



European Union Agency for the Cooperation  
of Energy Regulators

# Capacity use and booking trends in European natural gas markets

## 2025 Monitoring Report

30 October 2025



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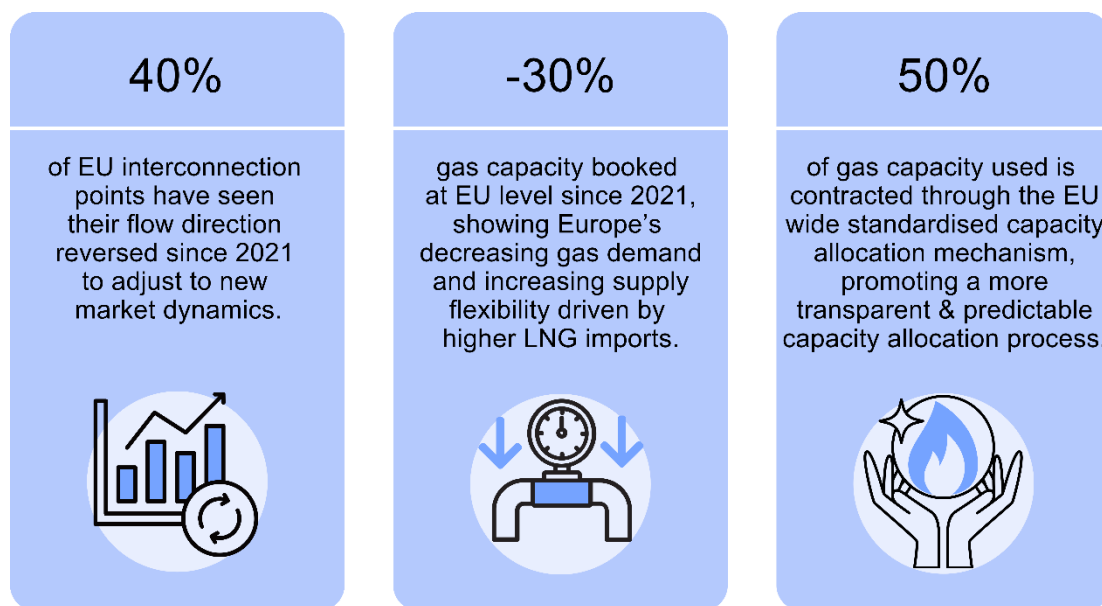
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## Executive summary



### Resilience in action: how the European Union's integrated gas system adapted to the energy crisis

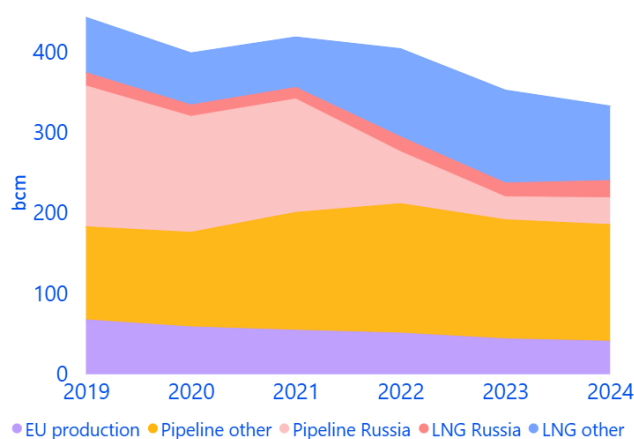
The European Union's integrated gas system has proven resilient to the crisis, reconfiguring to align gas flows with shifting supply and demand patterns. Following the initial shock of 2022, capacity use has adjusted to enable new flow paths, reduce congestion, and help ease upward pressure on EU gas hub prices and spreads.

Gas flow patterns in the European Union have undergone a shift since 2022. Westwardly flows have declined while east-to-west and south-to-north flows have increased. This shift occurred in response to the decline of Russian pipeline supply.

More flexible capacity use and changing booking trends have supported system adaptability.

Figure 1. Higher LNG imports and lower demand offset the drop in Russian pipeline supply.

EU gas imports per main supply source - 2019-2024 (bcm).



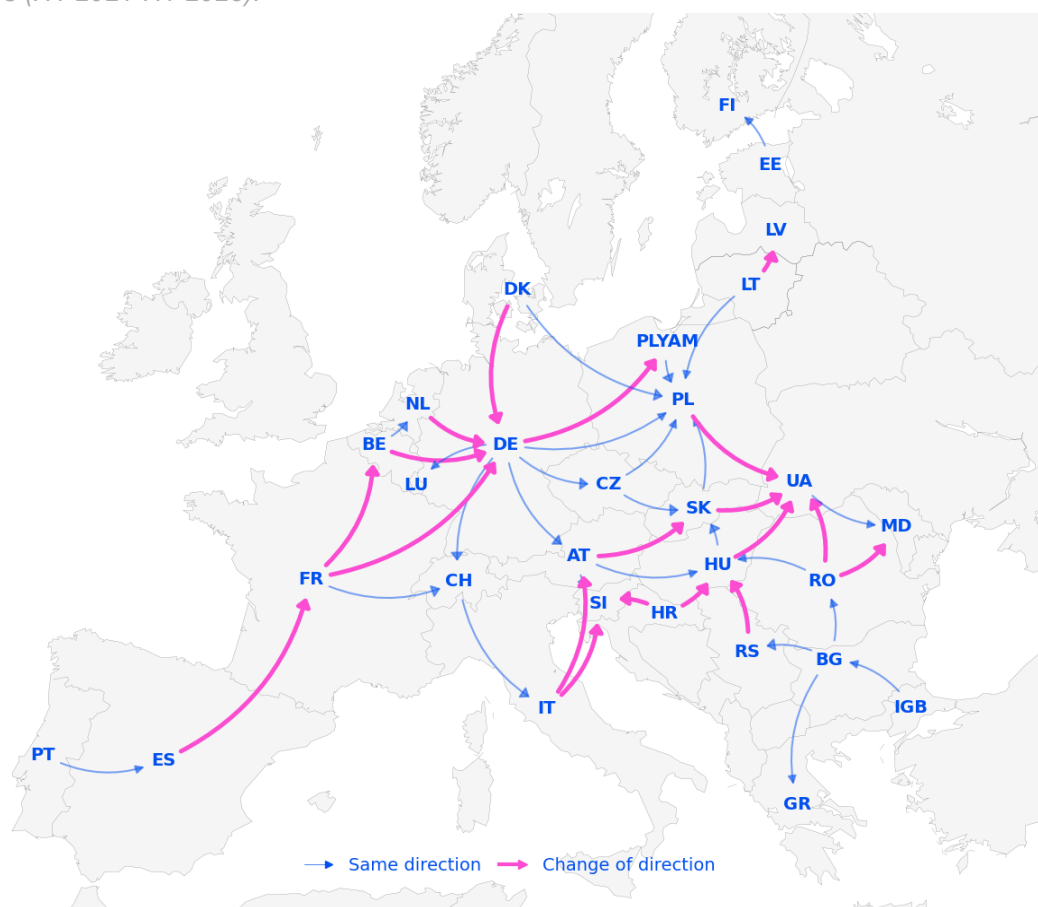
Gas flow changes within the EU have led to a reduction of gas transit in several transmission systems. As the decline in Russian pipeline gas supply has primarily been balanced by a decrease in consumption and increase of LNG imports, the need for cross-border flows has, on average, diminished. Although the impact varies between transmission systems, lower consumption and lower transit needs have triggered an increase of the average EU gas transmission tariff. This trend is expected to persist in the medium term, leading to lower capacity bookings and higher relative transport costs for gas consumers. Looking ahead, gas demand in the EU is projected to further decline by 40 to 90 billion cubic meters until the end of the decade, the drop being dependent on the speed of electrification and decarbonisation.

## European Union's gas flow reconfiguration resulted in new dynamics of capacity use

**The flow reconfiguration has put pressure on the utilisation of selected parts of the network.** After the initial shock of 2022, the system has been adapting to new flow paths by addressing bottlenecks as they emerged. Network capacity optimisation and infrastructure enhancement, including both new LNG regasification terminals and gas network reinforcements, have been key in this respect. Together with lower demand, these elements have contributed to easing congestion at most interconnection points, and notably along the supply corridors between West and Central Europe. However, in 2024, higher demand for gas flows from South to Eastern Europe, including for supplying additional gas volumes to Ukraine, have resulted in increasing congestion risks at specific interconnection points.

Figure 2. Adjusting gas flows proves the resilience of the EU gas system.

*Change in flow direction at EU gas cross-border interconnection points and with some neighbouring countries (H1 2021-H1 2025).*



**Transmission system operators had to adjust rapidly to accommodate new flow patterns.** The need to enhance offered capacity highlighted the importance of close monitoring of flows and efficient and coordinated system operation. This will remain especially important in light of evolving flow needs and of anticipated cases of infrastructure decommissioning or repurposing.

In this context, **ACER recommends:**



- to transmission system operators to improve transparency on how they optimise technical capacity, and to promote stakeholder consultations with network users;
- to national regulators to strengthen monitoring of the efficient use of capacity across Member States; and
- to ensure and oversee whether adjacent transmission system operators coordinate closely when determining capacity calculations and the methodologies for their maximisation at cross-border interconnection points.

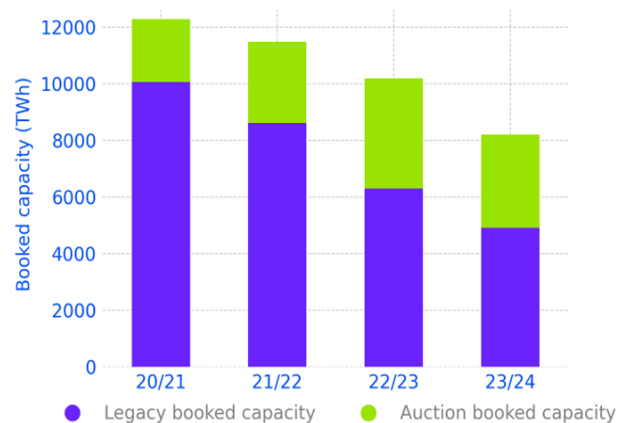


### Capacity bookings are adapting to new gas market conditions

**Aggregated booked capacity has dropped by circa one third in the European Union between 2021 and the end of 2024.** Until 2022, legacy contracts had continued to gradually expire but were being replaced at a relatively high rate with auctioned products. However, following the sharp disruption of legacy contracts linked to Russian pipeline supplies, combined with the flow reconfiguration and the sharp fall of demand from 2022 onwards, network users had to adapt their booking strategies. Whilst a substantial share of legacy contracts was terminated, network users secured capacities on alternative routes through auctions, underpinned by the Capacity Allocation Mechanism network code ('CAM network code'). This resulted in a substantial increase in CAM-auctioned bookings in 2022/2023 compared to the level observed in 2020/2021, despite a decline in overall booked capacities.

Figure 3. Auctioned capacity does not fully cover the expiry of legacy contracts after 2022.

*Evolution of booked capacity at CAM-relevant IPs: legacy versus auction booked capacity - October 2020-September 2024 (TWh).*



CAM network code provides a flexible and stable regulatory environment, allowing for a market-based allocation of capacity with clear market signals for network users.

In this context, the auction-based standard products foreseen by the CAM network code assisted shippers in optimising their booking portfolios. A scheduled, transparent and standardised capacity contracting enabled market participants to react in line with their needs. Such provisions had already been beneficial during the years before the crisis, contributing to the consolidation of the hub-to-hub market model, and ended up being even more relevant during the crisis.

The principles embedded in the code have also contributed to making the utilisation of the bookings more efficient in recent years. This had been reflected in higher utilisation ratios of booked capacity since the implementation of the CAM network code in 2015. However, the sharp demand drops and flow reconfigurations since 2022 have left some systems over-contracted, pushing today's utilisation ratios of booked capacity below the levels observed before the energy crisis.



**ACER recommends** to national regulatory authorities to ensure a full and consistent application of the CAM network code provisions without deviations, to retain the benefits of transparency, predictability, and standardisation of capacity allocation at interconnection points, enhancing competition and integration in the internal EU gas market.

## Congestion is much lower today, but some supply bottlenecks persist

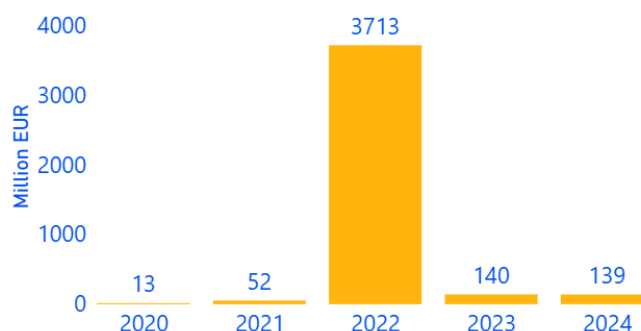
After peaking in 2022, congestion revenues have tracked capacity and utilisation trends, with most points experiencing no congestion today. Some increases are observed in Southeast Europe though.

The overall gas demand drop, coupled with LNG and pipeline infrastructure reinforcement, has alleviated peak congestion levels observed in 2022, critically in Northwest Europe.

However, in 2024, high utilisation of cross-border interconnection points in Southeast Europe resulted in the collection of non-negligible congestion revenues at specific interconnection points in that region.

Figure 4. Congestion revenues levels post-2022 follow market trends.

*Comparison of congestion revenues collected by transmission system operators – 2020-2024 (Million EUR)*



**Given these shifts in utilisation, ACER recommends rigorous assessment over new infrastructure investment needs**, focusing only on projects that solve persistent and long-lasting supply bottlenecks. These bottlenecks are those that remain after network optimisation. Otherwise, network development shall focus on facilitating the integration of decarbonised gas supply options. The development of the network shall equally align with the European Union's energy and climate goals, security of supply, and, in the future, may require taking a closer look at managing tariff changes and asset stranding. In this context, congestion revenues for new investments should be carefully drawn, and the investments must be clearly justified. Moreover, regulators must particularly oversee the distribution of revenue collected during periods of high congestion and aim to reduce and stabilise tariffs for European network users.

## A system at crossroads: final reflections on upcoming challenges

With natural gas consumption declining, and decarbonised gases options emerging, the European Union's gas system faces challenges to maintain a network that ensures secure and diversified supply, promotes market integration, supports the development of new decarbonised gases and manages network costs effectively. A resilient gas infrastructure is not only essential for gas supply security but also plays a key role in the broader energy system, serving as a core seasonal backup for electricity demand and providing flexibility to support the integration of renewable energy sources.

Seeking that equilibrium, a careful balance must be maintained to prevent assets stranding and rising tariffs, not to burden final consumers. Forward-looking and integrated network planning has therefore become increasingly important to ensure system adequacy from a cross-sectoral energy perspective and to optimise the use of existing infrastructure efficiently. Strong regulatory oversight and effective coordination among stakeholders remain crucial in achieving this balance.

## Introduction

- 1 This first edition of the Capacity use and booking trends Market Monitoring Report provides a comprehensive overview of capacity booking and utilisation trends in the European Union ('EU') gas network. It connects those trends to recent supply diversification, demand reduction and other overall market dynamics. The report offers a targeted comparison from 2021 to mid-2025<sup>1</sup> and emphasises the changes that occurred after the crucial mid-2022 market shift.
- 2 The report has two chapters, covering and connecting the following dynamics:
- 3 **Chapter 1** examines how the EU gas market has attracted significant volumes of LNG in an effort to diversify supply away from Russian sources. This strategic shift was assisted by a marked decline in gas demand in response to increased and volatile gas prices.
- 4 A **case box** describes the expansion of EU gas infrastructure, addressing the rising energy security concerns and sustaining the flow reconfiguration.
- 5 The chapter assesses how the changes in supply and demand have reshaped cross-border flow patterns. Notably, it explores how overall reduced demand and, in specific systems, reducing transit flows have led to lower capacity bookings, creating in turn upward pressure on tariffs.
- 6 The chapter finally analyses the gas market developments in 2025, with a particular focus on the impact of the termination of Russian gas transit via Ukraine as of 1 January 2025.
- 7 **Chapter 2** assesses the reshaping dynamics in booking levels and capacity contracting strategies in the past five years, and how they respond to and follow the market developments presented in Chapter 1. It analyses the booking behaviours of network users across the EU, and its outlook in relation to evolving flow paths and demand. In more detail, it maps the relative evolution of the capacity products after the implementation of the CAM network code and the termination of legacy contracts.
- 8 A **case box** describes how the market signals are impacting the use of interconnection capacity, supporting a more dynamic and price-responsive booking approach for selected cases.
- 9 Finally, the chapter concludes with another **case box** detailing the key elements included in the recommendations stemming from the CAM network code amendment proposal.
- 10 It is important to mention that the data analysis throughout the report draws from a wide range of sources and is underpinned by a robust methodology. This approach includes tailored strategies for aggregating cross-border gas flow and capacity bookings using time series data for each node in the network topology. To ensure clarity, **Annex 1** outlines the methodological frameworks and key considerations underpinning the analyses presented in the report, **Annex 2** provides additional figures, and **Annex 3** contains the list of acronyms used throughout this report.

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<sup>1</sup> For the first semester of 2025, the extent of some analyses depends on data availability. Furthermore, for some metrics such as latest gas hubs' price spreads or cross-border flows, [ACER's Quarterly Market Monitoring Reports](#) (Q3 2025) published in October provides further updated referential values.



# 1. Natural gas market dynamics

11 This chapter outlines how the EU gas market has adapted since 2022 to offset its reliance on Russian pipeline imports, attracting large LNG volumes, and how this transition has occurred alongside a significant decline in demand, altogether reshaping the EU gas network operation. The chapter thoroughly examines the changes in cross-border flow since 2021 and the resulting evolution of cross-border tariffs.

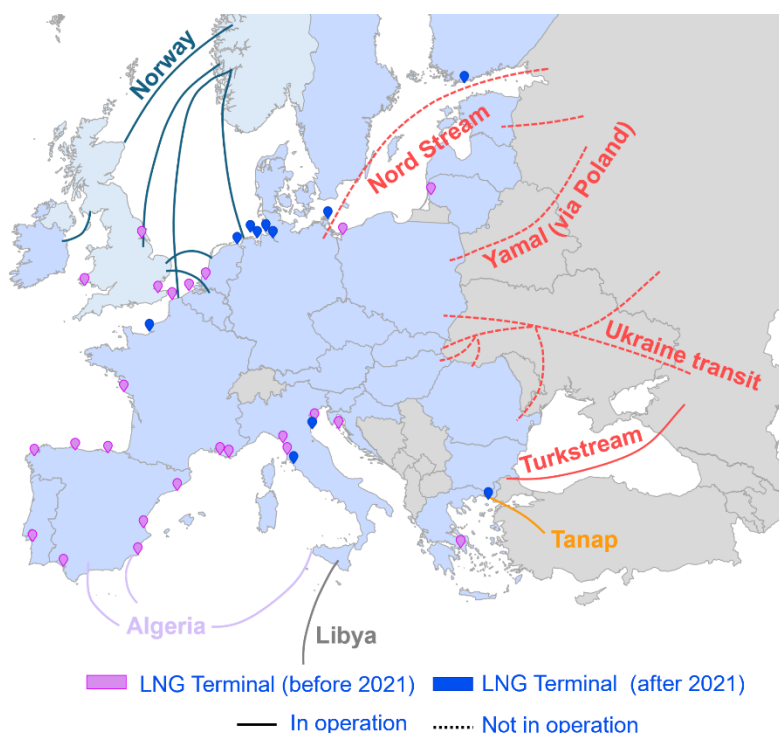
## 1.1. Import infrastructure and supply dynamics

12 The European Union is heavily reliant on gas imports. It has historically sourced most of its gas (88% approx. in 2024<sup>2</sup>) through four main gas pipeline corridors along with several LNG import facilities:

- Eastern corridors - comprise gas sourcing routes from Russia (via Belarus, Ukraine and Turkey);
- North Sea corridors - comprise import routes from Norway and the UK;
- Southern corridors - enable supplies from the Caspian Sea, off the coast of Azerbaijan;
- North African corridors - include gas sourcing infrastructure from Algeria, Tunisia and Libya;
- additionally, 33 large-scale LNG import terminals are operational at present along the shores of the EU, including both onshore and offshore facilities.

