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Quarterly Gas Market Review: Tracking Key Metrics

Introduction

This edition of the OIES Quarterly Gas Market Review covers Q4 2023 and Q1 2024. Generally speaking, this was a bearish period for the international gas market, with prices throughout winter remaining significantly lower year-on-year. The price rally in early Q4 2023 was driven by industry and geopolitical events rather than supply-demand fundamentals, with prices declining thereafter.

Falling gas prices through the European winter months reflect a fundamental picture that on the face of it, has put the Ukraine-driven market crisis of 2022 firmly in the rear vision mirror. Steady European supply, both pipeline and LNG, coupled with a demand profile that continues to weaken year-on-year to produce record stocks pre-winter and healthy stock levels thereafter, has heaped pressure on prompt gas prices. The term structure has moved south and flattened, helped by another winter that with few exceptions, produced mild temperatures.

With the benefit of hindsight, our pre-winter view that European balances remained tightly balanced (ref the winter outlook) could be characterised as a little too precautionary. But the price rallies in the run up to the winter in October 2023 and in January this year suggest the protective tone was correct. While the fundamental market outlook is dominated by year-on-year weakening demand, the market is sufficiently tight to respond to threats of supply interruptions – whether Australian LNG strikes, or the disruption to upstream, pipelines and shipping from Middle East conflicts. So even in a structurally weakening market, LNG's outsize role in replacing Russian volumes in Europe since 2022 means that European markets are now more international than ever. As a result, its energy supply chains extend further, marking the risk screen higher as a result.

While Europe's capacity to draw additional LNG flows has been impressive, the global LNG supply outlook for 2024 and into 2025 is mostly flat. New starts are limited to some small offshore projects and the overall profile is only stable because of the restart of Freeport LNG in 2023 as well as some small recovery in volumes from other exporters. The instability of several LNG players in the face of either feedstock challenges (Nigeria) or domestic demand growth (Egypt) continues to be an LNG-specific element of volatility, not seen so prominently for example in oil markets. Moreover, as the Ukraine crisis proved, gas and LNG is at the crux of rising global political and security tensions. Western sanctions on Russian LNG are clouding the outlook for supply and bringing into doubt Russia's residual pipeline exports to central Europe through Ukraine. Qatar's plans to further expand its own output and build its market position counter some of this uncertainty given the emirate's strong history of timely project delivery. But the concentration of even more of global LNG production at Ras Laffan, with exports depending upon less stable export routes should flash a warning signal to markets.

What has shrouded some of these risk factors has been a steady multi-year erosion of European gas demand, which is now down around 20 per cent or 100 bcm/y from pre-crisis levels. Recent quarters have seen a false dawn for recovering industrial demand, which in Q1 2024 resumed its downward trend. But it is gas-to-power where the declines are dramatic and the trend is clearest. A combination of price impacts, the weak macro-economic outlook and the progressive strategic shift towards renewables is eating away at the volume of gas required by Europe's power sector. Of course, there are realistic reversal scenarios. At some point falling power and gas prices will prompt stabilization and recovery in consumption. Falling interest rates later in the year should give the economic outlook a shot in the arm as well. But the enduring message is that while the markets focus on weak demand, supply risks have not gone away.

If you would like to discuss any of these issues further, please contact Jack Sharples (jack.sharples@oxfordenergy.org) or Anouk Honoré (anouk.honore@oxfordenergy.org).

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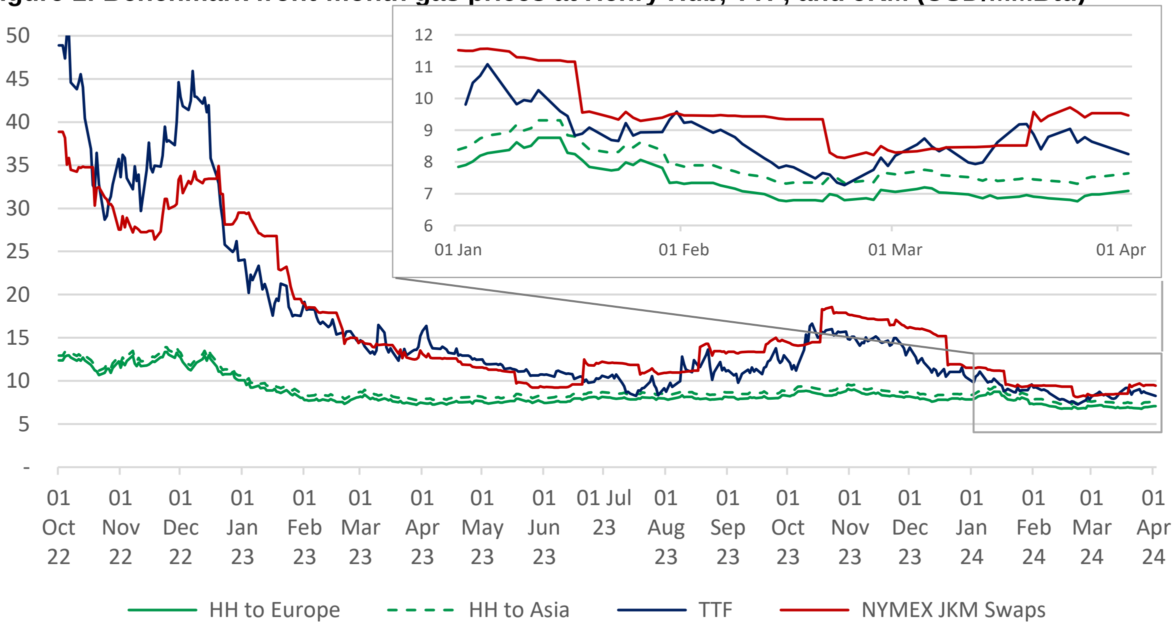
1.1. Market benchmarks

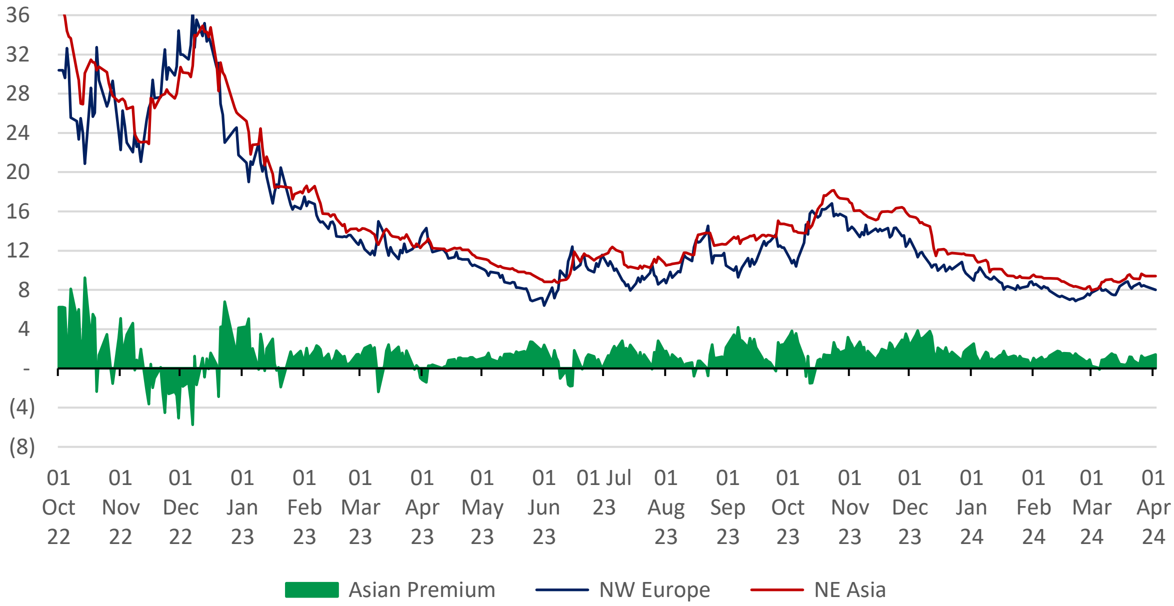
Figure 1: Benchmark front-month gas prices at Henry Hub, TTF, and JKM (USD/MMBtu)



Source: Data from S&P Global / Refinitiv. Inset focus on prices in Q1 2024.

Note: Henry Hub (HH) to Europe and Asia are calculated as 115% of the Henry Hub price plus 3 USD/MMBtu tolling fee for liquefaction. In addition, the HH to Europe price includes 1.50 USD/MMBtu for shipping and 0.45 USD/MMBtu for regasification. The HH to Asia includes 2.50 USD/MMBtu for shipping and no regasification fee.

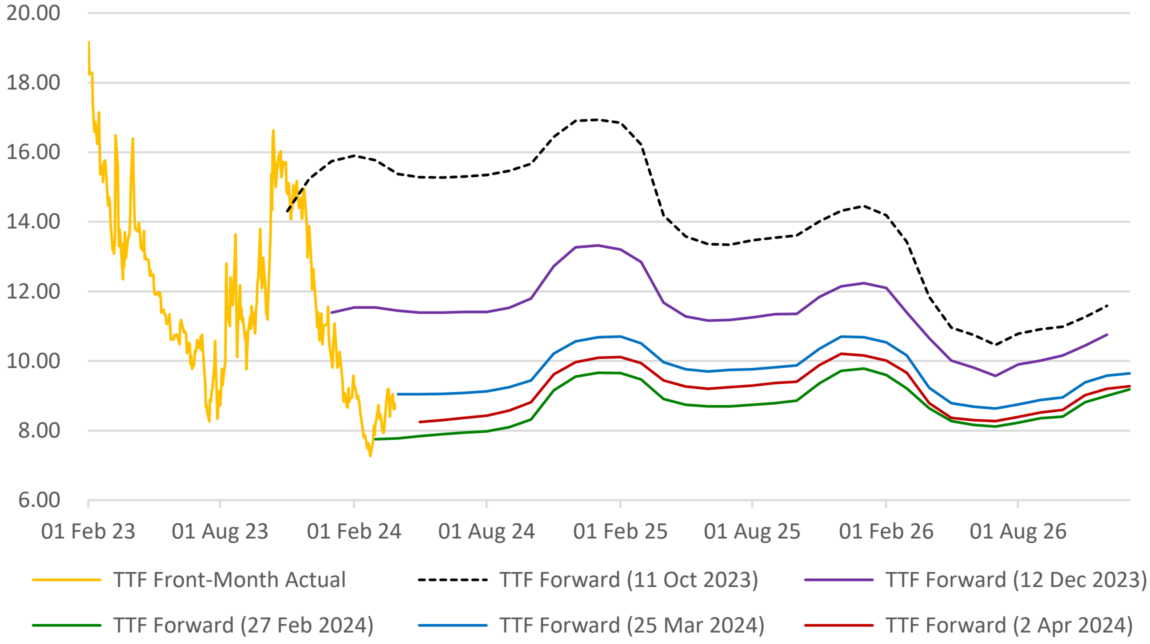
Figure 2: Front-month price assessments for LNG landed in NW Europe and NE Asia and premium of NE Asia over NW Europe (USD/MMBtu)



Source: Data from Argus

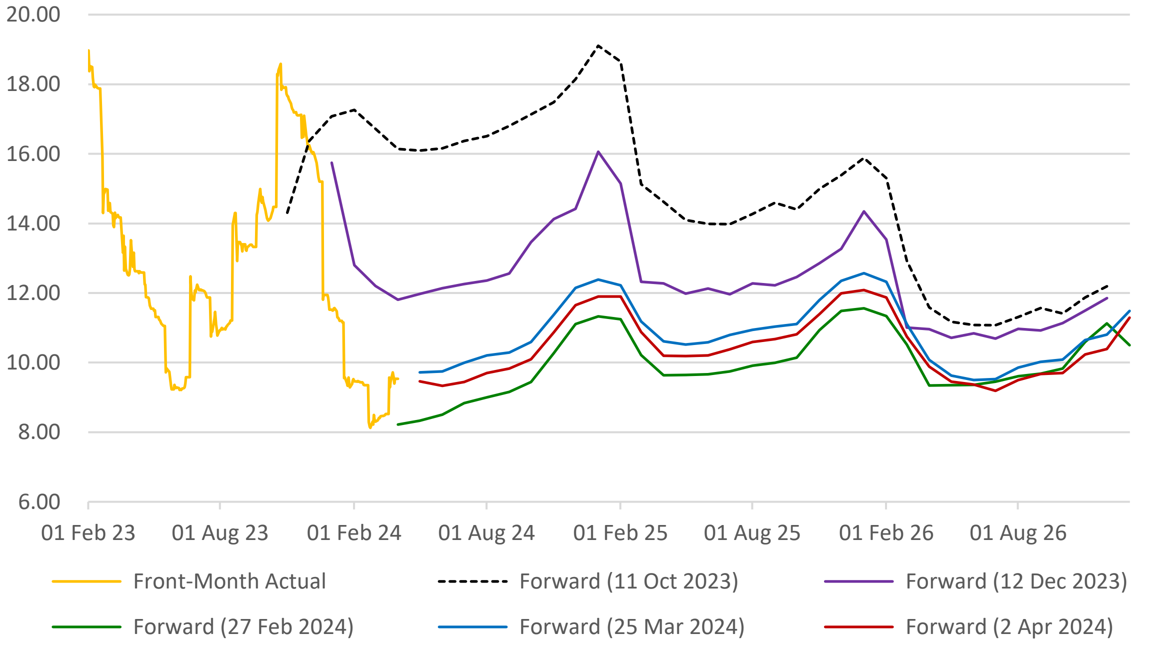
1.2. Forward curves in Europe and Asia

Figure 3: TTF historic front-month and forward prices by delivery month (USD/MMBtu)



Source: Data from S&P Global / Refinitiv

Figure 4: NYMEX JKM historic front-month and forward prices (USD/MMBtu)



Source: Data from S&P Global / Refinitiv

1.3. Strong inventories, supply and tepid demand keeps curve under pressure

European benchmark gas prices continued to slide into the 2023/24 winter on a combination of record high pre-winter inventories, solid supply, and weak demand, amid moderate winter temperatures and continued weakness in industrial demand. As demonstrated in Figure 1, benchmark prices in winter 2023/24 remained well below those of winter 2022/23. Furthermore, the Asian premium remained intact for the whole winter period, unlike in winter 2022/23 (Figure 2).

