation and Congestion Management,**



→ *Covering processes intended to optimise the utilisation of the existing infrastructure and to provide more possibilities to exchange energy, enabling the cheapest supply to meet demand with the greatest willingness to pay in Europe, given the capacity of the network.*

- **the Regulations establishing Guidelines on Forward Capacity Allocation and on Electricity Balancing,**



→ *The former establishes a framework for calculating and efficiently allocating interconnection capacity and for cross-zonal trading in forward markets, while the latter sets rules on the operation of balancing markets with the aim to increase the opportunities for cross-zonal trading and efficiency close to real time.*

- **the Clean Energy for All Europeans Package (Clean Energy Package, CEP).**



→ *The CEP defines an enhanced framework for a well-functioning, integrated market with non-discriminatory participation of all available sources, providing appropriate and affordable security of supply while enabling innovation and decarbonisation in line with the EU energy and climate objectives.*

# Cross-zonal capacity

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# moderate increases in cross-zonal capacity in 2021 where NTC calculations apply.



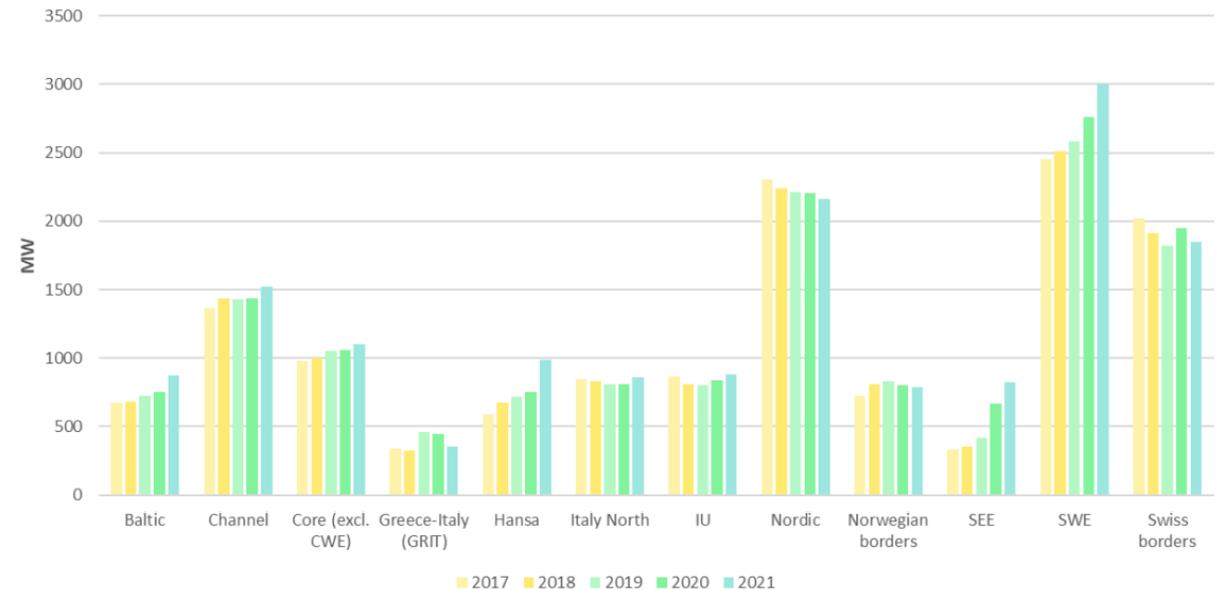
**There was an overall moderate increase in Net Transfer Capacity (NTC) (of 4.2% compared to 2020) in 2021.**

On alternating current (AC) borders, the largest increase in NTC was observed in the South West Europe (SWE) region.

→ *This increase is consistent with the improved performance with regard to the 70% target observed in [ACER's 70% monitoring report](#).*

Increases in the Baltic, South East Europe (SEE) and Hansa regions<sup>1</sup> relate to a reduced amount of interconnector outages and to the commissioning of new interconnection capacities.