Figure 5. Gas imports continue to dominate the European Union's gas supply.

Key supply sourcing routes and LNG terminals in the European Union.



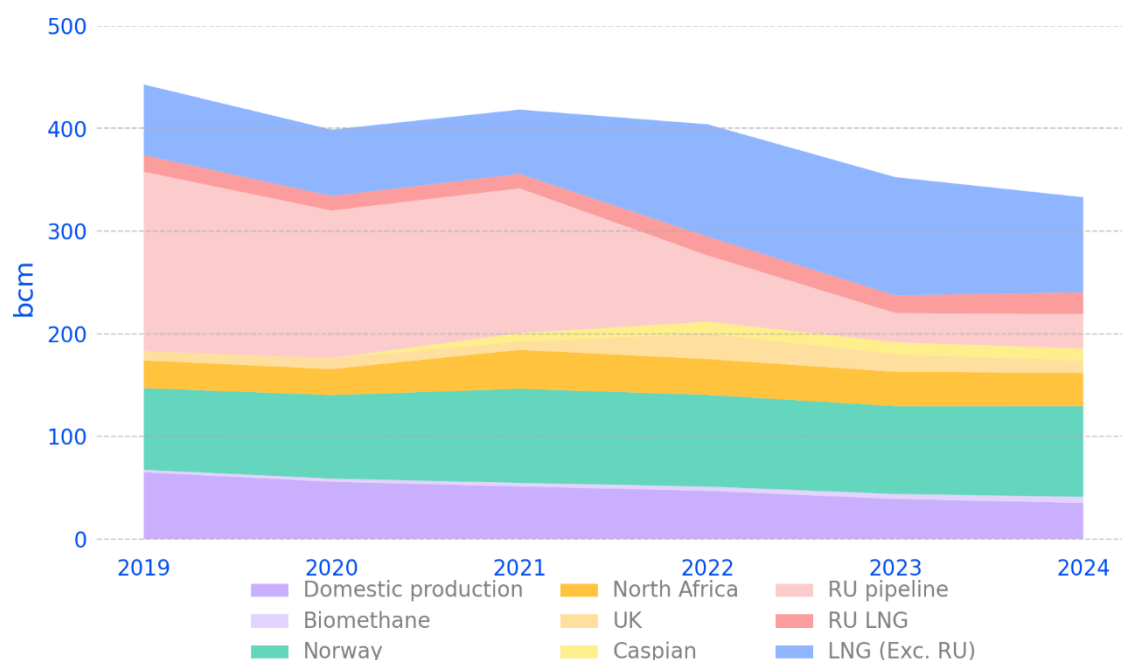
Source: ACER based on ENTSOG.

<sup>2</sup> In turn, EU domestic conventional gas production covers a gradually lower share of gas supply in the network (approximately 12% in 2024). That drop has accelerated following the decline and the closure of the gas production from the Dutch Groningen field in 2023. Biomethane output reached 4 billion cubic meters (bcm) in 2023 and is targeted to significantly rise under the REPowerEU Plan to 35 bcm by 2030. If met, that growth should contribute to offsetting the fall in domestic production and partially reduce reliance on external suppliers.

- 13 Figure 5 depicts both the key gas sourcing corridors and LNG terminals. Russia had historically provided the largest share of EU gas imports, via four major interconnectors and routes: Nord Stream (across the Baltic Sea and into Germany), Yamal-Europe (across Belarus and via Poland), Ukraine transit routes, and TurkStream (via Turkey<sup>3</sup>). These Russian flows, like all gas supplies from other sourcing origins, transit across Member States through a meshed and well-interconnected gas network that has been expanded over recent decades, enhancing market interconnection and integration.
- 14 However, as shown in Figure 6, EU gas supplies have undergone a strategic shift since 2022, following Russia's invasion of Ukraine. EU pipeline gas imports from Russia have fallen sharply since mid-2022<sup>4</sup>, dropping from circa 40% of EU import supply share in 2021 (~140 bcm in that year) to 6% mid-2025 (Russian pipeline volumes are anticipated to account for 16-17 bcm in 2025). This decline has been largely offset by increased deliveries from Norway and, critically, a surge in LNG imports, which cover today for more than 40% of the EU's final gas demand. Imports from North Africa and the Caspian region have overall remained stable during that period, while flow from the UK saw minor drops.<sup>5</sup>

Figure 6. The decline in Russian gas supplies has been largely balanced by record LNG imports.

Annual gas supply evolution in the EU's natural gas system - 2019-2024 (bcm).



Source: ACER based on ENTSOG, Eurostat, ICIS LNG Edge, ALSI.

<sup>3</sup> Additional Russian gas volumes can enter Europe via the Turkey-Bulgaria interconnection, transiting via Turkey and originating from Blue Stream, a pipeline connecting Russia and Turkey across the Black Sea.

<sup>4</sup> ACER's 2023 Gas Market Monitoring Report provided an in-depth analysis of Russian supply disruptions, contract terminations, and the key drivers behind the unprecedented surge in European gas prices during the summer of 2022.

<sup>5</sup> EU gas supply developments are regularly tracked in ACER's Quarterly Market Monitoring Reports, issued every three months.

- 15 In June 2025, the European Commission advanced its proposal to end EU's reliance on Russian gas by 2027.<sup>6</sup> The proposal consists of phasing out all remaining Russian gas imports, both pipeline and LNG, originating in Russia. This shift is anticipated to increase further EU's relative dependence on LNG, although the absolute LNG import volumes<sup>7</sup> will ultimately depend on the pace of gas decarbonisation and on future demand trends.
- 16 The remarkable shift in gas supply observed since 2022 has impacted the use of cross-border interconnection points (IPs) and, subsequently, capacity bookings within the EU gas network. To offset the decline in Russian pipeline gas imports, the historical East-West flow configuration has changed direction, shifting to a West-East one, enabled by increasing LNG deliveries, to supply Central and Eastern EU gas markets. The recent infrastructure expansions facilitated this reconfiguration. The case box below highlights some of these infrastructure developments.

### Case box: overview of EU gas infrastructure expansion since 2020

Building on efforts launched since the late of last decade, EU gas infrastructure has expanded and shifted to address the rising energy security concerns, culminated with Russia's invasion of Ukraine, supporting diversification objectives. Member States and regional stakeholders have accelerated several projects to further strengthen and diversify EU gas supply routes.

Significant investments in transmission capacity since 2020 include:

| Project                                        | Commissioning date | Capacity                                                                      |
|------------------------------------------------|--------------------|-------------------------------------------------------------------------------|
| Trans Adriatic Pipeline (TAP)                  | November 2020      | Annual capacity of 10 bcm/year                                                |
| Gas interconnector Poland-Lithuania (GIPL)     | May 2022           | 2.4 bcm/y to Lithuania and 1.9 bcm/y to Poland                                |
| Poland-Slovakia interconnector                 | August 2022        | 4.7 bcm/y to Poland and 4.7 bcm/y to Slovakia                                 |
| Interconnector Greece-Bulgaria (IGB)           | October 2022       | 3 bcm/y to Bulgaria and 3 bcm/y to Greece                                     |
| Baltic Pipe                                    | October 2022       | 10 bcm/y from Norway and Denmark to Poland and 3 bcm/y from Poland to Denmark |
| Enhancement of Lithuania-Latvia interconnector | December 2022      | 4.1 bcm/y to Latvia and 3.7 bcm/y to Lithuania                                |
| Gas interconnector Bulgaria-Serbia (IBS)       | December 2023      | 1.8 bcm/y with a reverse flow capability.                                     |

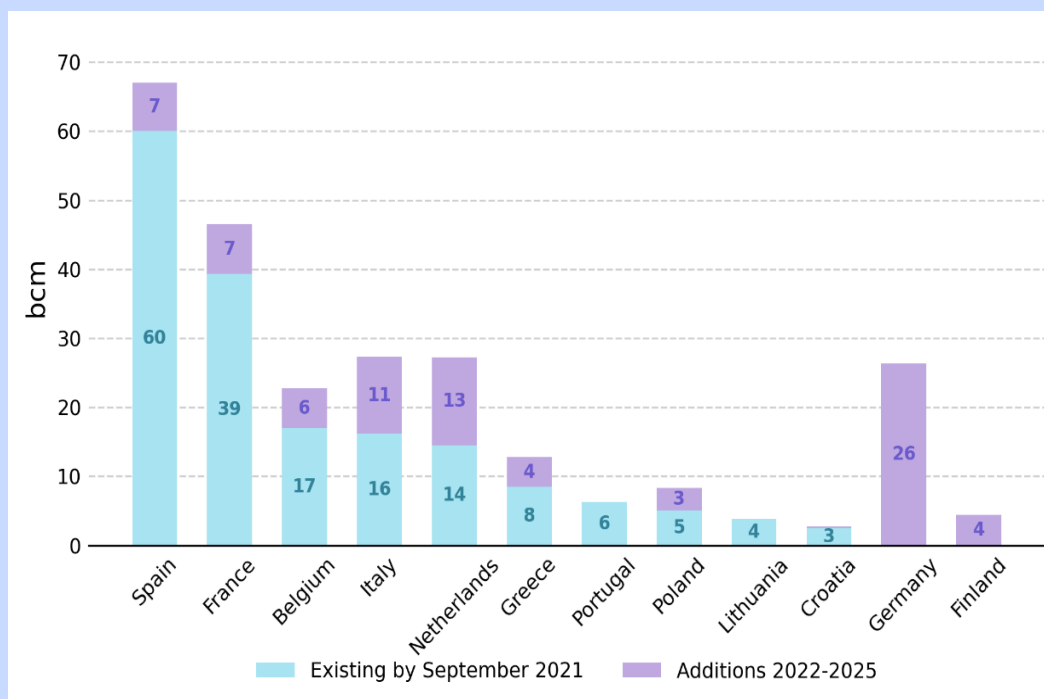
<sup>6</sup> EU's reliance on Russian gas is set to end by the end of 2027 under the [European Commission's REPower EU June 2025 proposal](#), backed by the [Council of the European Union in October 2025](#), and pending final agreement with the European Parliament at the time of publication of this Report. Discussions are also ongoing on a potential full ban of Russian LNG imports by January 2027, as part of a new sanctions package.

<sup>7</sup> According to [ACER's 2025 monitoring report on the European LNG market](#), Europe's substantial reliance on spot LNG imports is likely to persist through 2030 if decarbonisation targets fall short.

Regarding LNG infrastructure developments, the EU currently operates 33 large-scale import terminals. Between 2021 and 2025, twelve new LNG terminals and six expansions were commissioned, adding around 82 bcm/year of import capacity (Figure 7). As a result, the EU's total LNG import capacity is now about 250-255 bcm/year. Looking ahead, additional capacity in the order of another ~60 bcm/year is discussed to come online by 2030, with some projects already in the building phase and others pending final investment decisions.

Figure 7. The prompt rise in LNG capacity has allowed the shift from Russian gas.

LNG regasification capacity in EU Member States - 2021-2025 (bcm/year).



Source: ACER based on ALSI Transparency Platform.

Note: Additional capacity has been accounted from September 2021 until September 2025.

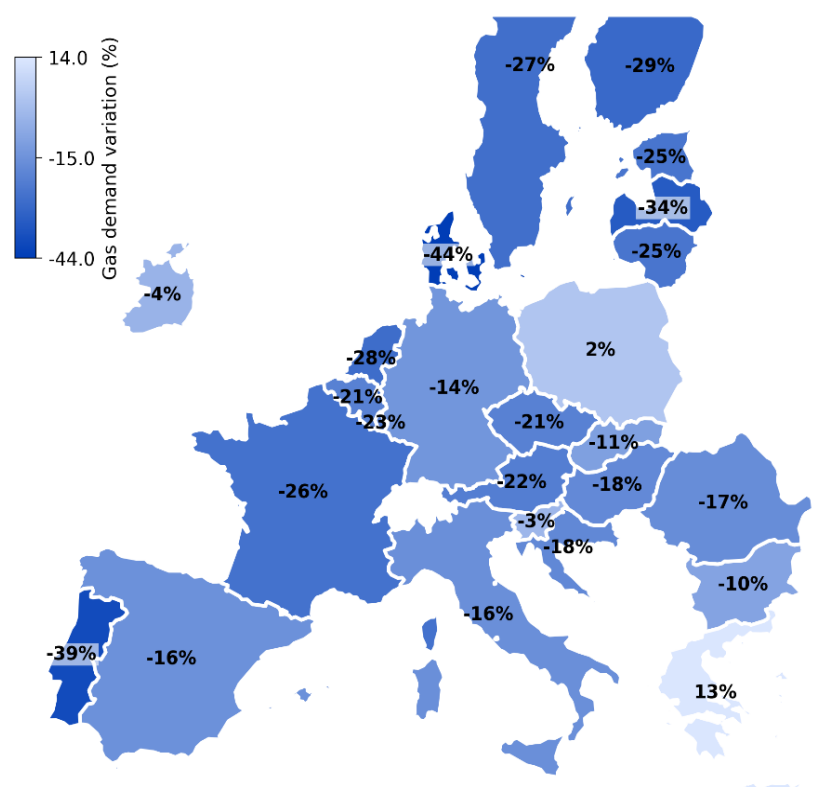
Looking ahead, future gas network developments in the EU must balance the reality of declining demand with supply diversification needs in some regions, and an overall need to adapt infrastructure for the transport of decarbonised gases. Reconciling the dual objectives of expanding the EU gas system where necessary and safeguarding security of supply, while also facilitating the uptake of low-carbon and renewable gases, will require enhancing cross-border and cross-energy sector planning and rigorous assessment over new infrastructure needs.

## 1.2. Demand dynamics

- 17 Gas demand is a key factor shaping the utilisation of cross-border interconnection points. The record high prices reached in 2022 and 2023, driven by supply tightness, triggered a sharp drop in EU gas demand that has not recovered since.<sup>8</sup> As Figure 8 shows, EU demand has fallen by 17% in 2024 relative to 2017-2021 average levels, with significant differences in both value and sector decomposition per Member State.<sup>9</sup> Gas demand drops are expected to overall continue, as the EU energy sectors shift towards increased electrification and to fulfil the decarbonisation objectives, even if at markets such as Germany, Greece and Poland, the phase out of coal-fired heat and power generation, and its replacement with gas could partially offset those drops.

Figure 8. Heterogeneous demand reduction after 2022 has contributed to shape the gas flow reconfiguration.

*Gas consumption variation in EU countries - 2024 vs 2017-2021 (%).*



Source: ACER based on Eurostat.

<sup>8</sup> In 2024, gas consumption rose slightly year on year (+0.6% to 333 bcm) but remains 12% below the 2019-23 average and 17% below 2017-21 levels. Interestingly, in the first half of 2025, gas consumption in the EU increased by 5% compared to the first half of 2024, largely driven by a 22% surge in gas demand for electricity generation during Q1 2025. This reflects stronger power sector reliance on gas, partly offsetting prior reductions in other sectors.

<sup>9</sup> EU gas consumption fell by 18% in Aug 2022-Mar 2023 relative to 2017-2021 levels, assisted by Council Regulation (EU) 2022/1369 on coordinated demand reduction measures. Demand reductions have been spread across industry, power, and buildings. Further information on sector decomposition and demand dynamics have been assessed in [ACER's Quarterly Market Monitoring Reports](#) (Q2 2025).



- 18 The significant reduction in gas demand since 2022 has affected total capacity bookings in the EU's natural gas transmission network. Moreover, expectations of further demand declines over the coming decade<sup>10</sup>, together with LNG flexibility, may have an impact on booking strategies, encouraging more cautious approaches in the medium to long term. The evolution of capacity bookings at interconnection points is examined in Chapter 2.

### 1.3. Changing cross-border flow dynamics

- 19 The flow shifts have resulted in the disruption of westward cross-border flows that had historically transported Russian gas from the EU's Eastern borders into Central and Western EU markets. The Russian invasion of Ukraine triggered a gradual cancellation of long-standing supply and capacity contracts within a broader political objective to reduce dependence on Russian imports (as already referred, the EU proposed to end the dependence with a full ban on imports by the end of 2027).
- 20 [ACER's 2023 Gas Market Monitoring Report](#) offered an in-depth analysis of Russian supply disruptions and contracts termination calendar. The disruptions covered the cessation of flow across the Yamal-Europe pipeline, followed by the halt of flow in the Nord Stream I pipeline and, later on, after a steady drop in 2022, the full expiration of transit gas flows via Ukraine on 1 January 2025.
- 21 In response to the sharp reduction in Russian pipeline supplies, the EU was able to expand its LNG imports. Combined with lower gas consumption, this helped to gradually offset the decline in deliveries from Russia. As depicted in Figure 9, the shift reshaped gas flow across Europe, west-east but also south-north gas movements intensified.<sup>11</sup> The red arrows in the figure indicate the largest cross-border gas net<sup>12</sup> flows in 2024. Notably, the remaining Russian gas flow into Europe entered primarily through Southeast and Central Europe via the Ukrainian gas transmission system and through the TurkStream pipeline in Bulgaria.<sup>13</sup> Finally, the overall volumes transiting in the system fell, with significant transit drops in selected markets as reflected in Section 1.4.
- 22 Initially, much of the additional LNG entered the EU through established Western EU LNG terminals such as in Spain, France, and Belgium, but also UK ones (transported to the continent through EU-UK pipeline interconnectors), enabling onward delivery to major markets. Over time, the commissioning of new terminals in Germany, Italy and the Netherlands, along with infrastructure expansions in the Northeast region (Finland, Poland and the Baltics), allowed more direct access to LNG at almost all EU coastal markets. Landlocked countries, meanwhile, continue their reliance on cross-border transits from neighbouring countries with LNG access.

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<sup>10</sup> The scale and trajectory of the demand decline vary significantly across scenarios though, as it remains closely tied to the pace of progress in meeting decarbonisation targets. For example, the European Commission's [Fit for 55 scenario](#) projects a reduction of around 40 bcm in gas demand from current levels by the end of the decade, while the more ambitious [REPowerEU scenario](#) targets an additional 80-90 bcm decline by then. Uncertainties can also be observed in [ENTSOG's TYNDP](#) scenario projections.