Two notable dynamics occurred in winter 2023/24: Firstly, prices peaked in October, rather than in the coldest part of winter (usually between mid-December and late January), and secondly, European prices exhibited a late winter ‘mini rally’ from late February to mid-March.

The late summer/early winter price rally leading to the October peak was driven by three events from August 2023 onwards, although the bullish impact was capped by the strong storage inventories, robust supply, and weak demand dynamics.

First, the threat of industrial action emerged in August 2023 at four Australian LNG plants operated by Chevron (Gorgon and Wheatstone) and Woodside Energy (North-West Shelf, and Pluto), following disputes relating to pay and conditions. In the first half of 2023, those four plants accounted for 22.4 million tonnes (mt) of LNG – 11 per cent of global LNG production of 202.0 mt in the same period. While Woodside Energy reached agreement with its workers in late August, the threat of strike action at Chevron-operated plants was not definitively assuaged until 18 October.[1]

Second, the Hamas attack on Israel on 7 October and the Israeli military response raised the possibility of a broader geopolitical conflict in the Middle East, raising the risk of disruption to LNG exports. The immediate practical implication was the Israeli government ordering Chevron to halt operations at the Tamar gas field, which lies 25km off the Israeli coast and was deemed to be within range of Hamas rockets.[2] Around 20 per cent of the Tamar production is usually exported to Jordan and Egypt.[3] Operations at Tamar resumed on 13 November.[4]

Third, Yemen’s rebel Houthis initiated a campaign of missile and drone attacks in November 2023 against shipping in the Red Sea, reducing LNG flows via the Suez Canal. Under the Houthi threat, LNG shipping via the Red Sea did not cease completely until 12 January 2024. The fact that LNG cargoes were either redirected to other markets (for example, Qatari LNG cargoes redirected from Europe to Asia and Algerian LNG cargoes redirected from Asia to Europe) or delivered to their intended markets via a longer route (round the Cape of Good Hope) meant that global LNG supply was not substantially curtailed and the movement of cargoes between the Atlantic and Pacific basins continued, despite the ongoing curtailment of LNG shipping via the Panama Canal, where LNG shipping fell in Q4 2023 and fell even further in Q1 2024.[5]

None of these supply events were sufficient to reverse the softer market tone for a sustained period and by mid-December 2023, prices were back at their pre-rally level. Prices and the term structure continued to weaken into the first quarter of 2024 amid robust supply, weak demand, and storage stocks that remained at record levels (Figure 3 and Figure 4).

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[1] Reuters, 2023. Chevron and LNG workers in Australia agree on deal. *Reuters*, 18 October. https://www.reuters.com/business/energy/chevron-lng-workers-australia-agree-deal-2023-10-18/

[2] Bowden, J., 2023. East Med: Gaza crisis tightens regional gas balances. *Oxford Energy Comment*, 8 November. https://www.oxfordenergy.org/publications/east-med-gaza-crisis-tightens-regional-gas-balances/

[3] Reuters, 2023. *Reuters*, 9 October. https://www.reuters.com/markets/commodities/israel-shuts-down-offshore-tamar-gas-field-output-2023-10-09/

[4] Reuters, 2023. *Reuters*, 13 November. https://www.reuters.com/business/energy/chevron-says-resumes-supplying-customers-tamar-natgas-gas-field-2023-11-13/

[5] Sharples, J., 2024. LNG Shipping Chokepoints: The Impact of Red Sea and Panama Canal Disruption. OIES Research Paper NG 188. *Oxford Institute for Energy Studies*, February 2024. https://www.oxfordenergy.org/publications/lng-shipping-chokepoints-the-impact-of-red-sea-and-panama-canal-disruption/

The February-March price rally in Europe saw front-month TTF prices rise from a low point of 7.27 USD/MMBtu on 23 February to a high of 9.19 USD/MMBtu on 19 March, before prices then slipped back and stabilised between 8 and 9 USD/MMBtu. During this period, one influential factor was the late arrival of LNG cargoes from Qatar that had been redirected away from the Red Sea via the Cape of Good Hope. [6] This was exacerbated in mid- March by brief slump in daily flows of Norwegian pipeline gas to Europe, as illustrated in Figure 12. This short, limited, price rally between late February and mid-March, and the subsequent retrenchment, was also visible in the forward curves for TTF and JKM. While forward prices for summer 2024 fell substantial from October 2023, through December, and on to late February 2024, the lift by late March and subsequent decline are visible for TTF and JKM in in Figure 3 and Figure 4, respectively.

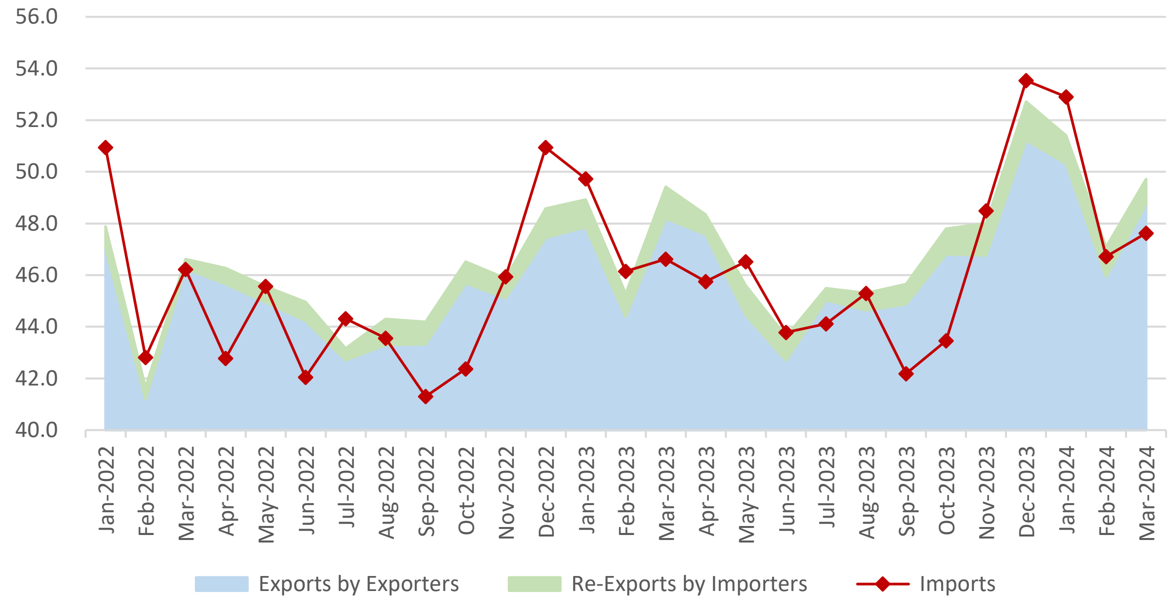
As the price graphs suggest, the impact of these events quickly dissipated, as seasonal demand continued to decline throughout March (Figure 16) and it became clear that Europe was going to end the winter with underground storage stocks at record levels (Figure 15). Europe ending the winter with substantial storage stocks is particularly pertinent for forward prices in both Europe and Asia, as it implies lower European LNG imports for storage replenishment in summer 2024.

[6] Sharples, J., 2024. LNG Shipping Chokepoints: The Impact of Red Sea and Panama Canal Disruption. OIES Research Paper NG 188. *Oxford Institute for Energy Studies*, February 2024. https://www.oxfordenergy.org/publications/lng-shipping-chokepoints-the-impact-of-red-sea-and-panama-canal-disruption/

2. Global LNG

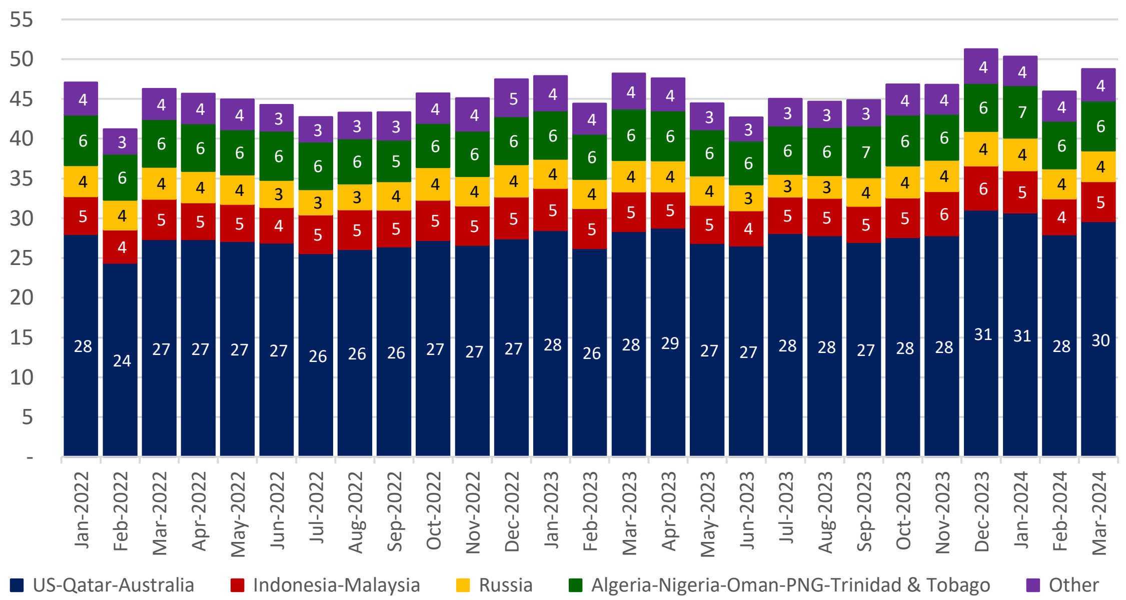
2.1. Global LNG supply and imports by region

Figure 5: Global monthly exports, re-exports, and imports of LNG (Bcm per month)



Source: Data from Kpler LNG Platform.[7]

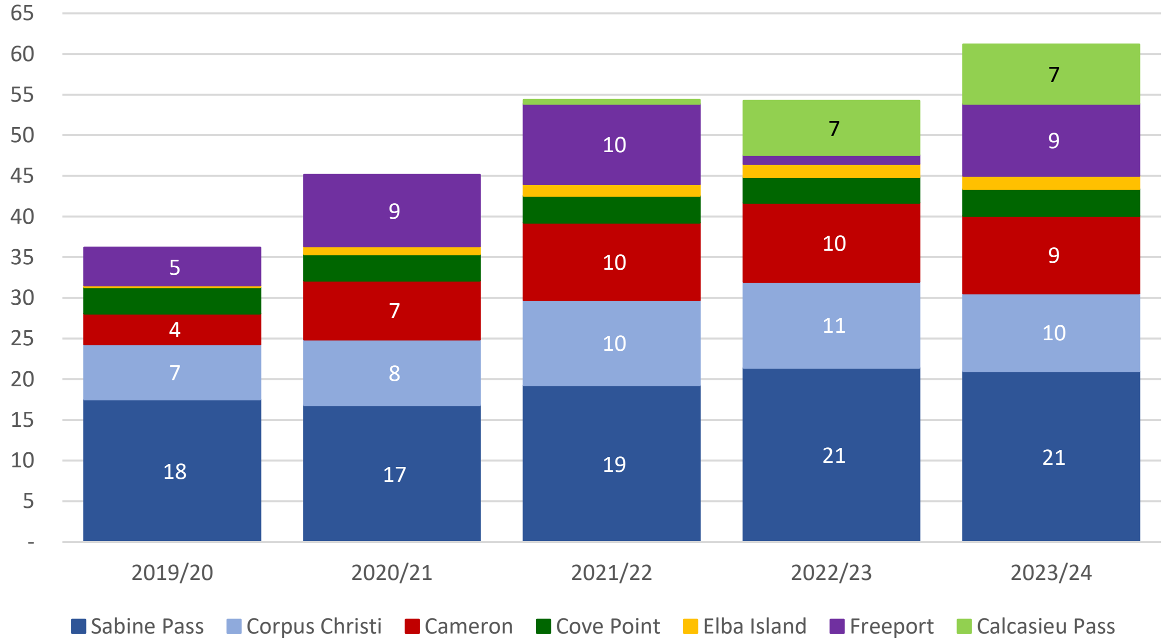
Figure 6: Monthly LNG exports by source (Bcm per month)



Source: Data from Kpler LNG Platform. Measured at point of export.