**Average NTC per cross-zonal border, aggregated per capacity calculation region – 2017- 2021 (MW)**



1. See [ACER Decision 04-2021 and related annexes](#) for a definition of capacity calculation regions.

Source: ACER calculations based on ENTSO-E data.

Note: Only cross-zonal NTC and technical profiles' values are considered in this figure. Bidding zone borders within countries (i.e. within Denmark, Italy, Sweden and Norway) are not included in this figure.

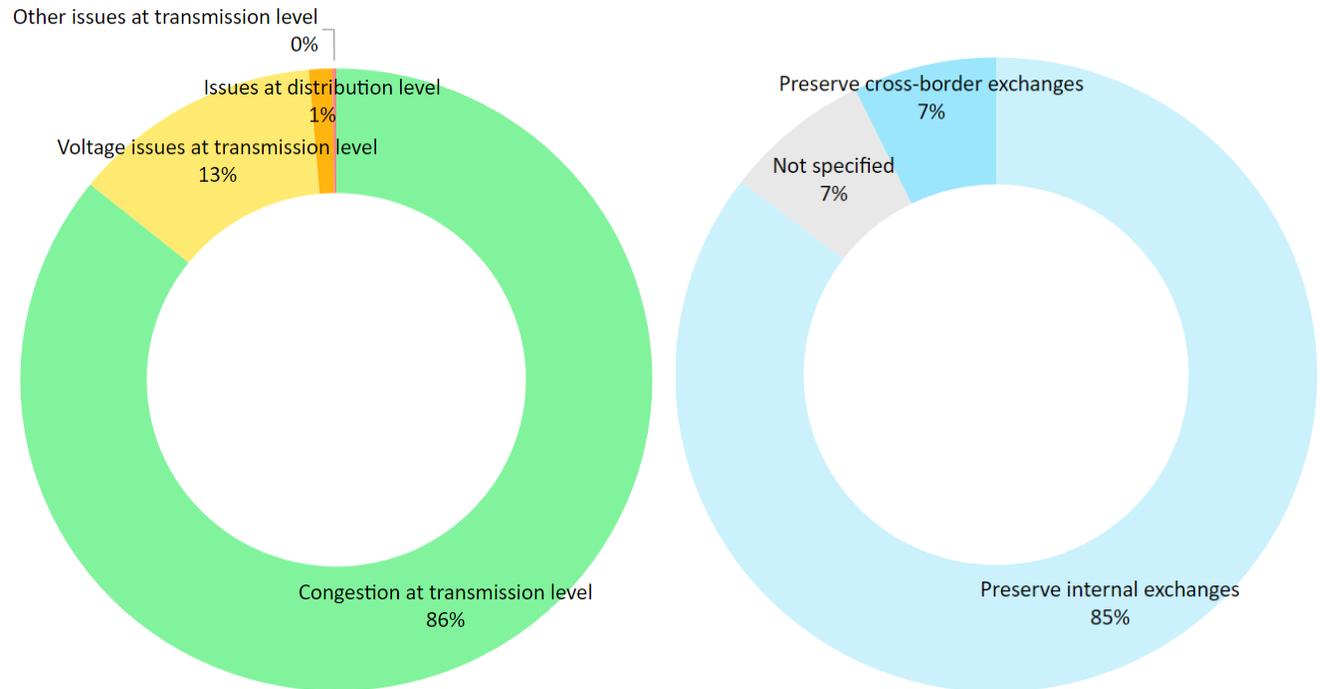
# In 2021, remedial actions mainly aimed to preserve exchanges within bidding zones.



**Redispatching volumes decreased by 2% in 2021. Transmission system operators (TSOs) mostly relied on redispatching to cope with congestion issues at the transmission level (86%).**

Clearly identifying a single objective for the applied remedial actions is not always possible; however the preservation of intra-zonal as opposed to cross-zonal exchanges was reported as the main objective behind the use of remedial actions (85%).

**Distribution of redispatching volume by underlying cause (left) and by objective (right) – 2021 (%)**



Source: ACER calculations based on NRAs data (bottom figures).

Note: The left chart does not include redispatching costs for Poland and Sweden as the breakdown per cause was not provided.

