



THE OXFORD
INSTITUTE
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STUDIES

European Gas Supplies: Outlook for Winter 2023/24

Swedish Energy Agency - Globala Energifrågor

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European Gas Demand: Limited Short-Term Flexibility

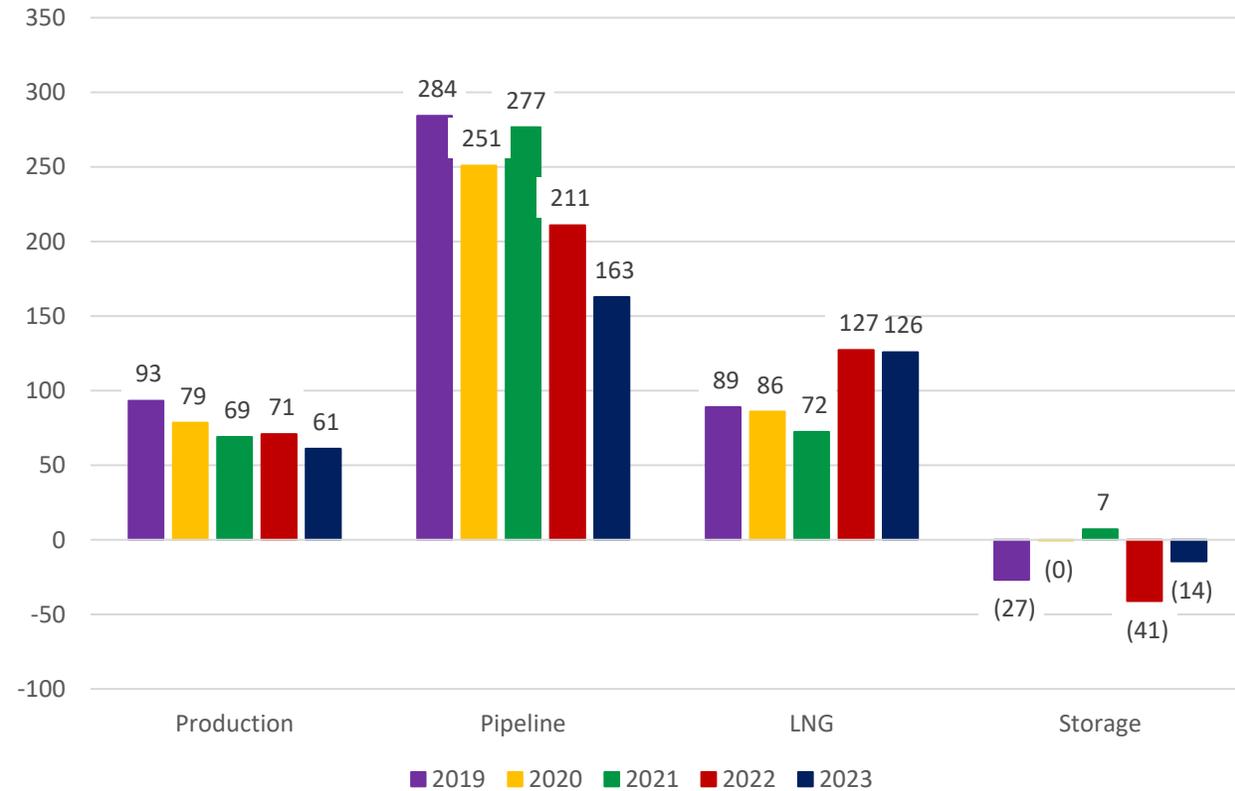
- European gas consumption primarily occurs in three sectors:
 - Electricity generation: Gas and coal-fired power stations ‘fill the gap’ between electricity demand and non-fossil power generation
 - Residential and commercial: Gas consumption in this sector is primarily used for space heating
 - Industry: Gas is used for process heat, for space heating in factories, and as a non-energy chemical feedstock
- Power generation: Gas demand is only flexible to the extent that it competes with coal-fired power stations
 - In the UK, a combination of carbon prices and the CSP have pushed coal out of UK power generation
- Residential/commercial sector: Gas demand in the is only flexible in the short-term on the basis of consumer behaviour (turning down the thermostat) and is heavily influenced by seasonal temperatures
- Industrial sector: Gas demand is influenced by gas prices, and broader economic conditions
- Because gas demand is relatively inelastic (outside industry), supply must be flexible enough to match demand as it fluctuates. European gas supply is derived from multiple sources:
 - Production, pipeline imports, LNG imports, and seasonal withdrawals from underground gas storage facilities