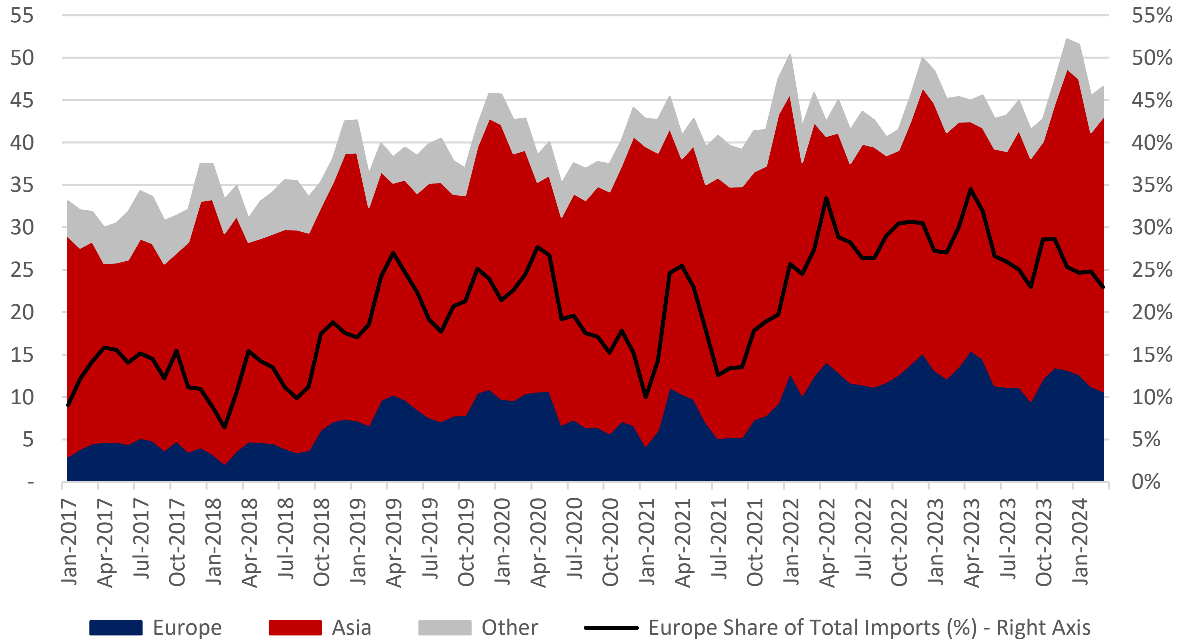
[7] Exports are measured at the point of export and imports are measured at the point of import. The differential between exports and imports is the volume of LNG 'on the water' and is particularly stark at the start of winter (September-October) when cargoes wait offshore for winter demand to begin, and in the peak of winter (December-January) when demand peaks.

Figure 7: US LNG exports by terminal in winter from October to March (Bcm)



Data from Kpler LNG Platform.

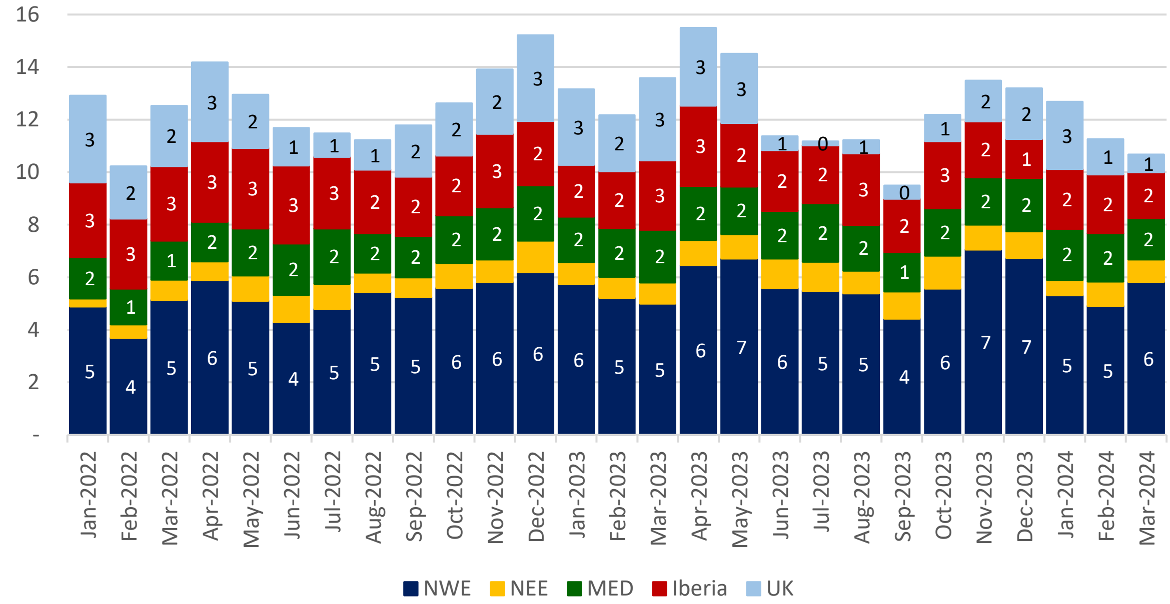
Figure 8: Monthly LNG imports by region (Bcm per month)



Source: Data from Kpler LNG Platform

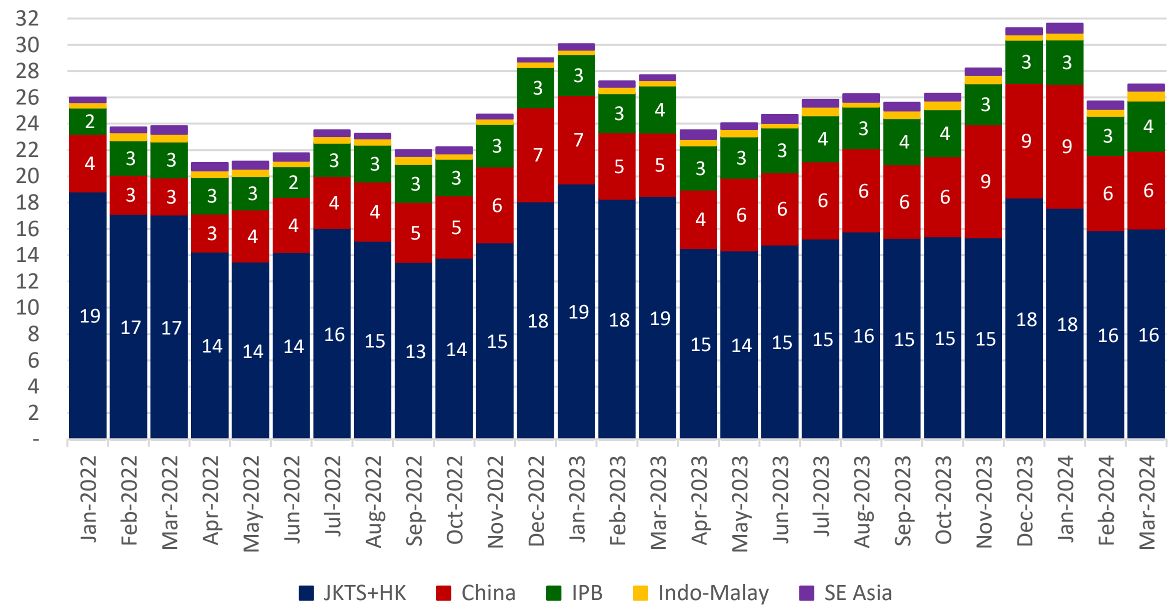
2.2. Breakdown of regional LNG imports in Europe and Asia

Figure 9: Monthly net LNG imports by region within Europe (Bcm per month)



Data from Kpler LNG Platform.[8]

Figure 10: Monthly net LNG imports by region within Asia (Bcm per month)



Data from Kpler LNG Platform. Note that imports into Indonesia and Malaysia are gross, not net.[9]

[8] Definitions: NWE (France, Belgium, Netherlands); NEE (Poland, Lithuania, Finland); MED (Italy, Croatia, Greece, Malta, Gibraltar); Iberia (Spain, Portugal); UK (United Kingdom)

[9] Definitions: JKTS+HK (Japan, South Korea, Taiwan, Singapore, Hong Kong); IPB (India, Pakistan, Bangladesh), Indo-Malay (Indonesia, Malaysia), SE Asia (Myanmar, Philippines, Thailand, Vietnam)

2.3. Global LNG: Stable supply ahead of a quiet year for new projects

Winter 2023/24 saw limited year-on-year growth in global LNG supply outside the restart at Freeport. Looking ahead to 2024, three small offshore projects will add new supply of just 8.3 Bcma to a market that supplied 552 Bcm in 2023, representing a meagre 1.5 per cent uplift. In a context of limited supply growth, the tightness of the global LNG market in the rest of 2024 will be strongly influenced by demand-side dynamics as they have over the past two winter quarters.

Without Freeport restart, global winter LNG exports would have been flat

A key takeaway from winter 2023/24 is that without the restart of Freeport LNG in the United States, global LNG exports[10] totalling 289.8 Bcm, would have been virtually flat year-on-year. Total exports grew by 11.1 Bcm (4 per cent), of which the Freeport restart accounted for 7.94 Bcm (2.9 per cent of the total or 71 per cent of growth) and all other liquefaction plants combined added just 3.15 Bcm (1.1 per cent). The Freeport terminal was taken offline due to a fire in June 2022, restarting in February 2023 and ramping up through April 2023, thus keeping the plant offline for most of winter 2022/23 (Freeport was hit by cold weather damage in Q1 2024 causing a fresh round of maintenance outages).

LNG exports from the United States from plants other than Freeport grew by 2.6 Bcm, while exports from Australia grew by 0.7 Bcm (+1.3 per cent) and exports from Qatar fell by 0.9 Bcm (-1.7 per cent). Therefore, if Freeport is excluded, year-on-year growth in LNG exports from the world's three largest exporters in winter 2023/24 was 2.4 Bcm, rising to 10.4 Bcm with the inclusion of Freeport.

Freeport aside, global LNG export growth has been lean. Most notable new supply is from Mozambique, where the Coral South FLNG starting ramping up from November 2022, but did not produce consistently at nameplate until winter 2023/24. New volumes also came from Tangguh Train 3 (Indonesia), although ongoing ramp-up means that expansion is not yet complete.

Supply growth from existing projects washed out by Egypt declines

Of the five countries outside the big three of Australia, Qatar and the US that saw their winter LNG exports rise or fall by more than 0.5 Bcm year-on-year in winter 2023/24, combined growth of 4.5 Bcm from Algeria, Malaysia, Nigeria, Russia, and the United Arab Emirates were more than compensated for by a 4.8 bcm decline in Egyptian output. Lower Egyptian output reflects squeezed gas output amid robust domestic demand growth.

New LNG supply in 2024 is concentrated in floating projects

Looking ahead to the rest of 2024, 6.1 mtpa (8.3 Bcma) of incremental supply is due from three offshore liquefaction projects Congo FLNG, which shipped its first cargo in March[11]; GTA FLNG (Senegal-Mauritania)**:** where first cargoes are expected in summer 2024; and Altamira Fast LNG (Mexico)**:** which is expected to load its first cargo in April 2024.[12]

Western sanctions on Russia's[13] Arctic LNG 2 project continue to cloud the start-up for export cargoes. The first train is complete and gas production began in December 2023, but the most pressing concern is the lack of ice-class LNG carriers for the project, with the orderbook significantly disrupted by western sanctions.

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[10] Not including re-exports from countries that are usually net importers of LNG

[11] Eni, 2024. The President of the Republic of the Congo, the Chairman of the Board of Directors of Eni and the CEO of Eni celebrate Congo's first LNG cargo. *Press Release*, 27 February. https://www.eni.com/en-IT/media/press-release/2024/02/the-president-of-the-republic-of-the-congo-the-chairman-of-the-board-of-directors-of-eni-and-the-ceo-of-eni-celebrate-congo-first-lng-cargo.html

[12] New Fortress Energy, 2024. New Fortress Energy Announces Record Fourth Quarter and Full Year 2023 Results. *Press Release*, 29 February. https://ir.newfortressenergy.com/news-releases/news-release-details/new-fortress-energy-announces-record-fourth-quarter-and-full

[13] Novatek holds 60 per cent stake, with TotalEnergies, CNPC, CNOOC, and Japan Arctic LNG each holding 10 per cent. The foreign shareholders suspended their participation in the project in December 2023.

US projects update plans but no output until 2025-26

Four US projects have offered updated guidance on their start-ups. Plaquemines LNG Phase 1 (10 mtpa) may not make cargoes available to long-term contract holders until 2026[14]; Corpus Christi Stage 3 Expansion (10 mtpa)**:** First LNG production is due by the end of 2024, although 'substantial completion' is planned for between Q2-3 2025 and H1 2026[15]; LNG Canada (7 mtpa) plans to begin start-up activities in 2024 and to export its first cargoes in 2025[16]; and Golden Pass (18 mtpa) expects first cargoes in H1 2025 – a slight delay to the previous schedule.[17]

None of these projects are affected by the 'pause' in the award of export licences by the United States Department of Energy, which allow the export of LNG from the United States to countries with whom the United Sates does not have a Free Trade Agreement. Rather, the issue affects projects that have either not yet received their export licences or are at risk of not completing construction and launching exports within seven years of being awarded their export licence. This primarily concerns projects that are planned for completion from 2028 onwards, as analysed in a recent OIES paper.[18]

Qatar's latest expansion

In February, Qatar announced an upward revision of its planned LNG export expansion to 142 mtpa from the previous planned 126 mtpa, which will be delivered by 2030. Qatar currently has nameplate capacity of 77 mtpa at its 14-Train Ras Laffan liquefaction complex. The recent announcement concerns an additional expansion project, North Field West (NFW), which will add a further 16 mtpa of capacity 'before the end of this decade'.[19]

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[14] Williams, C., 2023. Venture Global LNG expects extended start-up at second plant, says CEO. *Reuters*, 6 December. https://www.nasdaq.com/articles/venture-global-lng-expects-extended-start-up-at-second-plant-says-ceo

[15] Cheniere, 2024. Cheniere Reports Fourth Quarter and Full Year 2023 Results and Introduces Full Year 2024 Financial Guidance. *Press Release*, 22 February. https://lngir.cheniere.com/news-events/press-releases/detail/293/cheniere-reports-fourth-quarter-and-full-year-2023-results

[16] LNG Canada, 2024. LNG Canada 2023 Year-End Update. *Press Release*, 12 December. https://www.lngcanada.ca/news/lng-canada-2023-year-end-update/

[17] Golden Pass LNG, 2023. Schedule Update. *Press Release*, 7 December. https://www.goldenpasslng.com/newsroom/statements

[18] Fulwood, M., 2024. What next for US LNG Exports? *Oxford Energy Comment*, 1 February. https://www.oxfordenergy.org/publications/what-next-for-us-lng-exports/

[19] Qatar Energy, 2024. H.E. Minister Saad Sherida Al-Kaabi announces raising Qatar's LNG production capacity to 142 mtpa before the end of 2030. *Press* Release, 25 February. https://www.qatarenergy.qa/en/MediaCenter/Pages/newsdetails.aspx?ItemId=3799

2.4. Analysis: Global LNG demand

In global terms, winter 2023/24 saw the record for monthly LNG exports (excluding re-exports) broken three times. The previous record of 48.2 Bcm was set in March 2023. That record was surpassed in December 2023 (51.2 Bcm), January 2024 (50.3 Bcm), and March 2023 (48.7 Bcm). As a consequence, global net imports also surpassed 50 Bcm per month for the first time in December 2023 (51.5 Bcm) and January 2024 (50.5 Bcm).