# Use of cross-zonal capacity across timeframes

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**2021 saw further progress in the integration of EU markets in day-ahead, intraday (instrumental for the large scale integration of renewable energy resources) and in particular balancing markets.**

→ *Balancing efficiency increased by 29% (to reach 49%). Day-ahead and intraday progressed by 3% (to reach 88% and 66%, respectively).*

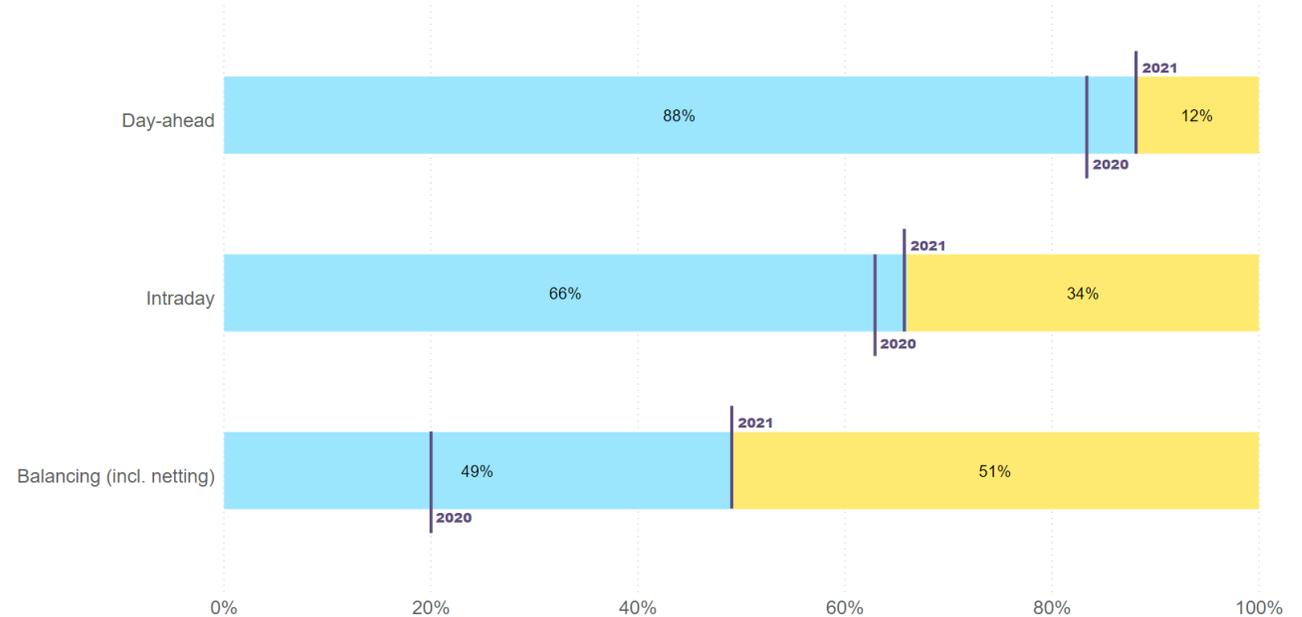


Balancing markets' outstanding integration coincides with the establishment of a common [European platform for operating the imbalance netting process](#), achieved by 24 June 2021.



According to ACER calculations, the integration of short-term electricity markets will deliver additional welfare benefits of 1 billion euros per annum.

**Level of efficiency in the use of interconnectors in Europe in the different timeframes – 2021 (% use of available commercial capacity in the 'right economic direction')**



# In 2021 forward market integration remained stable.



**Market participants have access to hedging instruments related to forward markets at most EU borders.**

→ *Financial instruments for hedging in the Nordic countries and Italy, for its inner borders, are based on the multi-zone hub design. All other countries rely on long term transmission rights allocated via a [single allocation platform](#).*



