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THE OXFORD INSTITUTE FOR ENERGY STUDIES

Quarterly Gas Review: Short- and Medium-Term Outlook for Gas Markets

Introduction

To say that the macro context for the European gas market has changed since the last edition of the OIES Quarterly Gas Review (published on 1 February 2022) would be something of an understatement. European prices had already been at sustained record high levels throughout the first half of winter, in a context of geopolitical concerns over the Russian military build-up around Ukraine's borders, and a global LNG market that was tighter than expected.

The Russian invasion of Ukraine on 24 February catalysed another round of price increases—with the TTF day-ahead price peaking at 227 EUR/MWh on 7 March—as well as a substantial reaction from the European Commission and governments in Europe which are now looking to reducing dependence on pipeline gas imports from Russia. The European Commission has also stated a policy objective of replenishing European storage stocks ahead of winter 2022/2023 to 80 per cent of storage capacity.

This is the context in which we have analysed ongoing developments in the European gas market and global LNG market. We are aided in this by Mostefa Ouki, and his insightful analysis of the extent to which Algeria is able to supply additional volumes to the European market as buyers seek to diversify away from Russia.

Overall, we see the present situation as a real-time 'stress test' for the European market: high prices are causing demand reductions in both the industrial and power generation sectors, while also making Europe a premium market for LNG sellers, leading to record European LNG imports in recent months. Looking forward to summer 2022, the high prices (and their attendant impact on demand) are likely to continue, but while global LNG supply is set to remain robust, the availability of LNG for Europe will depend on demand elsewhere. Finally, the ability of Europe as a whole to meet the European Commission storage target will depend on physical flows from Russia continuing, at least at the 'take-or-pay' levels stipulated in Gazprom's long-term contracts with its European counterparties. If the ongoing geopolitical factors discussed in this Quarterly Gas Review lead to a more substantial curtailment in Russian pipeline gas flows, that storage target will be significantly more difficult to achieve.

If you would like to discuss any of these issues further then please contact Mike Fulwood (mike.fulwood@oxfordenergy.org), Mostefa Ouki (mostefa.ouki@oxfordenergy.org) or Jack Sharples (jack.sharples@oxfordenergy.org).

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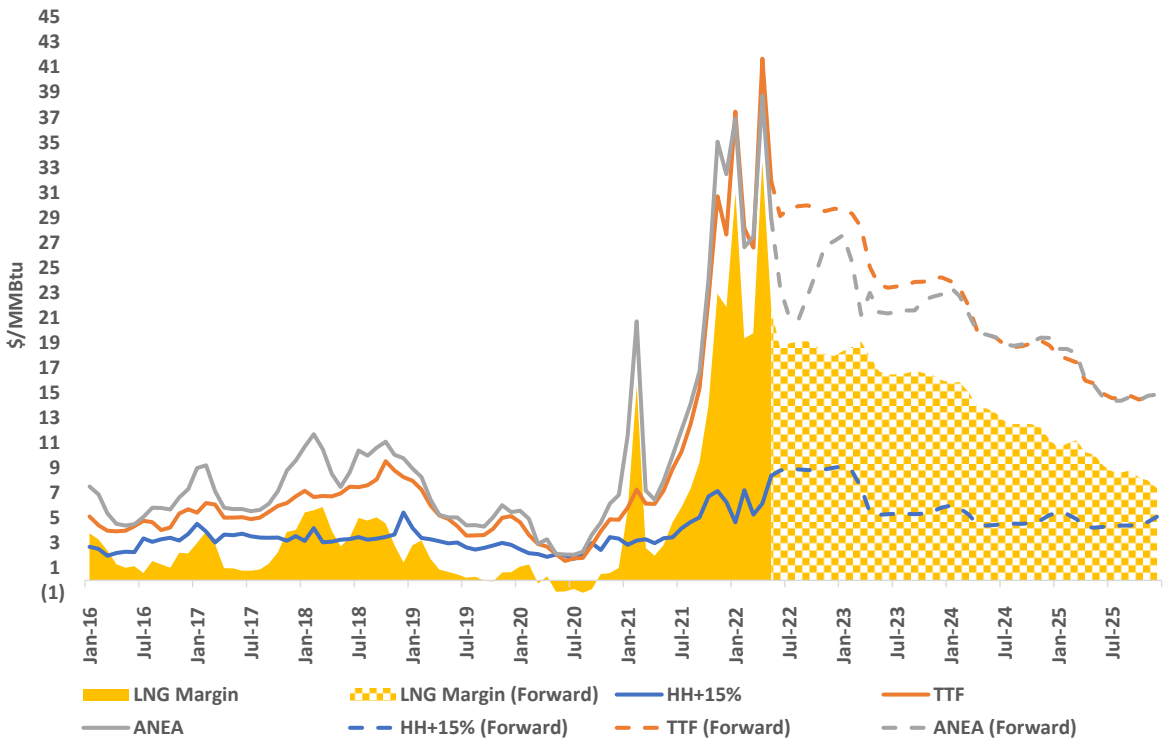
1. Price analysis

In this first section of the quarterly review, we include our regular review of some key pricing trends for global LNG, Europe, and Asia.

1.1 LNG tightness

As usual, we first consider our 'LNG tightness' analysis, as an indicator of how profitable existing export projects are, and whether there is a need for new FIDs to meet demand in the global market. Figure 1.1 is based on data from Argus Media and shows the prices for TTF in the Netherlands, the ANEA spot price in Asia and the Henry Hub price in the US. It then calculates the highest netback from Europe or Asia to the US Gulf Coast plants based on the respective shipping costs. Deducting Henry Hub plus 15 per cent from the highest netback gives the LNG Margin, which provides an indication of whether developers in the US can expect to recover the fixed cost of liquefaction. A margin in excess of $3/MMBtu (the fixed liquefaction cost in the traditional Cheniere contract) – as it was in 2018 - would provide an obvious incentive for new projects while a margin well below this suggests a more oversupplied market.

Figure 1.1: An assessment of 'LNG tightness'



Source: OIES, based on data from Argus Media. Forward curve at 11 May 2022

The negative margins back in 2020, as a result of the COVID-19 pandemic, seem a distant memory now. Between 150 and 200 cargoes were shut in, impacting the market during the summer months. The picture changed dramatically as the impact of the pandemic started to ease and economic recovery brought higher demand and increased prices, pushing the margin back into positive territory in Q3 2020. At the end of 2020 and in early 2021, the very cold weather and a dramatic rise in prices in Asia (see Figure 1.1) pushed the margin briefly to an extremely high level.

Prices fell back quickly after the Asian spike, but the continuing tightness of the global supply-demand balance led to firm prices throughout the summer of 2021. In August, however, prices started to rise dramatically in both Europe and Asia, seeming to incorporate a large 'fear' premium, pricing in another cold winter. There were also reports of some short covering by LNG traders in Asia supporting the price,

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and some traders having large short open positions on TTF which resulted in significant margin calls.[1] These short positions needed to be covered by buying on the physical or futures markets, providing short-term price support.

In December 2021, the price volatility increased with prices moving as much as 10 per cent up and down in a day on little more than good or bad news and windy or non-windy days in Europe. Prices were further supported as flows were significantly reduced along the Yamal-Europe pipeline from Russia. As we entered 2022, Russia flows declined further, for reasons discussed in section 1.3. The lower Russian flows were broadly offset by much higher LNG flows into Europe, which is discussed in more detail in section 3.

The Russian invasion of Ukraine in late February 2022 sent prices in Europe spiralling higher and dragged up Asian spot prices as well. Henry Hub prices in the US have also risen with rising demand for LNG exports straining the US supply. This has lessened the LNG margin, but it is still around $20/MMBtu, with the forward curve in double digits for the next couple of years. Clearly, current margins provide an incentive for new FIDs but much lower margins might not. However, it is not just the margin which will be needed for FIDs to be forthcoming. Even if the economics look good, most new LNG developments will still require the backing of long-term contracts. With renewed interest in long term contracts from both Asian and European buyers, the prospects for further FIDs are looking much rosier than a year ago.

1.2 Carbon prices and inter-fuel competition in Europe

The rising European prices reflecting the tight global supply demand balance might have been expected to lead to a loss of competitiveness for gas in the power market. Figure 1.2 compares TTF prices with the coal and carbon prices. The coal price (ARA – Amsterdam, Rotterdam, and Antwerp) is adjusted for the relative efficiency of gas power plants compared with coal power plants and the relatively higher carbon costs of coal.