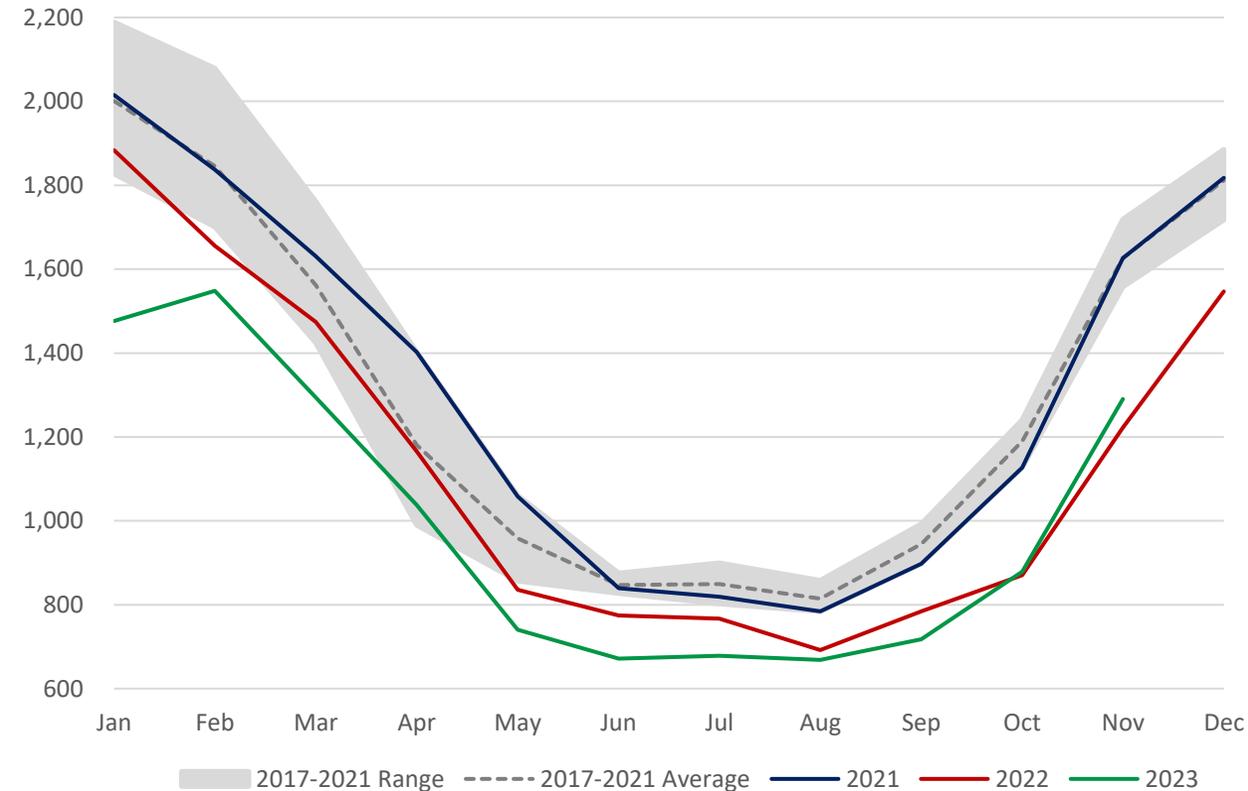
Ongoing Trends in European Supply (Implied Consumption)

Data sources: ENTSOG Transparency Platform; Eurostat; Gas Infrastructure Europe (AGSI); Kpler LNG Platform

January-November YTD Supply to Europe by Source (Bcm)



Total Supply to Europe (EU+UK), MMcm/d



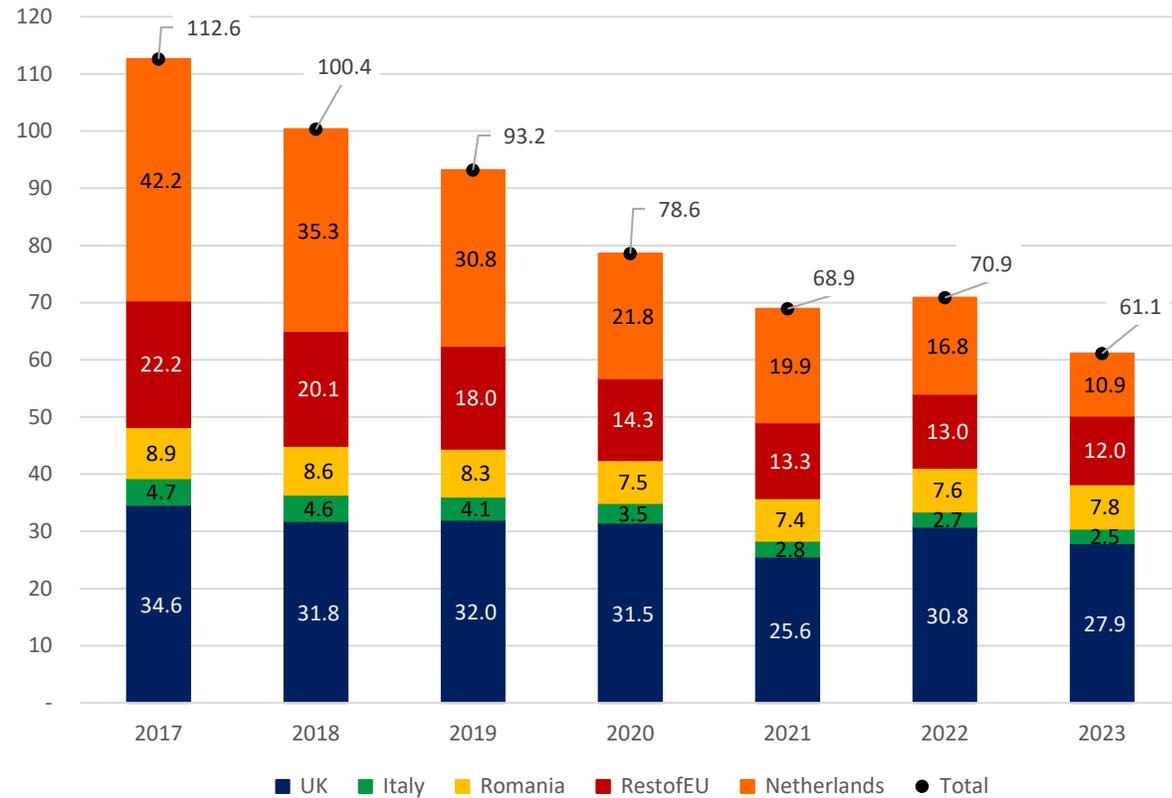
- In the YTD (January-November), total supply is -34.3 bcm (-9%) y-o-y, and -92.1 bcm (-22%) vs 2021
- The 58.25 bcm year-on-year combined decline in production (-9.8 bcm), pipeline supply (-48.05 bcm) and LNG sendout (-0.4 bcm), and more exports to Ukraine (+2.75 Bcm) has been partially offset by change in net withdrawals from storage (+26.7 bcm)
- Lower demand balanced the market in Q1-3, but demand in October-November similar y-o-y and may continue to be so in the rest of winter 2023/24