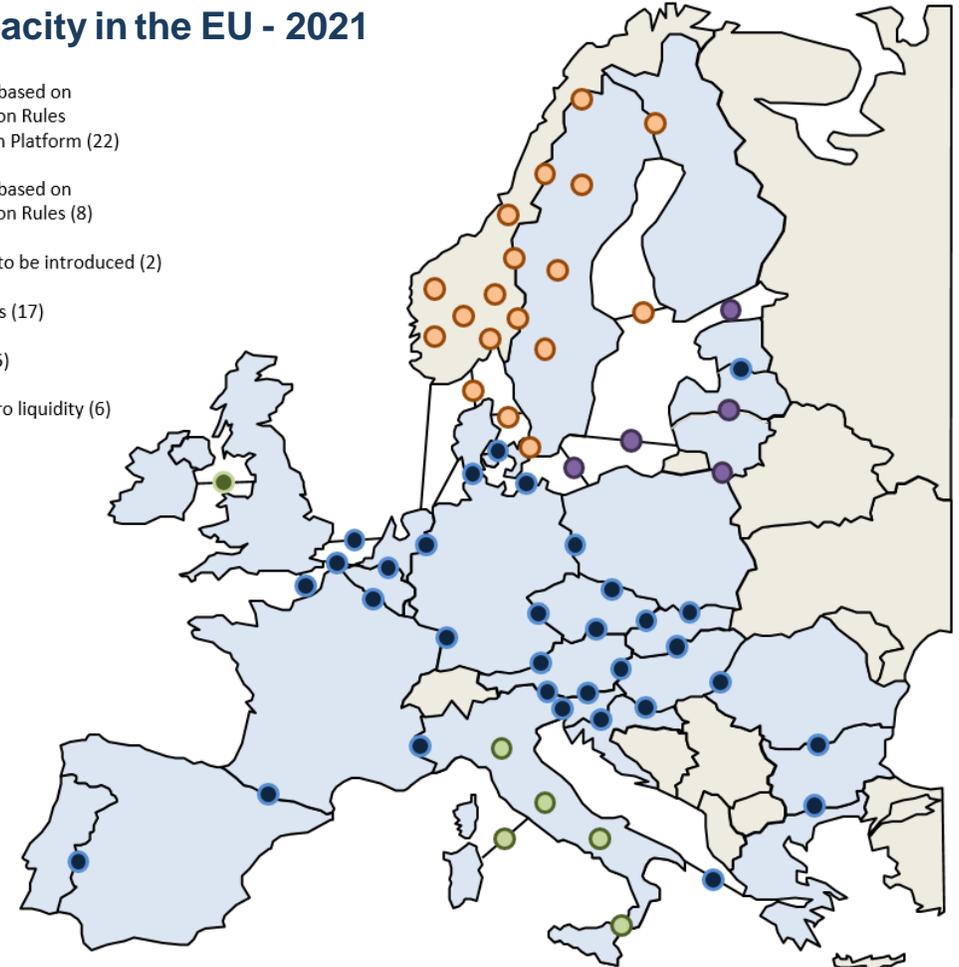
**Forward liquidity in local markets remains limited for a large part of Europe.**

Nevertheless, long-term transmission rights provide market participants with additional hedging opportunities in a given bidding zone and easier access to hedging contracts of neighbouring bidding zones.

→ *ACER and NRAs are currently investigating [possible developments of European forward electricity markets](#). In 2022, [ACER Decision 12-2022](#) suggests means to improve risk hedging opportunities on the bidding zone borders between Finland and Sweden.*

## Tools available for the allocation of forward capacity in the EU - 2021

-  Transmission Rights based on Harmonised Allocation Rules on a Single Allocation Platform (22)
-  Transmission Rights based on Harmonised Allocation Rules (8)
-  Transmission Rights to be introduced (2)
-  Financial Instruments (17)
-  Other Instruments (5)
-  No Instrument or zero liquidity (6)





Most borders that remained uncoupled joined the [Single Day-Ahead coupling](#) in 2021.

→ Bulgaria joined in May. In June, the so-called 4MMC and the MRC coupled via the borders PL-DE, PL-CZ, PL-SK, CZ-DE, CZ-AT and HU-AT. The BG-RO border was coupled in October.