Lower European demand eased the global market tightness

Europe's reduced need for LNG imports in winter 2023/24 loosened the global LNG market and put pressure on European and Asian LNG prices from October 2023 through the northern hemisphere winter. Winter imports in the EU-27 plus UK were down by 7.2 Bcm (9 per cent) year-on-year. LNG imports into Turkey (part of 'Other' in Figure 8) were down 3.2 Bcm (27 per cent) year-on-year. The decline in imported volumes obscures the fact that the European market for LNG has proven itself to be a premium market in its own right, as trading in 2022-2023 proved. Since 2022, Europe's baseload LNG demand has risen, while the 'balancing' element remains. The shift in the relative shares of 'baseload' and 'balancing' means that European LNG demand is less flexible than before. This shift matters, because Europe competes for supply on the global market to a greater extent than previously.

China's rebound continues as price-sensitive buyers return

In JKTS+HK[20] in winter 2023/24, lower demand in the largest markets (Japan and South Korea) more than offset higher demand in Singapore, while Taiwan imports were flat and Hong Kong's volumes are too small to affect the regional picture. Overall, LNG imports into this market fell by 4.4 Bcm (4.3 per cent) year-on-year in winter 2023/24.

By contrast, Chinese LNG imports grew by 10.2 Bcm (30 per cent) year-on-year, a significant lift even if still below the peaks seen in the winter of 2020-2021 (11.1-11.2 Bcm). Chinese LNG demand remains in a recovery phase after the 2022 decline, while China's imports from Russia via the Power of Siberia pipeline added 7 Bcm per year, curbing Chinese LNG imports. With global LNG imports 10.98 Bcm higher year-on-year in winter 2023/24, and the increase in China's imports (+10.2 Bcm) absorbing most of that, the decline in LNG demand in Europe (-7.2 Bcm), Turkey (-3.2 Bcm), and JKTS+HK (-4.4 Bcm) left a 15.6 Bcm year-on-year surplus available to other more price sensitive buyers.

In the price-sensitive markets of India-Pakistan-Bangladesh, LNG imports in winter 2023/24 rose by 1.4 Bcm (7.5 per cent) year-on-year, sparked by falling spot prices. LNG imports into South-East Asia[21] continue to grow rapidly, rising by 44 per cent year-on-year (+1.0 Bcm), while imports into Indonesia and Malaysia combined rose by 1.0 Bcm (+41 per cent) year-on-year.

Outside Asia, LNG imports in the rest of the world grew by 4.6 Bcm (+63 per cent) year-on-year in winter 2023/24. This growth was concentrated in the relatively small markets in Central America and the Caribbean (+1.8 Bcm, or +68 per cent)[22], in Brazil and Colombia combined (+1.9 Bcm or +697 per cent), and Kuwait (+0.7 Bcm or 38 per cent). The only notable year-on-year decline in LNG imports outside Europe and Asia was Chile, where imports fell by 325 MMcm (26 per cent).

Outlook for summer 2024

If the solid demand growth in China, South Asia, and South-East Asia continues through 2024, it will absorb new supply from offshore projects. As a consequence, LNG available to Europe could be flat to slightly lower year-on-year. Given LNG's substantial share of the European market (37 per cent in 2023), European balances will be driven by pipeline supply and the need to refill storage. These factors are analysed in Sections 3 and Section 4.

[20] Japan, South Korea, Taiwan, Singapore, and Hong Kong – the least price-sensitive markets in Asia

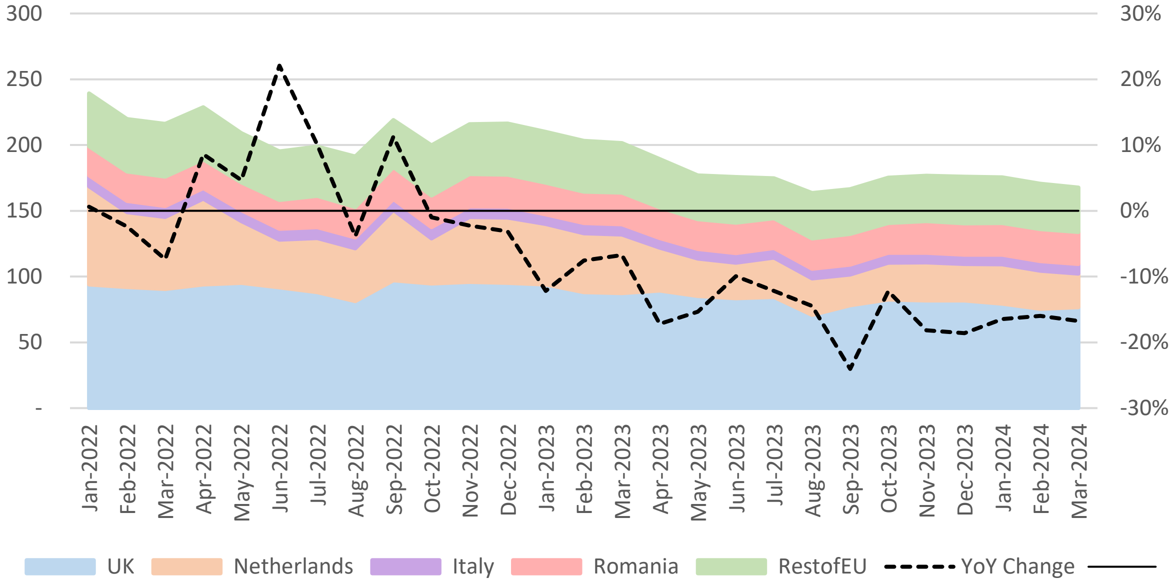
[21] Myanmar, Philippines, Thailand, Vietnam

[22] El Salvador, Panama, Dominican Republic, Jamaica, and Puerto Rico

3. European gas supply

3.1. Production

Figure 11: European gas production by source (MMcm/d)

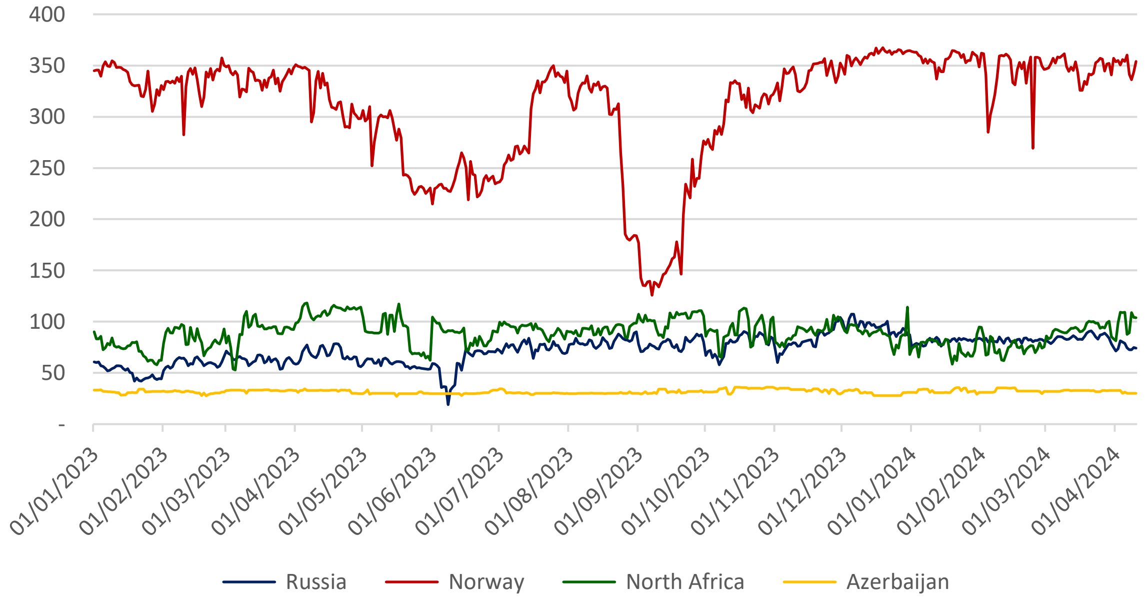


Data from Eurostat, ENTSOG, and National Gas Transmission (UK). Graph by the author.

3.2. Pipeline imports by source

3.2.1. Total pipeline imports

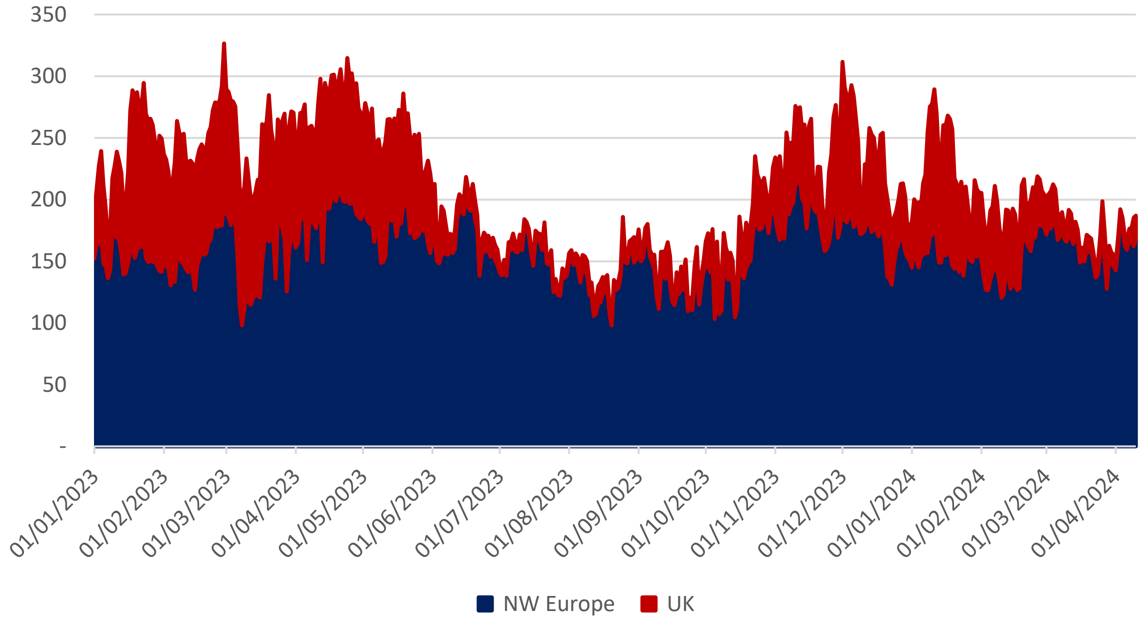
Figure 12: European pipeline gas imports by source (MMcm/d)



Data from ENTSOG Transparency Platform and National Gas Transmission. Graph by the author.