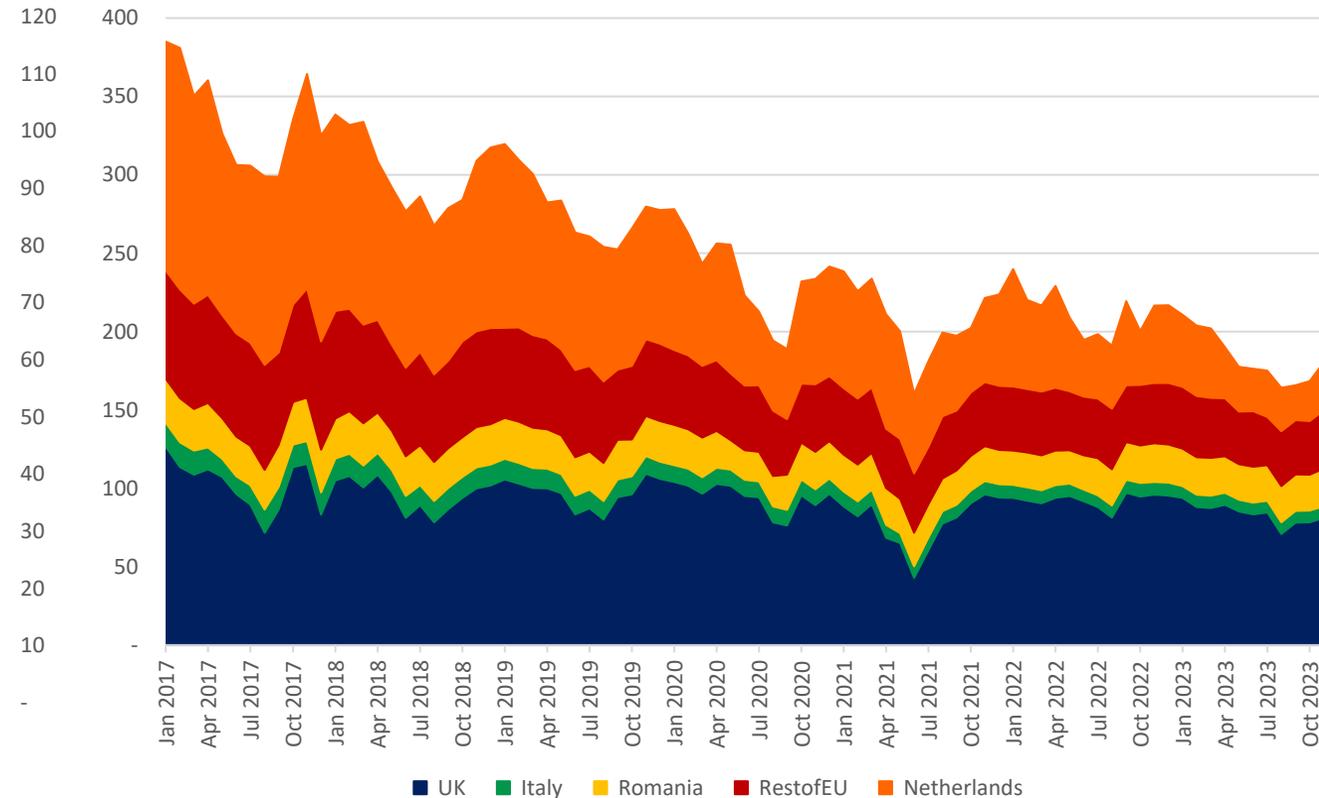
European Gas Production

Data sources: ENTSOG Transparency Platform; Eurostat

European Gas Production by Source in Year To Date, Jan-Nov (bcm)



European Gas Production by Source (mmcm/d)



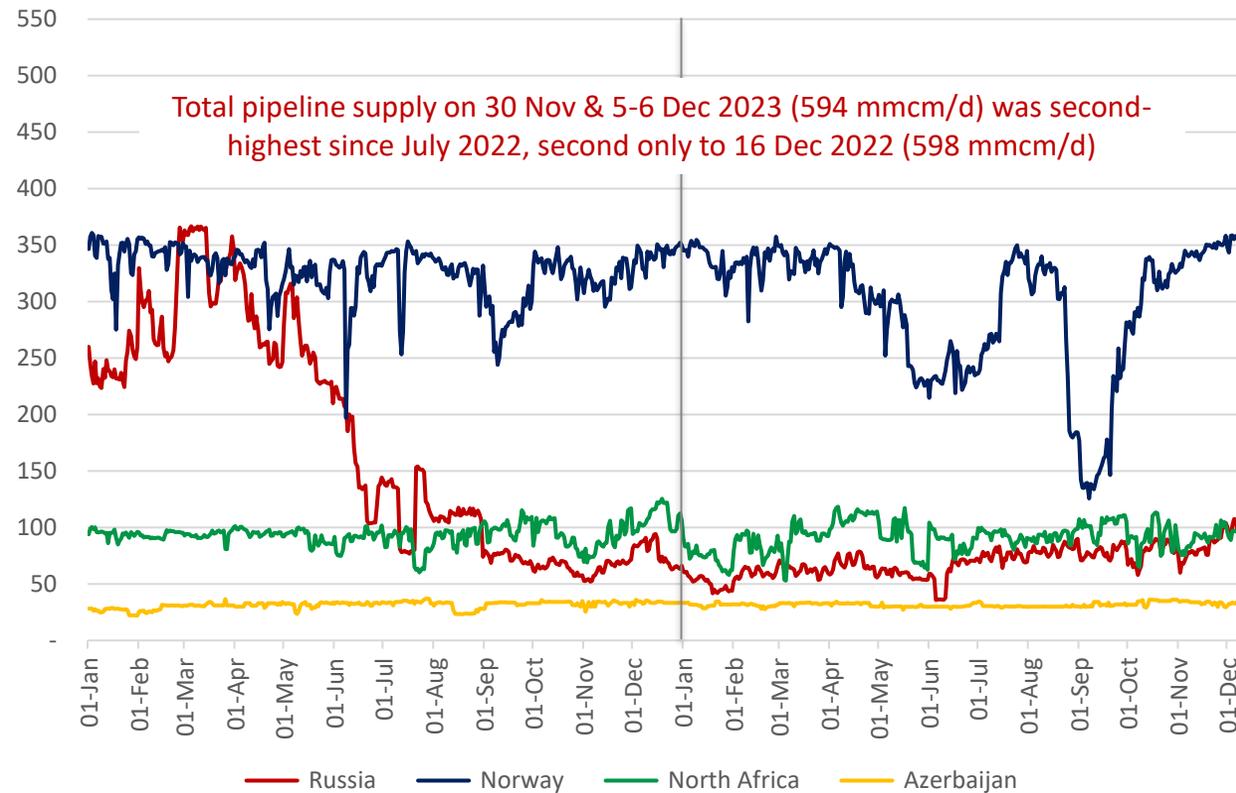
- Groningen production cap fell from 4.5 bcm in Gas Year 2021/22 to 3.2 bcm in Gas Year 2022/23, and halted on 1 October 2023
- Until 1 Oct 2024, Groningen will be held in readiness as ‘backup’ with the ability to restart production at relatively short notice
- Production in January-November shows continued decline not only in Netherlands, but also in the rest of the EU (except Romania)
- Declining European production reduces seasonal swing in supply, and raises importance of storage and LNG storage/sendout