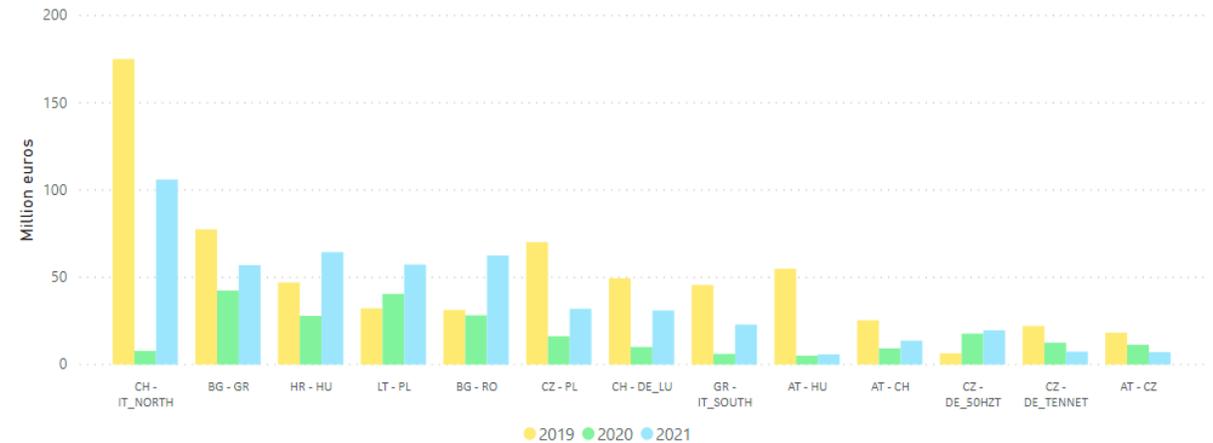
**Overall, in 2021, the efficient use of cross-zonal day-ahead capacity was measured at 88%<sup>1</sup>.**



Subsequently, in June 2022, in the context of the go-live of the Core flow-based project, a major milestone, the HR-HU border was coupled, marking the completion of a pan-European day-ahead market coupling.

→ The finalisation of the day-ahead market coupling on EU borders will lift the level of efficient use of cross-zonal capacity in the day-ahead timeframe. In turn, it will raise the overall economic efficiency of European electricity wholesale markets. For the next edition of the Market Monitoring Report, the level of efficiency in the use of day-ahead capacity can be expected to be reported at 100% for 2022.

Estimated social welfare gains still to be obtained from further extending DA market coupling per border – 2018–2021



1. Efficient use is defined as the percentage of the available NTC used in the 'right economic direction' in the presence of a significant price differential (>1 euro/MWh).

# Intraday markets: much progress, with few steps remaining.

↗ Aggregated cross-zonal volumes nominated in the intraday market timeframe across the European network increased over the past years, following the go-live of the single intraday coupling and its expansion to new borders.

→ The extension of the single intraday coupling to IT occurred in September 2021; GR, SK should follow by the end of 2022.

This upward trend is consistent with [the increase in intraday-traded volumes](#) observed in most member states over the same period.

⊗ Despite the increasing trend of [intraday-traded volumes](#) and cross-zonal nominations in the intraday market timeframe, **in 2021 the efficiency of the the utilisation of intraday cross-zonal capacity remained at 66%.**

→ Extensions to further EU borders, as well as the implementation of pan-European intraday auctions as envisaged in [ACER's decision 01/2019](#), are expected to further increase the level of efficient use of cross-zonal capacity in the intraday timeframe.

Absolute sum of net ID nominations at relevant EU borders – 2019–2021 (TWh)



# 2021: EU imbalance netting process achieved.



A [European platform for operating the imbalance netting process](#) was achieved by 24 June 2021.