<sup>11</sup> Jung, Daniel, et al. "The European natural gas system through the lens of data platforms." *Energy Strategy Reviews* 51 (2024): 101297. The red arrows in Figure 5 indicate the largest cross-border gas annual net flows in the year 2024 ranging from 50 TWh to approximately 160 TWh (or equivalently from 4 to 14 bcm).

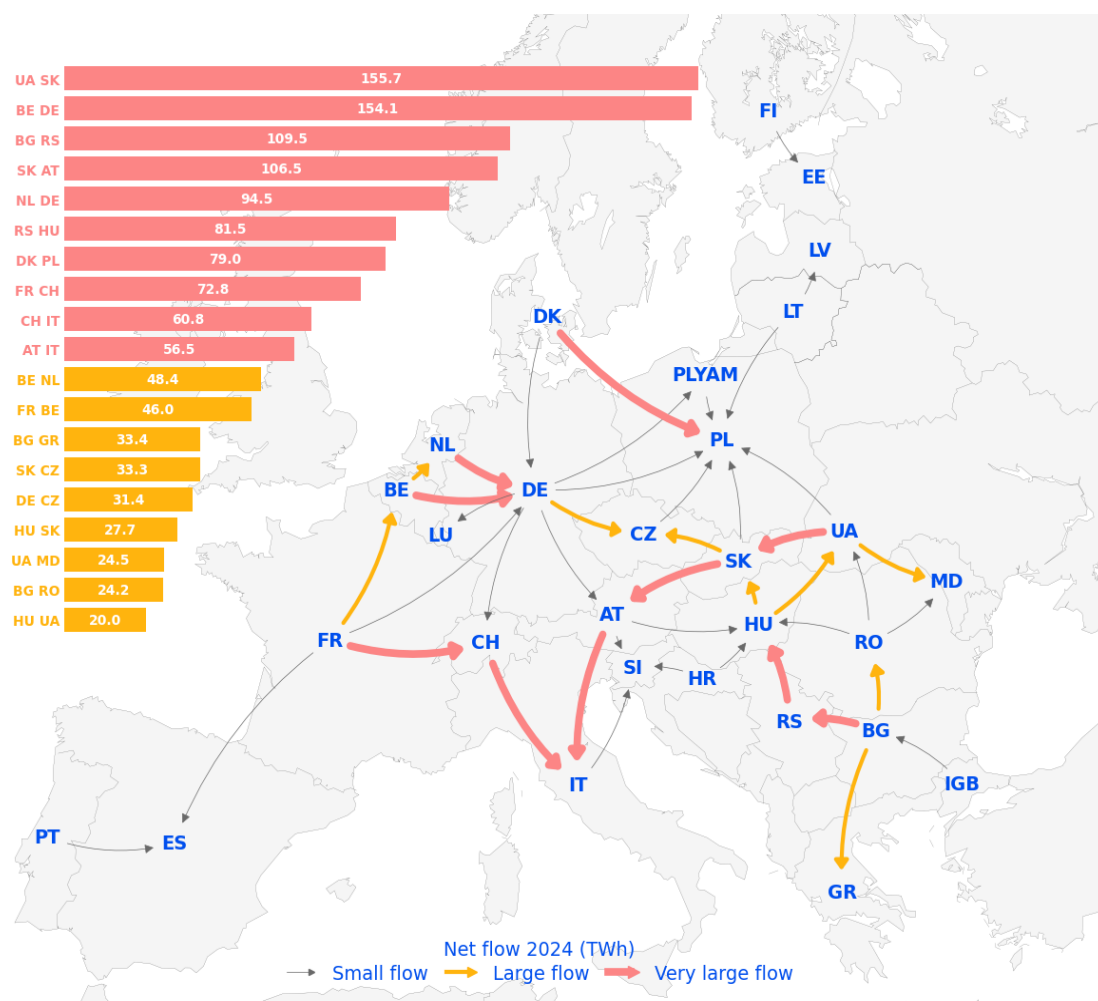
<sup>12</sup> Net flows at a certain border are defined as the difference between aggregated physical flows in one direction and those in the opposite direction across all IPs at that border.

<sup>13</sup> Additional Russian gas volumes can enter Europe via the Turkey-Bulgaria interconnection, transiting through Turkey and originating from Blue Stream, a pipeline connecting Russia and Turkey across the Black Sea.

- 23 Regarding LNG developments, the combination of new facilities, terminal expansions, and network reinforcements has played a decisive role in reshaping gas flows and alleviating congestion. By September 2025, the EU's yearly regasification capacity had reached 255 bcm, an increase of 82 bcm since September 2021. These efforts not only expanded import capacity but also helped overcome transmission constraints that had restricted LNG inflows in 2022-2023. Continued upgrades to key interconnectors further eased congestion, broadening supply options and strengthening the overall flexibility of the system.

Figure 9. Significant gas net flows move into Central and Eastern Europe in 2024.

Transmission network gas net flows at cross-border interconnection points - 2024 (TWh).



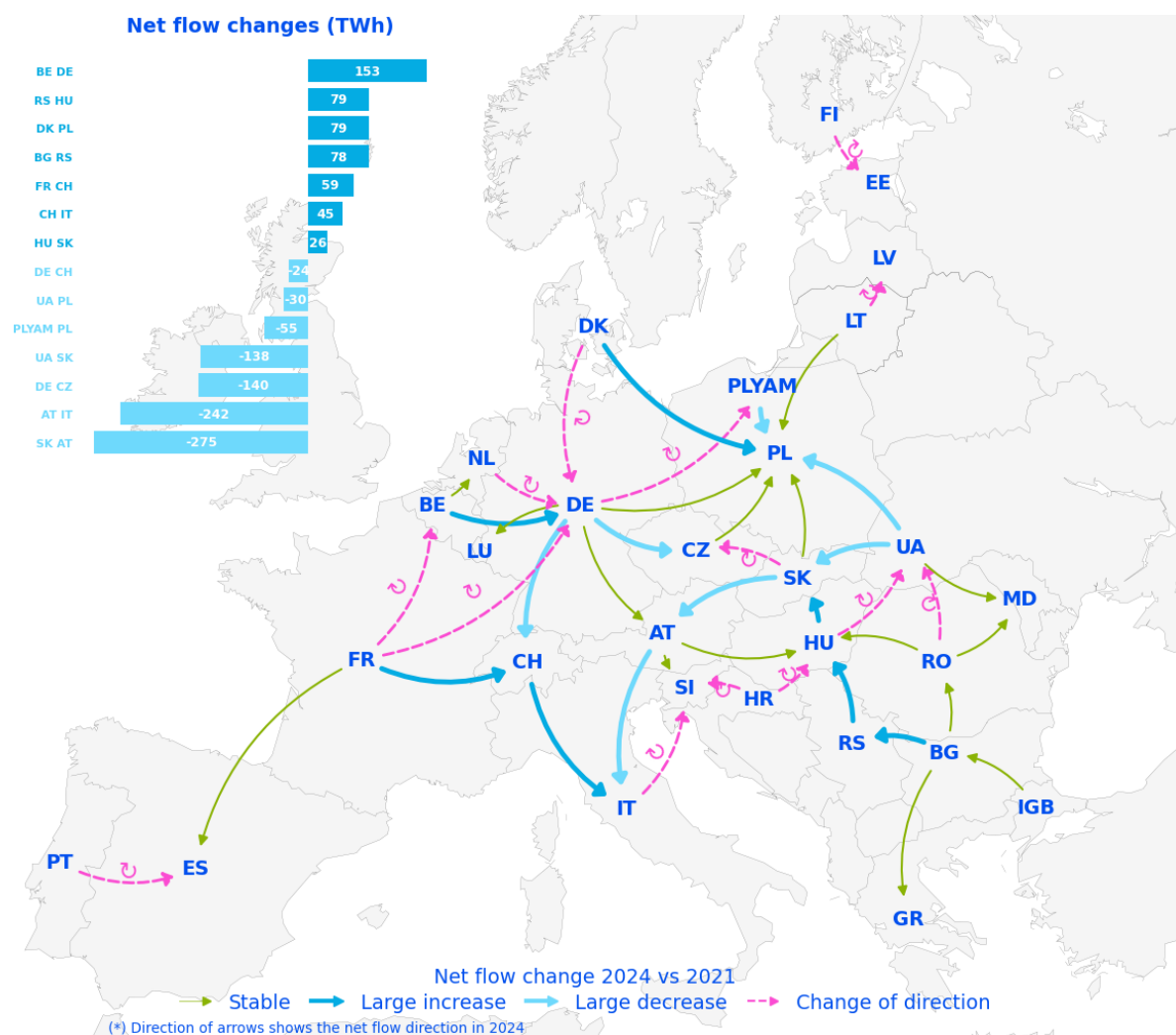
Source: ACER based on JRC (eurogastp Python package) and ENTSOG.

Note: Net flows are categorised as follows: very large flows exceed 50 TWh/year; large flows range between 20 and 50 TWh/year; and small flows are below 20 TWh/year.

25 As shown in Figure 10, cross-border gas flows across Europe have undergone significant changes since 2022. The figure compares the cross-border gas net flows in 2024 with those in 2021, highlighting in pink the borders where the prevailing net flow has changed direction. Notably, the infrastructure developments, detailed in the case box above, have facilitated significant flow shifts and created new flow patterns. The situation has further developed after the cessation of Russian gas transits through Ukraine as of January 2025, as it will be elaborated upon in Section 1.5.

Figure 10. 2022-2023 energy crisis has reconfigured cross-border gas flows across Europe.

Changes in cross-border gas net flows - 2024 vs 2021 (TWh).



Source: ACER based on JRC (eurogastp Python package) and ENTSOG.

Note: A change in flow direction compared to 2021 is shown in pink. Net flows that have maintained the same direction are represented by blue or green arrows: dark blue indicates a large increase in net flows (greater than 20 TWh/year), light blue shows a large decrease in net flows (greater than 20 TWh/year), and green indicates a stable net flow (change lower than 20 TWh/year).

### 1.3.1. Regional cross-border net transits developments: Key examples

#### 1.3.1.1. West and Central Europe

- 27 One of the most striking shifts since 2022 is the surge in flow into Germany and Italy, the two EU's largest gas consumers, from their Western neighbours. In the case of Germany, following the halt of Russian deliveries via Nord Stream I and Yamal-Europe pipelines, cross-border supply patterns changed markedly. This resulted in increased imports from Belgium and a change in flow direction from the Netherlands and France, which leveraged their LNG import terminals, and a reduction of transits to other markets such as Austria, Czechia and Switzerland. Despite a drop in transit flows relative to 2021 (see Section 1.4), Germany, with its central geographical position, its interconnected network, and the largest EU storage capacity, remains a pivotal actor to facilitate gas flow across Central Europe and to ensure security of supply in the region.
- 28 The Yamal-Europe pipeline, since the suspension of Russian gas flows in April 2022, started to operate in reverse direction, allowing Poland to receive additional gas volumes from Germany. This shift materialised in a decrease in net flows of around 20 bcm annually to Germany and 5 bcm to Poland, which had to be compensated with LNG imports and demand reduction measures.
- 29 As shown in the upper left graph of Figure 10, in 2024 the largest cross-border gas net flow change was recorded at the Slovakian-Austrian border (-24 bcm approx.). This development relates to the drop in transit, due to the cancellation of long-term supply contracts between Gazprom and Italian and Austrian buyers, reducing supplies to Austria and Italy by roughly 70% and 80% respectively between 2021 and 2024, with further declines in 2025. In turn, the historical flows from Czechia to Slovakia have reversed, with now the prevailing direction being Slovakia to Czechia, at around 3 bcm annually. Consequently, Slovakia has increased its imports from Hungary, as will be further described in Section 2.1.

#### 1.3.1.2. Northeast Europe

- 30 Another clear example of changing flow patterns has been allowed by the enhancement of the Lithuania-Latvia interconnector, completed in December 2022, that changed flow dynamics between Lithuania and Latvia, as well as between Finland and Estonia. This adjustment enabled greater use of the Latvian underground gas storage and optimised supplies from LNG terminals in Finland and Lithuania.
- 31 While not contributing to a changed flow direction, the new interconnector Denmark-Poland, known as Baltic Pipe, enhances the diversification of gas supply in Central and Eastern Europe, as well as the Baltic States, by opening a new import route for Norwegian and Danish gas into the EU. The interconnector was completed in October 2022 with a capacity of around 10 bcm per year. Figure 10 shows that approximately 8 bcm were delivered from Denmark to Poland in 2024.

#### 1.3.1.3. Southeast Europe

- 32 Another important development shaping flow patterns and strengthening regional supply security is the Bulgaria-Serbia Gas Interconnector (IBS), operational since January 2021. The pipeline allows Serbia to act as a transit market, moving predominantly Russian sourced gas from Bulgaria towards Hungary. In 2024, flow increased reaching 9.5 bcm from Bulgaria to Serbia and 7 bcm from Serbia to Hungary, both well above 2021 levels.
- 33 Finally, the Trans Adriatic Pipeline (TAP), linking Europe to Caspian gas fields, has been crucial in mitigating the loss of Russian supplies since 2022 in Eastern and Southern markets. TAP delivers Azerbaijani gas primarily to Italy, with branch connections extending into Southeast Europe. The Greece-Bulgaria Interconnector (IGB), operational since October 2022, enables direct deliveries from TAP to Bulgaria. In 2024, flows through IGB reached nearly 1 bcm. Before its commissioning, Azerbaijani gas entered Bulgaria via existing links with Greece.

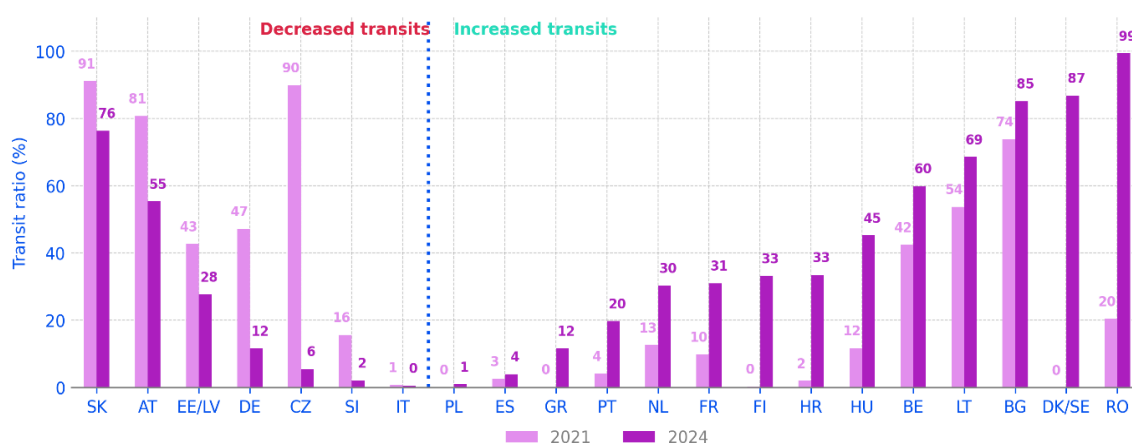
- 34 These combined terminal and network improvements helped to gradually relieve the upward pressure on EU gas prices and to reduce the record-high price spreads that emerged between hubs better supplied with LNG and those with more limited access to the LNG global market.
- 35 Today, price convergence is much stronger, although at the Member State and regional level, certain price differences persist, due to specific market fundamentals and transport cost variations. Overall, price differentials have not yet returned to pre-crisis levels. On average, higher price premiums have been observed in markets that need to attract alternative cross-border flows and LNG cargoes to replace Russian gas, especially during periods of market tightness, such as when injection demand rises.<sup>14</sup>

## 1.4. Cross-border tariff and transit dynamics

- 36 The general EU gas demand drop has not only led to lower utilisation of domestic exits in each system, but generally, to lower relative cross-border flows to serve domestic demand from adjacent countries. Furthermore, the reconfiguration of EU gas supply patterns needed to offset the drop in Russian imports, and the increased flexibility provided by the LNG deliveries has resulted in reduced pipeline transits in several systems, further decreasing the booking levels sustaining the allocation of the investment costs. While system specific, this flow reconfiguration has overall resulted in less transit across Central and Eastern Europe and overall sharper tariff rises in the region in comparison to the Western markets.

Figure 11. Transit ratios reflect the changing dynamics in cross-border flows and bookings.

Evolution of gas transit ratio at EU Member States - 2021 vs 2024 (%).



Source: ACER based on ENTSOG TP and ALSI GIE.

Note: Transit ratio = absolute exports / absolute imports (including LNG). Most EU countries are net importers, as all they import most of the gas that they consume plus export, in the absence of massive domestic production.

- 37 Figure 11 shows that transit ratios (i.e., absolute exports divided by imports, see note above) have dropped significantly in the systems historically flowing Russian pipeline gas westwards, such as Slovakia, Czechia, Austria, but also Germany. Such drops in transit, together with

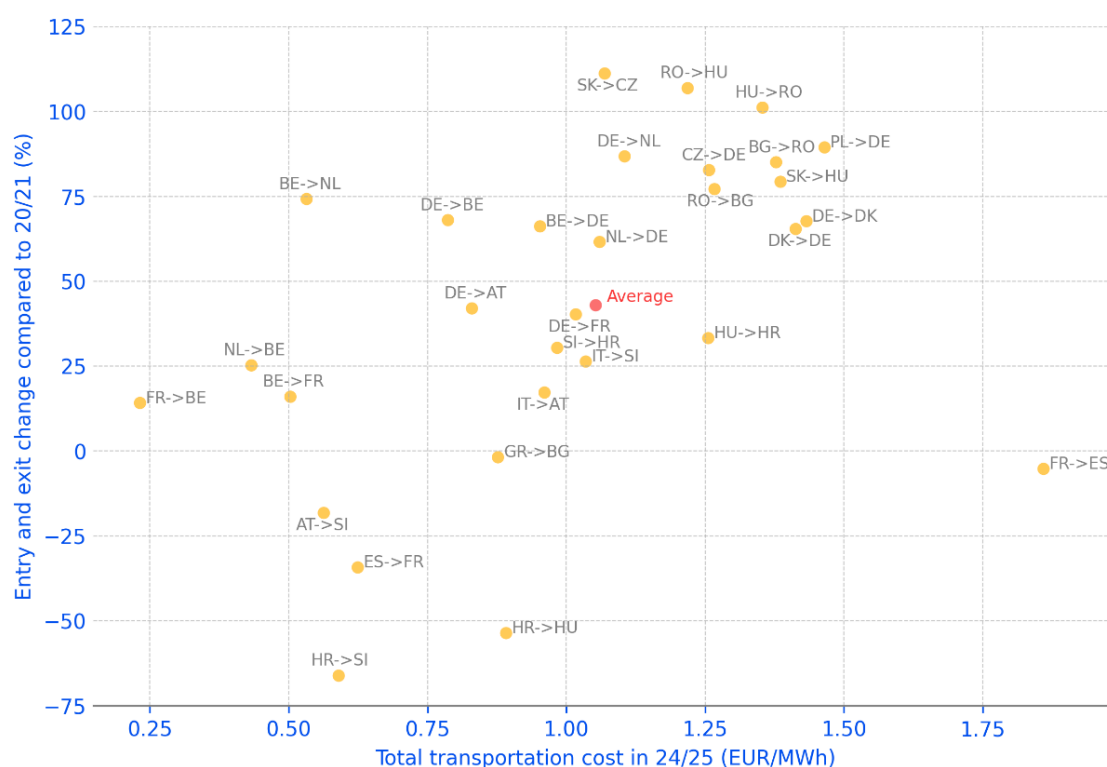
<sup>14</sup> As analysed in [ACER Quarterly Market Monitoring Reports](#), it is worth mentioning that recent price dynamics have also resulted in greater instances of hub price spreads above daily capacity tariffs than in the past, even if observations for 2025 indicate that spot price spreads between most EU hub pairs remain generally below both daily and annual transport tariffs. This suggests that the increasing transport costs are impacting but not entirely hindering price convergence. Variety in supply portfolios and their optimisation, financial arbitrages or marginal pricing aspects overall impact individual hubs' price formation and limit the direct additive influence of tariffs over spreads.

reduced demand, have led to lower cross-border capacity bookings, creating upward pressure on tariffs.