[1] Payne, J. and Zhdannikov, D. (2021). 'Commodity traders face big margin calls as gas prices soar'. *Nasdaq*, 4 October. https://www.nasdaq.com/articles/exclusive-commodity-traders-face-big-margin-calls-as-gas-prices-soar-2021-10-04-0

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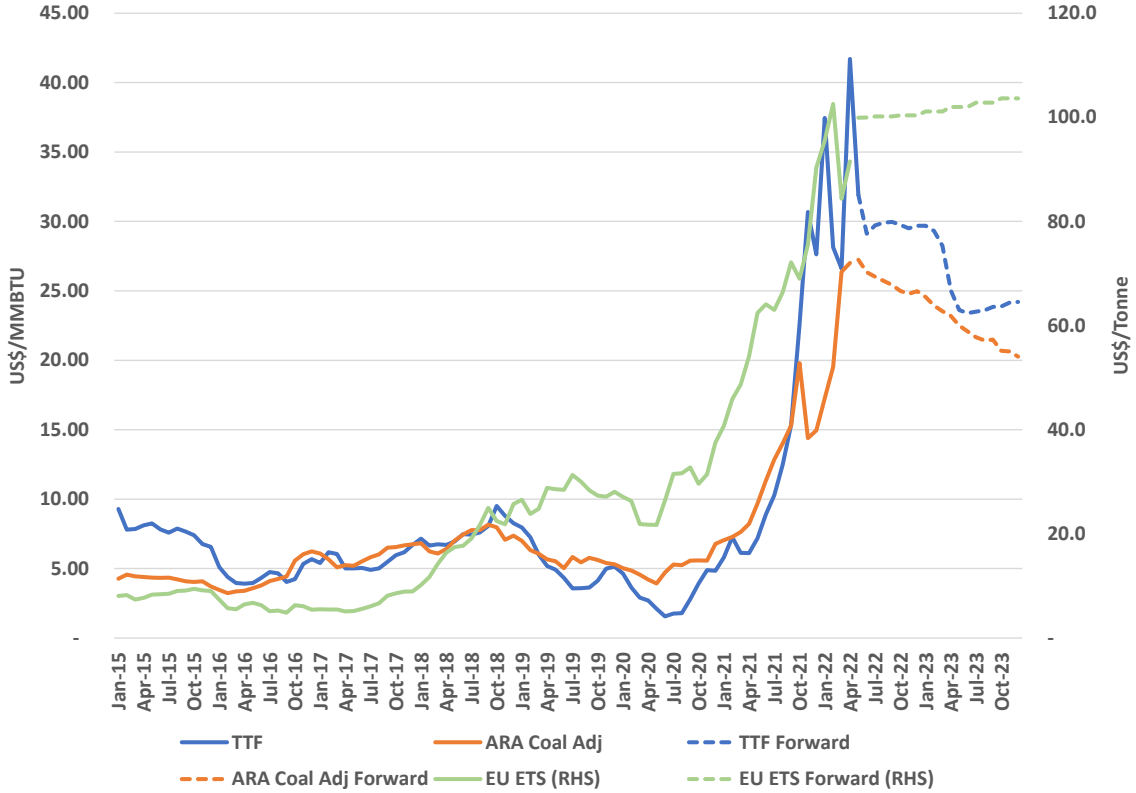
Figure 1.2: TTF and Rotterdam coal prices (adjusted for carbon price) and ETS prices



Source: Argus Media, ICE. Forward curve at 11 May 2022

In early 2019, as gas prices declined, we saw them fall well below the adjusted coal price, and this continued in 2020 as the impact of COVID-19 put significant downward pressure on prices. As a result, there was significant coal to gas switching in 2019 and in 2020 even some lignite to gas switching in Germany. The sharp rise in TTF prices in early 2021, might have been expected to lead to a significant loss of competitiveness of gas relative to coal. However, coal prices also rose sharply, although by less than the TTF price, and the EU ETS price also rose to provide a further boost to the carbon-adjusted coal price. Gas, therefore, maintained its competitive position, providing some support to gas demand in Europe through the middle of 2021.

The rise in prices since August, however, pushed gas prices well above the adjusted coal price, encouraging a switch to coal. The invasion of Ukraine pushed gas prices a lot higher but coal prices have also risen dramatically. However, gas prices are so high that there is still a large incentive to switch to coal in those markets where it is possible, and this has been noticeable in Europe. The forward curves show a big margin for gas over coal through 2023. This suggests that gas demand in power will remain weakened relative to coal.

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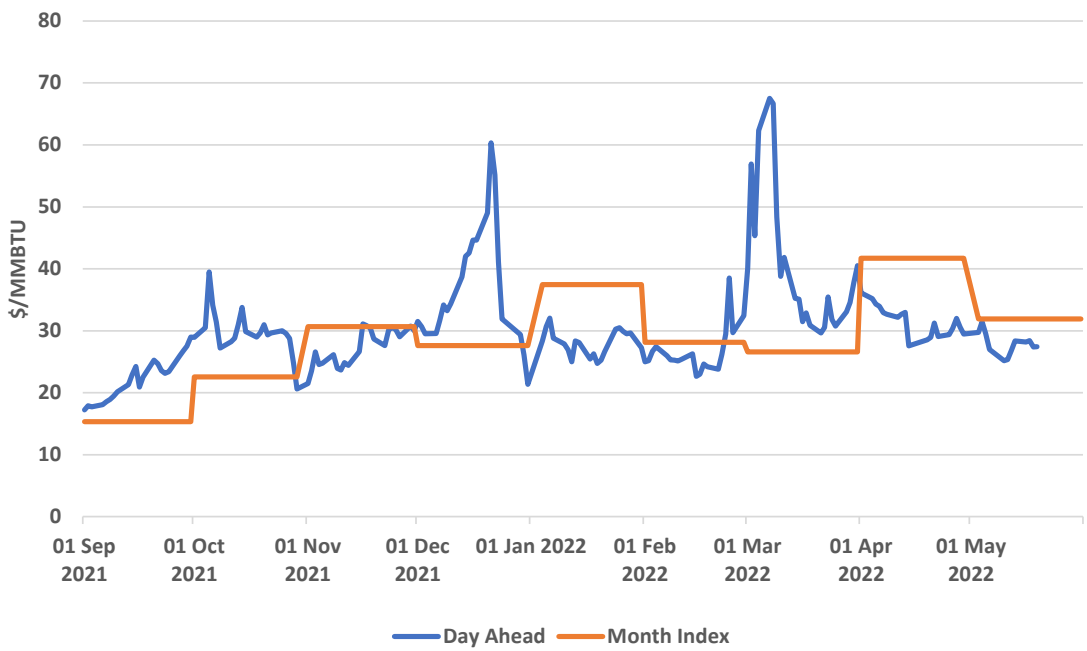
1.3 Gazprom contract prices v spot prices

The volatility of TTF prices both before and after the invasion of Ukraine has been well documented. Figure 1.3 compares the day-ahead TTF price with the front-month index price. The front-month index is the mathematical average of daily settlement prices for the TTF front-month contract in a calendar month. For example, the average of the TTF front-month daily settlement prices between 1 and 30 April provides an average price for gas bought in April and for delivery in May. The front-month (also referred to as month+1) contract is the most liquid and heavily traded contract at the TTF. Most of Gazprom's contracts to Northwest and Central Europe are now more or less linked to hub prices and the front-month index would appear to be a good proxy for Gazprom contract prices.

Figure 1.3: TTF Day-Ahead versus Front-Month Index (USD per MMBtu)



Source: Argus

In January and February this year the day-ahead prices were significantly below the front-month index. As a consequence, the European buyers had an incentive to buy gas on the day-ahead market, especially with a lot of LNG heading into the European market, and to nominate lower volumes under their long-term contracts. As Russia invaded Ukraine, the day-ahead price increased sharply and the front-month index for March was lower. Hence the European buyers increased their nominations under the long-term contracts. In April the reverse happened and flows fell back. This is illustrated in Figures 1.4 and 1.5, which show both total Russian flows to Europe and flows from Russia along Nord Stream, Yamal Europe and the Ukraine routes.

Taking the total flow from Russia to Europe (including Finland and the Baltic states, but excluding Turkey), the dip in physical flows in January and much of February – at a time when the front-month index was above the day-ahead price on TTF – is clearly visible. Likewise, the surge in flows in the immediate aftermath of the invasion, when day-ahead prices spiked, and the decline in April, when the front-month index once again rose to a premium over day-ahead prices. Finally, flows rose at the beginning of May, when the day-ahead and front-month index prices came into approximate alignment, but have fallen sharply since 6 May, as day-ahead prices have fallen below the front-month index.

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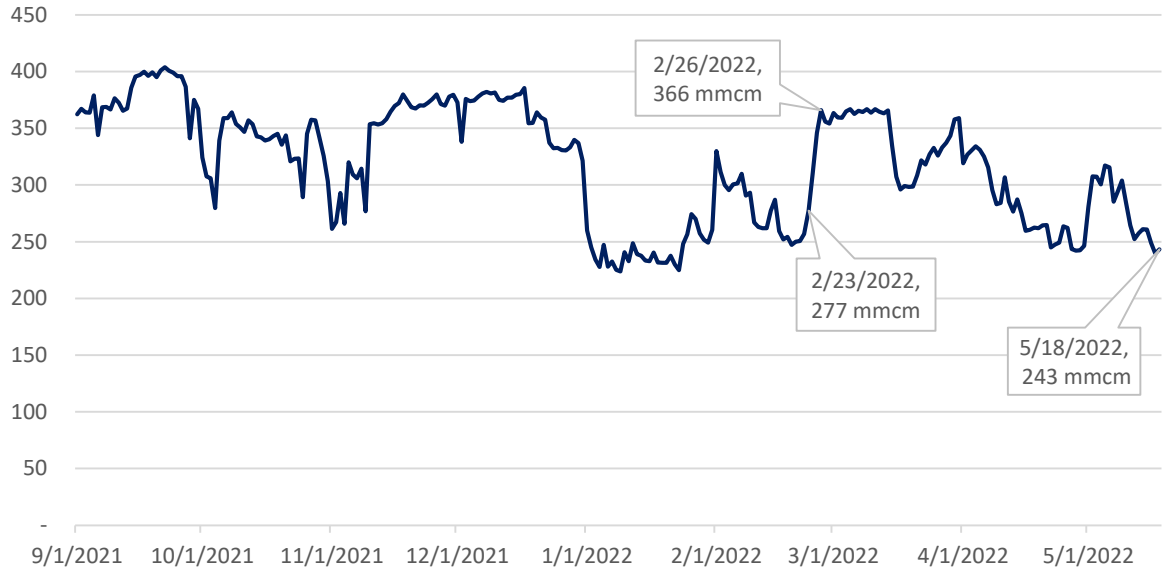
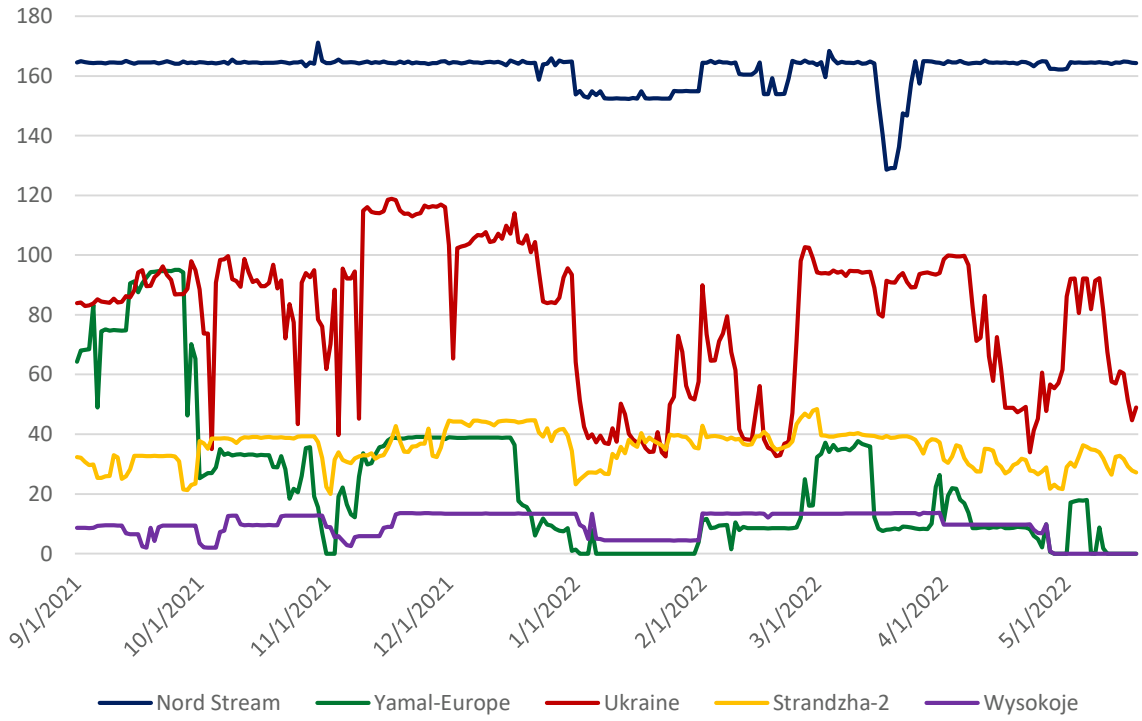
Figure 1.4: Total physical flows from Russia to Europe (excluding Turkey) (standard mmcm/d)