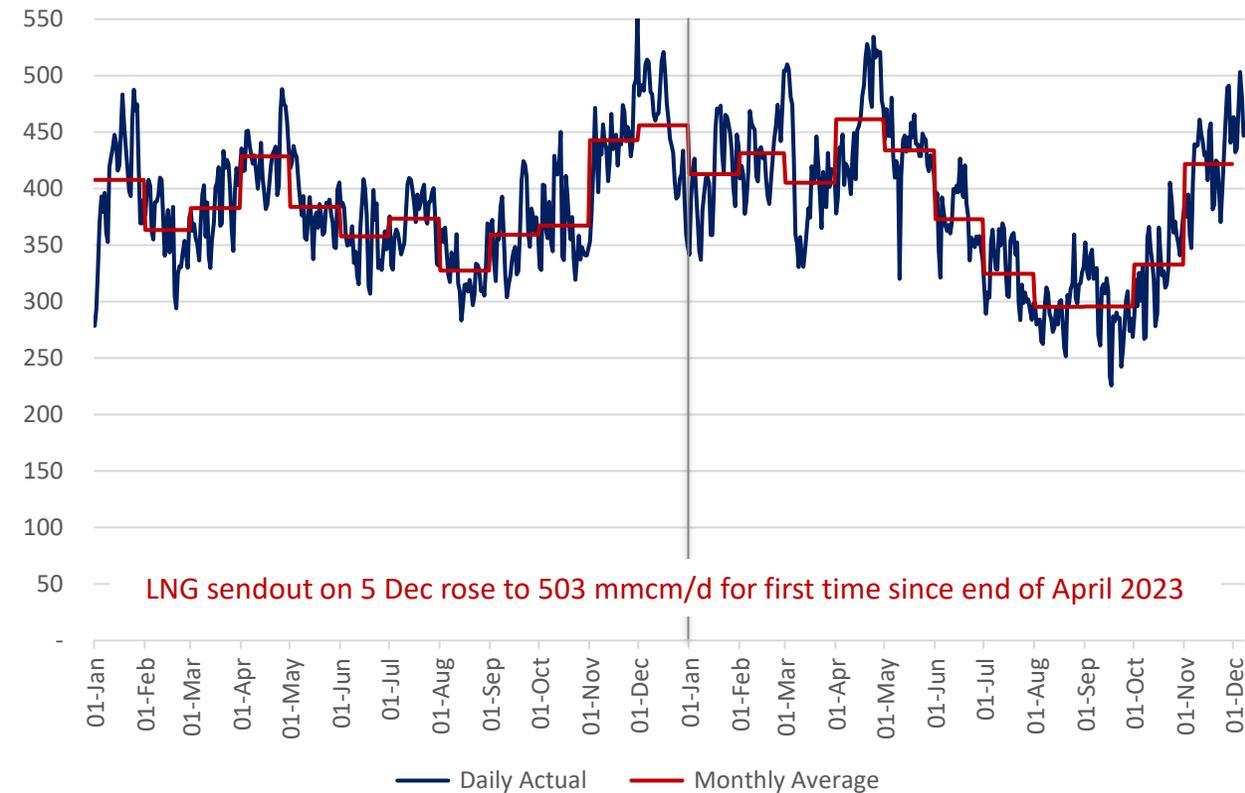
European Pipeline and LNG Imports

Data source: ENTSOG Transparency Platform

European Pipeline Imports by Supplier Since Jan 2022 (mmcm/d)



Actual Daily and Monthly Average LNG Send-Out (mmcm/d)