- 38 In contrast, transit ratios have increased in several North-West and Southern EU Member States, to back rising LNG exports from West to East, such as in Belgium and France, and the remaining Russian sourced pipeline imports from South to North, such as in Hungary. This does not necessarily result in tariff drops, but rather in a rise of cross-border flows, and consequently additional bookings, that may have stabilised the national tariffs, compensating for domestic demand drops. This stabilisation effect is more persistent in those cases where congestion led to auction premiums, and the subsequent congestion revenues have been allocated to smoothen tariffs (or in some cases to cover the costs of investments in new network infrastructures or the reinforcement of existing ones).
- 39 As shown in Figure 12, transmission tariffs have increased on average in the EU by 40% between gas year 2020/2021 and gas year 2024/2025. Since tariffs reflect how total allowed revenues (i.e., system costs) are allocated among system users through capacity bookings, the main drivers behind this increase have been the changing transit ratios and the sharp decline in EU gas demand, down by almost 20% compared to 2021.

Figure 12. Network user bookings directly impact tariffs and the recovery of system revenues.

*Relative change in cross-border capacity reserve prices for yearly products in selected borders - 2024/2025 vs 2020/2021 (EUR/MWh).*



Source: ACER based on ENTSOG, PRISMA, GSA, and RBP.

Note: The compared costs refer to the sum of entry and exit capacity reserve price based on the data from yearly gas auctions. It does not include commodity fees and other costs that can make total transport costs higher. The methodology for computing the tariffs is described in Annex 1. A 100% conversion factor has been used in the conversion between €/kWh/h/runtime and €/MWh.

- 40 While demand and transit flow are considered the key drivers, additional elements have also backed recent tariff rises. Among these are moderate increases in allowed revenues in some systems, driven by selected new investments to diversify supply away from Russian gas (e.g. new pipelines to diversify supply in Central-East Europe, new LNG facilities with parts of the costs assigned to the transmission system). Finally, the high inflation experienced in the period (circa



6% annually, computed as a yearly average between 2021 and 2024) had a major contribution to the tariff increase. While this report does not analyse specific cases in detail, another element that may explain changes in the final tariff level at single IPs is the design of the tariff structure and the resulting reference price methodology<sup>15</sup>.

- 41 In the future, with decarbonisation advancing, relatively high tariffs, which result from initially low bookings, may further discourage future bookings in favour of diversification in the energy mix. This creates the risk of a feedback loop in which lower bookings lead to higher tariffs, which in turn suppress bookings even further, gradually driving tariffs higher over time, impacting predominantly locked-in consumers.
- 42 Another element that may warrant further reflection is the effect of changes in booking behaviour among network users. A growing preference for short-term capacity products<sup>16</sup> and more efficient booking strategies can allow network users to reduce absolute booked capacity levels, which in turn lowers relative costs to domestic users but contributes less to the recovery of the transmission revenues. Lower levels of long-term capacity bookings may weaken the market signals to assess future capacity needs. This makes it more challenging for transmission system operators ('TSOs') to efficiently plan network utilisation, particularly when planning for the decommissioning or repurposing of infrastructure segments and maximising the remaining available capacity.
- 43 Both aspects, the impact on cost recovery and the reduced visibility on future system needs, should be closely considered in regulatory and infrastructure planning processes. Elements of the booking preferences development have been assessed and will be further described in Chapter 2.

## 1.5. Impacts of the end of Russian gas transit via Ukraine and market developments in 2025

- 44 This section focuses on the market developments in 2025, with a particular focus on the impact of the termination of Russian gas transit via Ukraine as of 1 January 2025. Overall, while the end of Ukrainian transit has halved total remaining Russian pipeline supplies to Europe compared with 2024, the drop was largely anticipated and has been offset by additional LNG import volumes. While the impact on the overall EU's security of supply has so far been limited, further pressure has been exerted on the Central and Southeast European regional hubs.
- 45 In addition, the first six months of the year experienced lower renewable electricity generation and colder-than-usual weather compared to the previous year. These factors contributed to reduced gas storage levels at the end of winter 2024-2025, thereby increasing the need for LNG imports during summer 2025 to fulfil storage obligations in accordance with the revised Security of Supply Regulation<sup>17</sup>. For a more detailed and up-to-date analysis of these market developments, please refer to [ACER's latest Quarterly Market Monitoring Report](#), which assesses market trends in Q3 2025.

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<sup>15</sup> ACER has a core mandate to examine the tariff methodologies (so called Reference Price Methodologies, or RPMs) that Member States implement to calculate their gas system tariffs. In accordance with the Tariff network code, RPMs must determine the tariffs charged to all gas network users in a cost reflective manner and avoiding undue cross-subsidisation.

<sup>16</sup> This is despite the fact that short-term tariffs are typically higher than annual tariffs, as short-term products account for tariff multipliers above 1. Lower tariffs for long-term capacity products are aimed at incentivising users to book yearly capacity to secure revenue recovery. Higher short-term multipliers, aligned with the requirements of the Tariff network code, can impact price spreads upwards and carry multiplicative effects.

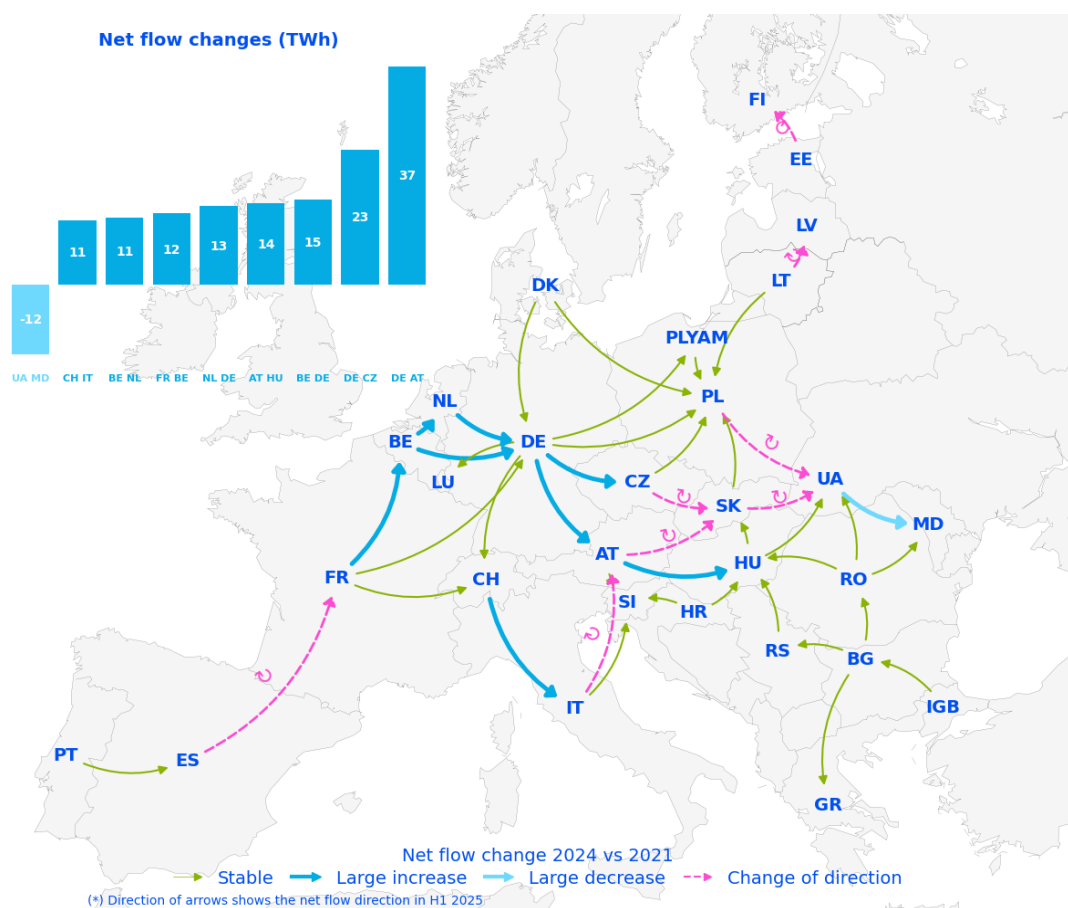
<sup>17</sup> Regulation (EU) 2025/1733 of the European Parliament and of the Council of 18 July 2025 amending Regulation (EU) 2017/1938 as regards the role of gas storage for securing gas supplies ahead of the winter season.

### 1.5.1. Impact on Central-Southeast Europe region

- 46 The termination of gas transit from Ukraine to the Central region, along with Ukraine's new role as a net gas importer, has further altered the flow dynamics in the Central-Southeast Europe region. The lost volumes of Russian gas could not be fully rerouted through Southeast Europe via the only remaining transit pipeline, the TurkStream pipeline, directly supplying gas of Russian origin to Europe, due to the already high utilisation of the network capacity in the region.
- 47 This, in turn, led to additional pressure on Central and Southeast European hubs, requiring flow readjustments in Central Europe to compensate for the missing volumes. **Error! Reference source not found.** illustrates the resulting gas net flow changes in the first half of 2025 compared to the same period in 2024. A noticeable increase in flows from Germany to Austria can be observed, along with subsequent changes in the direction of flows from Austria to Slovakia, and from Czechia to Slovakia. In addition, the historically prevailing Austria-Italy gas flow has reversed, with net flows now moving from Italy to Austria, driven by hub price dynamics.

Figure 13. The drop in Russian deliveries was largely anticipated and offset by additional LNG imports.

Changes in cross-border gas net flows - H1 2025 vs H1 2024 (TWh).



Source: ACER based on JRC (eurogastp Python package) and ENTSG.

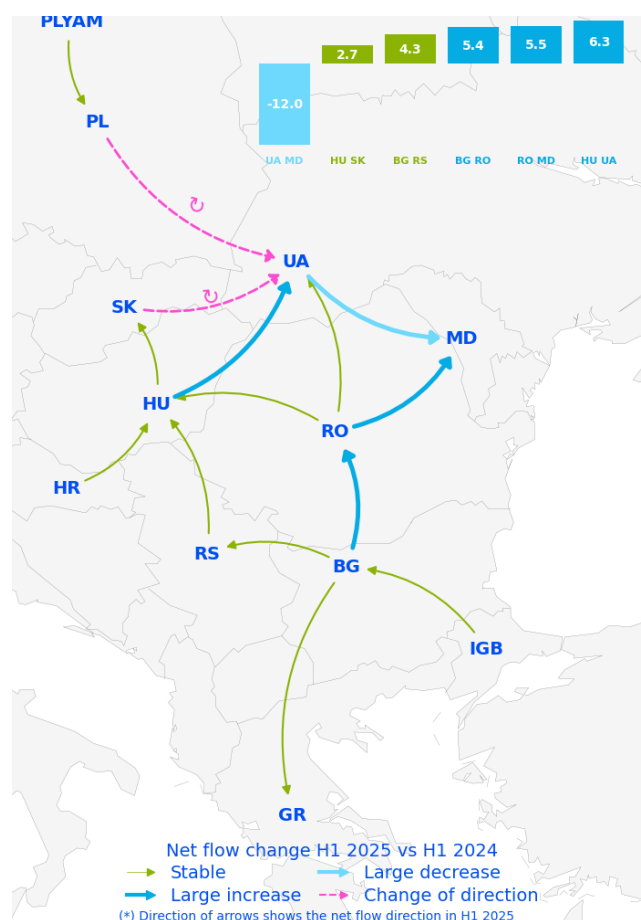
Note: A change in flow direction compared to H1 2024 is shown in pink. Net flows that have maintained the same direction are represented by blue or green arrows: dark blue indicates a large increase in net flows (greater than 10 TWh/year), light blue shows a large decrease in net flows (greater than 10 TWh/year), and green indicates a stable net flow (change lower than 10 TWh/year).

### 1.5.2. Impact on Ukraine import/export balance

- 48 Since Russian gas transit ceased at the end of 2024, Ukraine has increasingly relied on net imports from the EU to refill its underground gas storage facilities and compensate for domestic production losses caused by Russian attacks on its gas infrastructure. During the first half of 2025, gas flowed to Ukraine mainly through interconnectors from Poland, Slovakia, and Hungary.
- 49 In the first half of 2025, most imports were shipped via Hungary (1.1 bcm). The combination of low sourcing costs and low transport tariffs resulted in the route being highly utilised, leading to physical congestion at the border between Hungary and Ukraine. The high utilisation of the route has led to the emergence of auction premiums, lowering the competitive advantage with respect to other sourcing routes.

Figure 14. The end of Russian gas transit through Ukraine has partially shaped market developments in Southeast European countries in 2025.

Changes in cross-border gas net flows - H1 2025 vs H1 2024 (TWh).



Source: ACER based on JRC (eurogastp Python package) and ENTSG.

Note: A change in flow direction compared to H1 2024 is shown in pink. Net flows that have maintained the same direction are represented by blue or green arrows: dark blue indicates a large increase in net flows (greater than 10 TWh/year), light blue shows a large decrease in net flows (greater than 10 TWh/year), and green indicates a stable net flow (change lower than 10 TWh/year).

- 50 To meet the high demand and given the full utilisation of Hungary's cross-border capacity, alternative supply routes have emerged. As depicted in Figure 14, gas flow transiting via Poland ramped up during the year (0.5 bcm in the first half of 2025), reaching the technical capacity limits around June 2025. As a result of joint efforts by the Polish and Ukrainian TSOs, the offered capacity at the Poland-Ukraine interconnection point has been doubled as of July 2025, thanks to a temporary technical solution. This route provided additional supply to the region, leveraging the newly developed Baltic Pipe infrastructure, with Norwegian and Danish originated gas, as well as LNG regasification capacities in Poland, Lithuania, and Germany.
- 51 Previously a key transit country for Russian sourced gas from Ukraine to Europe, Slovakia retains substantial transmission capacity that could enable reverse flows to Ukraine. However, a combination of limited upstream supply availability and high transportation costs have constrained the utilisation of the interconnection point between Slovakia and Ukraine, resulting in only modest gas flows (0.4 bcm in the first half of 2025) being delivered relative to its technical capacity, while comparable to the other transit routes via Hungary and Poland.
- 52 The termination of Ukrainian transit flows has also had significant implications for the Republic of Moldova. Similar to Ukraine, Moldova had to rely increasingly on the EU gas system to meet its demand and offset the shortfall caused by the absence of Russian supply via Ukraine.
- 53 Romania and Serbia have emerged as strategic actors in the region by facilitating gas flows from Bulgaria towards Hungary. Notably, Romania has also started transiting gas volumes to Moldova, enhancing regional energy security. Looking ahead, Romania's role as a transit and production hub is expected to further strengthen with the proposed phasing out of Russian supplied gas and the commencement of production at the Neptun Deep gas field. Given its strategic position in the regional energy supply landscape, removing the barriers to the development of a competitive and transparent wholesale gas market in Romania is essential to enhance liquidity and trades between hubs, fostering a deeper integration of the Southeast gas markets, which would deliver significant benefits to all gas consumers in the region.<sup>18</sup>
- 54 This analysis highlights the continued significance of Russian gas in the Southeast European region, while also pointing to the early emergence of new supply sources. Besides Romania's domestic production, these include gas from Azerbaijan, LNG imports via Turkey, and the growing role of Croatia and Greece as an LNG entry points. Further diversification efforts are expected to fulfil the Commission's proposal to terminate the Russian residual imports. Close regulatory oversight will be needed to facilitate the progress of market integration in the region, ensuring alignment with the EU regulatory framework to avoid market fragmentation and anticompetitive practices.

### 1.5.3. Vertical integrated corridor initiative

- 55 Amid tightened regional gas supply, several initiatives have regained traction to open new supply routes in Southeast Europe and enhance the region's supply diversification, aligned with the broader objective of phasing out Russian gas.
- 56 These efforts fall under the so-called Vertical corridor initiative, an EU project aimed at expanding gas transportation capacity across Southeast, Eastern, and Central Europe, along several corridors in the region. The initiative supports the integration of larger volumes of regasified LNG from Greece and Turkey, as well as increased gas imports from the Caspian region into the European network, leveraging different transmission infrastructures.

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<sup>18</sup> In May 2025, the European Commission sent a reasoned opinion to Romania, as part of an infringement process (INFR (2024)2194), for restricting the freedom of domestic gas producers to determine their wholesale prices of gas. More specifically, Romania introduced a national measure that obliges gas producers to sell part of their domestic production at a fixed price to customers at wholesale level. Regulated prices at the level of the EU-wide wholesale market distort price signals and effective market functioning and are therefore incompatible with Directive 2009/73/EC concerning common rules for the internal market on natural gas.

- 57 Critically, the Vertical corridor could also provide additional supply routes to Ukraine, strengthening its resilience and regional security of supply amid the ongoing war. Given the potential for further disruptions to domestic production, ensuring access to diversified imports is essential to meet Ukrainian domestic demand, avoiding curtailments, and ensuring sufficient storage levels ahead of winter.
- 58 One such initiative gaining renewed attention is increasing the commercial attractiveness of the Trans-Balkan Pipeline<sup>19</sup>, which is being explored as a potential route to increase gas transmission from Southeast Europe to Central Europe. However, the route suffers from several limitations that have hindered its commercial development.
- 59 From May to October 2025, the transmission system operators in the region proposed a monthly bundled product to book firm capacity from Greece to Ukraine. The product was designed to bring gas volumes from Greece to Ukraine point to point, without the possibility to enter the Virtual trading points along the route and instead of purchasing capacity separately at each interconnection point. Additionally, the product was offered at a discount.
- 60 While this product has been designed to temporarily contribute to alleviating the urgent supply needs of Ukraine, it is relevant to bring this initiative within the applicable EU regulatory framework with the intention to reach full alignment with the principles of the gas network codes and promote a broader dialogue to progress regional market integration and development.

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<sup>19</sup> The Trans-Balkan pipeline infrastructure ('TBP') was designed and built during the late eighties (1988). It spans from Ukraine towards the Greek-Turkish border. Its primary purpose was to transport Russian gas through Ukraine to supply Moldova, Romania, Bulgaria and Turkey. Over the years, the importance of the TBP has gradually receded, due to the diversification of supply routes to Turkey and the ramp-up of domestic natural gas production in Romania. A major turning point came at the beginning of 2020, when TurkStream was commissioned. TurkStream's first line started to directly supply Turkey, while its second line created a new Russian supply route to Central Europe via Bulgaria and Serbia towards Hungary.