Source: Data from ENTSOG Transparency Platform

Figure 1.5: Total physical flows from Russia to Europe (excluding Turkey) (standard mmcm/d)



Source: Data from ENTSOG Transparency Platform

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This dynamic is even more pronounced when the flows from Russia to Europe are analysed by route, and other factors also come into play. The Yamal-Europe pipeline (measured at Kondratki on the Belarus-Poland border) traditionally served the Polish market and delivered gas on to Germany, which is also served by Nord Stream. Here, flows to the liquid market of North-Western Europe have responded to shifts in the day-ahead and front-month index balance. By contrast, flows to South-Eastern Europe via Turkish Stream and the Strandzha-2 interconnection point on the Turkey-Bulgaria border, have been less responsive to these pricing shifts.

The most significant fluctuations have been on the Ukrainian transit route. The surge in flows on 11 November was related to Gazprom completing its domestic storage replenishment and freeing up some additional volumes for export, while the flows from January 2022 onwards were also influenced by the 'spot versus LTC' price balance. Finally, the cessation of flows at Wysokoje (on the Belarus-Poland border) was due to the cessation of Gazprom's supplies to PGNiG discussed below.

1.4 Geopolitical factors in Russian gas supply

Following Russia's invasion of Ukraine on 24 February 2022, the UK, EU, and US placed unprecedented sanctions on Russia. These including sanctions against Russia's Central Bank, and the freezing of around half of Russia's $600bn foreign currency reserves, which were held in the UK, EU, and US.[2] On 8 March, the European Commission published its 'REPowerEU' strategy to reduce EU demand for Russian gas by two-thirds by the end of 2022, and set a target of having EU storage stocks at 80 per cent of storage capacity by 1 November 2022. Those aims were analysed in an OIES paper published on 18 March.[3]

On 31 March, the Russian President, Vladimir Putin, issued a Presidential Decree, stipulating that companies from 'unfriendly countries' must henceforth pay for their Russian gas supplies in Roubles, rather than Dollars or Euros. The proposed payment procedure requires Gazprom's European counterparties to set up two bank accounts with GazpromBank – one denominated in Euros and one in Roubles. The European buyer would receive its monthly invoice in Euros, and transfer that amount to its Euro-denominated account with GazpromBank. GazpromBank would then take those Euros, exchange them for Roubles on the Moscow Exchange, and credit the Roubles to the Rouble-denominated GazpromBank account held by the European buyer, before finally transferring the Roubles to Gazprom's account with GazpromBank.

Whether or not this procedure breaches EU sanctions against the Russian Central Bank remains unclear at present. The EU position is that if the European buyers transfer Euros to GazpromBank and declare the transaction complete, this is not in breach of sanctions.[4] It remains to be seen whether this is accepted by the Russian side, given that the decree states that the transaction is only considered complete when the Roubles are credited to Gazprom's bank account. However, the Russian government seems to have attempted to assuage concerns that the move would breach sanctions, by clarifying that the conversion of Euros to Roubles by GazpromBank at the Moscow Exchange would involve the National Clearing Centre (not the sanctioned Russian Central Bank) as the counterparty, and that the conversion would be completed within two days, to avoid foreign currency funds being

[2] Partington, R., 2022. Russia 'preparing legal action' to unfreeze $600bn foreign currency reserves. *The Guardian*, 19 April. https://www.theguardian.com/business/2022/apr/19/russia-preparing-legal-action-to-unfreeze-600bn-foreign-currency-reserves

[3] Fulwood, M., Honoré, A., Sharples, J., and Hall, M., 2022. The EU plan to reduce Russian gas imports by two-thirds by the end of 2022: Practical realities and implications. *Oxford Energy Insight № 110*, 18 March. https://www.oxfordenergy.org/publications/the-eu-plan-to-reduce-russian-gas-imports-by-two-thirds-by-the-end-of-2022-practical-realities-and-implications/

[4] Reuters, 2022. EU Commission stands by its guidance on payments for Russian gas. *Reuters*, 13 May. https://www.reuters.com/world/europe/eu-commission-stands-by-its-guidance-payments-russian-gas-2022-05-13/

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seen as a loan (which would breach sanctions).[5] This issue has been analysed in detail in two papers by colleagues from OIES: Agnieszka Ason and Katja Yafimava.[6] [7]

In physical flow terms, the first impact of this Rouble payment mechanism occurred on 27 April, when Gazprom halted supplies to PGNiG (Poland) and Bulgargaz (Bulgaria), for failure to adhere to the new payment mechanism. At the time of writing, four European buyers have reportedly paid for gas using the new procedure, 20 have opened accounts with GazpromBank for this purpose, and a further 14 have requested the paperwork necessary to open such accounts.[8] However, Gasum refused to follow the new payment procedure and instead launched arbitration proceedings. The flow of Russian gas to Finland was halted at 7am on Saturday 20 May.[9]

The cessation of deliveries to PGNiG provided a boost to a dynamic that was already developing: German imports of Russian gas via the Yamal-Europe pipeline coming to an end, and Poland increasing its imports from Germany. Specifically, this concerns the flow dynamics of the Yamal-Europe pipeline, which runs from Russia to Germany via Belarus and Poland.

In Q4-2021, gas volumes entered Poland from Belarus at Kondratki, flowed through Poland, and on to Germany at Mallnow. The difference between the flows at Kondratki and Mallnow was offtaken at the mid-point of the Polish section of the pipeline. However, from January 2022 onwards, the flow at Kondratki fell to zero and the flow at Mallnow went into reverse, from Germany to Poland. This reverse flow is illustrated as a negative flow in Figure 1.6. In this case, Germany is not receiving gas via the Yamal-Europe pipeline, and Poland is receiving gas from Germany, not Russia.

On 27 April, the flow at Kondratki again fell to zero, and the physical flow of gas from Germany to Poland rose sharply. Then, on 11 May, the Russian government placed sanctions on EuRoPol Gaz, which operates the Polish section of the Yamal-Europe pipeline.[10] This means that Gazprom cannot use the pipeline to deliver gas to Germany. When combined with the cut-off to PGNiG, the result is that flows along the Yamal-Europe pipeline will now remain at zero, while PGNiG (and other Polish gas importers) will now look to a combination of pipeline imports from Germany and LNG imports at Swinoujscie. By 18 May, the net physical pipeline flow from Germany to Poland was 25 mmcm/d, equivalent to 9.1 bcm per year – a volume similar to PGNiG's previous imports from Russia.