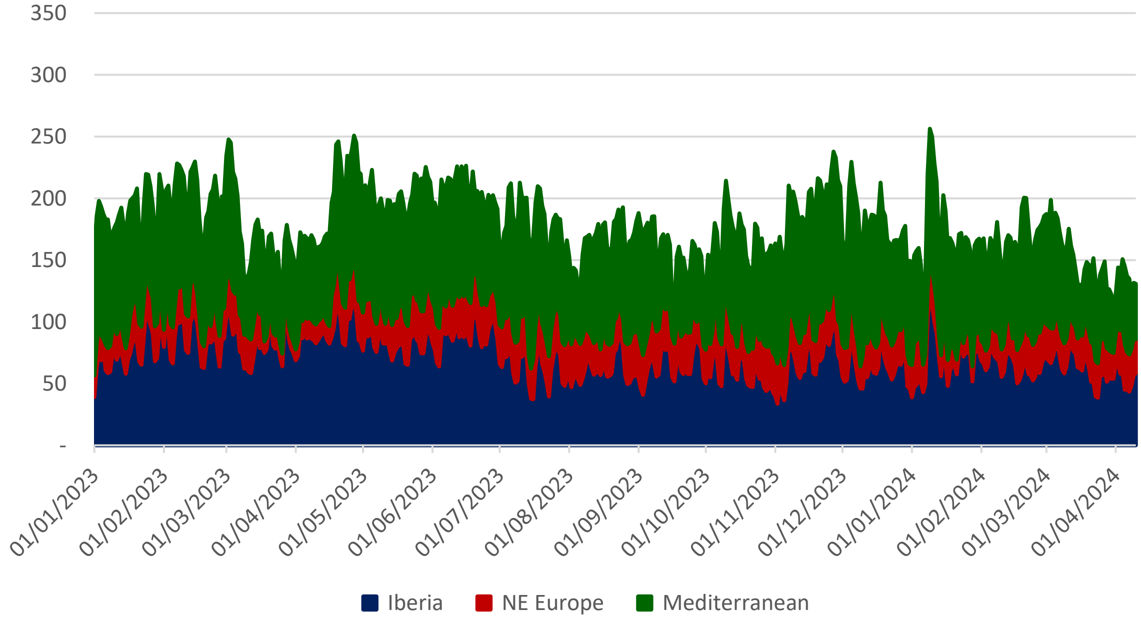
3.3. LNG sendout

Figure 13: Daily LNG sendout in NW Europe and UK (MMcm/d)



Data from Kpler LNG Platform. Graph by the author.[23]

Figure 14: Daily LNG sendout in other regions (MMcm/d)



Data from Gas Infrastructure Europe Aggregated LNG Storage Inventory (ALSI). Graph by the author.[24]

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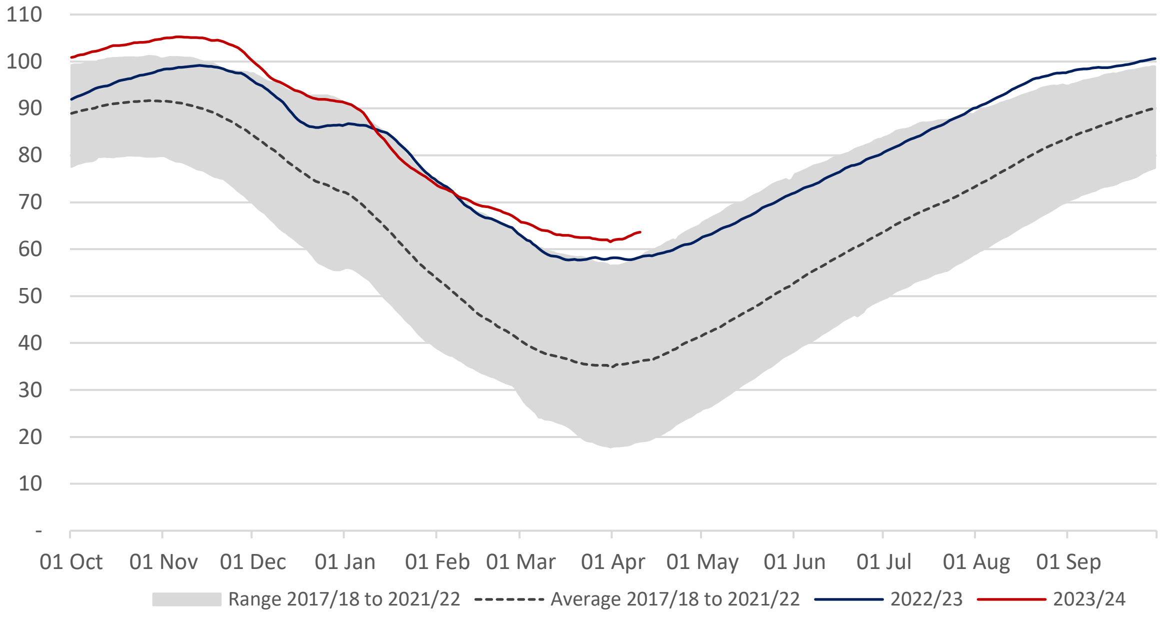
[23] NW Europe: Belgium, Netherlands, Germany, and northern France (Dunkerque, Le Havre, Montoir).

[24] Iberia: Portugal and Spain. NE Europe: Poland, Lithuania, and Finland. MED: Italy, Croatia, Greece, and southern France (Fos Cavaou and Fos Tonkin).

3.4. Storage

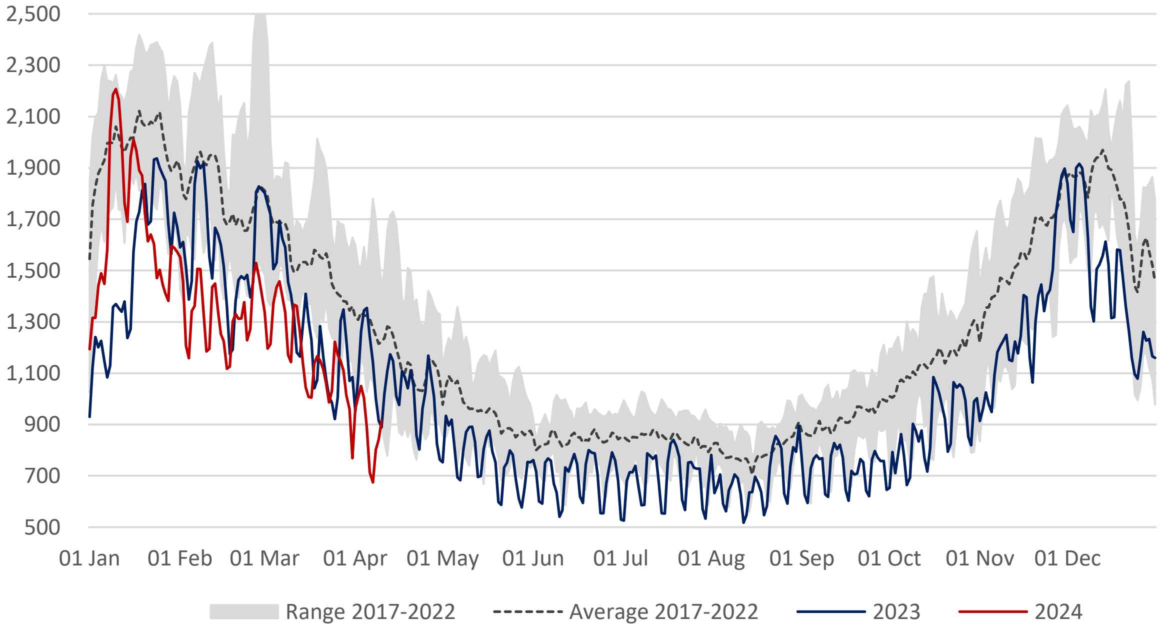
Figure 15: EU-27 gas storage stocks (Bcm)



Data from Gas Infrastructure Europe Aggregated Gas Storage Inventory. Graph by the author.

3.5. Total supply (implied consumption)

Figure 16: EU-27 plus UK implied gas consumption (MMcm/d)



Data from ENTSOG, National gas Transmission (UK), Gas Infrastructure Europe, Kpler. Graph by the author.

3.6. Analysis of European supply

3.6.1. European gas production

European gas production continues its ongoing decline, although the rate of decline is slowing. The winter of 2023/24 was the first without supply from the Groningen gas field in the Netherlands, where production ceased on 1 October 2023, although the field will be kept on standby until 1 October 2024.

Elsewhere in the Netherlands, the future of production from the remaining ‘small fields’ will be influenced by a series of ongoing issues: In March 2024, the Dutch government rejected an initial application by NAM (a parity joint venture between Shell and ExxonMobil) to produce gas from the Ternaard field, which could hold up to 25 Bcm.

NAM has also proposed decommissioning the Norg low-calorie underground gas storage facility and extracting the cushion gas, but has not yet received a definitive decision from the Dutch government. That decision will determine whether the storage facility is filled in summer 2024, or whether the cushion gas will contribute to Dutch gas production.

In Denmark, TotalEnergies announced the restart of gas production in the Danish offshore, following the redevelopment of the offshore Tyra hub. Production was suspended in September 2019, and following the restart, production of 5.7 MMcm/d (the equivalent of 2.08 Bcma) will be available.[25]

3.6.2. European pipeline imports

Norwegian pipeline gas supply to Europe in winter 2023/24 was 1.9 Bcm (3 per cent) higher year-on-year. The increase in Q4 2023 was 0.5 Bcm year-on-year, and the increase in Q1 2024 was 1.4 Bcm year-on-year. As illustrated in Figure 12, this is the result of daily Norwegian pipeline flows to Europe averaging 352 MMcm/d from 1 December 2023 to 31 March 2024, following the end of substantial maintenance that had reduced Norway’s gas production and processing capacity to varying degrees from early April to late November 2023.

The Norwegian Offshore Directorate forecast total Norwegian gas production to be notably higher year-on-year in May, June, and September, similar in July, August, and October, and slightly lower in April, November, and December. As a result, Norwegian production could be 4 Bcm (8 per cent) higher year-on-year in Q2-3 combined, and 3.4 Bcm (3 per cent) higher in 2024 overall.[26]

Residual **Russian** pipeline gas is supplied to Europe by Gazprom under long-term contracts, with Gazprom having effectively withdrawn from the European spot market. As a result, daily Russian pipeline supply to Europe is determined by the nominations made by Gazprom’s European counterparties. Since 31 August 2022 (the day on which flows via Nord Stream ceased), Russian pipeline gas deliveries to Europe have been made via two routes: transit via Ukraine to Central Europe (across Ukraine’s western border to Slovakia) and transit via Turkish Stream to South-East Europe.

The volume of gas crossing the Russian border into Ukraine has been stable at monthly averages of 40-43 MMcm/d since June 2022.[27] Since then, the flow of Russian gas into Ukraine has been 3-9 MMcm/d higher than the physical flow from Ukraine to Slovakia at Velké Kapušany, with that differential representing ‘backhaul’ imports into Ukraine. In December 2023, the flow from Ukraine to the EU at Velké Kapušany was higher than the flow from Russia to Ukraine. A parallel occurrence was the resumption of a physical flow of gas from Ukraine to Poland from 6 November 2023 to mid-March 2024. This was due to gas being withdrawn from Ukrainian storage and re-exported to the EU, not an increase

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[25] TotalEnergies, 2024. Denmark: TotalEnergies Restarts Gas Production at the Tyra Offshore Hub after a Major Redevelopment. *Press Release*, 22 March. https://totalenergies.com/media/news/press-releases/denmark-totalenergies-restarts-gas-production-tyra-offshore-hub-after

[26] Norwegian Offshore Directorate, 2024. Production figures February 2024. *Press Release*, 20 March. https://www.sodir.no/en/whats-new/news/production-figures/2024/production-figures-february-2024/

[27] The exceptions to this were January 2023 (32 MMcm/d) and February 2023 (35 MMcm/d)

in Russian pipeline gas delivery to Europe. The volumes were not large, but they do show that in winter 2023/24, volumes from Ukrainian storage were being re-sold into the EU gas market.

Looking ahead, the expiry on 31 December 2024 of the contract for the transit of Russian gas via Ukraine could result in the cessation of physical flows of Russian gas via Ukraine to the markets of Slovakia and Austria. It will also signal the end of backhaul gas imports into Ukraine, and potentially make it more challenging for Ukrainian importers to source physical imports from Central Europe, if the physical flow from Russia to the EU via Ukraine ceases and the Central European market tightens.

Here it is worth recalling that Ukrainian importers have not purchased gas directly from Gazprom since November 2015. The majority of Ukraine's imports are physical flows from West to East across Ukraine's borders with neighbouring EU member states. In 2023, Ukraine physically imported a total of 5.1 Bcm from Slovakia (1.4 Bcm), Hungary (1.3 Bcm), Poland (0.6 Bcm), and Romania (0.6 Bcm).

In addition, Ukraine imports gas from the EU using backhaul ('virtual reverse'), where physical volumes of Russian gas destined for the EU are offtaken as they pass through Ukraine, in accordance with agreements between the European buyers of those Russian volumes and the Ukrainian importers to whom those volumes are re-sold. In 2023, backhaul from Slovakia (435 MMcm), Hungary (22 MMcm), Poland (16.5 MMcm), and Romania (zero) provided a further 473.5 MMcm of imports. If gas transit via Ukraine ceases, backhaul will no longer be possible.

Given this possibility, it would not be surprising to see a greater than usual volume of imports into Ukraine in Q2 and Q3 2024, to fill Ukraine's gas storage facilities, and thus ensure supply to the domestic Ukrainian market in Q1 2025.

Elsewhere, monthly average Russian supply to South-East Europe via Turkish Stream has been stable in a range of 38-50 MMcm/d since July 2023, as measured on the Turkey-Bulgaria border where the daily capacity is 54 MMcm/d. While there is usually spare capacity on the Turkey-Bulgaria border, the capacity on the Bulgaria-Serbia border at Kireevo is 43 MMcm/d, and the capacity on the Serbia-Hungary border at Kiskundorozsma is 23 MMcm/d. In winter 2023/24, flows from Serbia to Hungary were generally 17-23 MMcm/d, which suggests that there may not be much spare capacity to use this route to supply Russian gas to Slovakia or Austria via Hungary if Russian gas transit via Ukraine stops on 31 December 2024.

North African supply is almost entirely from Algeria, with a small volume from Libya. The relative size (and long-run stability) of deliveries via different routes are illustrated by the fact that in both 2022 and 2023, 2.5 Bcm per year was supplied from Libya to Italy via the Green Stream pipeline, 22 Bcm per year from Algeria to Italy via the Transmed pipeline, and approximately 9 Bcm per year from Algeria to Spain via the Medgaz pipeline.

In winter 2023/24, supply from Libya to Italy was stable at around 6 MMcm/d, slightly below the average of 7 MMcm/d since June 2021. Since November 2021, Algerian supply to Spain has been via a single pipeline (Medgaz), where daily flows have remained within a corridor of 19-29 MMcm/d.