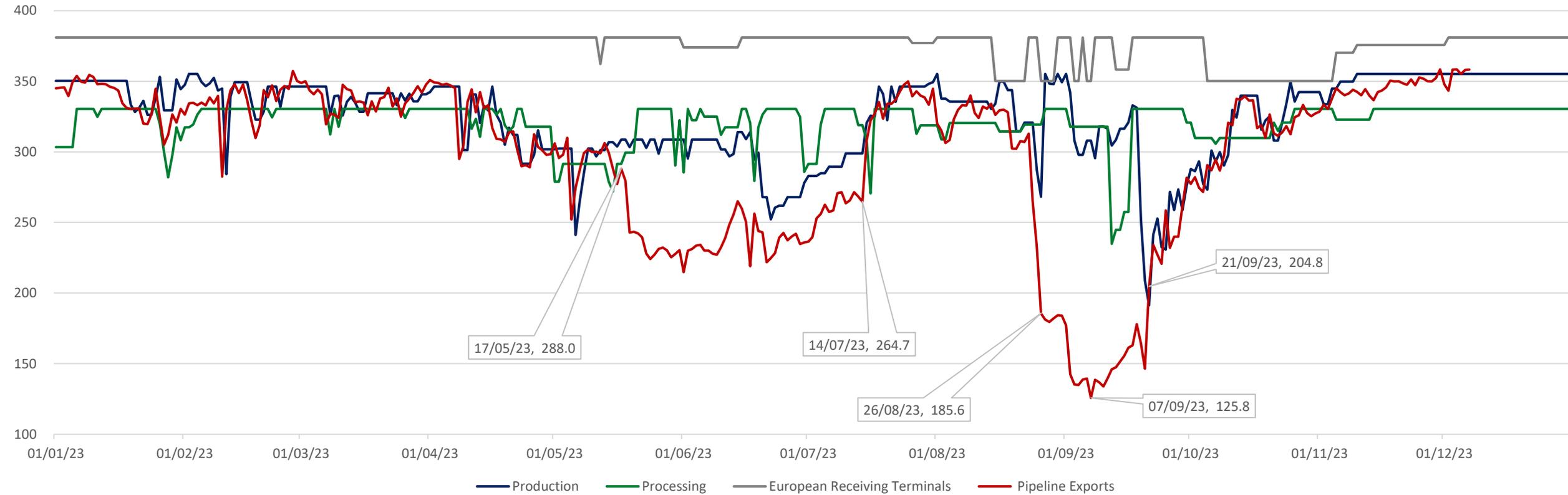
- Stable pipeline imports from Azerbaijan (32 mmcm/d), while imports from Norway back to capacity after disruptive summer maintenance
- North African supply remains volatile as buyers optimise between long-term contract offtake and prompt hub purchases
- Russian pipeline supply stabilised as prices declined in Spring 2023, by long-term contract offtake has risen since then as demand and prices picked up
- Monthly average LNG sendout in August was below 300 mmcm/d but rose above 450 MMcm/d in late November, peaking at 500 MMcm/d in early December



Norwegian Capacity and Pipeline Exports (MMcm/d)

Data source: Gassco UMM

Norwegian Gas Production, Processing, and Export Capacity vs Pipeline Export Flows (MMcm/d)



- From 19 May to 16 July, and again from 26 August to 7 September, the Nyhamna gas processing plant was offline
- The outage at Nyhamna was compounded by outages at Troll, Aasta Hansteen, and Dvalin fields in mid-September
- Not all of these outages are captured in the Gassco data on past outages, which reports one day of outage at Nyhamna from May to September 2023
- This partial data accounts for the difference between production/processing capacity and actual pipeline exports in the graph above