[5] Bloomberg, 2022. Gazprom Tries to Reassure Europe Clients They Can Still Buy Gas. *Bloomberg*, 7 May. https://www.bloomberg.com/news/articles/2022-05-07/gazprom-tries-to-reassure-europe-clients-they-can-still-buy-gas

[6] Ason, A., 2022. Rouble gas payment mechanism: implications for gas supply contracts. *Oxford Energy Comment*, 5 April. https://www.oxfordenergy.org/publications/rouble-gas-payment-mechanism-implications-for-gas-supply-contracts/

[7] Yafimava, K., 2022. The EC guidance on the Russian 'gas for Rubles' decree: all things to all people? *Oxford Energy Comment*, 10 May. https://www.oxfordenergy.org/publications/the-ec-guidance-on-the-russian-gas-for-rubles-decree-all-things-to-all-people/

[8] Bloomberg, 2022. Ten More European Gas Buyers Open Ruble Accounts for Payments. *Bloomberg*, 12 May. https://www.bloomberg.com/news/articles/2022-05-12/ten-more-european-gas-buyers-open-ruble-accounts-for-payments

[9] Gasum, 2022. Natural gas imports from Russia under Gasum's supply contract will be halted on Saturday 21 May at 07.00. *Press Release*, 20 May. https://www.gasum.com/en/About-gasum/for-the-media/News/2022/natural-gas-imports-from-russia-under-gasums-supply-contract-will-be-halted-on-saturday-21-may-at-07.00/

[10] Reuters, 2022. ANALYST VIEW 5 Russia sanctions European gas companies, Polish part of gas pipeline. *Reuters*, 12 May. https://www.reuters.com/business/energy/view-russia-sanctions-european-gas-companies-polish-part-gas-pipeline-2022-05-11/

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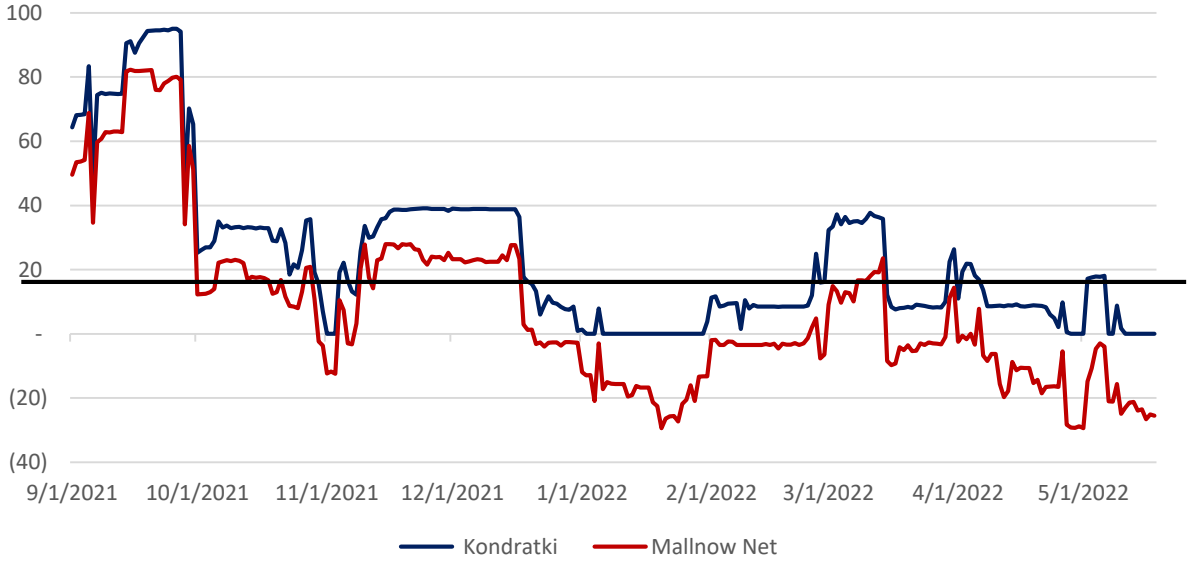
Figure 1.6: Physical gas flows at Kondratki (Belarus-Poland border) and Mallnow (Poland-Germany border) (standard mmcm/d)



Source: Data from ENTSOG Transparency Platform

A second geopolitical factor to come into play was Gazprom's withdrawal from its subsidiaries in Europe, namely Gazprom Germania and the subsidiaries of Gazprom Germania (including London-based Gazprom Marketing & Trading, Swiss-based Gazprom Schweiz, German-based traders Wingas & WIEH, and the German-based gas storage operator, Astora). The Gazprom withdrawal, on 1 April 2022, followed reports that some of its offices had been raided by European Commission antitrust investigators. The German government and Federal Network Regulatory Agency (BNetzA) are acting as trustees of Gazprom Germania until 30 September 2022. On 11 May, the Russian government placed sanctions on Gazprom Germania and Gazprom's other former subsidiaries.[11] The practical result is that Gazprom will cease providing gas to these companies, which will likely be visible in lower physical flows of Russian gas to Europe in the second half of May.

A third geopolitical factor to impact physical flows of Russian gas to Europe is the partial cessation of Russian gas flows into Ukraine. Until recently, Russian gas was physically delivered to Ukraine via two interconnection points: Sudzha and Sokhranivka. Sudzha is the larger, with GTSOU (the Ukrainian TSO) reporting capacity of 244 mmcm/d.[12] In 2021, flows hit a sustained peak of 87 mmcm/d. Sokhranivka is the smaller – flows in 2021 hit a sustained peak of 38 mmcm/d.[13]

On 10 May, GTSOU reported that it no longer had technical and operational control over the 'Novopskov' compressor station, to the west of Sokhranivka.[14] This was a response to GTSOU dispatchers reporting unauthorised offtake of gas in the area the day before. On 11 May, GTSOU

[11] Reuters, 2022. Germany assessing Russian announcement on Gazprom Germania sanctions. *Reuters*, 11 May. https://www.reuters.com/business/energy/german-regulator-takes-over-gazprom-germania-ensure-energy-supply-2022-04-04/
[12] GTSOU, 2022. Regarding the technical possibility of transferring transit volumes to GMS "Sudzha". *Press Release*, 11 May. https://tsoua.com/en/news/regarding-the-technical-possibility-of-transferring-transit-volumes-to-gms-sudzha/
[13] GTSOU, 2022. Transparency Platform. https://tsoua.com/en/news/regarding-the-technical-possibility-of-transferring-transit-volumes-to-gms-sudzha/
[14] GTSOU, 2022. The actions of the occupiers led to the interruption of gas transit through the GMS Sokhranivka. *Press Release*, 10 May. https://tsoua.com/en/news/the-actions-of-the-occupiers-led-to-the-interruption-of-gas-transit-through-the-gms-sokhranivka/

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reported that Gazprom had closed the valve on the 'Soyuz' ('Union') pipeline, and that as a result, gas flows at Sokhranivka were halted.[15]

Gas transit flows via Ukraine are governed by a long-term transit contract between Gazprom and GTSOU, which expires at the end of 2024. That contract provides for 109.6 mmcm/d of total transit capacity, which Gazprom then 'books' for different cross-border interconnection points both into and out of Ukraine. At present, Gazprom has 77.2 mmcm/d of entry capacity into Ukraine booked at Sudzha and 32.4 mmcm/d at Sokhranivka.

In the first week of May, flows at Sudzha were around 75 mmcm/d, while flows at Sokhranivka were 24 mmcm/d, giving a total of 99 mmcm/d. On 9 May, the flows at Sudzha and Sokhranivka were 75 mmcm and 24 mmcm, respectively. The latest data shows that flows at Sudzha did not rise to compensate for the loss of flows at Sokhranivka, but actually fell to around 53 mmcm/d on 18 May.[16]

Looking ahead, the payment for offtake under long-term contracts by Gazprom's European counterparties in the last week of May will provide clarity over which buyers have acceded to the new payment regime and which put themselves at risk of a cut-off. It is possible that PGNiG and Bulgargaz were more willing to 'take a stand' against Rouble payments because their long-term contracts were due to expire at the end of 2022 in any case. Conversely, many other European buyers are likely to be willing to adapt to the new regime unless they receive specific guidance that payment for Russian gas in a manner acceptable to the Russian government and Gazprom is a breach of sanctions.

For the rest of summer, the cut-offs to PGNiG, Bulgargaz, and Gasum, the Russian sanctions against Gazprom's former subsidiaries, and the cessation of Russian gas flows at Sokhranivka (if Gazprom does not raise its capacity booking at Sudzha) will all take volumes off the European market, and cause buyers (namely PGNiG, Bulgargaz, Gasum, and Gazprom's former subsidiaries) to seek volumes elsewhere. This will impact the supply-demand balance of the broader European market.

1.5 The European supply-demand balance

In the first four months of 2022, implied European gas consumption (production plus net imports and net storage withdrawals) totalled 185 Bcm. This was a 24.5 Bcm (11.7 per cent) decrease on 2021 (209.5 Bcm), as high prices undoubtedly weighed on gas demand. Indeed, it was even lower than January-April 2020 (190.8 Bcm), which was impacted by the start of the COVID-19 pandemic in Europe.

Breaking this implied consumption down by month, it can be seen that each of the first three months of 2022 were significantly lower than in previous years (2018-2021). It is only in April that the figure for 2022 was notably above that for 2020 (when April 2020 was markedly impacted by COVID-19) and slightly above the figure for April 2018.

[15] GTSOU, 2022. Gazprom stops transporting gas through the GMS Sokhranivka. *Press Release*, 11 May. https://tsoua.com/en/news/gazprom-stops-transporting-gas-through-the-gms-sokhranivka/

[16] ENTSOG, 2022. *Transparency Platform – Physical flow and GCV at Sudzha and Sokhranivka*. https://transparency.entsog.eu/#/points/data?from=2022-04-18&indicators=Physical%20Flow%2CGCV&points=ru-tso-0001itp-00184exit%2Cua-tso-0001itp-00184entry%2Cua-tso-0001itp-00183entry&to=2022-05-18