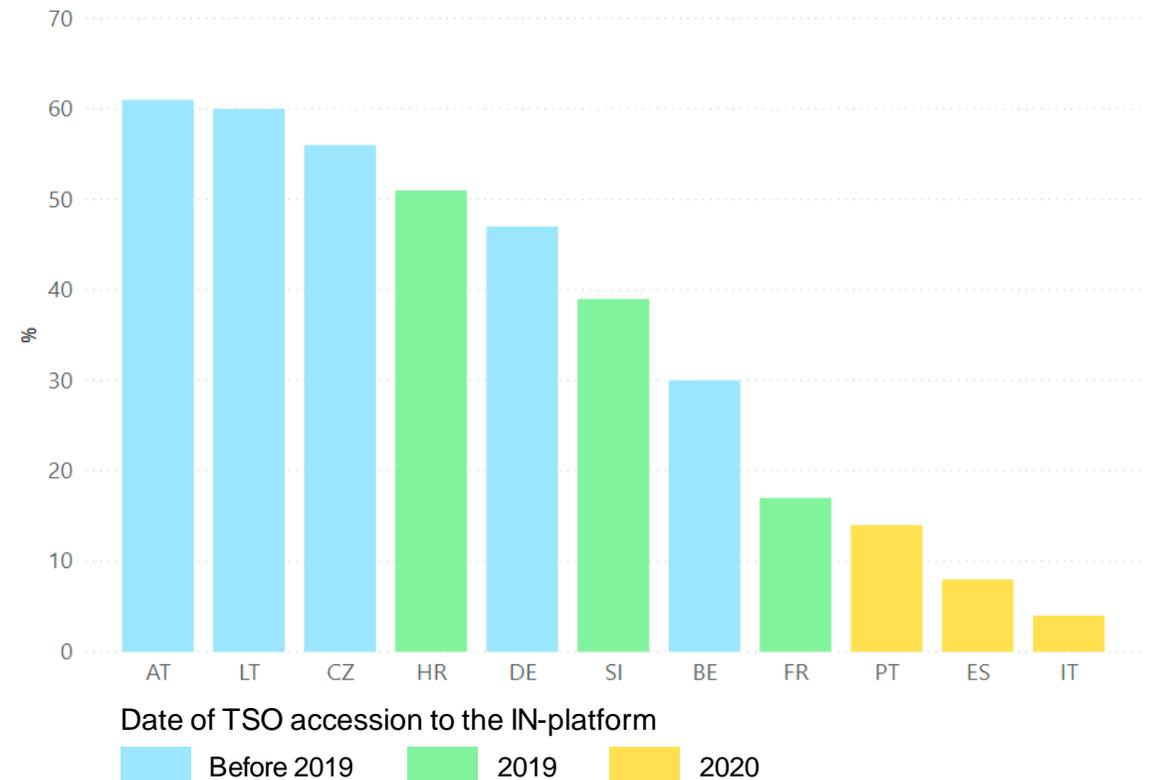
→ *The platform coordinates “imbalance netting”, a process optimising the use of frequency restoration reserves among transmission system operators.*



From February 2019 to June 2022, the number of transmission system operators active on the platform went from 11 to 23. Imbalance netting among countries that reported some level of cross-zonal exchange both in the years 2020 and 2021 grew by 25%.

→ *The growth is led by newcomers (ES, IT, PT) but also by those who joined in previous years (e.g. HR by 30% and SI by 12%).*

**Imbalance netting as a percentage of the total need for balancing energy (explicitly activated or avoided by means of netting) from all types of reserves in national balancing markets – 2021 (%)**



# Liquidity across market timeframes

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**Market liquidity is one of the key indicators of a well-functioning electricity market.<sup>1</sup>**

An electricity market is considered liquid if a significant number of market participants are able to sell and buy products in large quantities, quickly, without significantly affecting prices and without incurring significant transaction costs.



**‘Churn factor’**, defined as the overall volume traded through exchanges and brokers expressed as a multiple of physical consumption, are a mean to measure liquidity.

→ *The churn factor provides an indication of the relative ‘size’ of the market compared to its physical size and it is relevant to all market timeframes.*



**‘Bid-ask spreads’** are defined as the average difference between the highest buy offer (bid) and the lowest sell offer (ask) across the trading period of a given product.

→ *These spreads relate to the costs that market participants may incur when making a transaction. It is mostly relevant to markets based on continuous trading, i.e. most of forward markets and a large share of intraday markets in Europe.*

1. This statement should not be understood in isolation from other aspects of a well-functioning market assessed elsewhere in the report. In particular, there is a trade-off between high liquidity and efficient price signals representing market congestion.