The greater volatility is in Algerian supplies to Italy via the Transmed pipeline, with variation in flows determined by long-term contract offtake nominations and the extent of spot purchases. The volumes made available by Sonatrach for spot purchase are influenced by Algeria's domestic supply and demand balance, and the volumes committed for export via Algeria's two LNG liquefaction plants.

The extent of the spot purchases in the past two calendar years is illustrated by the fact that Algerian state-owned Sonatrach has 13 Bcma of long-term contracts with Italian buyers, plus contracts with

Geoplin (Slovenia), and ENGIE for delivery via the Transmed pipeline. These contracts allow for substantial additional spot purchases, over and above these volumes.[28] [29] [30] [31] [32]

According to the pipeline operator, the capacity of the Transmed pipeline is 100.7 MMcm/d.[33] In winter 2023/24, the daily flows via Transmed varied from 28 to 81 MMcm/d, while the monthly average flows between October 2023 and March 2024 ranged from 43 to 62 MMcm/d, at an average of 53 MMcm/d. In summer (April to September) 2023, the monthly averages were notably higher, ranging from 57 to 80 MMcm/d, at an overall average of 67 MMcm/d. This suggests substantial spare capacity on both a daily and monthly average basis in both summer and winter.

Looking ahead to summer 2024, the issue to watch will be the extent to which Sonatrach's long-term contract counterparties increase their nominations (compared to summer 2023) or attempt to make spot purchases above and beyond those contracts, for supply via Transmed as a source of supply for storage replenishment. This will be influenced by the price competitiveness of Algerian pipeline supply relative to landed LNG and the minimum volume that those counterparties must offtake in a calendar year.

Azeri supply continues at full capacity of Trans-Adriatic Pipeline (TAP), averaging 30-34 MMcm/d in every month since September 2022. During winter 2023/24, the most notable developments with regard to Azeri gas supply to Europe were the signing of a gas supply contract between Azeri state-owned SOCAR and Serbian state-owned Srbijagas, in November 2023,[34] and the inauguration of the Bulgaria-Serbia interconnector (IBS) in December 2023. The gas supply contract will take effect from 2024 with a volume 'up to' 400 MMcm per year, while the Interconnector Bulgaria-Serbia (IBS) has an annual capacity of 1.8 Bcma (4.93 MMcm/d). At the launch of the IBS, the Serbian Minister of Energy, Dubravka Đedović Handanović, noted that the new pipeline will give Serbia access to not only Azeri gas, but supply from other sources as well, including LNG via the new Alexandroupoli FSRU in Greece.[35]

The diversification of Serbia's gas supplies is notable because Serbia has traditionally been 100 per cent dependent on Russian pipeline gas supply from Gazprom. This should be seen in the context of a South-East European regional market traditionally dominated by Gazprom, where Slovenia, Bulgaria, and Romania no longer receive long-term contract supplies from Gazprom, and Gazprom's contracts with DEPA (Greece) and PPD (Croatia) expire in 2026 and 31 December 2027, respectively.[36] [37]

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[28] Sonatrach's contracts are with Eni to 2027 (9 Bcma) and Enel until 2028 (3 Bcm) (both with the option of two more years), and Edison until 2027 (1 Bcm). The three-year contract with Geoplin was signed in November 2022. Geoplin's 0.6 Bcma contract with Gazprom expired in January 2023, and its contract with Sonatrach could be a similar volume.

[29] Elliott, S., 2019. Algeria's Sonatrach renews long-term gas sales contract with Italy's Edison. *S&P Global Commodity Insights*, 12 November. https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/111219-algerias-sonatrach-renews-long-term-gas-sales-contract-with-italys-edison

[30] Sonatrach, 2023. SONATRACH and the Slovenian company GEOPLIN sign a contract for the purchase and sale of natural gas. *Press Release*, 15 November. https://sonatrach.com/presse/sonatrach-et-la-compagnie-slovene-geoplin-signent-un-contrat-dachat-et-de-vente-de-gaz-naturel/

[31] Geoplin, 2022. Geoplin signed a contract for natural gas from Algeria. *Press Release*, 15 November. https://www.geoplin.si/en/news-and-reports/geoplin-signed-a-contract-for-natural-gas-from-algeria

[32] Geoplin, 2018. A new contract on natural gas supply to Slovenia is signed. *Press Release*, 13 April. https://www.geoplin.si/en/news-and-reports/a-new-contract-on-natural-gas-supply-to-slovenia-is-signed

[33] Transmed, 2024. *Urgent Market Messages*. https://www.transmed-spa.it/urgent_messages.php?lingua=2

[34] SOCAR, 2023. Documents of strategic significance were signed between Azerbaijan and Serbia in the field of natural gas. *Press Release*, 15 November. https://www.socar.az/en/post/documents-of-strategic-significance-were-signed-between-azerbaijan-and-serbia-in-the-field-of-natural-gas

[35] Srbijagas, 2023. The presidents of Serbia, Azerbaijan and Bulgaria and the head of the EU delegation in Serbia, in the presence of the director of Srbijagas and numerous other dignitaries, put into operation the new gas interconnector between Serbia and Bulgaria. *Press Release*, 10 December. https://www.srbijagas.com/?p=16084

[36] Reuters, 2022. Greece's DEPA, Gazprom agree long-term gas deal. *Reuters*, 4 January. https://www.reuters.com/business/energy/greeces-depa-gazprom-agree-long-term-gas-deal-2022-01-04/

[37] Vecernji List, 2017. Russian Gazprom and PPD signed a ten-year supply of gas. *Vecernji List*, 18 September. https://www.vecernji.hr/biznis/ruski-gazprom-i-ppd-ugovorili-desetogodisnu-isporuku-plina-1195136

3.6.3. European LNG sendout and import capacity

Northern European LNG sendout shifts from UK to new FSRUs in EU

Although a breakdown of European LNG imports by sub-region is provided in Figure 9, the contribution of LNG supply to the European market on a daily basis is best illustrated using data on sendout from European regasification terminals, as presented in Figure 13 and Figure 14.

Figure 13 illustrates not only the strong seasonality of LNG sendout in the UK (where it acts as a seasonal source of supply in the absence of substantial seasonal underground gas storage facilities), but also the ability to LNG sendout to respond rapidly to brief surges in gas demand. Figure 14 shows a similar spike in LNG sendout in Iberia in mid-January 2024, in response to a brief surge in demand.

European LNG regasification capacity, and the capacity of LNG storage tanks at those regasification terminals, are now sufficient to enable rapid ramp-up of gas supply into the national grid systems of Europe to make a valuable contribution to meeting fluctuations in demand.

Figure 13 also shows the year-on-year decline in UK LNG sendout in winter 2023/24. This is a consequence of new LNG regasification facilities in Germany (Wilhelmshaven, Brunsbüttel, and Lubmin), Netherlands (Eemshaven), and France (Le Havre) being fully operational over winter 2023/24, meaning that continental North-West Europe had less need for regasified LNG being re-exported from the UK to Belgium and the Netherlands via the Interconnector and BBL pipelines, respectively.

Continued growth in European LNG import capacity

European import capacity continues to grow, with Phase 1 of the expansion of the Zeebrugge regasification terminal coming online on 1 January 2024. The expansion increased the nominal import capacity at Zeebrugge from 6.6 mtpa (9.0 Bcma) to 11.3 mtpa (15.4 Bcma). Phase 2 (due in 2026) will increase the capacity further, to 12.6 mtpa (17.2 Bcma). [38] [39]

Looking ahead, three more German FSRUs at the ports of Wilhelmshaven, Lubmin, and Stade (15 Bcma in total)[40] and the Alexandroupoli FSRU in Greece (5.5 Bcma) are all set to begin operation in Q2 2024, adding just over 20 Bcma of new import capacity. In addition, the expansion of the Swinoujscie LNG regasification terminal in Poland, which will increase nominal import capacity by 2.1 Bcma from 6.2 Bcma to 8.3 Bcma, is set for completion in 2024.[41] [42]

In Germany, plans are continuing to move forward for three new onshore LNG regasification terminals to replace the FSRUs in 2026-2027. At Stade, FID for a 13.3 Bcma-capacity onshore regasification terminal was announced on 21 March 2024.[43] At Wilhelmshaven, Tree Energy Solutions (TES) announced on 25 March that its planned 15 Bcma onshore project had received exemptions from tariff and third-party access regulations for 20 years from the start of operations and that it expects to take

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[38] GIIGNL, 2023. *GIIGNL Annual Report 2023 Edition*. 13 July. https://giignl.org/resources2/ (see page 64)

[39] GIIGNL, 2024. Zeebrugge expansion has started operations. *News*, 11 January. https://giignl.org/zeebrugge-expansion-has-started-operations/

[40] In Wilhelmshaven, the *FSRU Hoegh Esperanza* has been in place since December 2022, and will be augmented by the *FSRU Excelsior*. In Lubmin, the *FSRU Hoegh Neptune* has been in place since December 2022 and will be augmented by the *FSRU Energos Power*. Both FSRUs will move from Lubmin to Mukran, to gain access to deeper water and the ability to receive full-sized LNG carriers. The *FSRU Hoegh Gannet* has been operational at Brunsbüttel since April 2023. The *FSRU Energos Force* is due to become operational at the port of Stade in Q2 2024.

[41] Gaz-System, 2024. *LNG terminal expansion program*. https://www.gaz-system.pl/en/terminal-lng/lng-terminal-expansion-program.html

[42] TGE Gas Engineering, 2024. *05617 // LNG Terminal Extension | Świnoujście, Poland*. https://www.tge-gas.com/pf/lng-terminal-extension-swinoujscie-poland/

[43] Hanseatic Energy Hub, 2024. Green light given for Germany's first land-based terminal for liquefied gases in Stade. *Press Release*, 21 March. https://www.hanseatic-energy-hub.de/en/news/detail/gruenes-licht-fuer-deutschlands-erstes-landbasiertes-terminal-fuer-verfluessigte-gase-in-stade/

FID later in 2024.[44] Gasunie and RWE are also planning an 8 Bcma onshore terminal at Brunsbüttel, but have not yet taken FID.[45]

Overall, European LNG import capacity of 255.6 Bcma at the end of 2023 is set to rise to 284.7 Bcma by the end of Q2 2024 – an increase of 29.1 Bcm (11.4 per cent). The increase in capacity is by no means a guarantee of higher overall European import volumes, but the new capacity in Belgium and Germany will likely result in another year-on-year decrease in net flows from the UK to the EU in summer 2024. The expansion of import capacity is set to continue in 2025 with an FSRU in Ravenna, Italy, and the expansion of Isle of Grain, UK, adding 10 Bcma of import capacity. This will be followed by the Zeebrugge Phase 2 expansion and expansion of Gate Rotterdam adding a further 5.8 Bcm in 2026, taking European regasification capacity past 300 Bcma at a time when global LNG supply is expected to be growing strongly, in particular from the United States and Qatar.

3.6.4. European gas storage

The EU-27 began winter 2023/24 with stocks of 100.9 Bcm on 1 October, which then rose to a peak of 105.25 Bcm on 6 November. The stocks on 1 October 2023 were a record for that date, being marginally higher than stocks on 1 October in 2019 (99.24 Bcm) and 2020 (98.56 Bcm). The peak stocks were also the largest volume ever held in EU-27 storage, above the 101.2 Bcm held on 19 October 2019.

European storage capacity reached its present size in April 2016, meaning that the winter of 2016/17 is the earliest that is comparable with the most recent winter. Between 1 November and 31 March, the winter of 2023/24 saw a net withdrawal of 44.0 Bcm. This is the same as winter 2019/20, slightly more than the record smallest winter withdrawal of 40 Bcm in winter 2022/23, and significantly less than the winters of 2020/21 (67 Bcm) and 2021/22 (52 Bcm).

Aside from the cold snap in January 2024, it is clear that storage withdrawals (as a marginal source of supply) were lower due to European gas consumption falling to the bottom of the 2017-22 range in Q4 2023 and being at or below the 2017-2023 range in February-March 2024.

Looking ahead, with end of winter stocks of 61.6 Bcm on 31 March 2024, Europe finds itself in the relatively benign position of requiring net storage replenishment of around 34 Bcm to reach the EU target of stocks being 90 per cent of capacity by the start of winter, and a net storage replenishment of just over 43 Bcm to return to the record high stocks of 105 Bcm seen in mid-November 2023.

The context for European storage replenishment in summer 2024 – with summer defined as the period from 1 April to 31 October – is the expectation of a relatively limited year-on-year change in supply from production, pipeline imports, and LNG imports, and a relatively limited year-on-year change in demand. With this in mind, the fact that European storage replenishment in summer 2024 will be slightly lower than in summer 2023 (47 Bcm) and summer 2021 (48 Bcm), and substantially lower than summer 2022 (70 Bcm), is suggestive of a reasonably balanced European gas market in summer 2024.

3.6.5. Total European supply

Taking all elements of supply – production, pipeline and LNG imports, net storage withdrawals, and physical re-exports to Ukraine – it is possible to generate implied European gas consumption, as illustrated in Figure 16. Overall, implied European gas consumption in Q4 2023 was down by 1.2 Bcm (1.1 per cent) year-on-year, while implied consumption in Q1 2024 was down by 3.8 Bcm (2.9 per cent) year-on-year, thus giving a total decline of 5.1 Bcm (2.1 per cent) for the winter as a whole.