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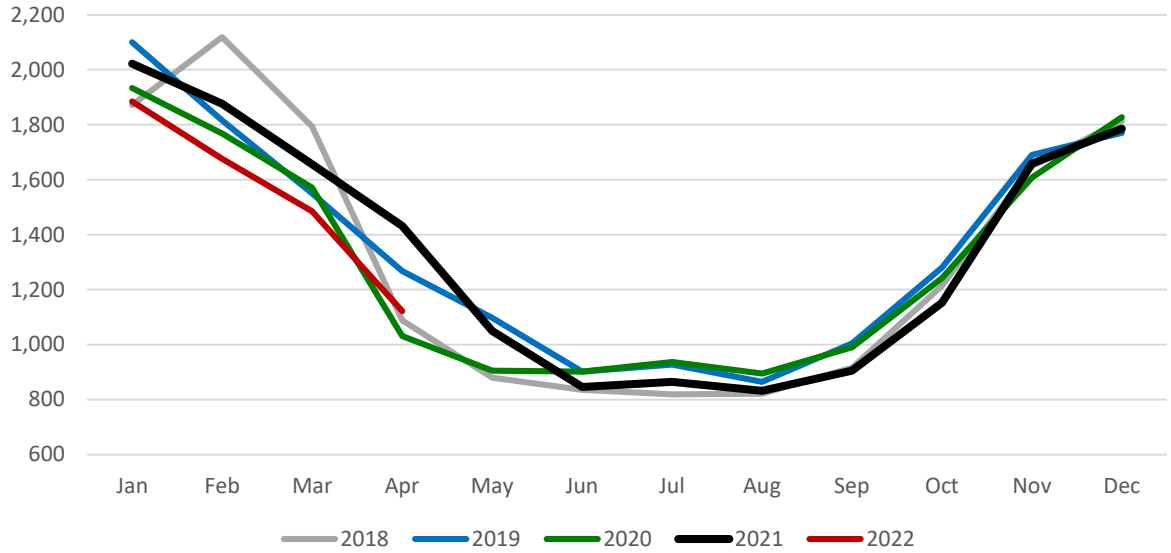
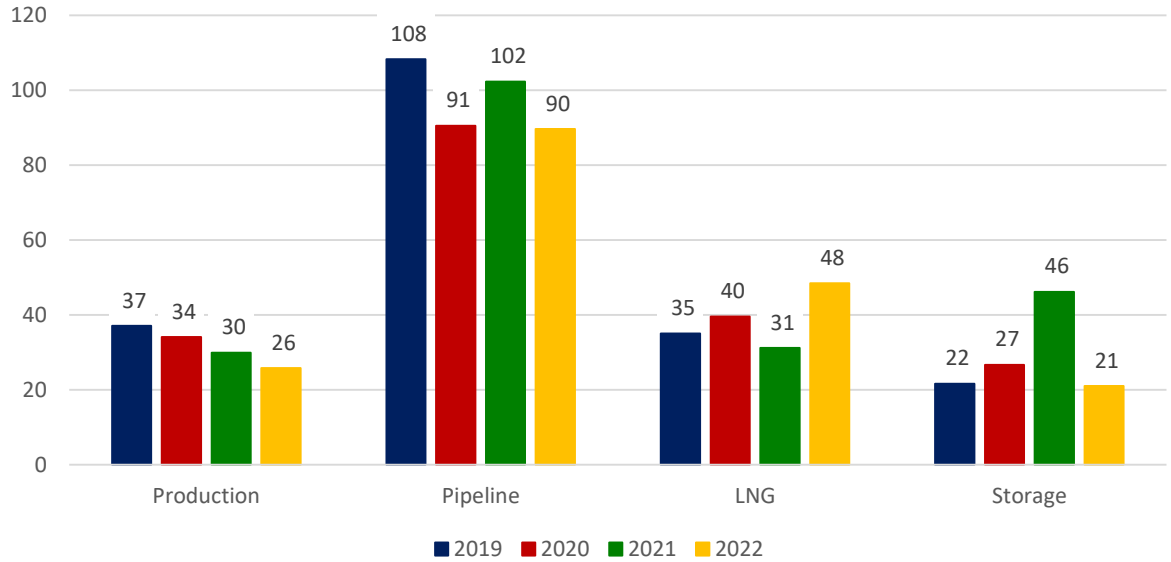
Figure 1.7: Supply to the European market (monthly average MMcm/d)



Source: Data from ENTSOG, Gas Infrastructure Europe, and Kpler

The different sources that make up this supply in the period January to April are illustrated in Figure 1.8, where the first four months of 2022 are compared with the same time period in recent years (2019-2021).

Figure 1.8: January-April supply to the European market 2019-2022 (Bcm)



Source: Data from ENTSOG, Gas Infrastructure Europe, Eurostat, and Kpler

European production continued its decline, and only a small part of this decline is temporary: production in Denmark will rebound in mid-2023 when maintenance work at the Tyra offshore gas field is complete. However, the latest Danish forecasts are for gas production in 2024 and 2025 (the first full calendar

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years of restored production) to be 2.85 and 2.65 bcm, respectively.[17] This is around one-third lower than production in 2018 (4.2 bcm), the last year before maintenance at Tyra began.[18]

Production in the Netherlands also continues its ongoing decline, mainly as a result of production ramping down at the Groningen gas field. Speaking to Natural Gas Intelligence in April, Jules van de Ven, spokesperson for the Dutch Ministry for Economic Affairs and Climate Policy, stated:

> "This is the last normal gas year for Groningen… The field will remain available in case of emergency starting October 2022 with only a minimal flow" of about 1.5 billion cubic meters (Bcm) annually. "We're planning to permanently close down the field in either 2023 or 2024, meaning that production will be zero and all gas wells will be abandoned and cleaned up."[19]

While UK production has now recovered from the impact of maintenance in 2021, production in the EU minus the Netherlands has been effectively flat since mid-2020. While the outlook is for a gradual decline in whole-Europe production through the rest of the 2020s, in the short-term the decline of recent years appears to be flattening off. This is in part due to the final stages of the Groningen ramp-down: Once production there has reached zero, it will have no further to fall.

Pipeline imports in January-April were down year-on-year, and this was primarily due to lower flows from Russia. As Figure 1.9 illustrates, flows from Norway and North Africa have been robust, while flows from Azerbaijan have grown from around 0.2 bcm in January-April 2019 & 2020, due to the launch of the Trans-Adriatic Pipeline (TAP) in January 2021. By contrast, physical flows from Russia are down 30 per cent year-on-year. Gazprom had already largely ceased selling prompt volumes on its Electronic Sales Platform (ESP) in summer 2020, and it ceased ESP sales entirely on 13 October 2021. Although there is no publicly-available data on Gazprom's sales via its trading subsidiaries at European hubs, it appears that Gazprom effectively withdrew from that market when it abandoned Gazprom Germania at the beginning of April 2022. By giving up control over its storage operator subsidiaries, Gazprom also lacks an incentive to flow additional volumes to replenish downstream storage stocks in summer 2022. Indeed, Gazprom ran them down to very low levels in summer 2021 and held very limited downstream storage stocks in winter 2021/22. Therefore, the year-on-year figures for physical Russian gas flows to Europe will almost certainly remain lower year-on-year for the rest of 2022.

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[17] Argus, 2021. Denmark slashes gas production forecast. *Argus Media*, 6 September. https://www.argusmedia.com/en/news/2251350-denmark-slashes-gas-production-forecast

[18] Sharples, J., 2021. A Series of Unfortunate Events – Supply-side factors in the European gas price rally in 2021 and outlook for the rest of winter. *Oxford Energy Insight*, December 2021. https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/12/Insight-108-Supply-Side-Factors-in-European-Gas-Prices.pdf (see page 9)

[19] Robinson, T., 2022. Dutch Government to Shutter Groningen, Rely More on LNG. *Natural Gas Intelligence*, 20 April. https://www.naturalgasintel.com/dutch-government-to-shutter-groningen-rely-more-on-lng/

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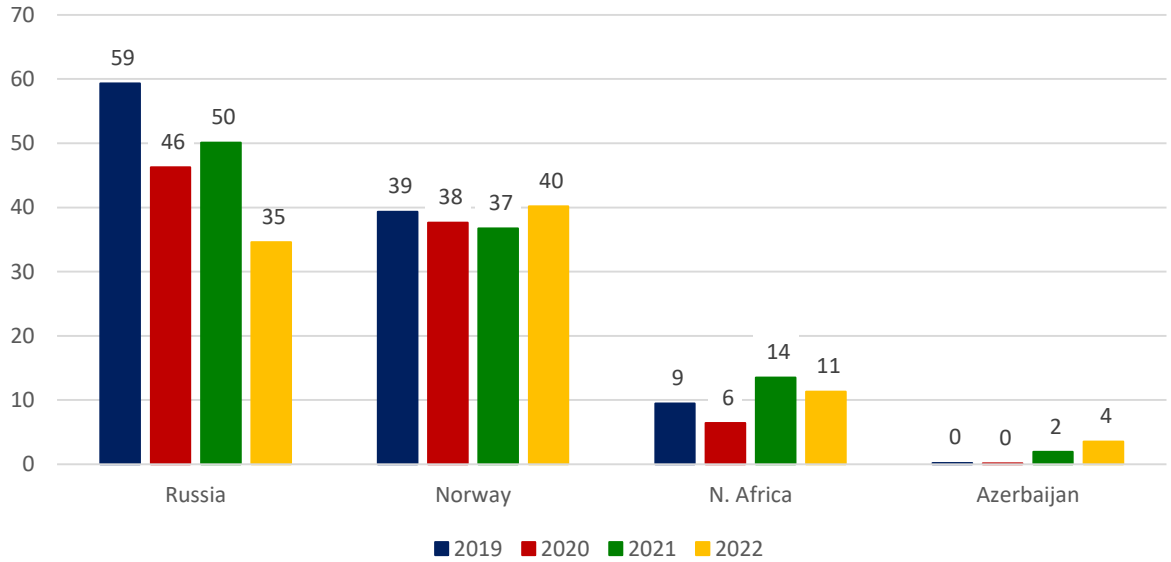
Figure 1.9: January-April pipeline supply to the European market 2019-2022 (Bcm)



Source: Data from ENTSOG

In sharp contrast to the lower European production and pipeline imports in January-April 2022, LNG imports surged, as cargoes were attracted to Europe by high prices. In macro terms, it also helped that the winter across the northern hemisphere was relatively mild (reducing the pull of LNG cargoes to Asia) and that supply in various locations recovered from some of the issues that temporarily reduced global LNG export capacity in 2021.