## 2. Capacity use and booking dynamics in European gas markets

61 This chapter provides a comprehensive analysis of capacity utilisation and booking trends in European Union gas markets, with a particular focus on the development before and after mid-2022, following the energy crisis period. It begins with an overview of capacity use per border across the European natural gas system, examining its evolution and the key factors driving recent changes. It then offers insights into how contracted capacity aligns with actual market needs. To do that, it examines interconnection point contracting per product type, distinguishing capacity contracts first along legacy contracts and auctioned capacities, and for the latter between short-term and long-term bookings. Finally, it explores the evolution of congestion revenues.

### 2.1. Capacity use across the European gas system

62 The capacity use indicator, or utilisation rate, reflects the proportion of technical transmission capacity used over time. At each border comprising one or more interconnection points, the indicator value results from the ratio between the gas flowing through the system (physical flow) at the interconnection points compared to the corresponding technical capacity<sup>20</sup>. The gas flow patterns are shaped by a combination of contractual and price factors, available infrastructure alternatives and other overall market factors.<sup>21</sup>

63 Figure 15 shows the capacity use ratio of cross-border IPs in 2024. It complements the cross-border flow analysis presented in Chapter 1. In line with the flow assessments, the figure illustrates how both shifting flow patterns and declining gas demand have reshaped capacity utilisation dynamics. On some borders, higher flows, and in certain cases, reductions in technical capacity, have led to higher utilisation rates, at times signalling emerging congestion risks. Conversely, in regions where capacity has expanded, capacity use rates have remained stable despite increasing flows.

64 EU gas system has proven resilient during the crisis, facilitating the reconfiguration of supply and demand and ensuring gas flow where most needed. After the energy crisis of 2022-2023, the market has adapted to the new prevailing flow paths, addressing the emerging bottlenecks. This flow reconfiguration has brought the TSOs to jointly optimise the use of cross-border IPs to accommodate the new flow configuration.

65 The optimisation allowed to increase technical capacity at the borders where it was needed and to reassess the technical capacity levels to be maintained in situations where the new flow reconfiguration has diminished or changed the direction of the historical flow in view of maximising the new needs.<sup>22</sup>

66 In this context, the full implementation of the CAM network code has provided a flexible and stable regulatory environment to allow a market-based allocation of capacity with clear signals for market users.

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<sup>20</sup> Defined as the maximum firm capacity that can be offered to the network users, taking into account system integrity and the operational requirements of the transmission system operator, resulting from the dynamic optimisation of the network.

<sup>21</sup> The considerations used to compute capacity use ratios are described in Annex 1. For each border (or 'edge') and direction, physical flows and technical capacity are first aggregated. Then, daily capacity ratios are assessed as the fraction of physical gas flows and the corresponding technical capacity. Annual utilisation for a given edge and direction is then calculated as the average of these daily utilisation rates over the selected timeframe.

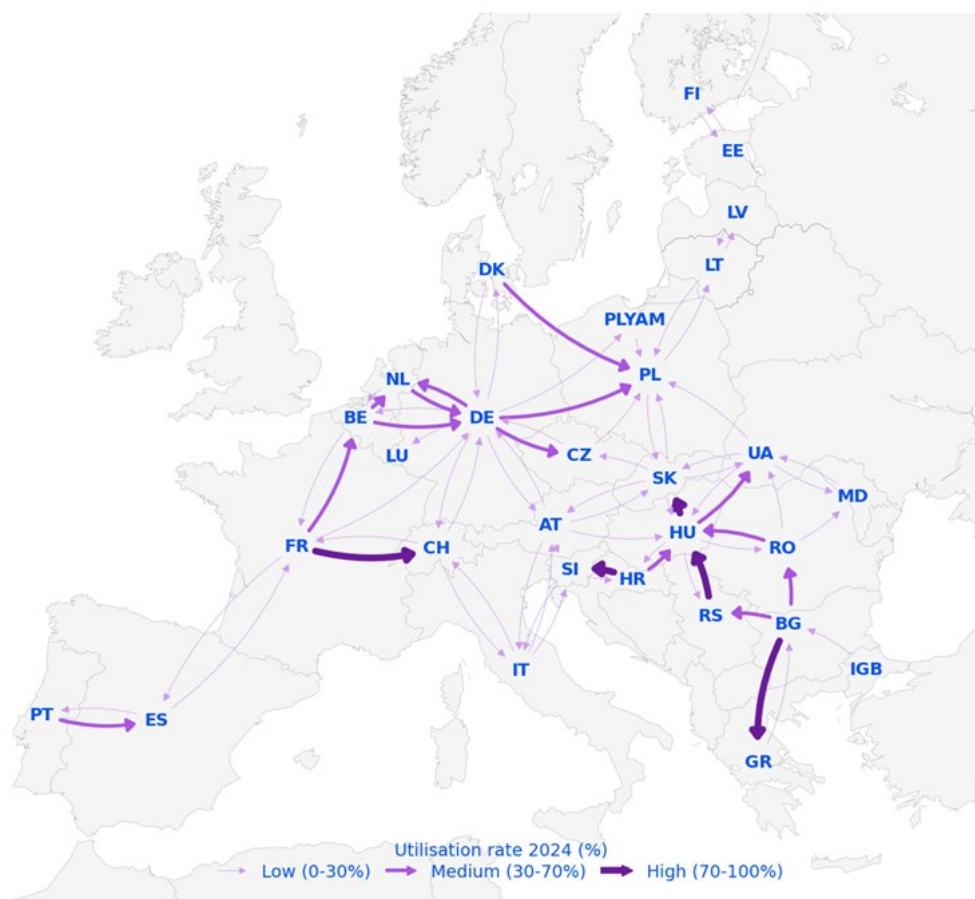
<sup>22</sup> The capacity reduction coordination between neighbouring market actors will take a more prominent role to ensure continued network access and security of supply, especially in a context where the decarbonisation pathway will result in possible decommissioning or repurposing of gas pipelines.



67 With decarbonisation advancing and gas consumption progressively declining, close monitoring of the system utilisation has become increasingly important in order to facilitate the optimal use of existing infrastructure and promote efficient and forward-looking network planning. In turn, not only to safeguard long-term security of supply, but also to avoid the risk of assets stranding and cost increases for consumers. Regulatory oversight and effective coordination among regulators, network operators and network users will be essential to achieving this balance.

Figure 15. Southeast European borders experienced the highest utilisation levels in 2024.

Utilisation of European gas cross-border interconnection points - 2024 (%).



Source: ACER based on JRC (eurogastp Python package) and ENTSOE.

Note: Utilisation is defined as gas physical flow divided by the corresponding technical capacity. Utilisation ratios are categorised as follows: High utilisation exceeds 70%; medium utilisation ranges between 30% and 70%; and low utilisation is below 30%. Annex 1 provides further details on the methodological aspects to compute the utilisation ratios.

## 2.1.1. Regional cross-border capacity utilisation developments: Key examples

### 2.1.1.1. West and Central Europe

68 Comparing the utilisation trends observed in 2024 (Figure 15) with the pre-crisis level observed in 2021 (Figure 25, in Annex 2), a broad shift in gas flows from east-to-west to west-to-east is evident in Northwest Europe. In 2024, this is exemplified by increased utilisation of interconnectors from the Benelux region to Germany<sup>23</sup>, as well as at the France-Belgium and

<sup>23</sup> In 2024, utilisation ratios between Benelux and Germany were moderate—higher than in 2021, though below the peak congestion levels seen in 2022 and parts of 2023, described in [ACER report on Addressing congestion in North-West European gas markets](#).

France-Switzerland borders. This reflects the growing importance of Western European supply sources to Germany, and the new transit role that Germany is acquiring, facilitated by the increasing LNG imports via its new terminals. Conversely, other interconnectors with Germany recorded modest ratios, well below those pre-2022, including Czechia, Austria, and Poland (where flow direction has reversed).

- 69 Notably, the traditional transits through Slovakia and Austria toward Italy have diminished, impacting the utilisation of the interconnection points between these countries. Italy has strategically shifted away from Russian gas, supplied mainly via Austria, and it has replaced the Russian volumes with LNG (primarily from newly commissioned terminals on its shores) and Norwegian sourced gas, reaching Italy via Switzerland.

### 2.1.1.2. Northeast Europe

- 70 The Baltic Pipe, linking Denmark and Poland, provided additional diversification and security of supply in the region, transporting gas from the Norwegian shelf and Danish domestic production. Ramping up since October 2022, it has been used at a moderate to high rate (approximately 70% on average in 2024). This reflects its emerging role in regional supply, while complementing the growing volumes of LNG imports into the area.
- 71 Regarding the Northeast area, imports from Lithuania into Latvia have increased significantly, largely driven by the enhanced utilisation of the Klaipeda LNG terminal in Lithuania to substitute Russian gas. The strengthened Lithuania-Latvia interconnection and the Poland-Lithuania link have been instrumental in improving the security of supply and contributing to more balanced gas flow across the Baltic states, reinforcing the importance of LNG infrastructure in regional market integration.
- 72 Noteworthy, it is also the change in flow dynamics and capacity use between Finland and Estonia. The use of the Balticconnector is largely driven by price dynamics between the two markets and can reverse direction. Notably, with the Inkoo LNG terminal in Finland, additional LNG tends to be supplied to Estonia to replace Russian gas, but also stored in the Latvian underground gas storage, which serves not only Latvia but the whole region.

### 2.1.1.3. Southeast Europe

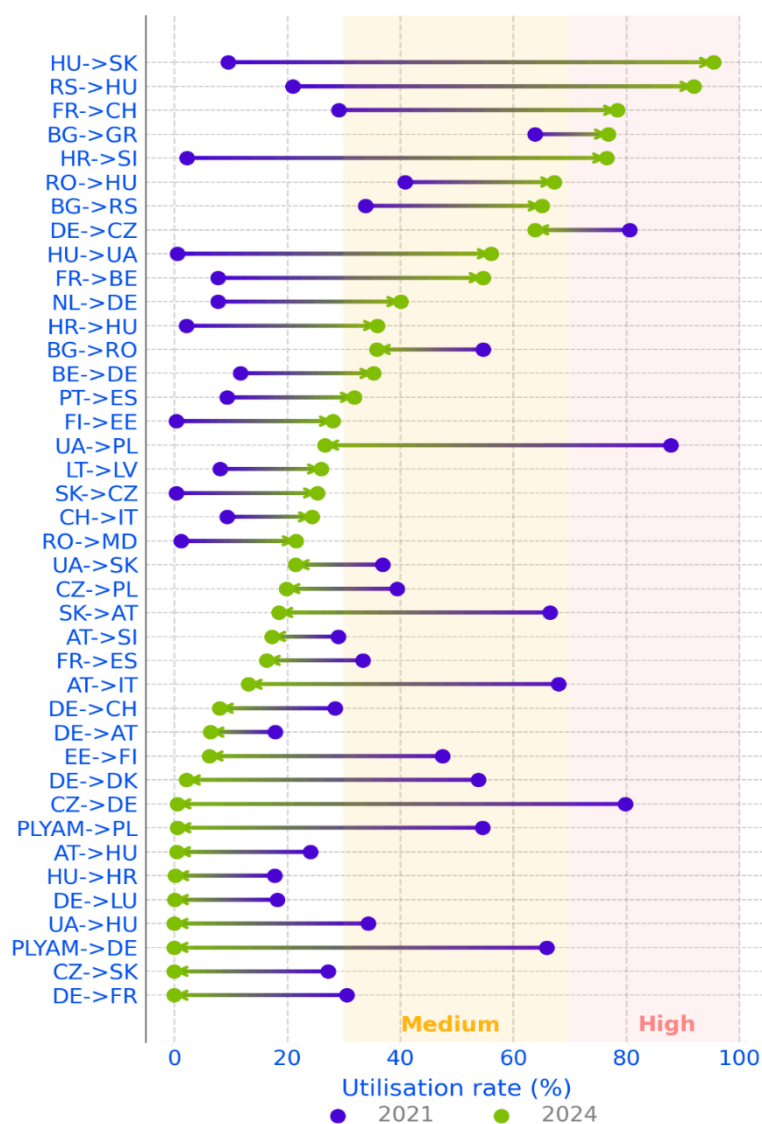
- 73 In 2024, Southeast European interconnection points recorded the highest overall utilisation levels. The more used interconnection points were located along the transit corridor transporting Russian gas via Serbia towards Hungary and Slovakia. These flows rely on the TurkStream infrastructure running almost at full capacity to deliver residual Russian volumes to Europe. This helped to partially offset the closure of other routes in Northeast Europe and ensured the fulfilment of contractual obligations for the remaining Russian gas supplies to Europe (towards Hungary, Serbia and Slovakia). Other highly utilised interconnection points included Kulata/Sidirokastron (on the Bulgaria-Greece border) and Rogatec (on the Croatia-Slovenia border).
- 74 The high utilisation of the interconnection points in Southeast Europe has been confirmed and aggravated with the termination of the transit agreements between Ukraine and Russia (as analysed in Section 1.5), putting further pressure on an already tight situation in Southeast and Central East Europe.
- 75 Complementing the analyses above, Figure 16 shows the evolution of capacity use ratios at selected interconnection points from 2021 to 2024. It assesses only the borders where changes in capacity use exceeded 10 percentage points. Notably, many of the most heavily utilised interconnection points in 2024 were underutilised in 2021<sup>24</sup>, highlighting a major reconfiguration of flow patterns across the European continent.

<sup>24</sup> For reference, a full overview of cross-border interconnection points utilisation in 2021 is provided in Figure 25 of Annex 2.

76 The reconfiguration of gas capacity utilisation patterns at European interconnection points, affected by the evolving flow paths and changing demand dynamics, is closely linked to the capacity booking behaviour of network users in Europe. The following section maps the evolution of capacity products highlighting how bookings have first reactively shifted due to the energy crisis and secondly how they have adapted to the new system equilibrium.

Figure 16. Europe's gas network underwent a major reconfiguration of gas flows since 2021.

*Evolution of utilisation ratios of European gas cross-border IPs - 2021 and 2024 (%).*



Source: ACER based on JRC (eurogastp Python package) and ENTSOG.

Note: Utilisation is defined as gas physical flow divided by the corresponding technical capacity. Annex 1 provides further details on the methodological aspects to compute the utilisation ratios.

## 2.2. Capacity booking dynamics and products

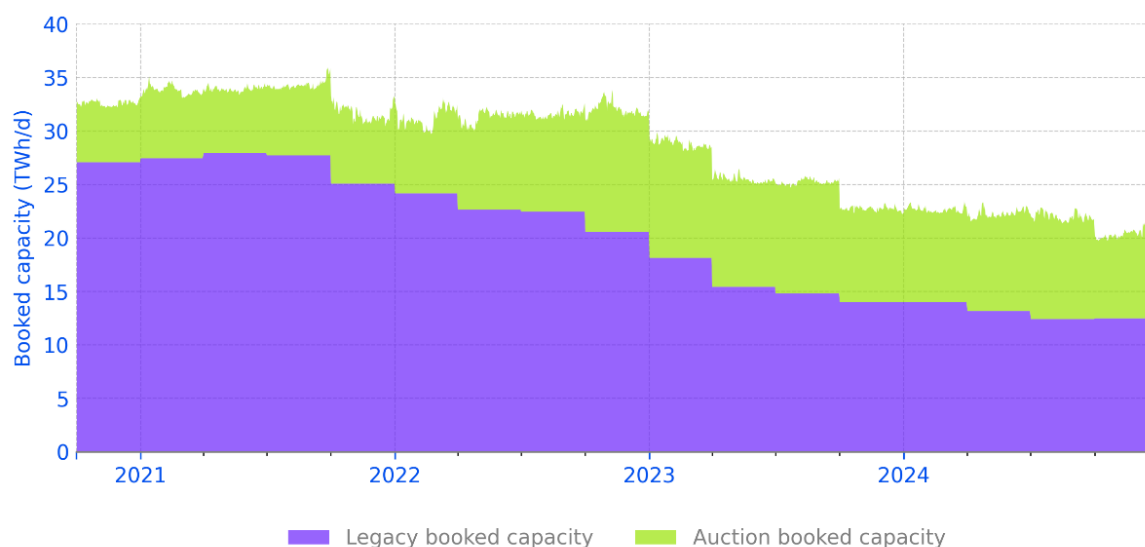
- 77 The developments in gas flows analysed in previous sections are supported by capacity booking rights, which allow capacity holders to nominate cross-border capacities at interconnection points. When examining these booking rights, a first qualitative distinction is made between: (i) prevailing contracts that existed before the implementation of the CAM network code or **legacy booked capacities**, and (ii) newly capacities booked thereafter according to the criteria and mechanisms established by the network code or **auction booked capacities**.
- 78 The Capacity Allocation Mechanisms network code governs how shippers access cross-border transportation capacity. It established market-based auctions for a set of standardised capacity products that are managed through centralised booking platforms. The code over the last 10 years has increased the transparency, accessibility and standardisation of the allocation of capacities at IPs, with the objective of increasing the competition and integration of the EU natural gas market.

### 2.2.1. Overview of legacy booked capacities and their evolution

- 79 Legacy capacity<sup>25</sup> contracts are contracts signed before the implementation of the CAM network code. They represent the underlying capacity rights assigned under long-term contracts. As opposed to legacy contracts, since 2015, capacity has been gradually offered via auctions that offered standard products. Figure 17 tracks the evolution of both contract types since October 2020, and the rate of substitution of legacy contracts with CAM network code underpinned capacity products.

Figure 17. After a rapid decline since 2021, legacy contracts still represent over half of the EU's total contracted capacity.

*Evolution of booked capacity at CAM-relevant IPs: legacy versus auction booked capacity - October 2020-December 2024 (TWh/d).*



Source: ACER based on ENTSOG, PRISMA, GSA, and RBP.

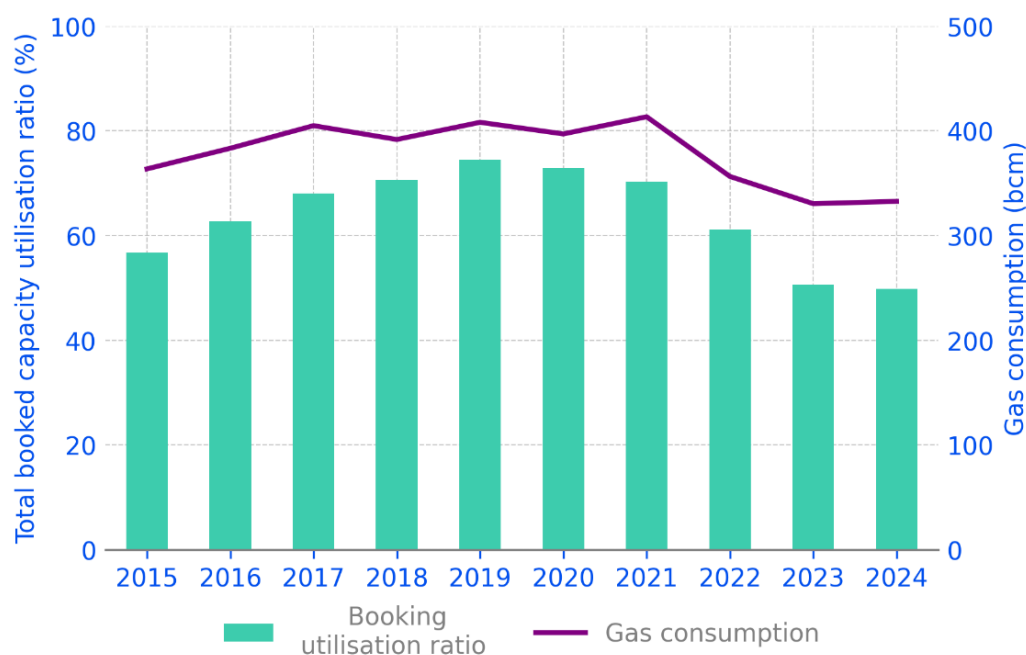
Note: The figure represents the evolution of booked capacity for a subset of CAM-relevant interconnection points covering around 92% of the CAM auction booked capacity. Note that auction instances where the offering TSO is a UK operator have been excluded from the analysis. Legacy booked capacity has been calculated on a quarterly basis by subtracting the auction booked capacity from the total booked capacity reported by ENTSOG at the corresponding interconnection points. Annex 1 describes the methodology to compute the legacy booked capacity relying on data from booking platforms and ENTSOG.