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[44] TES, 2024. Wilhelmshaven Green Energy Hub receives exemption from regulation. *Press Release*, 25 March. https://tes-h2.com/news/wilhelmshaven-green-energy-hub-receives-exemption-from-regulation

[45] Gasunie, 2023. European Commission approves state aid for Brunsbüttel LNG terminal. *Press Release*, 27 July. https://www.gasunie.nl/en/news/european-commission-approves-state-aid-for-brunsbuettel-lng-terminal

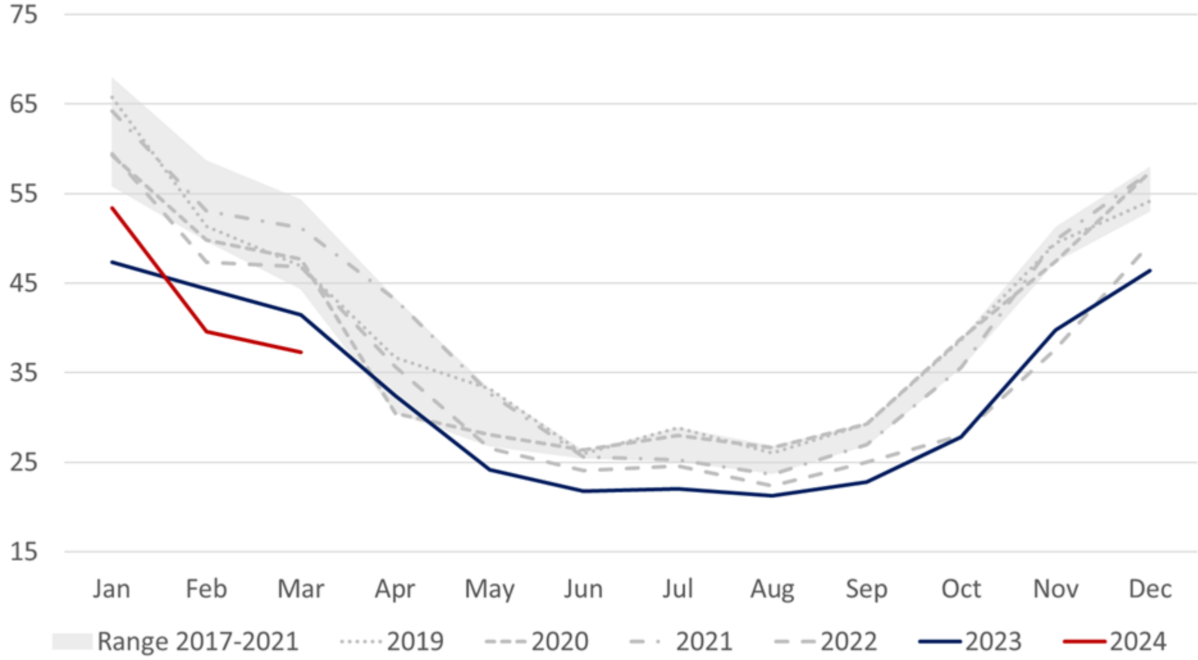
While the drivers of those demand levels will be analysed in the following section, the main supply-side conclusions from winter 2023/24 concern the limited near-term upside potential to supply from production and pipeline imports. While LNG is more flexible, it is now performing a dual role in European gas supply. On the one hand, it has replaced the lost volumes of Russian pipeline gas as baseload supply to the European market, providing supply to meet both winter demand in Q4-Q1 and early summer storage replenishment (Q2), ramping down in Q3 as storage reaches full capacity. This is reflected in the fact that LNG provided 37 per cent of European (non-storage) gas supply in 2023.

On the other hand, the significant fluctuations in daily LNG sendout demonstrate the importance of LNG storage stocks and rapid sendout in reaction to sudden shifts in European demand relating to both temperature-driven gas demand for space heating and providing feedstock to gas-fired power plants that have the flexibility to balance non-dispatchable power generation.

With supply from production and pipeline imports relatively stable, storage replenishment that is predictable based on storage target achievement, and growth in China and South-East Asia likely to absorb much of the incremental year-on-year growth in global LNG supply, the relative tightness (and price levels) on the European gas market will be strongly influenced by demand-side dynamics, in particular the question of whether European gas demand reached a nadir in 2023 and could begin a rebound, or could fall even further.

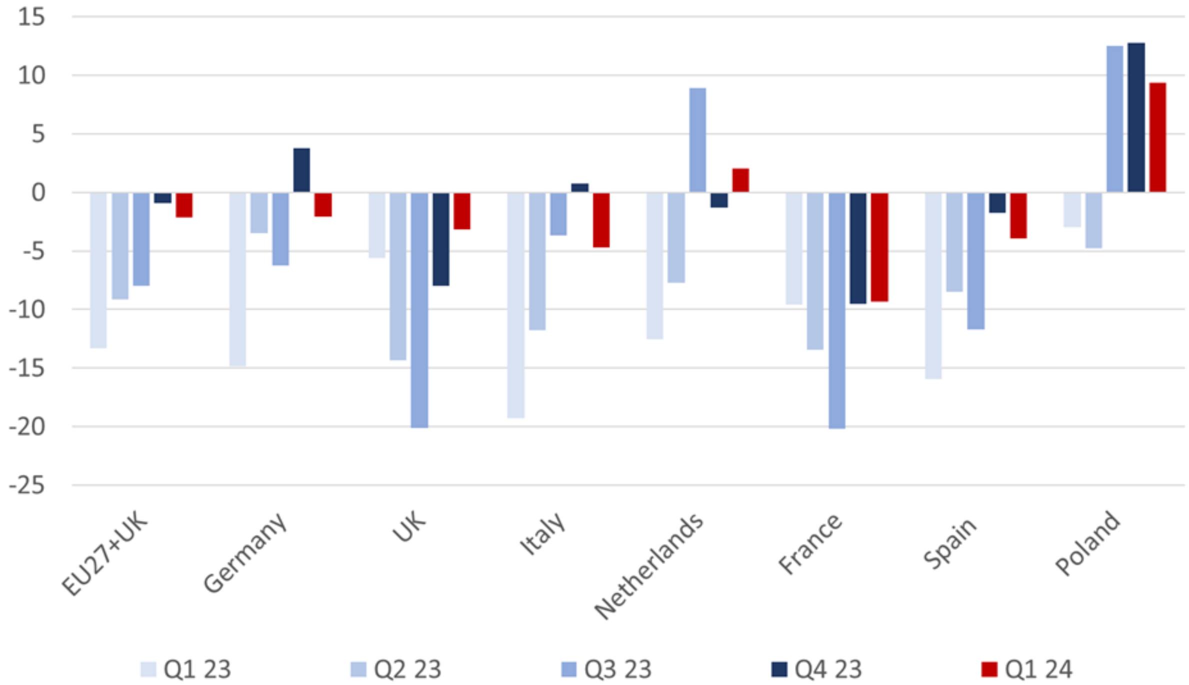
4. Analysis of European gas demand

Figure 17: EU-27 plus UK observed gas demand (Bcm)



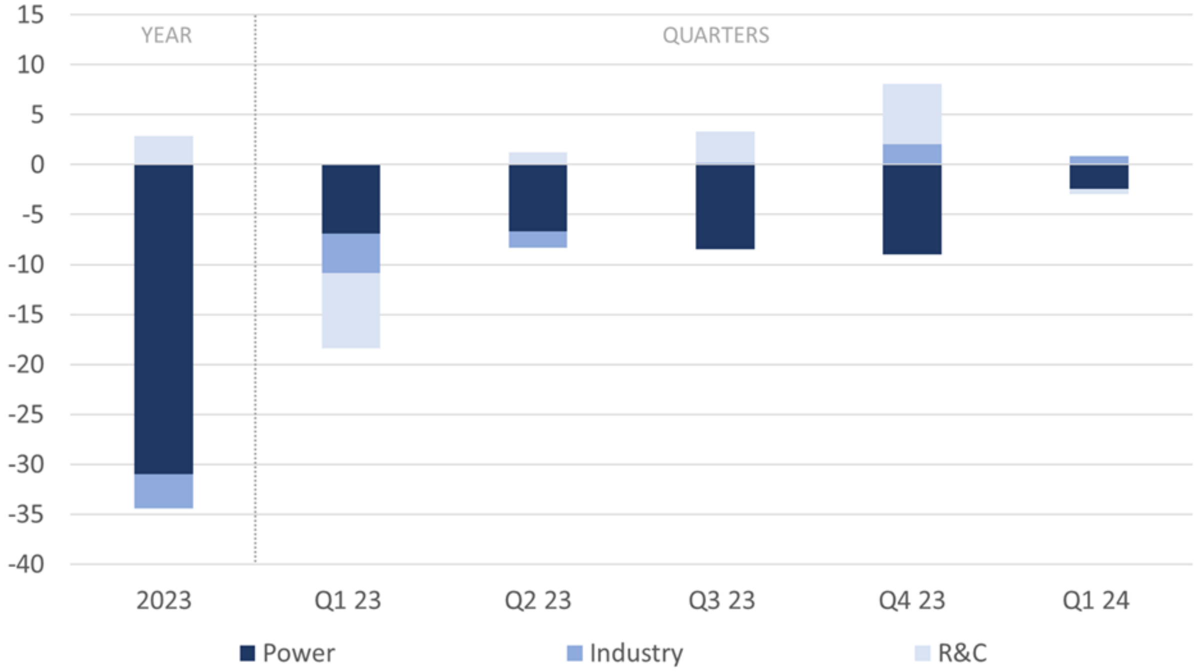
Data from author's assumptions and calculations based on various sources, including IEA, Eurostat, ENTSOG, GRTgaz, Terega, THE, SNAM, Enagas and NGT. Graph by the author.

Figure 18: Year-on-year change in observed gas demand in the seven largest gas markets (%)



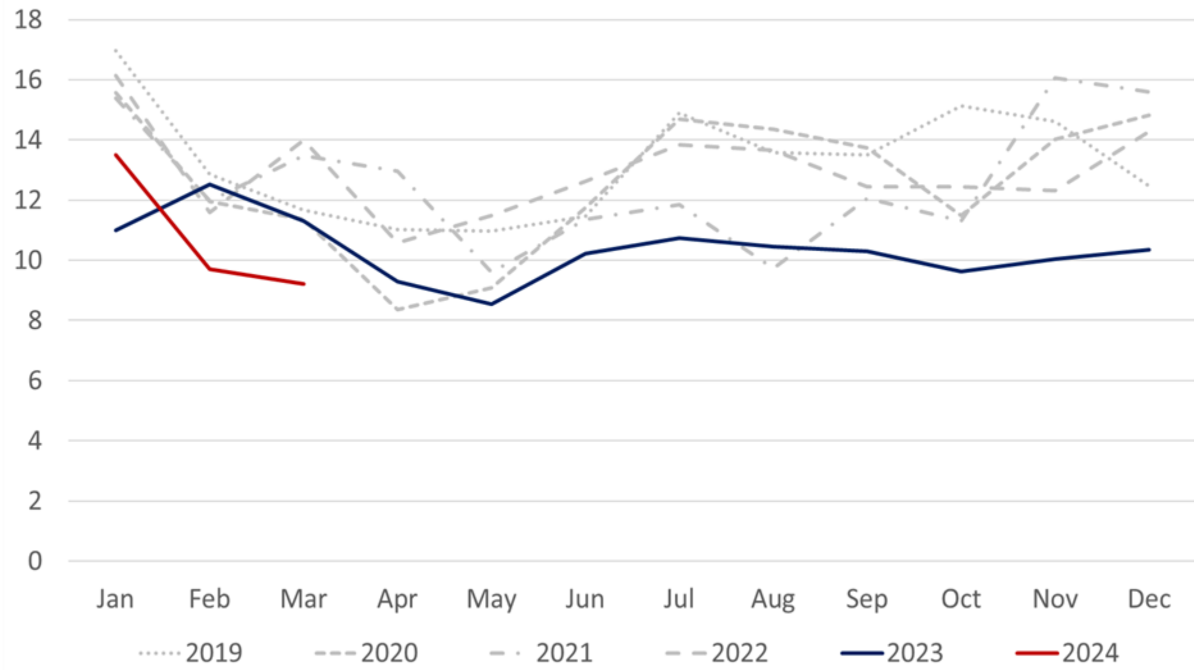
Data from author's assumptions and calculations based on various sources, including IEA, Eurostat, ENTSOG, GRTgaz, Terega, THE, SNAM, Enagas and NGT. Graph by the author.