# Forward markets liquidity decreased in 2021.



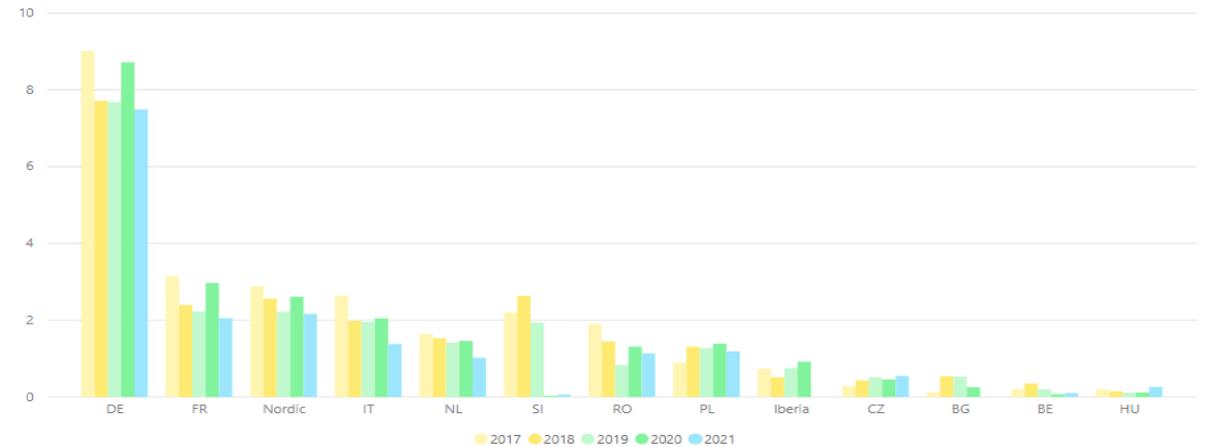
**During 2021 Forward markets' liquidity decreased in every member state except for BE, CZ, HU, and SI.** Decreases are unlikely due to a single factor, and partly Member State-specific. One shared reason could be a correction of the increase triggered by the COVID-19 pandemic in 2020 and the focus on a shorter-term horizon.

→ *Decrease was significant in IT, FR, NL (about 30%) and the Nordics, DE, RO and PL (about 15%). DE remains the most liquid market in 2021.*

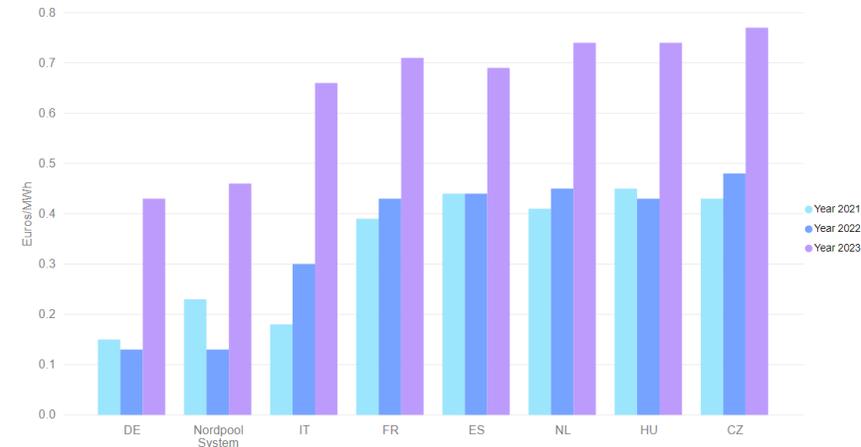


Bid-ask spreads of over-the-counter (OTC)-traded yearly base-load products for delivery in 2021, 2022 and 2023 for the major European forward markets show a **significant increase for delivery in the year 2023**. The timing of the increase corresponds to the increase in electricity wholesale prices (second semester of 2021). Taken as a percentage of the wholesale electricity price, the increase is not so significant.