<sup>25</sup> Annex 1 describes the methodology to compute the legacy booked capacity relying on data from booking platforms and ENTSOG.

- 80 The first and most notable consideration that stems from the analysis is that aggregated EU cross-border booked capacity, the sum of both legacy and auctioned capacity, has dropped by circa one third since 2021 to the end of 2024. Following the termination of legacy contracts linked to Russian pipeline supplies and the severe demand drops from 2022 onwards, shippers had to rapidly shift their booking strategies. Expiring or terminated legacy contracts were substituted mainly by CAM-auctioned products causing a substantial increase of these products in 2022/2023 compared to the level observed in 2020/2021, despite a decline in the overall booked capacity.
- 81 While legacy booked capacity contracts have halved since 2021, they still cover today for more than half of the EU total contracted capacity. Moreover, although some legacy capacity tied to long-term Russian gas supply contracts has been annulled by EU buyers (or cancelled by Gazprom first), following the sharp reduction of Russian flows since 2022 and the increase in LNG imports, parts of the legacy booked capacity still in place may no longer align with current gas flow dynamics.
- 82 This situation, together with the decreasing demand trend, could also explain the worsening of the EU ratio of used booked capacity. The indicator shown in Figure 18, computed as the total physical flow over the contracted capacity, depicts a decreasing ratio starting from 2021, and worsening across 2022 and 2023. In an environment of reallocation of capacity and certain mismatch of prevailing contracts, after a period of increasing trend observed since 2015, the capacity bookings appear to have been used less efficiently.
- 83 Initially, increasing booking efficiency can help reduce the costs paid by network users. However, if overall bookings continue to decline, there may be a counter effect: tariffs could rise to recover the fixed costs of investments, particularly if non-utilised infrastructure is not decommissioned or repurposed. These effects should be further examined and the lessons learnt leveraged in the context of the future decarbonisation of the gas sector to ensure a more flexible infrastructure that can evolve along the changing role of gas in the energy mix.

Figure 18. Capacity bookings efficiency is improving after CAM network code introduction but is influenced by market fundamentals.

Annual booked capacity utilisation ratio (%) and EU27 gas consumption (bcm) - 2015-2024.



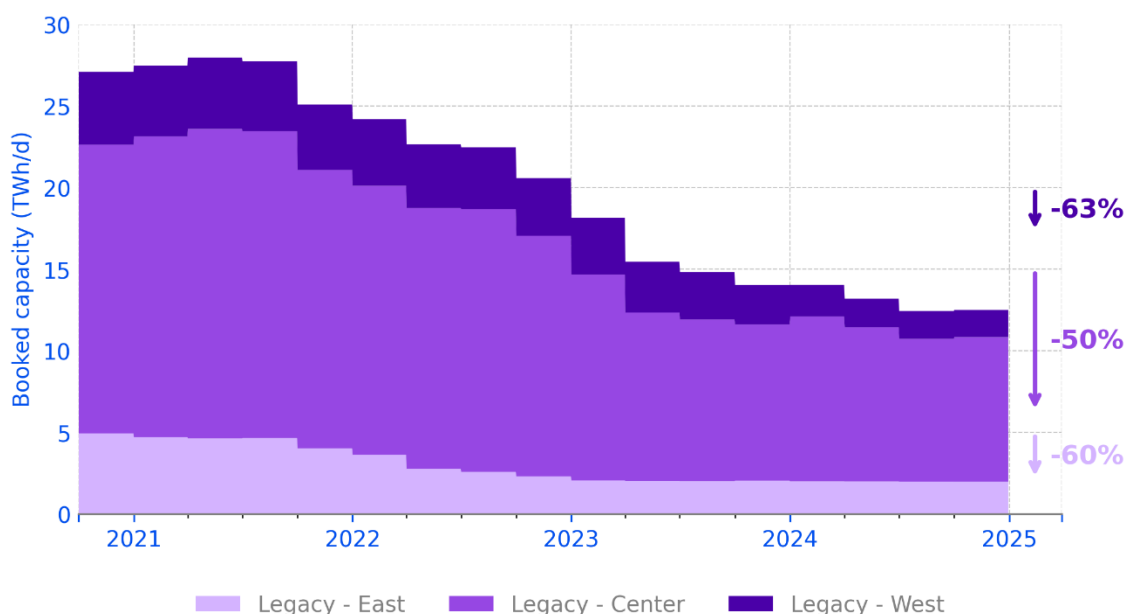
Source: ACER based on Eurostat and ENTSOG.

Note: Booked capacity utilisation has been computed as the ratio between the annual physical flow and the annual booked capacity reported by ENTSOG only at CAM-relevant interconnection points.

84 As shown in Figure 19, legacy booked capacity changes are overall distributed evenly across regions. This reflects historical long-term supply and capacity contracts signed to secure flows from non-EU producers being a common practice across the European Union before the implementation of CAM network code. In all three regions identified, legacy capacity has circa halved since 2022. As mentioned, this is the result of the gradual expiration of the oldest-dated contracts, but also, importantly, because of Russian-supply tied capacity being annulled post-2022. The relative differences observed across the three identified regions may stem from variations in the rate at which existing contracts have been terminated. These differences may deserve to be further analysed at a country-specific level.

Figure 19. Legacy capacity has halved since 2021 due to expiring contracts and reduced Russian supply.

*Evolution of legacy booked capacity at CAM-relevant IPs per region - October 2020-December 2024 (TWh/d).*



Source: ACER based on ENTSOG, PRISMA, GSA, and RBP.

Note: The figure represents the evolution of legacy booked capacity for a subset of CAM-relevant interconnection points covering around 92% of the CAM auction booked capacity. Note that auction instances where the offering TSO is a UK operator have been excluded from the analysis. Legacy booked capacity has been calculated on a quarterly basis by subtracting the auction booked capacity from the total booked capacity reported by ENTSOG at the corresponding interconnection points. Regional grouping is specified in Figure 27 of Annex 2.

## 2.2.2. Overview of auction booked capacities and their evolution

85 Auction booked capacities refer to newly contracted capacities according to the mechanisms established by the CAM network code. The flexibility allowed by the CAM auction booking has been instrumental in replacing the gradually expiring legacy contracts, but also in accommodating and adjusting booking rights to the actual and projected market dynamics stemming since 2018, which were intensified post-2022.

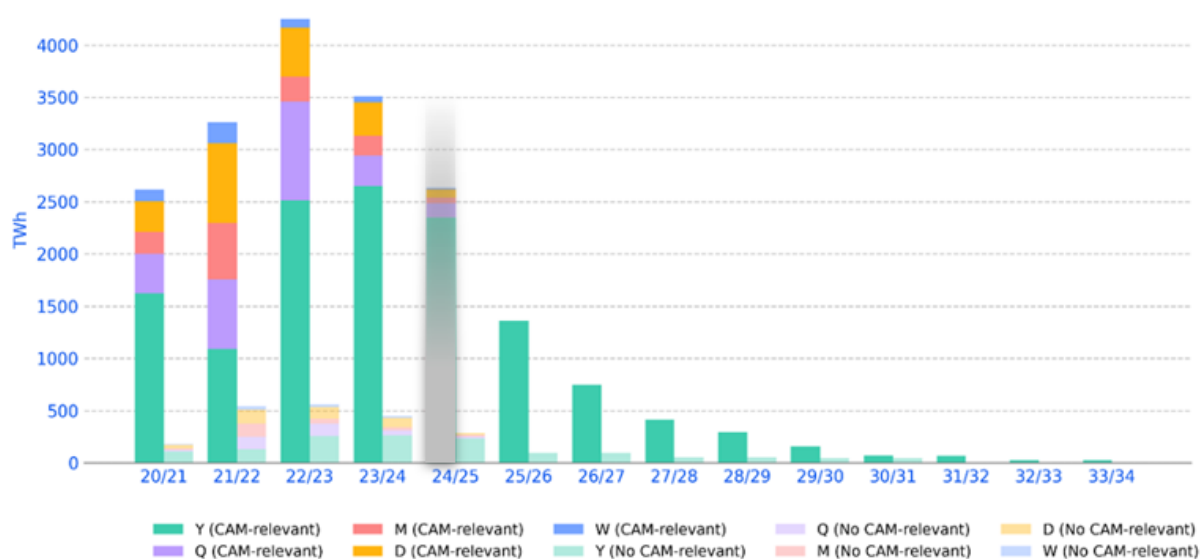
86 By introducing more scheduled, transparent and standardised capacity contracting, the CAM network code has assisted shippers to optimise their booking portfolios and hence has overall enabled market participants to contribute to and benefit from the consolidation of the hub-to-hub market model. In line with this objective, the proposal to amend the CAM network code, submitted by ACER to the European Commission, seeks to reflect crisis-related lessons and respond to users' demand for more flexible and efficient capacity booking. Further details are provided in a case box at the end of this chapter.



- 87 Besides yearly auctioned products, a range of shorter-term products are also offered (quarterly, monthly, daily and within-day) each with its own use rationale and dynamics. These products tend to serve somewhat different purposes: yearly products would support mid- to long-term supply stability; quarterly products are often used to optimise seasonal needs and storage cycles; and short-term products, namely monthly, daily and within-day products, allow shippers to gradually fine-tune supply portfolios and capture trading opportunities.
- 88 All product maturities have been influenced by the reconfiguration of cross-border physical flows following different logics. Analysing their evolution is important to understand booking dynamics and how market participants are benefiting from the flexibility that they provide. Changes in the uptake of shorter-term products can reveal how effectively network users can adapt to shifting flow patterns and whether shippers are relying more on shorter-term bookings rather than committing to long-term maturities.
- 89 Figure 20 shows the distribution of firm capacity products booked between 2020 and 2024 and granting capacity use rights spanning from 2020-2021 until 2033-2034. The assessment distinguishes between CAM-relevant interconnection points, where the CAM network code is fully applied, and non-CAM relevant interconnection points, where the CAM network code is not fully applied, such as at interconnection points connected with third countries.

Figure 20. Auction booked capacity products peaked in 2022-2023 at the heart of the energy crisis.

Annual evolution of capacity booking products for CAM-relevant and non-CAM-relevant interconnection points - October 2020-October 2034 (TWh).



Source: ACER based on PRISMA, GSA and RBP.

Note: Auction capacity products from 1 October 2020 until 30 September 2034 from auctions recorded in 2020-2024 have been considered, 2024/2025 data are partial (grey bar). Y, Q, M, D, and W, stand for yearly, quarterly, monthly, daily, and within-day products. The figure does not consider bookings made before 2020, therefore the total yearly booking may be underestimated, particularly on the first years observed.

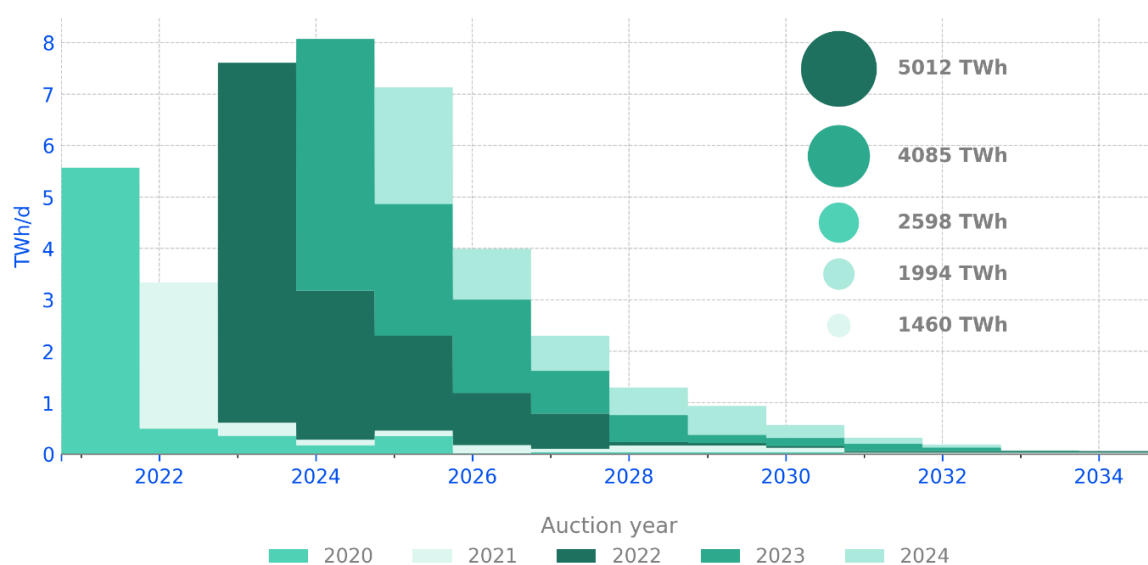
- 90 Consistent with the observations in Figure 20, capacity-use rights underlined by CAM-auctioned products have increased in the year 2022/2023, compared to the level of 2020/2021: shippers significantly increased CAM bookings after the invasion of Ukraine, to adjust to shifting gas flow needs and in response to heightened market volatility. Figure 26 in the Annex 2 depicts the daily representation of the capacity bookings.
- 91 Notably, bookings of quarterly, monthly and daily products were higher in 2021/2022 compared to 2020/2021 and 2022/2023 (Figure 28 in Annex 2). This indicates that, at the height of the crisis, shippers competed to secure available capacities to meet their shifting supply needs at all short-term auctions available before the following 2022/2023 yearly auction. This effect has been complemented by instances of auctions not closing in time, due to the design of the ascending

clock auction mechanism, and therefore not allocating capacity even if highly requested. This implies that the non-allocated capacity had to be reoffered in the auction for shorter-term maturities.<sup>26</sup>

- 92 The yearly auction of July 2022 resulted in high demand for yearly products, which led to congestion premia at some borders, notably in Northwest Europe.<sup>27</sup> Starting in 2023 and gradually more in 2024, the stabilisation of capacity portfolios and the decreasing gas demand led to lower annual bookings. While these considerations are representative of the general context, specific trends should be studied on a case-by-case basis and per border.

Figure 21. Yearly capacity bookings rose in 2022, to gradually decrease following the flows consolidation.

Yearly capacity products per registered auction year - October 2020-October 2034 (TWh/d).



Source: ACER based on PRISMA, GSA and RBP.

Note: Yearly capacity products from 1 October 2020 until 30 September 2034 from auctions recorded in 2020-2024 have been considered. The figure does not consider bookings made before 2020, therefore the total yearly booking may be underestimated, particularly on the first years observed.

- 93 Figure 21 focuses on the evolution of the yearly capacity products booked at the gas auctions organised in gas years 2020-2024. The figure reveals that in the 2022 yearly auction, during the market turmoil driven by the Russian invasion of Ukraine, auctioned yearly capacity bookings rose sharply compared to 2020/2021 and 2021/2022 values. Shippers significantly increased the annual bookings at the first yearly capacity auction after the invasion of Ukraine, to adjust to the termination of legacy contracts and shifting gas flow needs.

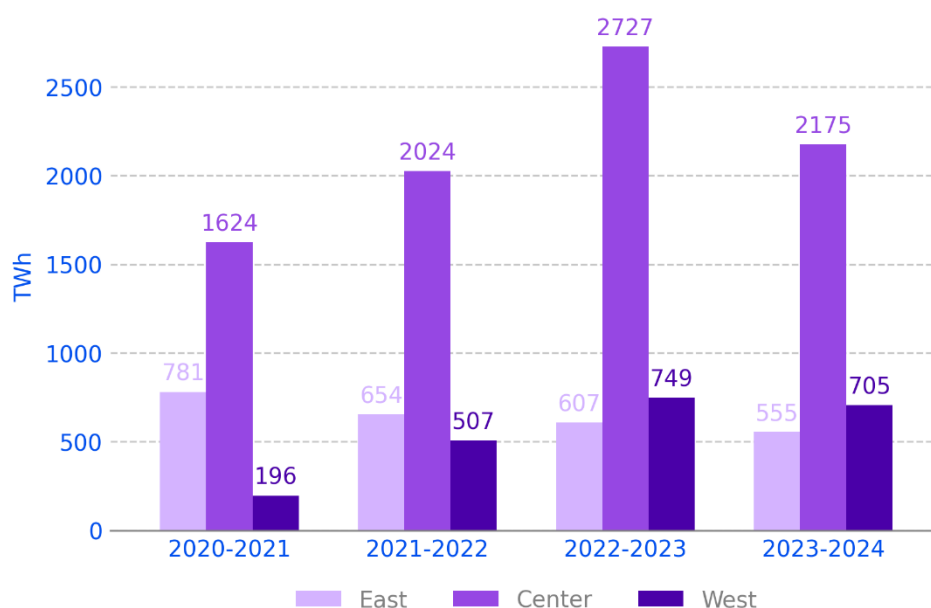
<sup>26</sup> This effect stems from the design of the Ascending Clock Auction (ACA) mechanism, in which capacity requests are submitted through a procedure involving increasing price steps. During the auction, the progression of price steps cannot be modified once the process is underway. As a result, the high commodity price volatility effect on hub price differentials could not be properly reflected in the fixed step structure. This led to price increments that were too modest, ultimately hindering effective price discovery before the auction deadline. This issue was later addressed by the transmission system operators in subsequent auctions and has been considered as part of the amendments presented in the recommendations submitted to the European Commission on reasoned proposals for amendments to the CAM network code. The revised approach allows transmission system operators to adjust price steps during the auction process, enabling a more accurate response to changing market conditions.

<sup>27</sup> As analysed in [ACER report on Addressing congestion in North-West European gas markets](#).

- 94 The figure shows that annual bookings eased in subsequent years, falling by around 20% in 2023 and by roughly 50% in 2024 compared to 2022. This trend suggests a more stable market environment, with capacity and supply portfolios becoming more consolidated and an overall stabilisation in the new flow configuration. Most recent booking dynamics could be influenced by the termination of the Russia-Ukraine gas transit agreement, the commissioning of new LNG terminals and the proposed ban on pipeline Russian gas - unless these developments had also been partly anticipated by market participants in previous years.
- 95 Finally, in Figure 22, the auctioned capacity bookings are divided by the regional distribution identified in Figure 27 of Annex 2, and aggregated at yearly level. This analysis shows a relative balance across the Central and Western regional groups, while the Eastern regional group appears to have a different and decreasing trend. The reasons behind this difference should be further assessed at the national level to disentangle several competing factors, such as the changes in utilisation patterns, the heterogeneous demand reductions, the different expiration trajectories of legacy contracts, and, potentially, the presence of more liquid hubs that facilitate trading opportunities and allow for greater supply portfolio optimisation. The case box below further illustrates this point, highlighting how dynamic or economically efficient has been the use of interconnectors.