Figure 19: Year-on-year change in EU-27 plus UK observed gas demand in key sectors (Bcm)



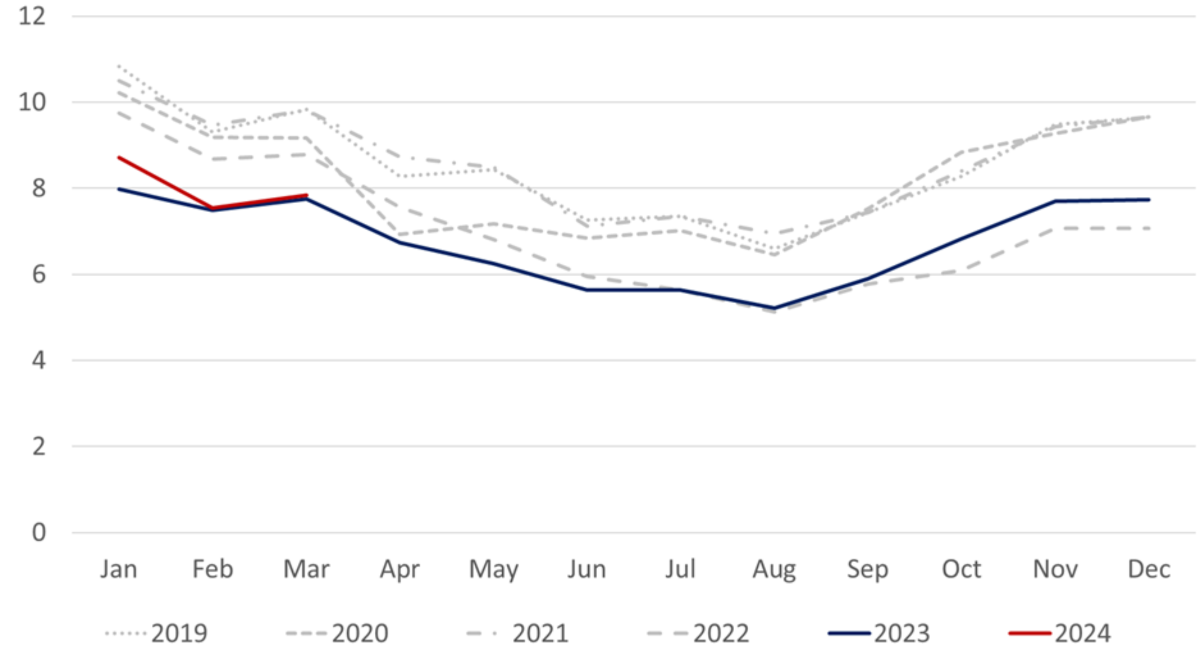
Data from author’s assumptions and calculations based on various sources, including IEA, Eurostat, ENTSOG, GRTgaz, Terega, THE, SNAM, Enagas and NGT. Graph by the author.

Figure 20: EU-27 plus UK gas demand in the power sector (Bcm)



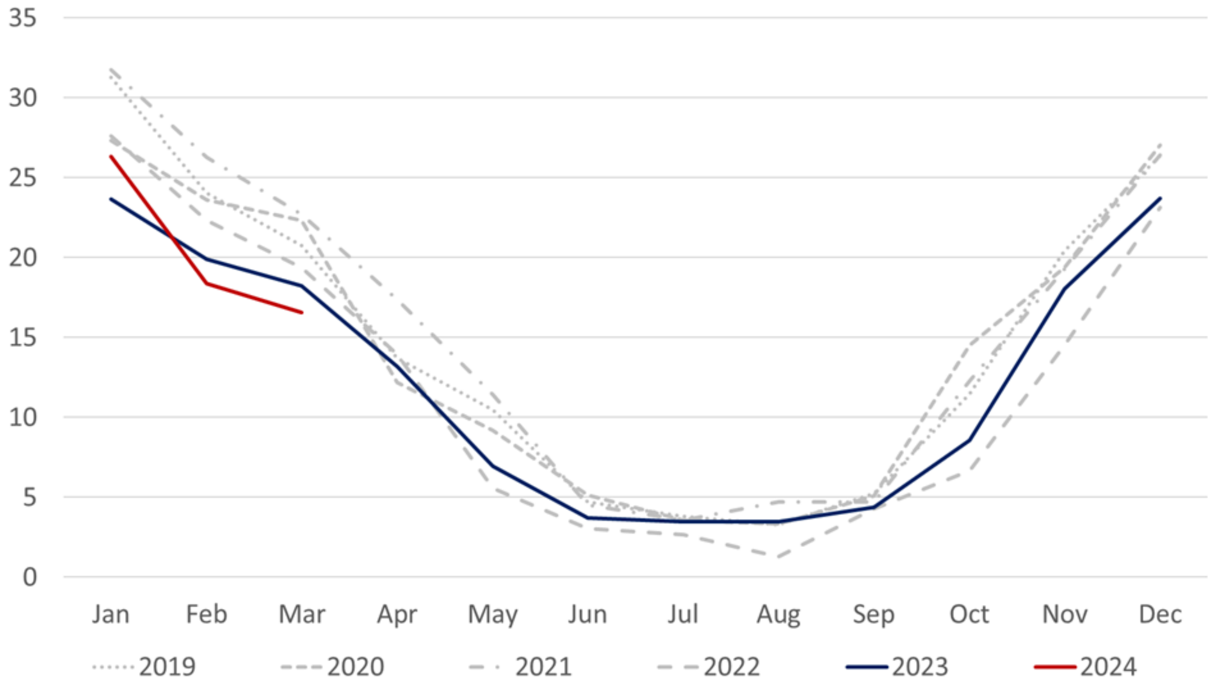
Data from author’s assumptions and calculations based on various sources, including IEA, Eurostat, ENTSOG, GRTgaz, Terega, THE, SNAM, Enagas and NGT. Graph by the author.

Figure 21: EU-27 plus UK gas demand in the industrial sector (Bcm)



Data from author's assumptions and calculations based on various sources, including IEA, Eurostat, ENTSOG, GRTgaz, Terega, THE, SNAM, Enagas and NGT. Graph by the author.

Figure 22: EU-27 plus UK gas demand in the residential and commercial sector (Bcm)



Data from author's assumptions and calculations based on various sources, including IEA, Eurostat, ENTSOG, GRTgaz, Terega, THE, SNAM, Enagas and NGT. Graph by the author.

4.1. European gas demand declines extend into third year

Observed gas demand in EU-27 plus UK dropped to 395 Bcm in 2023 despite much lower year-on-year gas prices, as illustrated in Figure 17. This was almost 100 Bcm less than just two years ago, raising questions as to whether some major demand losses may be permanent.

Gas consumption is influenced by country-specific factors and as such, the picture was uneven around Europe as shown in Figure 18.[46] Poland for instance is a good example of deviation from the trend, especially gas use in the power sector which increased by 37 per cent year-on-year in 2023. Anecdotally, the EU easily met its gas demand reduction targets for the period covering April 2023 to March 2024, with over 14 Bcm to spare.[47]

Overall, gas demand this winter continued the trend with a total decline of 4 Bcm (1.6 per cent). In Q4 2023, gas use was down by 1.1 Bcm (0.9 per cent) year-on-year driven by the power sector as illustrated in
Figure 19. Signs of rebound in the other sectors were short-lived, and the timid growth momentum seems to have now receded. As a result, gas demand was down by 2.9 Bcm (2.2 per cent) year-on-year in Q1 2024. These figures are very close to the supply-side 'implied consumption' noted in section 3.6.5 earlier.[48]

Consequently, we now expect gas demand in 2024 to remain nearly flat year-on-year, a revision lower from our previous view that demand would grow this year by 1-1.5 per cent.[49]

4.2. Trends and drivers by sector

Reduced gas for power generation was the main factor in 2023

In 2023, gas use for power generation was down by 20 per cent on the back of low electricity demand due to energy savings and economic slowdown, improved renewables availability, and the progressive return of the French nuclear fleet in line with EDF's target.

In 2024, the same drivers suggest overall weak gas demand (Q1 was down by 7 per cent year-on-year as illustrated in Figure 20). There are, however, two main caveats: first, days with low wind availability will undoubtedly mark a short-term spike in gas use; and second, if electricity demand picks up, then gas plants may be needed to replace some of the planned 15GW of coal power capacity due to be phased out, especially during cold days. However, with economic forecasts being generally revised down, a sudden recovery in electricity consumption is unlikely.

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[46] Gas consumption is influenced by country-specific factors, which are multiple and include the role of gas in the energy mix, access to alternative fuels, and more recently, the levels and extent of the support measures from governments to shield their national consumers from the worst impacts and long-term consequences of high energy and gas prices.

[47] On 28 March 2023, the Council reached a political agreement on a new regulation that set a voluntary target for member states to reduce their natural gas consumption by 15 per cent between 1 April 2023 and 31 March 2024, compared to their average consumption in the period between 1 April 2017 and 31 March 2022. https://www.consilium.europa.eu/en/press/press-releases/2023/03/28/member-states-agree-to-extend-voluntary-15-gas-demand-reduction-target/

[48] Data for observed gas demand in this section differ from the data for implied gas consumption in the previous section. The later represents a calculated gas demand using a top-down methodology. Observed gas demand in this section is calculated using a bottom-up methodology. As a result, both methods use different sources, methodologies, and definitions. For a market of about 400 Bcm composed by 28 countries, a few Bcm of difference are to be expected. The authors verified that the overall conclusions and trends remained consistent.

[49] Honoré A., 2023. *European gas demand fundamentals, Q3 2023 review, October 2023 first glance, and winter 2023/2024 outlook*. Oxford Institute for Energy Studies. https://www.oxfordenergy.org/wpcms/wp-content/uploads/2023/11/Insight-138-European-gas-demand-fundamentals-.pdf

Lacklustre economic activity caps industrial gas demand

Overall gas use in the industrial sector was down by 4 per cent last year. Interestingly, a closer analysis highlights remarkable differences between the beginning and the end of the year with signs of a year-on-year rebound in Q3 and Q4 2023 (although from record low levels in 2022), which were driven by the petroleum and the chemical sectors.

In Q1 2024, industrial gas demand was up by about 4 per cent year-on-year, but it was largely the result of cold temperatures in January, as shown in Figure 21. For the rest of the year, considering the trends in EU manufacturing output, which fell in 2023 after two consecutive years of recovery following the impacts of the Covid-19 pandemic, and the general worsening of the economic outlook in Europe, then the demand for end-products (rather than the level of gas prices) is likely to be the key driver placing a cap on industrial gas demand recovery in 2024.

Demand in the R&C sector to be flat, after very mild weather in Q1

In 2023, gas consumption in the residential and commercial sector was up by 2 per cent, driven by a combination of the apparent rebound in the commercial sector from Q2 and several cold days in October and November, as illustrated in Figure 22.

In Q1 2024, gas use was down by almost 2 per cent after (very) mild temperatures in February and March. This sector is, and will continue to be, the largest uncertainty regarding year-on-year variation in gas consumption. But unless the end of the year is particularly cold, overall gas demand in 2024 is likely to be flat, or slightly down.

4.3. Conclusion for 2024 and black swans

There are still many moving pieces to the puzzle, but overall European gas demand in 2024 is likely to be, at best, nearly flat year-on-year. Limited use of gas in power generation is unlikely to be counterbalanced by higher gas use in the other sectors, although a modest rebound in industrial gas consumption could happen, especially in Central and Eastern Europe where the latest economic forecasts anticipate higher GDP growth for 2024.[50] In addition, high import costs could also trigger some rebound in domestic ammonia production, while gas demand for other gas-intensive sectors remains weak.

Two possible black swans include higher-than-expected economic growth in some Western European countries and severely cold weather for prolonged period(s) at the end of the year, which would boost the use of gas for heating, even assuming consumer demand restraint continues to some degree in the context of lower gas prices. Both events would also trigger higher electricity demand around Europe, and in turn increase the probability of higher gas use in the power generation sector.

[50] For instance, see: European Commission, 2024. *Winter 2024 Economic Forecast*, 15 February. https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/economic-forecasts/winter-2024-economic-forecast-delayed-rebound-growth-amid-faster-easing-inflation_en#forecast-for-countries

Conclusions

The winter of 2023/24 stands in sharp contrast to the winter of 2022/23, when TTF front-month prices began the winter at 50 USD/MMBtu and faced a second peak of around 45 USD/MMBtu in December 2022, before falling away. In winter 2023/24, the peak in October was one-third that level, around 16 USD/MMBtu. Not only did Europe begin the winter of 2023/24 more sanguine than twelve months earlier, but it became even more bearish throughout the winter, as illustrated by the changes in forward curves.

On the supply side, the 5 Bcm year-on-year increase in pipeline imports in winter 2023/24 (due to higher volumes from both Russia and Norway) and 1 Bcm year-on-year decrease in physical re-exports to Ukraine almost precisely offset the 6 Bcm year-on-year decline in European production. With European demand once again lower year-on-year, there was less call on the marginal sources of supply, namely LNG sendout and storage withdrawal.

Starting the European winter with record storage stocks provided a significant buffer, and as the winter progressed, the relatively slow rate of storage withdrawals meant that the market only grew in confidence as time went on that Europe would finish the winter with record stocks on 31 March 2024. The reduced call on LNG, in the context of a global LNG market that continues to add only incremental supply growth as it awaits the ‘wave’ of substantial new supply from 2025/26 onwards, meant that the global LNG market also loosened somewhat, pulling down Asian spot prices in line with the decline in European prices and stimulating LNG demand growth in some of the price-sensitive markets.

Therefore, it was subdued European demand, rather than abundant supply, that underpinned the bearish price dynamic throughout winter 2023/24. The overall weakness in European gas demand in winter 2023/24 was due to a ‘perfect storm’ of weak demand across all three of the largest gas-consuming sectors simultaneously: less call on gas-fired power generation, weak industrial gas demand, and a mild winter (especially in February and March) reducing the space heating load.

Looking ahead to Q2 2024, the macro-economic outlook for Europe suggests that industrial gas demand is unlikely to rebound. In terms of weather-driven demand, Q2 is usually a ‘limbo’ period, with temperatures being notably milder than winter but lacking the peak summer temperatures that may drive air conditioning load and, by extension, gas-fired power generation. On the supply side, the fact that Europe has made a rapid start to its storage replenishment (with stocks growing by 2.7 Bcm between 31 March and 13 April and on course to add more than 6 Bcm in April alone) is an early indicator of robust supply relative to demand.

The key factors to look for in the coming quarter will be continued updates and revisions to the macro-economic outlook, the forecast year-on-year increase in Norwegian pipeline supply in the absence of maintenance-led curtailments that curbed supply in summer 2024, and the rate of storage replenishment, as these will all have substantial influence over the outlook for the subsequent quarter.

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