**Churn factors in major European forward markets – 2017–2021**



**Average bid-ask spreads of OTC yearly products in European forward markets - 2021-2023 delivery (euros/MWh)**



# In 2021, liquidity in day-ahead markets was stable.



Levels of day-ahead liquidity in European markets diverge significantly. Differences are often related to differences in market design and market structure.

→ *Churn factors are close to one in markets that are exclusive<sup>1</sup>, such as in the Single Energy Market of Ireland and Northern Ireland and Greece. Churn factors are lower in markets where a significant share of the energy can be sourced through bilateral contracts or through specific national arrangements such as in France.*



**Year-on-year changes in DA market liquidity are in general modest. This suggests that DA markets are mature for the largest part of Europe. Some exceptions include markets that emerged in recent years.**

→ *For example, Bulgaria saw a year-on-year increase of 62 %, in 2021.*

**Churn factors in major European DA markets - 2017-2021**



1. 'Exclusive' refers to markets that represent the only route to trade ahead of delivery.

# Intraday markets liquidity remains on the rise



**Overall, Intraday churn factors have been increasing steadily since 2019.** In 2021 Germany and the Iberian Market continued to have the highest ID-traded volumes expressed as a share of physical consumption.

→ *The upward trend in liquidity levels observed over the past years in most of the countries continued in 2021 but not for Belgium and France.*



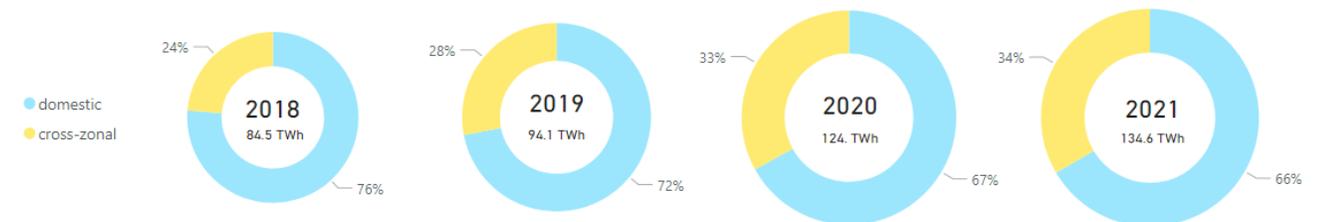
**The share of cross-zonal intraday trade expressed as a percentage of the overall continuous intraday trading volumes in Europe, has been steadily increasing** following the go-live of single intraday coupling (SIDC) in 2017.

→ *Overall, it confirms that SIDC allows market participants to access a larger portfolio of bids and offers to reduce their imbalances or support the system's balance in an efficient way.*

**Yearly ID churn factors in major European markets by type of trade – 2019–2021**



**Share of continuous ID-traded volumes according to intra-zonal vs. cross-zonal nature of trades in Europe and yearly continuous ID-traded volumes – 2018–2021 (% and TWh)**



# Conclusion

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# Monitoring EU electricity markets remains crucial for progress

In the context of the current energy crisis, speeding up energy independence, and a massive rollout of low-carbon generation remain core EU objectives. Continued monitoring of those markets in the context of significant shifts and change supports strategies for resilience.



**The integration of European energy markets has yielded significant benefits. It contributed to decreasing price volatility and optimising resources. There is scope for further improvement.**



**Sufficient cross-zonal capacity is crucial both for a flexible and efficient electricity market functioning and for smoothing price peaks.**

→ *TSOs should make available 40% of additional cross-zonal capacity to meet the minimum 70% target.*



**Making short-term electricity markets work better everywhere**

2021 saw further progress in the integration of EU markets in day-ahead, intraday (instrumental for the large scale integration of renewable energy resources) and in particular balancing markets.

→ *€ 1 billion of additional yearly welfare gains from finalising the integration of short-term electricity markets.*



**Driving the energy transition through efficient long-term markets**

While in 2021 all forward markets have access to some form of hedging tools, forward liquidity remains limited in many parts of Europe.

**Continued energy market integration could deliver more than 300 billion Euros in benefits for the next decade.**



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