Figure 22. Central EU Member States show higher auctioned volumes due to demand changes, legacy contract expiration, and liquid hubs.

Evolution of auction booked capacity at CAM-relevant IPs per region - October 2020-October 2024 (TWh/d).



Source: ACER based on PRISMA, GSA, and RBP.

Note: Regional grouping is specified in Figure 27 of Annex 2.

### Case Box: Economically efficient interconnectors and their capacity use

Most EU cross-border interconnectors were initially developed to secure supplies from non-EU producers and ensure transit across Member States, with capacity largely contracted on a long-term basis to underpin the infrastructure investments. Over time, the number and role of EU interconnection points have expanded, and today they are essential not only for securing supply but also for fostering competition between hubs.

From a purely economic perspective, the use of interconnection capacity should respond to the combined signals of hub price spreads and transport tariffs. In view of maximising market opportunities, gas flows (underpinned by capacity bookings) would become increasingly flexible to closely follow price signals.<sup>28</sup>

In practice, a mix of long- and short-term capacity products is common at most interconnection points, while the price responsiveness of flows and bookings can vary per interconnection point. Shippers typically align their mid and long-term bookings with their seasonal supply needs and overall sourcing strategies. While, complementarily, they tend to adjust shorter-term bookings based on evolving hub price signals (different actors may play different roles and promote different practices in this process, including using extra long-term capacities to arbitrage market opportunities). The CAM network code has overall supported a more dynamic and price-responsive booking approach, facilitating short-term and more transparent capacity acquisition.

Today, some interconnection points show still limited responsiveness to combined hub price and tariff signals. In such cases, bookings are predominantly made to secure long-term capacity for baseload supply, rather than based on active trading driven by hub price changes. This occurs in a context where hub price signals may be weaker or absent, given the existence of less liquid hubs. Reduced flow responsiveness often results from the specific design of the EU gas network and the geographic distribution of hubs. For example, large, unidirectional transit flows may persist regardless of unfavourable hub spreads, as gas must be transported from external producers to EU consumers. Reliance on long-term supply contracts and steady supply obligations tends to be also backed by corresponding long-term capacities. Examples of more/less dynamic and price responsive capacity have been discussed in previous Market Monitoring Reports reports.<sup>29</sup>

Overall, utilisation of EU booked capacity has become more efficient and price responsive over time, indicating a shift towards hub progression, portfolio optimisation and more strategic and efficient use of available resources. However, different levels of responsiveness have been observed across the EU.

## 2.3. Contractual congestion revenues: Evolution and drivers

- 96 In transmission capacity auctions, contractual congestion occurs when the demand for firm capacity exceeds the available technical capacity. When requested capacity surpasses the firm capacity offered in the auction, contractual congestion can lead to auction premia and generate congestion revenues.
- 97 While this report does not examine contractual congestion in the strict legal sense defined by Annex 1 of Regulation 2024/1789<sup>30</sup>, it does assess the associated congestion revenues collected from 2020 to 2024. These congestion revenues are an important signal of market demand for cross-border capacity and capacity utilisation.
- 98 In this context, congestion management procedures remain important to manage contractual congestion by bringing any unused capacity back to the market, potentially easing contractual congestion.

<sup>28</sup> For example, net flows would even reverse direction based on evolving price differences between hubs, while transported volumes would further rise when price spreads clearly exceed transport costs.

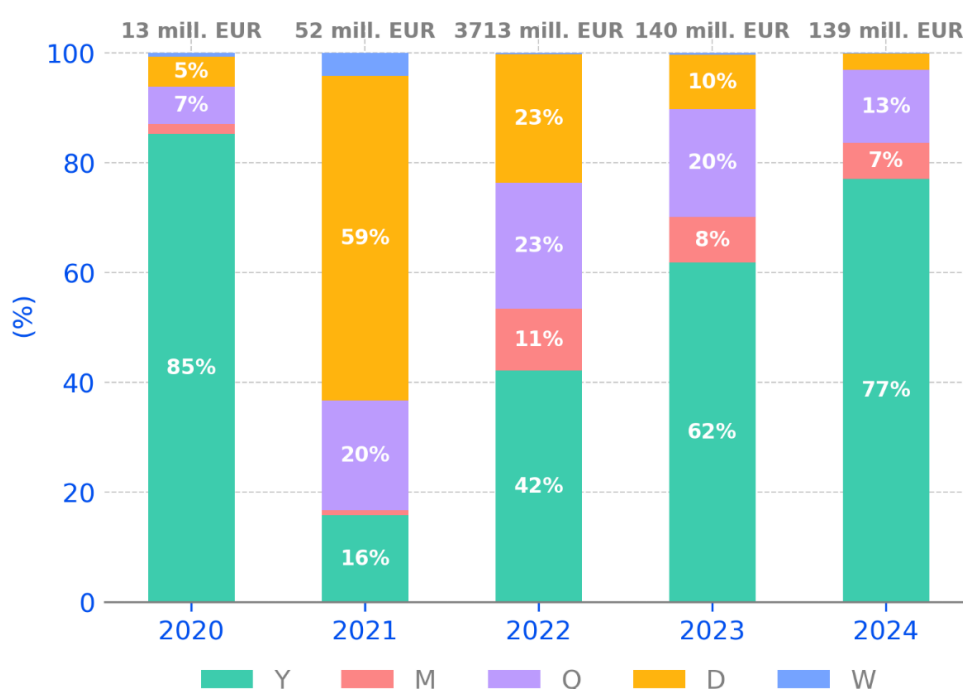
<sup>29</sup> For example, the [October 2024 Quarterly Market Monitoring report](#) compared the daily hub spreads and flows at VIP Pirineos (an example of price-responsive line) and Baumgarten (an example of a line used in a steady manner and less responsive to the adjacent hubs' price signals).

<sup>30</sup> The Congestion management procedure Guidelines ('CMP GL'), in particular its Point 2.2.1(2), stipulate that the ACER has to monitor and publish a report on contractual congestion at EU interconnection points.

- 99 Congestion revenues also contribute to system revenue recovery, which can be used either by investing the premia to finance network investment to reduce congestion or can be distributed back to network users by lowering transmission tariffs for the following tariff period.
- 100 Transmission system operators have to carefully consider if investments are needed where physical bottlenecks remain after the operational optimisation of the existing network and consider whether the bottlenecks would prevail over a relevant period. National regulatory authorities shall carefully assess the appropriateness of investment that removes structural bottlenecks, considering the Union's energy and climate policies, security of supply and potential future asset stranding. Also, regulators must closely oversee the distribution of revenues collected during periods of high congestion, with the aim of reducing and stabilising tariffs for network users.
- 101 Figure 23 compares the total congestion revenues collected at European cross-border points since 2020. After transmission system operators have collected an unprecedented peak of 3,713 million EUR in 2022<sup>31</sup>, congestion revenues have fallen to 140 million EUR in 2023, and a similar revenue has been registered in 2024 (around 139 million EUR).

Figure 23. Long-term bookings stabilize revenue but can limit short-term flexibility and network efficiency.

Share of congestion revenues by capacity product and registered auction year - 2020-2024 (%).



Source: ACER based on PRISMA, GSA and RBP.

Note: Y, Q, M, D, and W, stand for yearly, quarterly, monthly, daily, and within-day products. All auctions recorded between 2020 and 2024 have been considered.

- 102 This sharp reduction reveals an improvement in market conditions led by demand decrease and new infrastructure commissioning, but also system operation optimisation, as highlighted in the [11th ACER Congestion Report](#). Despite this sharp decline since 2022, congestion revenues have not yet returned to the pre-crisis levels. This suggests that as the market finds a new equilibrium,

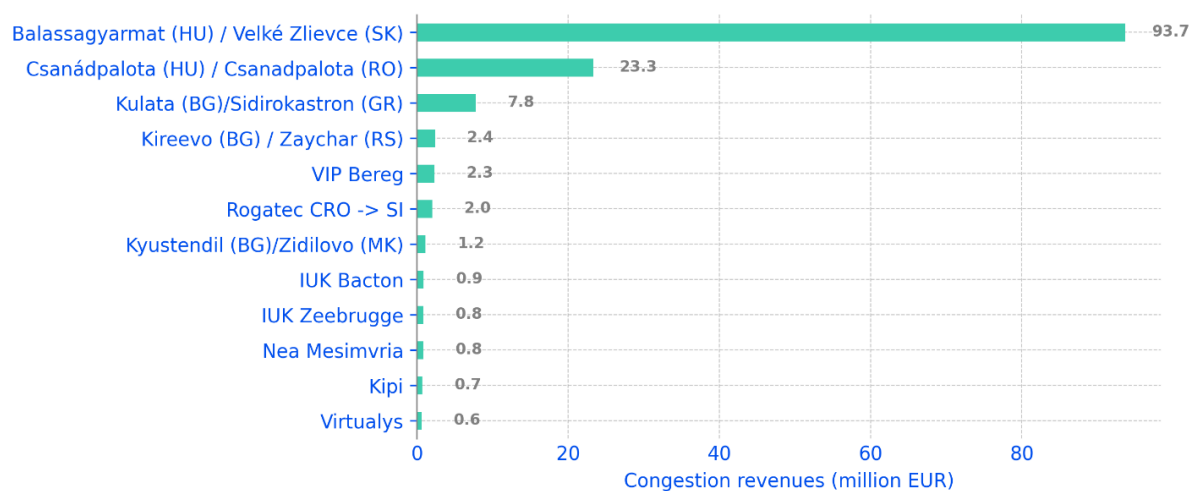
<sup>31</sup> It should be noted that a portion of the congestion revenues recorded in 2022 relates to yearly and quarterly capacity products intended for use in 2023 and beyond.

there are still clusters of highly utilised and, at times, congested IPs, as discussed in previous sections.

- 103 Interestingly, the distribution of congestion revenues by capacity product reflects the booking trends highlighted in the preceding sections. In 2020, before the commencement of the energy crisis, the majority of revenues were generated from annual products. In contrast, in 2021, the short-term capacity products generated more congestion revenues, to answer the abrupt demand for capacity intended to accommodate the new flow patterns.
- 104 Since 2022, the share of congestion revenue from yearly capacity products has steadily increased and accounts for circa 80% of total congestion revenues (in 2024). This shows that the market stabilised, and the long-term capacity needs adjusted to the reconfigured supply landscape. Moreover, this effect is further exacerbated by the higher absolute values of the premiums paid for yearly capacity products, which generate substantial revenues compared to shorter-term maturities.
- 105 The regional distribution of congestion revenues in 2024 mirrors the annual capacity booking and utilisation trends discussed in Section 2.1 and Section 2.2, with a prevalence of congestion revenues recorded in Southeast European IPs.
- 106 As highlighted in Figure 24, the highest congestion revenues in 2024 were recorded at the Hungarian-Slovak border, with 93.7 million EUR collected at the Balassagyarmat/Velké Zlievce interconnection point. This was followed by the Csanádpalota interconnection point at the Hungarian-Romanian border, which generated 23.3 million EUR of congestion revenue. Additionally, significant congestion revenues were reported at the Greek-Bulgarian, Bulgarian-Serbian, and Hungarian-Ukrainian borders, reflecting the high utilisation of the cross-border points in the region.

Figure 24. 2024 congestion revenues follow capacity and utilisation trends, peaking in Southern and Eastern Europe.

*Congestion revenues - 2024 (Million EUR).*



Source: ACER based on PRISMA, GSA and RBP.

Note: The figure shows only interconnection points with congestion revenues greater than 0.5 million EUR.



### Case Box: Capacity Allocation Mechanism network code amendment

#### The revision process

At the invitation of the European Commission, ACER launched in 2023 the revision process of the Capacity Allocation Mechanism network code, following discussions initiated in 2020. The code sets harmonised rules for how TSOs offer and allocate cross-border gas transmission capacity within the EU gas transmission system. ACER targeted improvements were influenced by several factors: new regulatory elements from the hydrogen and gas decarbonisation package, ACER's initial analysis of the network code's achievements and areas for improvement, lessons learnt from the energy crisis, and extensive dialogue with stakeholders.

Following the analysis of inputs received during the final consultation (September-October 2024), ACER concluded the process by issuing its [Recommendation](#) to the European Commission on 20 December 2024. In January 2025, ACER published its final Recommendation.

#### Main recommendations

The proposals submitted by ACER can be grouped into three main changes to the rules:

##### 1. Efficient use and enhanced monitoring of the gas system:

- Improving transparency on how capacity is maximised by TSOs, enabling regulatory and other competent authorities to monitor it more effectively. This will help EU Member States to be better prepared for handling future crises as well as have better information on system capability, in view of possible decommissioning or repurposing of gas pipelines. [amendment to Article 6]
- Strengthen coordination and consultation among relevant regulatory authorities, TSOs and network users. [new Article 7A]

##### 2. Improving the dynamism and availability of the transmission capacity:

- Increasing auction opportunities for existing capacity products with additional auction dates to enable re-offering of unsold firm capacity of yearly, quarterly, and monthly standard products. [new Article 13A]
- Introducing a new capacity offer between monthly and daily auctions (which align more with the needs of LNG deliveries), thereby contributing to security of supply. [new Article 13B]
- The Uniform Price Auction (UPA) algorithm is put forward for the proposed additional auctions and for the balance-of-the-month auctions. This algorithm is considered as more efficient in allocating capacity in shorter timeframes and is well known to the market as already used for day-ahead and within-day capacity auctions. [amendment to Article 16]

##### 3. Adapting non-essential technical rules in response to evolving market conditions by:

- Offering the flexibility for transmission system operators to propose and national regulatory authorities to agree to modify specific technical parameters (notably to speed up the capacity allocation processes) while keeping the rules harmonised at all IPs and respecting the limitations of the mandates of ACER and ENTSOG. [new Article 37A]

ACER's Recommendation provides a structured basis for the European Commission to initiate the comitology process for revising the network code. The process is expected to conclude in the first quarter of 2026.

## Annex 1: Description of methodologies

### Methodology for assessing transmission cross-border gas flows and utilisation

The transmission cross-border gas flows and the corresponding utilisation rates are based on publicly available data from the ENTSOG Transparency Platform (TP) in the period corresponding from 1 January 2020 until 1 July 2025. In addition, the aggregation of cross-border gas flows is based on tailored strategies that generate timeseries for each edge (or border) of the target topology using [JRC's eurogastp Python package](#). This tool contains an excel file referred to as topology file which establishes the tailored strategies to aggregate gas flows and technical firm capacity for each border of the EU. Some rules of the topology file have been updated accordingly.

- **Step 1. Data collection.** ENTSOG TP provides daily physical and booked capacity at European gas IPs.
- **Step 2. Data preparation of physical flows.** The daily physical flow data were first reindexed and aligned to the relevant time periods. Subsequently, flows were aggregated at the border level according to the strategies defined in the topology file of the [JRC's eurogastp Python package](#). Flows and capacities associated with low-calorific gas were excluded from the analysis to maintain consistency and focus on IPs transporting high-calorific gas.
- **Step 3. Data preparation of firm technical capacity.** To align with ENTSOG's capacity map and observed gas flows, firm technical capacity has been further refined on a case-by-case basis using various approaches (outlier removal, smoothing, or assuming a constant value over specific periods). It is also assumed that utilisation rate is capped at 100% where observed gas flows exceed technical firm capacity.
- **Step 4. Computation of utilisation rate.** The utilisation rate reflects the extent to which the available transmission capacity is used over time. Utilisation of a given edge in the target topology over a specific timeframe is defined as the average of the daily utilisation rates. Each daily utilisation rate is calculated by dividing the physical gas flow by the corresponding technical capacity for that day.

## Methodology for analysing auction booked capacity

Auction booked capacity data are collected from three major capacity platforms, namely PRISMA, GSA, and RBP. These platforms provide detailed information on allocated and offered capacity, cleared and offered prices, and product types for each interconnection point and direction. Capacity products vary in duration, ranging from short-term (within-day, daily, monthly) to long-term (quarterly and yearly) products. To ensure consistency and comparability across platforms, the following data harmonisation steps are applied:

- **Step 1. Data collection.** Booked capacity data from capacity auction platforms are collected annually. In addition, the scoping list from ENTSOG identifies which interconnection points are relevant for the CAM network code, which defines the scope of the analysis. Moreover, daily Euro foreign exchange reference rates from the European Central Bank (ECB) were employed to standardise currency values, ensuring that all amounts are expressed in Euros.
- **Step 2. Data filtering.** First, auction data are filtered for quality and product type. Only firm capacity products are retained for the analyses performed in this report, as they reflect guaranteed transmission rights. Interruptible products are excluded. Unless stated otherwise, the following categories of quality have been considered: Firm, FZK (Freely allocable capacity), DZK (Dynamically allocable capacity), and BZK (Condition-dependent allocable capacity).
- **Step 3. Data cleaning.** The data undergo basic preprocessing, including handling duplicates, correcting inconsistent identifiers across platforms when detected, and aligning timestamp formats.
- **Step 4. Data standardisation.** To enable cross-platform comparisons, capacities are converted to a common unit (kWh/h), while prices are standardised to €/kWh/h/runtime by using daily Euro foreign exchange reference rates from the ECB. The Moldovan leu (MDL) is not covered by ECB reference rates; therefore, a fixed exchange rate of 20 MDL per Euro was applied. Some prices are expressed in volumetric-based units rather than energy-based units. In these cases, a constant conversion factor of 11.2 kWh/m<sup>3</sup> is applied to harmonise all prices into energy-based units.
- **Step 5. Scoping list integration.** The ENTSOG scoping list is merged with the auction data to map both offering and adjacent TSOs to their respective market areas (or countries) as well as identify CAM-relevant interconnection points.<sup>32</sup>

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<sup>32</sup> The set of CAM-relevant IPs account for approximately 86% of total booked capacity through auctions. The total firm booked capacity in the auctions recorded from 2020 until 2024 (PRISMA, GSA, and RBP) is approximately 66650 GWh/d. It results in 490 operator-point-direction (OPD) combinations. Out of the total auction booked capacity, 3% has not been assigned to any OPD from the ENTSOG scoping list (and it represents 9% of the OPD combinations). From 2022 onwards, some auctions have been performed for UGS and LNG points. Around 1% of the total auction booked capacity belongs to these points. In terms of OPD combinations, 16.3% of OPD combinations is related to UGS points, while just 0.2% corresponds to LNG points.