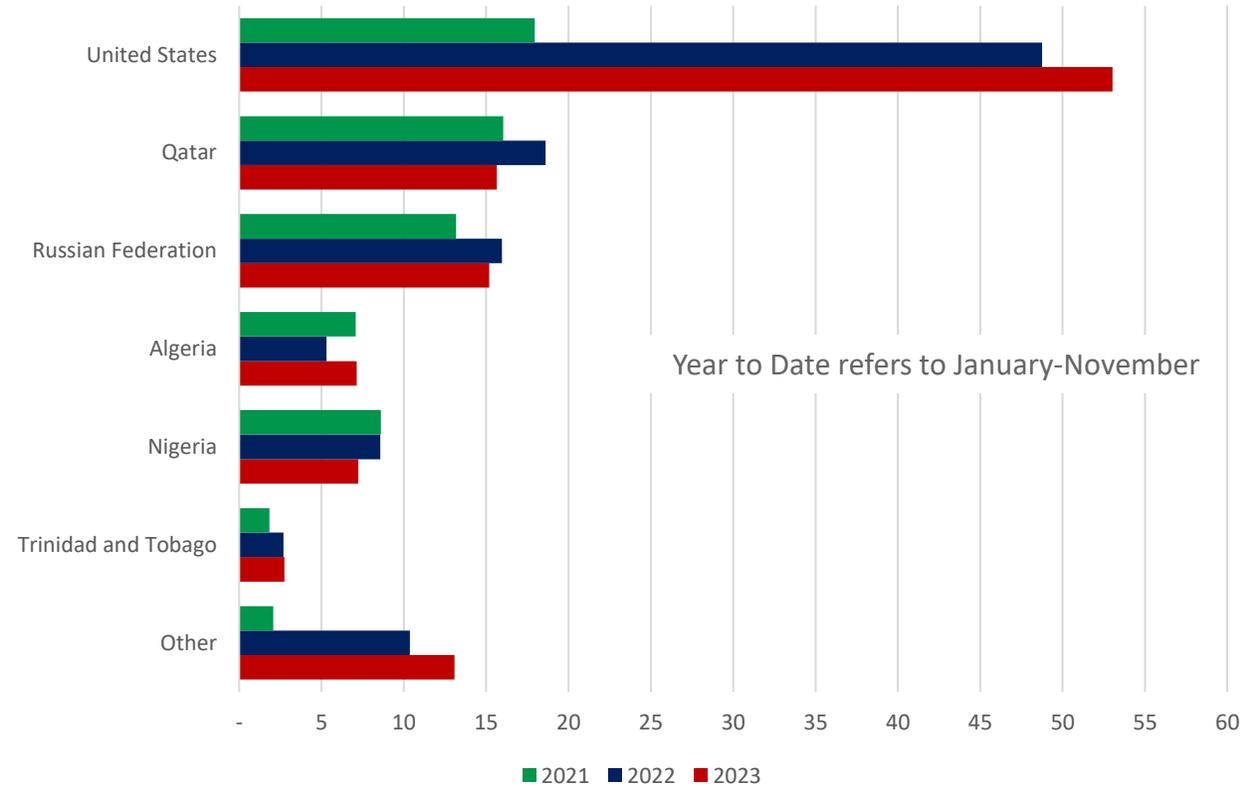
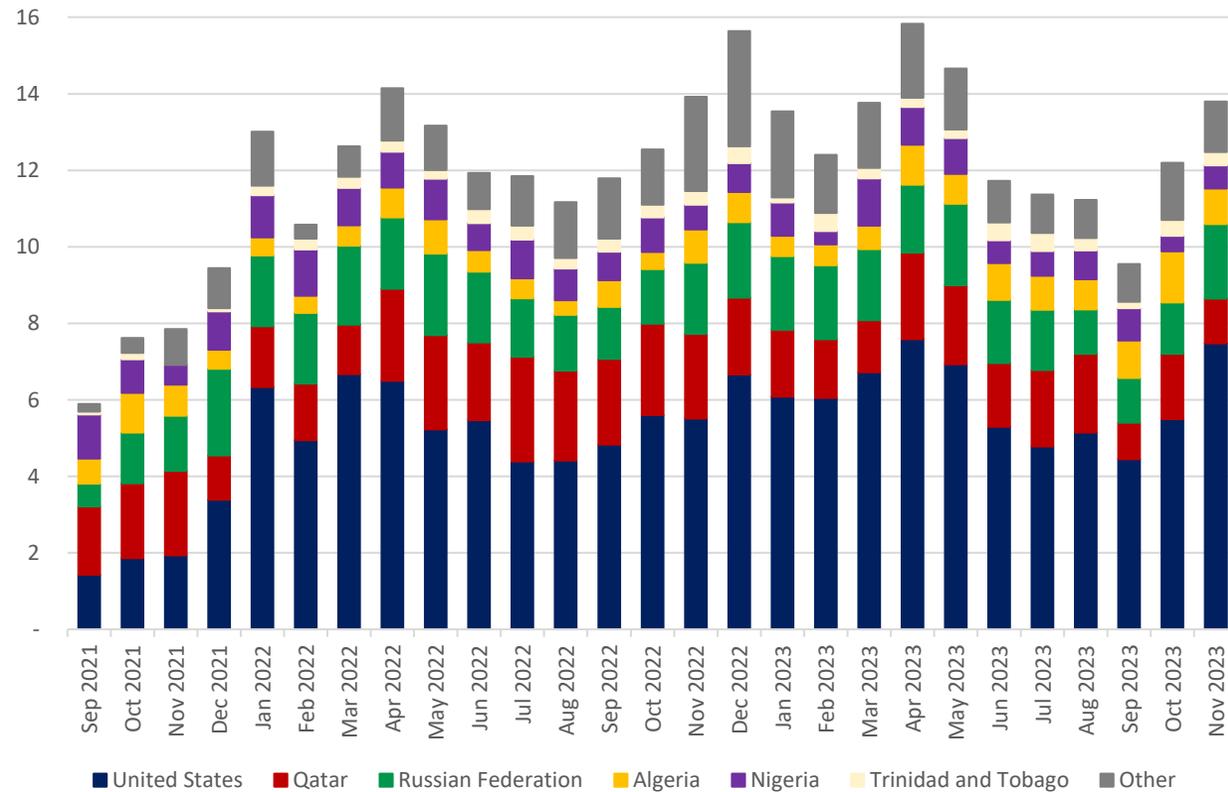


European LNG Imports by Source

Data Source: Kpler LNG Platform

EU-27 + UK Gross LNG Imports by Source (Bcm per Month)

EU-27 + UK Gross LNG Imports by Source in Year to Date (Bcm per Year)