When European (EU plus UK, excluding Turkey) LNG imports in January-April 2022 are compared to previous years, several key points stand out. Firstly, European LNG imports were boosted by the launch of the Yamal LNG export terminal in Russia (three trains launched between December 2017 and December 2018[20]) and the ramp-up in US LNG export capacity. US LNG exports in January-April grew from 0.5 bcm in 2016 to 13 bcm in 2019 and 39 bcm in 2022, with much of that being shipped to Europe. Indeed, while around 25 bcm of US LNG was shipped to Europe in the whole of 2021, 26 bcm of US LNG was shipped to Europe (excluding Turkey) in January-April 2022.[21]

A second key point is that the market dynamics are different in each of the past several years. While 2019 and 2020 were effectively supply-long years for the global LNG market, with excess volumes landing on European shores, the first four months of 2021 saw significant Asian LNG demand amid relatively cold winter temperatures. In that instance, LNG was pulled away to Asia and European storage withdrawals effectively balanced the market. Finally, in 2022, we are seeing a new phenomenon: Europe as a premium market.

In the past, Europe has acted as the balancing element in the global LNG market with the Asian market commanding premium prices. But in January-April 2022, European prices were at sustained high levels sufficient to attract cargoes that would have otherwise been delivered elsewhere.

[20] Yamal LNG, 2019. Yamal LNG Exceeds Annual Nameplate Production Capacity. *Press Release*, 29 November. http://yamallng.ru/en/press/news/37916/
[21] Kpler LNG Platform – Subscription required

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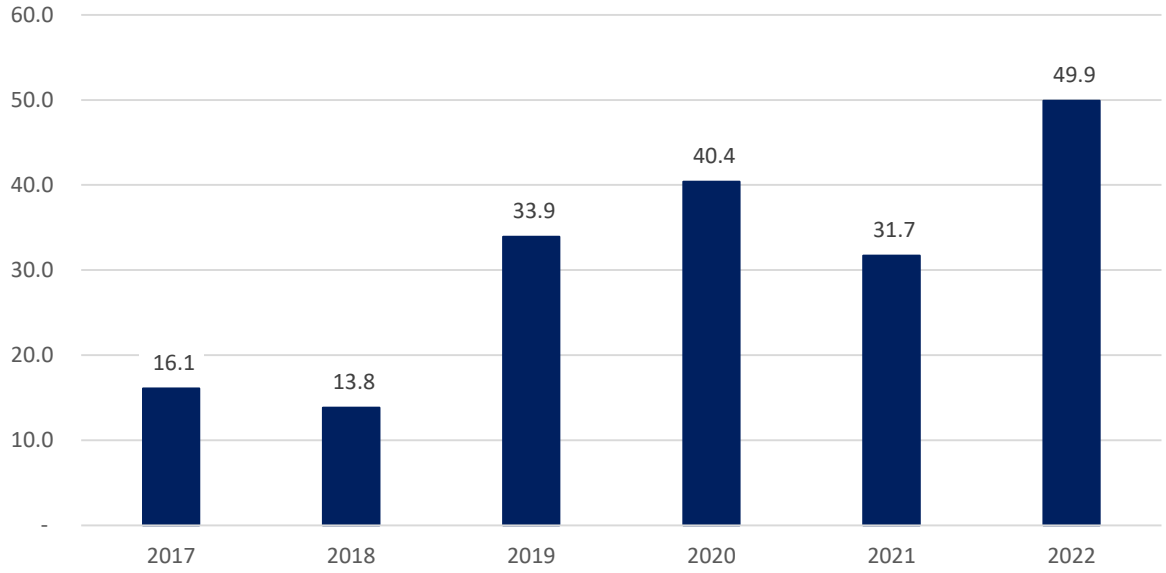
Figure 2.0: EU+UK LNG imports in January-April (Bcm)



Source: Kpler LNG Platform (subscription required)

1.6 European gas storage

In the editions of the Quarterly Gas Review published on 1 November 2021 and 1 February 2022, we noted the concern over European storage stocks being below those seen in recent years. However, in the period January-April 2022, the dynamic has been rather different.

From around 26 January, the rate of net storage withdrawals began to slow down. On 1 March, total European stocks surpassed those held on 1 March 2018, meaning that from that date, stocks held in 2022 were no longer the lowest on that date in recent years. By 21 March, net withdrawals had effectively ceased, and from 3 April, European storage as a whole moved into 'net injection' mode. On 19 April, European stocks surpassed those held on the same date a year earlier.

A major difference year-on-year is the weather. Not only was European storage needed to compensate as LNG was pulled away to a cold North-Eastern Asia at the start of 2021, but in Europe the winter temperatures lingered into April. Indeed, European stocks on 1 May 2021 were 0.1 bcm *lower* than they had been on 1 April 2021. Where Europe effectively 'lost' April as a storage injection month in 2021, net injections in April 2022 totalled 7.6 bcm. Net injections in 1-18 May added a further 7.8 bcm to European stocks.

Looking back to our analysis in the last Quarterly Gas Review, while the prediction that Europe would end the winter (1 April) with stocks lower than the year before proved to be correct, the extent to which end-of-winter stocks were lower year-on-year was nowhere near as great as we had feared.

As Figure 2.1 shows, the rate of injection was sustained between mid-April and mid-May. To meet the European Commission target of European storage being 80 per cent full by 1 November, Europe will need to inject 37.5 bcm between 18 May and 1 November – This is 6.7 bcm less than was injected between 18 May and 1 November in 2021, when stocks on 1 November reached 79.7 bcm.

In the last Quarterly Gas Review, we noted that two years of storage stock accumulation in 2019/2020 was unwound in the space of several months in early 2021, with the pendulum then swinging sharply the other way, to stocks being markedly lower than usual at the start of winter 2021/22. As the situation stands in mid-May, European is on track to get back to a 'normal' level of storage stocks at the start of winter 2022/23. However, this is being underpinned by substantial political will and concerns over the stability of pipeline supply from Russia, rather than favourable seasonal price spreads.

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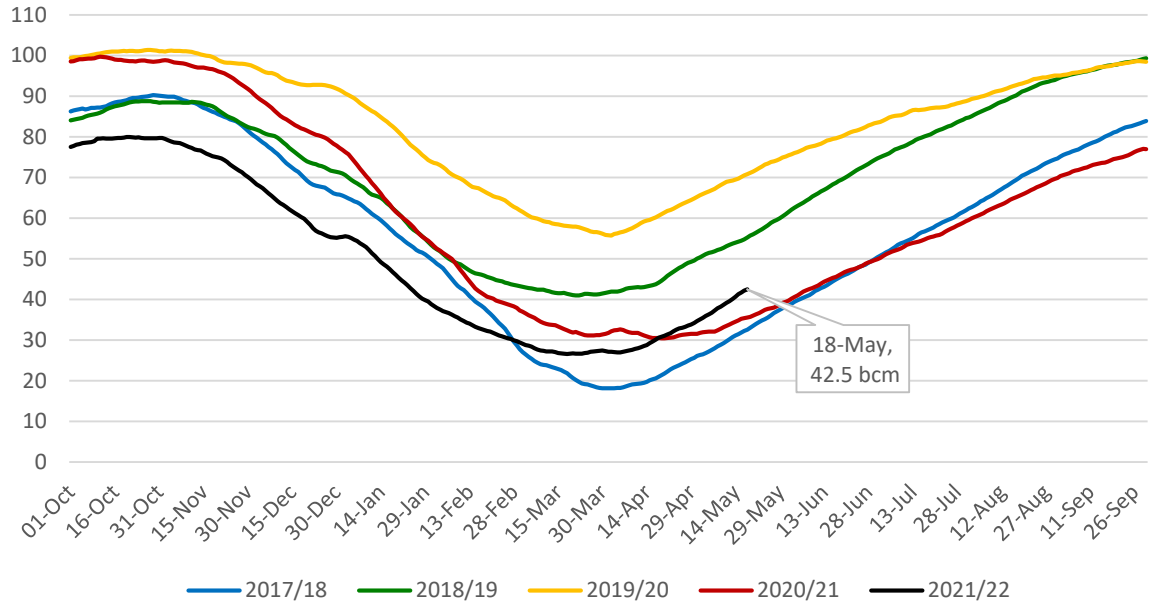
Figure 2.1: Stocks held in European storage (Bcm)



Source: Gas Infrastructure Europe Aggregated Gas Storage Inventory (AGSI+)

Overall, the European market remains finely balanced on the supply side. The direction of travel for 'domestic' European production seems clear, while the non-Russian pipeline suppliers all appear set on continuing to export at close to full capacity throughout the rest of the year. Continued sustained LNG imports will be dependent upon supply being available on the global market, both in terms of suppliers maintaining production and markets in other parts of the world (primarily Asia) not experiencing a surge in demand. Supply from Russia remains very much the 'wildcard', given the geopolitical issues discussed earlier. The ability of Europe to meet its storage targets will depend to a significant extent on that Russian supply continuing, at least at the 'take-or-pay' level of Gazprom's long-term contracts with European counterparties.

Mike Fulwood, Senior Research Fellow, and Dr Jack Sharples, Research Fellow, OIES

2. Algeria and the new geopolitics of gas supply

The war in Ukraine triggered an unexpected disruption of the European natural gas market dynamics with Europe's reliance on imports of Russian gas[22] at the centre of a geopolitical storm expanding beyond Europe's frontiers.

Less than two weeks after the Russian invasion of Ukraine, the European Union (EU) issued a communication on the "Joint European Action for more affordable, secure and sustainable energy." [23] One of the key decisions of this action is to "eliminate Europe's dependence on Russian fossil fuels" through the implementation of a REPowerEU plan "well before 2030". This plan includes a significant and fast diversification away from Russian gas "via higher LNG imports and pipeline imports from non-Russian suppliers, and higher levels of biomethane and hydrogen."