## Methodology for computing cross-border tariffs

Cross-border gas transmission tariffs are inferred from the reserve prices applied in yearly capacity auctions. These prices do not fully represent total transport costs (i.e., commodity price is missing, as well as other charges) and some discrepancies may arise when compared to ENTSOG simulation costs. The following steps describe the methodology used:

- **Step 1. Data collection.** Two main datasets are required for this analysis: offered capacity and reserve price from capacity auction platforms, and the scoping list from ENTSOG. This scoping list identifies the market areas of the offering and adjacent TSOs. This list is used to define cross-border transmission edges. Moreover, daily Euro foreign exchange reference rates from the ECB were employed to standardise currency values, ensuring that all amounts are expressed in Euros, as described in the methodology for analysing auction booked capacity.
- **Step 2. Auction data processing.** First, auction data are filtered for quality and product type. Since tariffs are based on yearly capacity products, only yearly capacity auctions have been included. Second, units of capacity products are standardised to kWh/h, while units of reserve prices to €/kWh/h/runtime. Note that the units of the resulting cross-border tariff shown in **Error! Reference source not found.** were changed to €/MWh, for comparison purposes. A 100% conversion factor has been used in the conversion between €/kWh/h/runtime and €/MWh.
- **Step 3. Scoping list integration.** The ENTSOG scoping list is merged with the auction data to map both offering and adjacent TSOs to their respective market areas (or countries).
- **Step 4. Market area assignment.** Typically, while the offering TSO is consistently reported in the auction data and easily linked to its market area, the adjacent TSO is missing in 33% of yearly auctions recorded between 2020 and 2024. In those instances, the adjacent market area from the scoping list is used to map it to its respective adjacent TSO.
- **Step 5. Edge formation.** Using the offering and adjacent market areas as well as the direction field, the edges (for example, BE->DE) are defined for each auction instance.
- **Step 6. Cross-border tariff calculation.** For each gas year corresponding to the year when the auction is carried out, edge, and direction, the cross-border tariff is computed as the capacity-weighted average reserve price of the corresponding yearly auctions, when data for more than one interconnection point is available for one border. The offered capacity has been used for this calculation. Note that only bundled products and IPs transporting high-calorific gas have been considered for the computation of the tariffs. The transport cost is the sum of the exit and entry tariffs, provided that both tariff components are available from the auction data.

## Methodology for estimating the legacy booked capacity

Legacy booked capacity represents capacity still attributed to pre-existing long-term contracts, rather than new capacity allocated via auctions. To estimate it, the following steps were followed:

- **Step 1. Data collection.** Three datasets are needed for this analysis: physical flows and booked capacity from ENTSOG TP, booked capacity from capacity auction platforms, and the scoping list from ENTSOG. ENTSOG TP provides daily physical and booked capacity at European gas IPs. Capacity auction platforms (such as GSA, PRISMA, RBP) contain data on booked capacity through auctions, including duration and volume of the products, among other characteristics. Finally, ENTSOG's scoping list identifies which IPs are relevant for the CAM network code, guiding the selection of infrastructure to include in the analysis.

The period of interest ranges from 1 October 2020 until 31 December 2024 because the auction data coverage is more reliable and complete. Before 1 October 2020, auction data may be incomplete, possibly leading to overestimated legacy bookings. After December 2024, auctioned capacity data is incomplete, as future auctions are not yet conducted or recorded. It should be noted that all capacity auctions where the United Kingdom's TSO acted as the offering TSO have been excluded from the dataset.

- **Step 2. Auction data processing.** First, auction data are filtered based on quality type. Second, units of capacity products are standardised to kWh/h. In addition, there should be a temporal alignment to aggregate correctly the booked capacity. To do that, we need to reindex all auction data to a continuous daily time series and apply periodisation to correctly allocate auctioned volumes across appropriate contractual durations.
- **Step 3. Scoping list merge.** The ENTSOG scoping list is merged with the auction data to isolate IPs subject to the CAM regulation. This step ensures the focus is placed on infrastructure where market-based capacity allocation is mandated and legacy contracts may still be in place.
- **Step 4. ENTSOG data processing.** ENTSOG booked capacity and physical flow data are extracted for each IP. The same reindexing and periodisation procedures as those used for the auction data are applied to ensure consistent time formatting. Finally, it is ensured data alignment with auction records in terms of temporal resolution and IP identification.
- **Step 5. Data integration.** The processed ENTSOG and auction datasets are joined based on existing operator-point-direction (OPD) identifiers. This results in a subset of CAM-relevant IPs in which the total booked capacity is known from ENTSOG reported data and auction booked capacity is derived from the auction platforms.<sup>33</sup>
- **Step 6. Data harmonisation.** In principle, the reported total booked capacity should not be lower than the booked capacity resulting from capacity auctions. Nevertheless, data inconsistencies were identified for certain OPD identifiers during specific periods, where the total booked capacity is reported as lower than the corresponding auction booked capacity. To address this anomaly and ensure data consistency, the total booked capacity is adjusted to be at least equal to the auction booked capacity whenever the latter exceeds the reported total value. This assumption is considered reasonable because the total booked capacity should conceptually include all auctioned capacities. Therefore, setting the total capacity to match the auction booked in those cases prevents underestimation while maintaining consistency with the underlying market mechanism.

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<sup>33</sup> Considering a time horizon from 1 October 2020 until 30 September 2035, the capacity belonging to the subset of CAM-relevant points for the calculation of the legacy booked capacity represents 80.1% of the total auction booked capacity, while it represents 93.6% of the auction booked capacity of all CAM-relevant points.

- **Step 7. Computation of legacy booked capacity.** To mitigate short-term variability, the legacy booked capacity is computed as the difference between total booked capacity and auction booked capacity, which are averaged over quarterly intervals. Quarterly smoothing reduces noise caused by mismatches in timing or small-volume auction products. The quarterly average legacy capacity is then redistributed evenly across all days in each quarter, which makes it suitable for visualisation and comparison with other daily datasets.

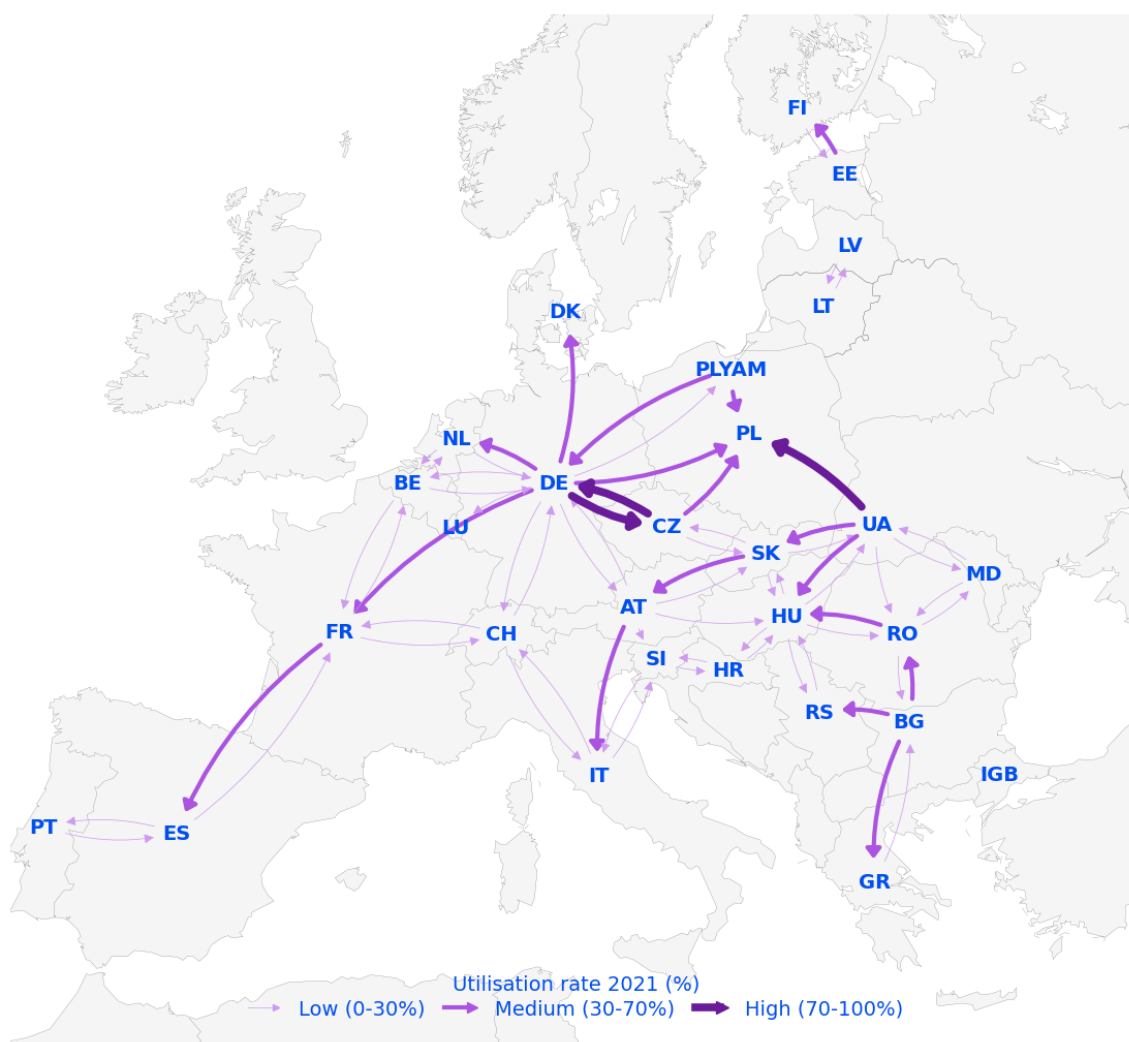


## Annex 2: Additional figures

This annex provides additional figures to reinforce and complement the main analyses in this report.

Figure 25 illustrates the utilisation of the European gas transmission network at cross-border interconnection points in 2021. Figure 27 provides the group of countries belonging to each of the regions considered for the regional assessments performed in Section 2.2. Figure 26 provides the daily evolution of capacity booking products for CAM-relevant IPs. Finally, Figure 28 illustrates the share of capacity booking products of CAM-relevant interconnection points from October 2020 to December 2024.

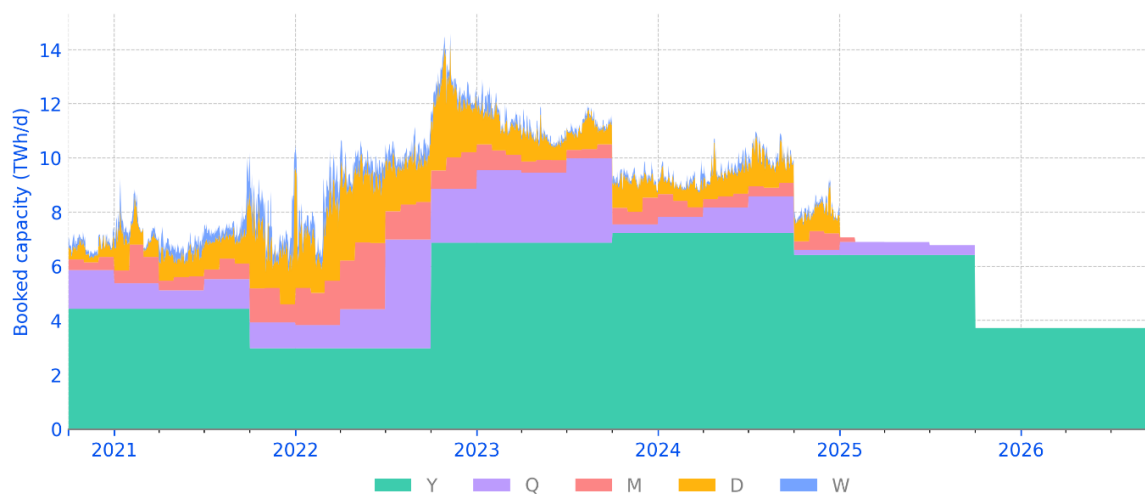
Figure 25. Utilisation of gas transmission network at cross-border interconnection points in 2021 (%).



Source: ACER based on JRC (eurogastp Python package) and ENTSOG.

Note: Utilisation is defined as gas physical flow divided by the corresponding technical capacity. Utilisation ratios are categorised as follows: High utilisation exceeds 70%; medium utilisation ranges between 30% and 70%; and low utilisation is below 30%. Annex 1 provides further details on the methodological aspects to compute the utilisation ratios.

Figure 26. Daily evolution of capacity booking products for CAM-relevant interconnection points.

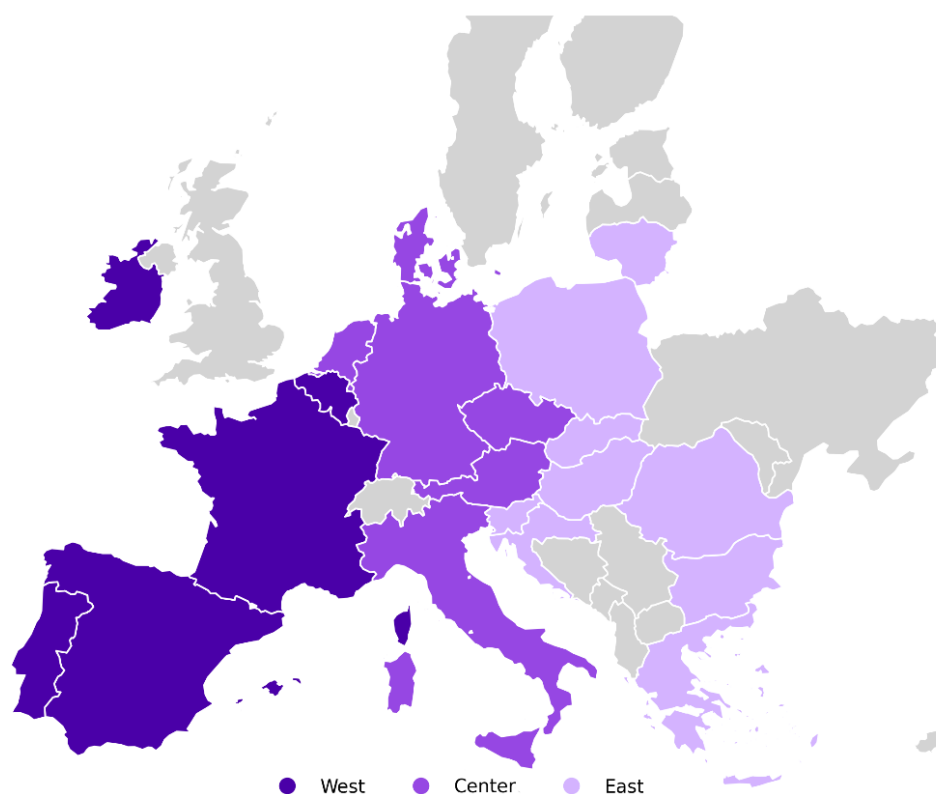


Source: ACER based on PRISMA, GSA and RBP.

Note: Y, Q, M, D, and W, stand for yearly, quarterly, monthly, daily, and within-day products.

The figure does not consider bookings made before 2020, therefore the total yearly booking may be underestimated, particularly on the first years observed.

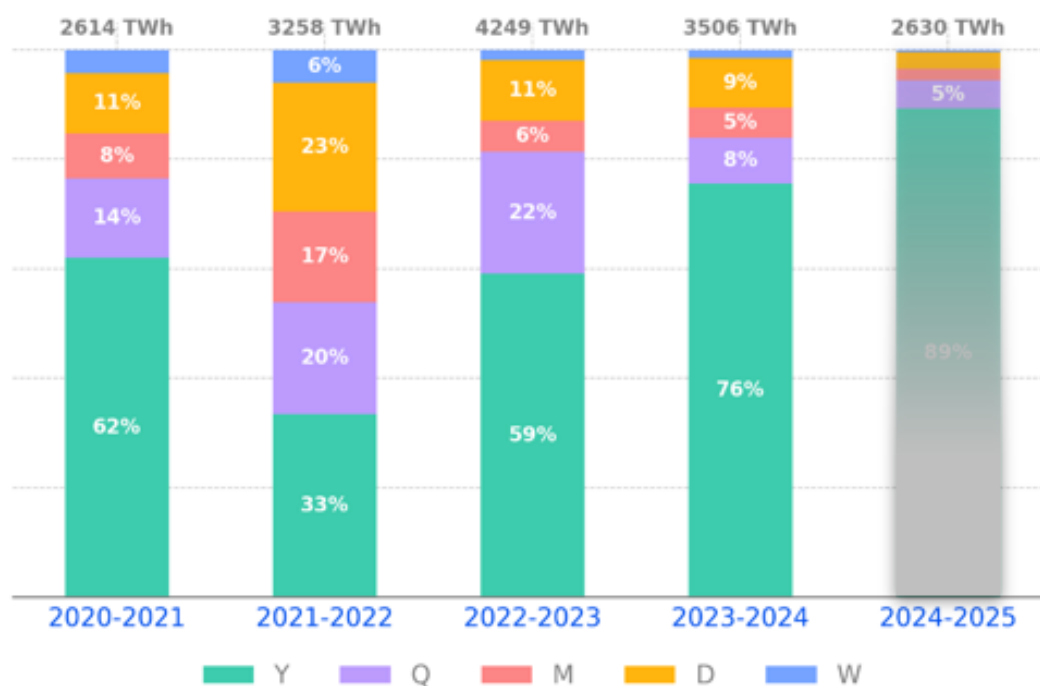
Figure 27. Regional grouping of countries for the regional assessment.



Source: ACER.

Note: In the regional assessments, TAP has been considered part of the central region because it serves primarily gas to Italy since its commissioning.

Figure 28. Share of capacity booking products of CAM-relevant interconnection points - October 2020-December 2024 (%).



Source: ACER based on PRISMA, GSA and RBP.

Y, Q, M, D, and W, stand for yearly, quarterly, monthly, daily, and within-day products. The figure does not consider bookings made before 2020, therefore the total yearly booking may be underestimated, particularly on the first years observed. 2024/2025 data are partial (grey bar).

## Annex 3: List of acronyms

| Acronym | Meaning                                                    |
|---------|------------------------------------------------------------|
| ACA     | Ascending Clock Auction                                    |
| CAM     | Capacity Allocation Mechanism                              |
| CMP     | Congestion Management Procedures                           |
| D       | Daily booked capacity product                              |
| EC      | European Commission                                        |
| ECB     | European Central Bank                                      |
| ENTSOG  | European Network for Transmission System Operators for Gas |
| GIPL    | Gas Interconnector Poland-Lithuania                        |
| GL      | Guidelines                                                 |
| GSA     | Great Solution for Auction Booking Platform                |
| IBS     | Interconnection Bulgaria-Serbia                            |
| IGB     | Interconnector Greece-Bulgaria                             |
| IP      | Interconnection Point                                      |
| LNG     | Liquefied natural gas                                      |
| NC      | Network code                                               |
| JRC     | Joint Research Centre                                      |
| M       | Monthly booked capacity product                            |
| MDL     | Moldovan leu                                               |
| MMR     | Market Monitoring Report                                   |
| OPD     | Operator-point-direction                                   |
| PRISMA  | European Gas Booking Platform                              |
| Q       | Quarterly booked capacity product                          |
| RBP     | Regional Booking Platform                                  |
| RPM     | Reference Price Methodology                                |
| TAP     | Trans Adriatic Pipeline                                    |
| TBP     | Trans-Balkan Pipeline                                      |
| TP      | Transparency Platform                                      |
| TSO     | Transmission System Operator                               |

|     |                                    |
|-----|------------------------------------|
| UGS | Underground gas storage            |
| UPA | Uniform Price Auction              |
| VTP | Virtual trading point              |
| W   | Within-day booked capacity product |
| Y   | Yearly booked capacity product     |

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