Year to Date refers to January-November

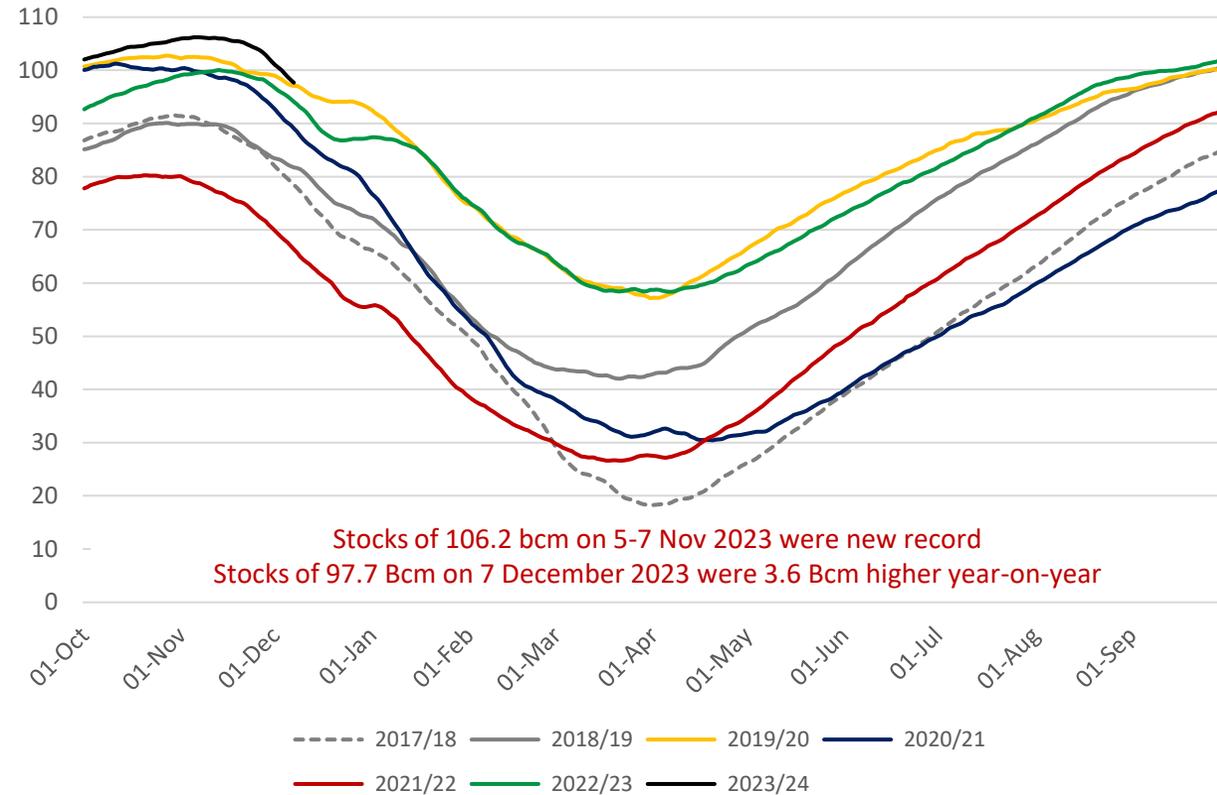
- Imports from the US and 'Other' accounted for most of the year-on-year increase in LNG supply to Europe in 2022 and 2023
- 'Other' refers to supply from Norway, Egypt, Peru, Angola, Equatorial Guinea, Oman, and Cameroon – their combined supply to Europe grew in 2022 and 2023
- While 2022 saw growth in supply from Qatar, Russia, and Nigeria, this fell back in January-November 2023 – only Trinidad continued its modest growth
- Algeria may have prioritised pipeline supply to Europe in 2022, while Nigeria (whose total LNG exports fell sharply in 2022) struggled with feedgas issues



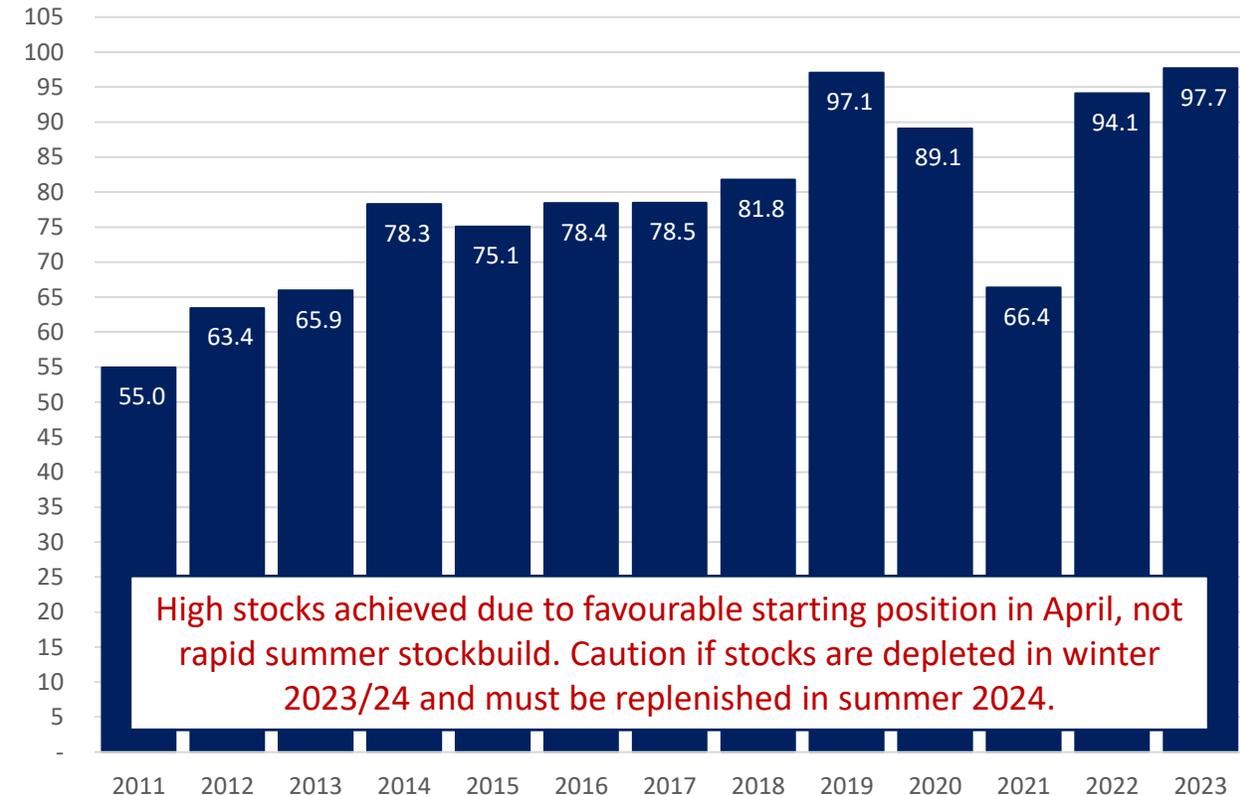
European Gas Storage

Data source: Gas Infrastructure Europe (AGSI)

European Daily Gas Storage Stocks (bcm)



European Storage Stocks on 7 December (bcm)



- Stockbuild in April-September 2023 (43.3 bcm) was slower than in 2021 (45.8 bcm) and 2022 (65.2 bcm), only slightly higher than 2020 (42.8 bcm)
- Aside from 2020, 2023 saw smallest summer stockbuild since 2014 (41 bcm). Period 2015-2019 saw April-September stockbuilds of 54-67 bcm
- Net injection of 3.9 bcm in October and net withdrawal of 4.3 bcm in November, leaving stocks on 1 December very similar to on 1 October
- Will European net withdrawals between Dec 2023 and Mar 2024 be limited to c. 50 bcm, sufficient to leave 50 bcm of stocks by end of winter?