This rapid EU decision led to a frantic search for alternative sources of gas supply to Europe and a potential increase in gas flows from Europe's existing non-Russian gas import sources. Member states

[22] It should be noted that not all European countries rely heavily on Russian gas.
[23] European Commission (2022). "REPowerEU: Joint European Action for more affordable, secure and sustainable energy", 08 March. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A108%3AFIN

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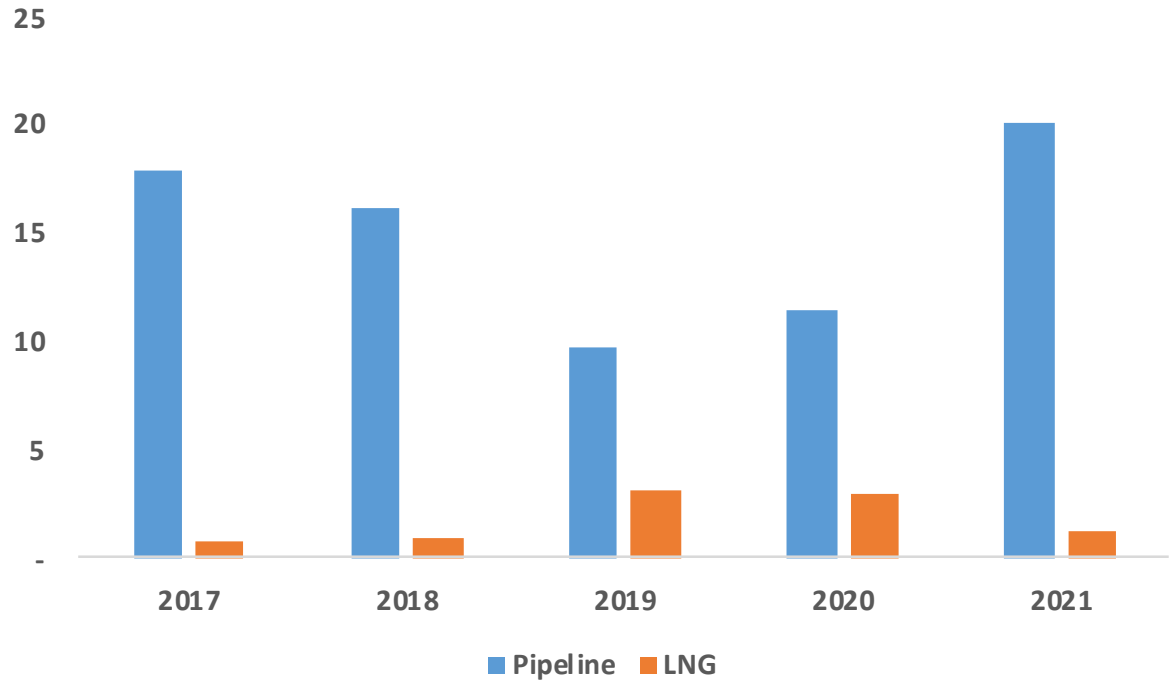
then began seeking additional volumes of gas from existing gas exporters, like Algeria, Egypt, Qatar, and Nigeria. In the case of Algeria, the discussions that preceded the agreement signed in April 2022 between Algeria's Sonatrach and Italy's Eni[24] to increase Algerian gas supplies to Italy led to speculation about the agreed volume of incremental Algerian gas supplies and their delivery period.

Some predicted that Algeria "will aim to increase supplies to Italy by 9 to 10 billion cubic meters on an annual basis by as early as the end of 2022."[25] Noting that in 2021 Algerian gas pipeline exports to Italy rose by about 80 percent compared to 2020, such an important additional volume increase over a very short period is an unrealistic scenario. Actually, the CEO of Sonatrach indicated, in early April 2022, that "at present, Algeria has only few billion cubic meters of additional gas supply available" for exports.[26]

Figure 2.2: Algerian gas exports to Italy: 2017 - 2021 (billion cubic meters)



Sources: ENTSOG & Kpler

The Sonatrach and Eni press releases that followed the signature of the above-mentioned gas agreement between the two companies provide very limited details about what this new contract entails. The Eni press release includes a vague statement about volumes and timing. It states that "this agreement will allow to exploit the [TransMed] pipeline's available transportation capacities to ensure greater supply flexibility, gradually providing increasing volumes of gas from 2022, up to 9 billion cubic meters per year in 2023 - 24".[27] The Sonatrach press communique does not provide any information

[24] Eni, 2022. Eni and Sonatrach agree to increase gas supplies from Algeria through Transmed. *Press Release*, 11 April. https://www.eni.com/en-IT/media/press-release/2022/04/eni-and-sonatrach-agree-to-increase-gas-supplies-from-algeria-through-transmed.html

[25] Albanese, Chiara et al., 2022. Draghi Heads to Algeria as Italy Seeks to Cut Russia Gas Imports. *Bloomberg*, 09 April. https://www.bloomberg.com/news/articles/2022-04-09/algeria-to-expand-natural-gas-exports-to-italy-by-almost-half

[26] Algerie Presse Service, 2022. Exploration pétrolière: l'année 2022 commence sous de bons auspices, 01 April. https://www.aps.dz/economie/138078-exploration-petroliere-l-annee-2022-commence-sous-de-bons-auspices

[27] Eni, 2022. Eni and Sonatrach agree to increase gas supplies from Algeria through Transmed. *Press Release*, 11 April. https://www.eni.com/en-IT/media/press-release/2022/04/eni-and-sonatrach-agree-to-increase-gas-supplies-from-algeria-through-transmed.html

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about the agreed volumes of incremental gas supplies or the timing of their delivery. However, it focuses on two key aspects. First, the fact that "this agreement accelerates the development of natural gas production projects, by combining the efforts of the two companies, and increases the volumes of gas exported by using the available capacities of the TransMed" [cross-border gas pipeline between Algeria and Italy, via Tunisia]. Second, it highlights that "this agreement also allows the two companies to set natural gas sales price levels, in line with market conditions, for the 2022 - 2023 financial year, in accordance with contractual price revision clauses."[28]

In the immediate short-term, additional gas supplies from Algeria to Europe would be very limited due to natural gas production constraints and the impact of a rapid domestic gas demand growth. It should be noted that the issue of internal security of energy supply is becoming a rising concern in Algeria. The recent reactivation of Algeria's high energy council emphasises the importance of the country's energy security through, notably, the conservation, renewal, and development of national hydrocarbon reserves.[29]

The new geopolitics (or realpolitik) of energy could facilitate the return of international partnerships in Algeria's upstream hydrocarbon sector and in the long term boost the country's natural gas export potential. The European Union's current prioritisation of a policy of diversification of its sources of natural gas imports away from Russian gas, could ease the joint development, between Sonatrach and international companies, of new Algerian gas supplies. Potential incremental gas exports could be dispatched mainly through Algeria's existing gas pipeline export infrastructure, which is connected to Europe's natural gas networks.

Although some European companies, such as Italy's Eni, have already increased their upstream involvement or interests in Algeria, the implementation of the proposed incremental gas supply scenario could be affected by some serious challenges. The signing of long-term upstream agreements could be inconsistent with Europe's decarbonisation policies and regulations. Could new international upstream partnerships be possible if they incorporate in their projects clearly measurable, verifiable, and meaningful carbon footprint reduction actions? In fact, this question is not only relevant to the Algerian case, but to all other gas exporting countries.

In the short to medium term, prevailing geopolitical considerations could allow for more pragmatic policies to secure Europe's gas supply needs. They could also help allay the rising concerns and anxiety of European taxpayers that are presently facing very challenging cost of living conditions, dominated by unprecedented high energy prices. A resumption of international upstream investments in Algeria and in other relevant African countries would at some stage boost these countries' gas export levels. These potentially increased African gas export volumes would not completely replace Russia's current gas exports to Europe, but they would strengthen Europe's gas supply diversification efforts.

Nevertheless, there are a lot of uncertainties about the likelihood of an increase in the level of upstream investments taking place any time soon. Europe's long-term priorities will continue to be focused on the significant decarbonisation of its economies. But in today's disrupted energy markets and possibly disturbed energy transition, it is still not clear what the share of natural gas would be in Europe's long term energy mix to justify an upstream investment revival.

Mostefa Ouki Senior Research Fellow, OIES

[28] Sonatrach, 2022. SONATRACH et Eni signent un accord dans le domaine du Gaz. *Press Communique*, 11 April. https://sonatrach.com/presse/sonatrach-et-eni-signent-un-accord-dans-le-domaine-du-gaz

[29] Maghreb Emergent, 2022. "Sécurité énergétique: création d'un Haut conseil de l'énergie", 03 April. https://maghrebemergent.net/securite-energetique-creation-dun-haut-conseil-de-lenergie/

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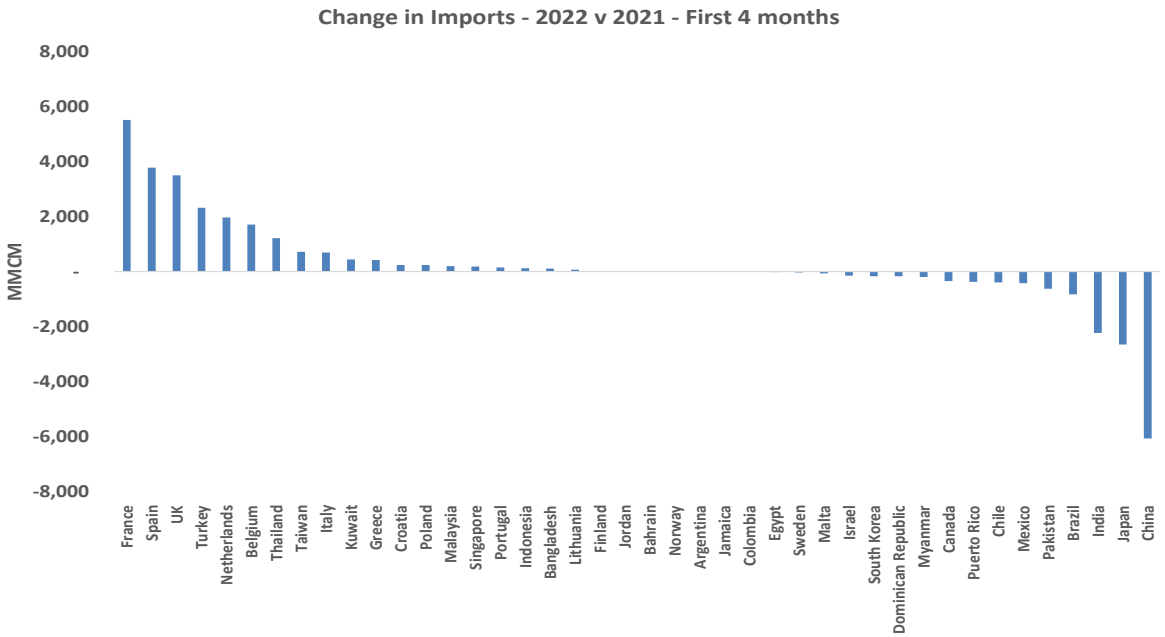
3. LNG Trade in 2022