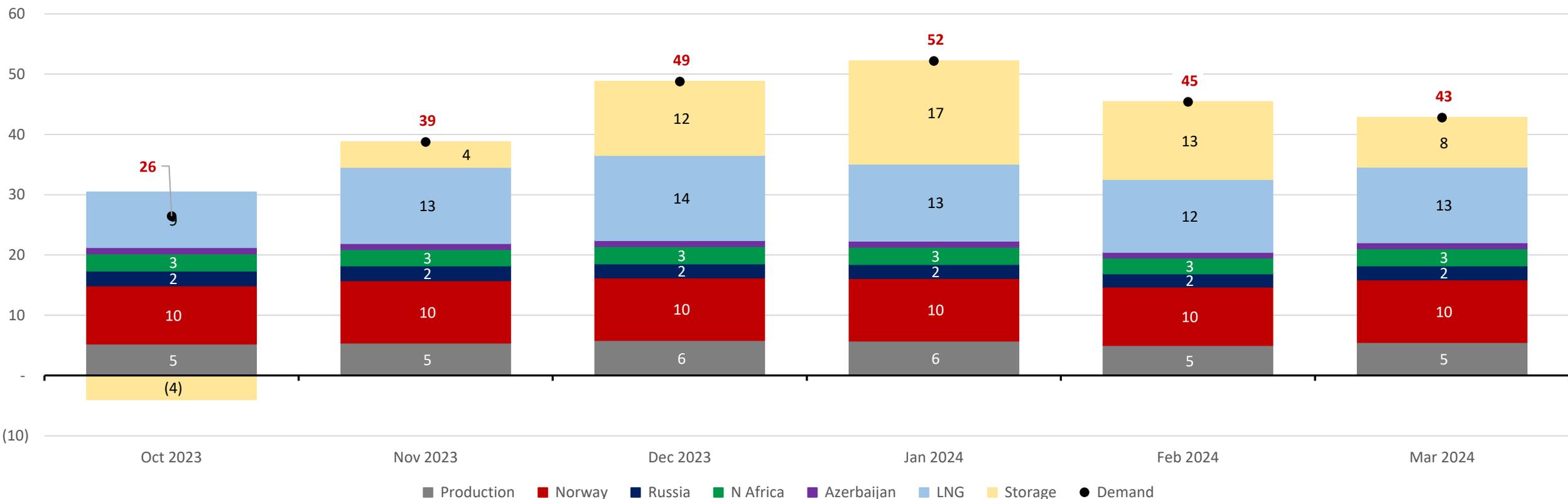


OIES Winter Outlook (Bcm)

Production: No Groningen, year-on-year -17% from Dutch small fields, -2% UK, and -3% rest of EU.

Data sources: ENTSOG Transparency Platform; Eurostat; Gas Infrastructure Europe (AGSI); Kpler LNG Platform

European Monthly Supply Balance in Winter 2023/24 (Bcm)



- Perhaps up to 10 MMcm/d upside to baseline for pipeline supply from Norway (from 335 MMcm/d to 345 MMcm/d) and Russia (from 75 MMcm/d to 85 MMcm/d) across whole winter
- No upside to Azerbaijan (TAP capacity of 34 MMcm/d) or Libya. Algeria seemingly unable to provide more despite pipeline capacity available
- LNG sendout same as winter 2022/23, and storage as the balancing item, given demand slightly higher than 22/23 (+10 bcm year-on-year across whole winter)
- **Result is net storage withdrawal of 50 Bcm between 1 Dec 2023 and 31 Mar 2024, leaving end of winter stocks of 51 Bcm, implying summer 2024 net injection 55 Bcm**
- **2023 summer net injection of 47.3 Bcm, from 1 Apr 2023 (58.7 Bcm) to 1 Nov (106.0 Bcm) – Summer 2024 could need 7.7 Bcm more net injections year-on-year**



Conclusions

- European gas demand for residential/commercial and power generation has limited short-term demand-side flexibility. **Supply must therefore be flexible to match demand**
- As European production has declined, it has become less flexible and can be (short-term) forecast
- Pipeline imports are underpinned by fixed infrastructure and long-term contracts:
 - Despite modest fluctuations from each of the individual sources of supply, the monthly supply from Russia, Azerbaijan, and North Africa combined has been 175-220 MMcm/d in all but one month (January 2023) since September 2022
 - Pipeline supply from Norway has seen far greater fluctuation, with supply in a range of 235-345 MMcm/d in all but one month (September 2023) since September 2022
 - At present, pipeline supply to Europe runs ‘at maximum capacity’, driven by long-term contract offtake nominations, so there is little upside flexibility in pipeline supply to respond quickly to higher demand
- LNG is the marginal source of supply. When Europe needs more gas at relatively short notice, it buys more LNG. **Europe is dependent on the dynamics of global LNG supply, and LNG demand outside Europe**
- In winter, storage withdrawals are the ‘balancing element’, and most responsive to daily fluctuations in demand. The volume withdrawn in winter must be replenished the following summer. **Storage is an indicator of the current state of the market (based on current withdrawal rates) and influences the balance next summer**



Thank You!

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For More Information:

European Gas Market Supply & Demand: Winter Outlook 2023/24 (published 7 December 2023)

<https://www.oxfordenergy.org/publications/european-gas-market-supply-demand-winter-outlook-2023-24/>

OIES Quarterly Gas Review: <https://www.oxfordenergy.org/publication-topic/quarterly-gas-review/>

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