In the first four months of 2022, there has been a surge of LNG imports into the European market. Total global LNG trade is up by some 9 bcm year on year – around a 5 percent increase. However, within that, imports into Europe (including Turkey) are up by over 20 bcm or 55 per cent. Relative to 2021, significant volumes were diverted away from Asia, especially China, where imports were 6 bcm lower. Some of this turnaround reflected a milder winter this year but also higher prices, which have impacted demand in India and Pakistan, and weaker than expected economic activity, related to Covid lockdowns in China. Volumes were also lower to Central and South America, as gas demand in power generation declined with hydro power picking up.

Figure 3.1 shows the strong growth in LNG imports in a number of European countries, but there has also been noticeable growth in Taiwan, Thailand, and other southeast Asian countries. Meanwhile, LNG imports into Central and South America have been lower in Brazil but also Chile, the Dominican Republic, and Puerto Rico. Total import volumes in Asia are 9 bcm lower than in 2021, despite ASEAN volumes being 1.5 bcm higher.

Figure 3.1: LNG Imports Year on Year Change by Country



Source: Kpler

The overall global growth has been helped by the partial unwinding of some of the supply constraints which inhibited LNG supply in 2021. Figure 3.2 shows the estimated change in available LNG export capacity in both 2021 over 2020 and 2022 over 2021.

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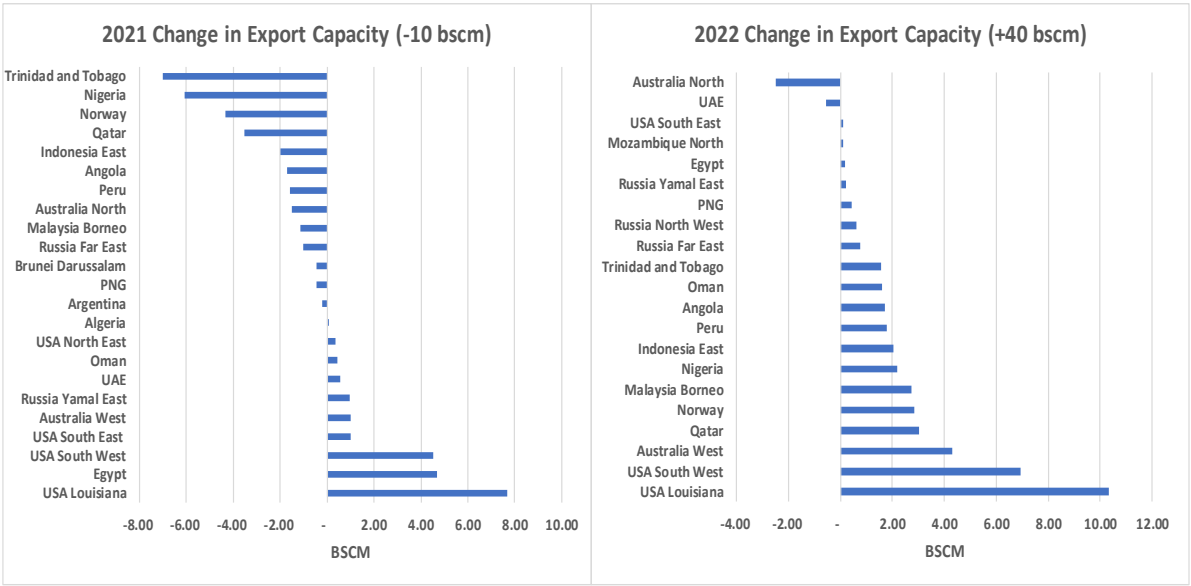
Figure 3.2: Change in LNG export capacity



Source: NexantECA WGM, OIES estimates

Overall, LNG export capacity in 2021 was expected to increase over 2020 as US LNG export capacity ramped up and new production trains came on. However, these increases in new LNG production and export capacity were more than offset by significant declines in supply from existing LNG export facilities elsewhere, notably in Trinidad and Nigeria (where there were feedgas issues), in Norway (where the Hammerfest plant was closed due to a fire), and at numerous plants including in Peru, PNG, Angola, Qatar, Malaysia, and Indonesia (due to a number of technical outages and extended maintenance).

In 2022, the outlook is much brighter. New trains in the US (Sabine Pass Train 6 and Calcasieu Pass) are now operating and Tangguh Train 3 in Indonesia is expected to start up later this year. Hammerfest in Norway is expected to restart shortly and with a number of the technical outages in Peru, Angola, PNG and Malaysia having been resolved this also adds to available capacity. Overall, it is expected that available capacity could increase by some 40 bcm this year. With Europe struggling to cope with lower Russia volumes, the rise in available LNG supply is welcome. Figure 3.3 suggests that, for 2022 as a whole, Europe could increase LNG imports in total by around 40 bcm. A potential recovery in China in the second half of the year, leading to a small uptick in LNG demand for the year as a whole, and continuing ASEAN growth broadly offsets weakness in the rest of Asia and Central and South America.

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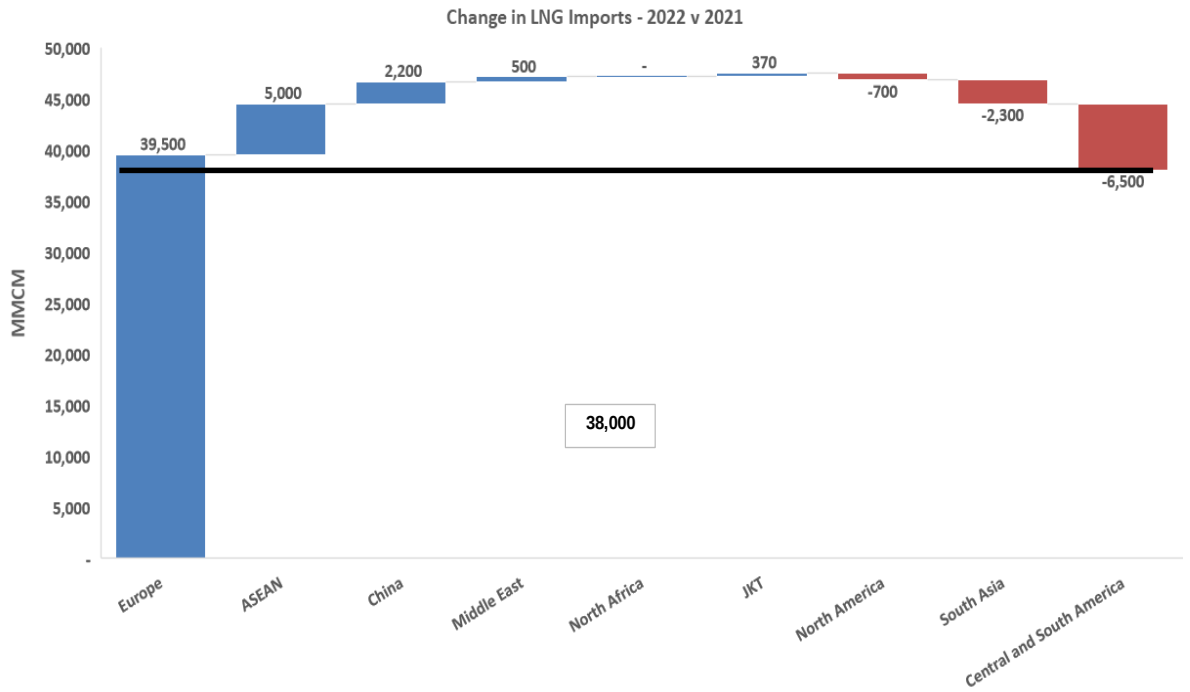
Figure 3.3: LNG Imports – a scenario for 2022



Source: NexantECA WGM, OIES estimates

This relatively rosy scenario for LNG supply is dependent on there being no material issues with LNG capacity this year. For Europe to reach the almost 40 bcm increase in LNG imports, this also requires weak demand elsewhere. China remains a big uncertainty, however, with the projected growth of over 2 bcm year on year implying an increase of 8 bcm for the May to December period, compared to last year. China's LNG imports were relatively healthy last year with growth in Q2 and Q3 2021 compared to 2020, reaching 18 percent year on year. Recording growth this year, therefore, requires a strong recovery as the lockdowns in China ease.

The 2023 outlook is even more uncertain. Higher available LNG supply is looking likely, with Calcasieu Pass and Sabine Pass Train 6 expected to be at full capacity, for the whole year, Tangguh Train 3 ramping up and Coral FLNG (Mozambique) and Tortue FLNG (Senegal/Mauritania) starting. Hammerfest in Norway should also enjoy a full year of full capacity and there is the prospect of more feedgas for Trinidad and Nigerian plants. However, LNG demand outside Europe is expected to resume growth, especially in China, with ASEAN countries, now including Vietnam and the Philippines, also growing. Europe may be able to import additional LNG, to offset any further falls in pipe imports from Russia, but the outlook for 2023 looks somewhat tighter than this year.

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