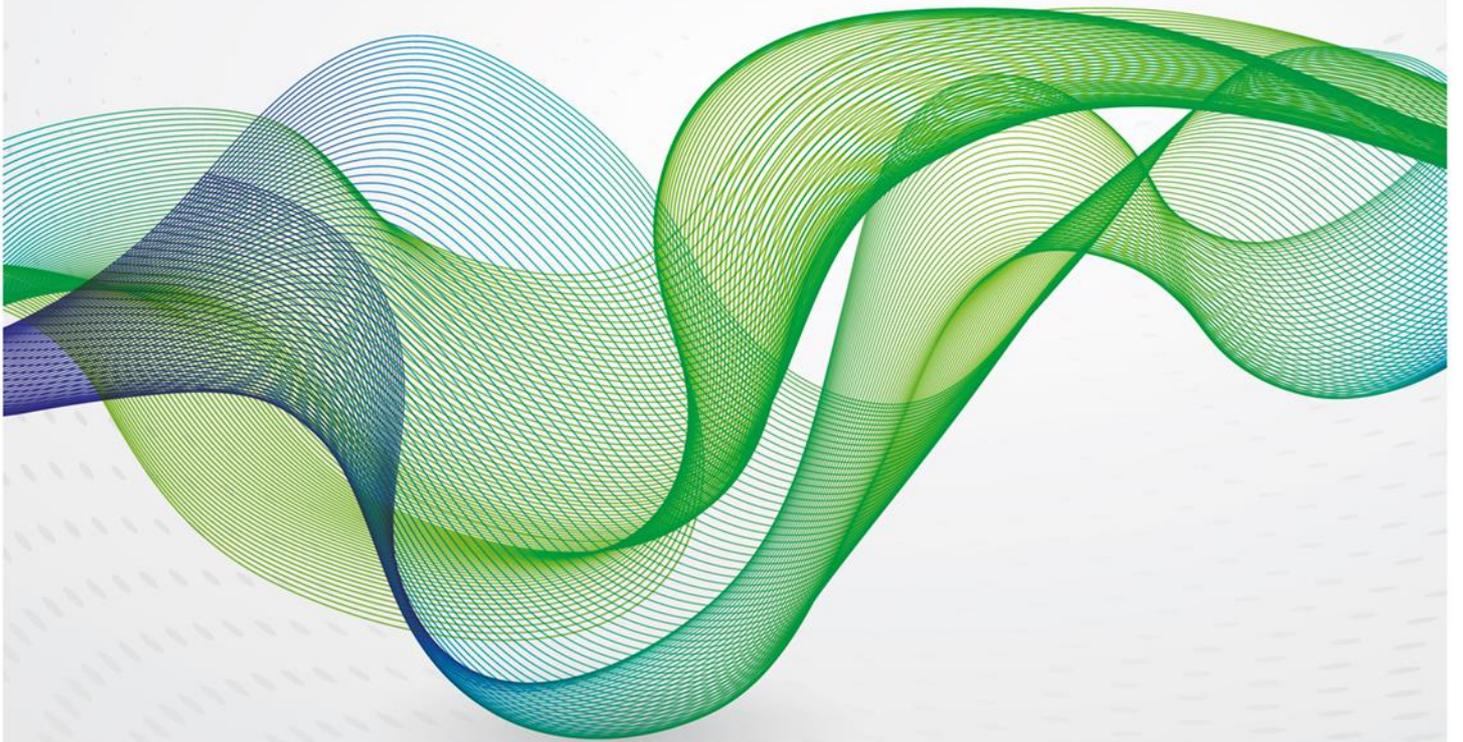


January 2022

Surging 2021 European Gas Prices – Why and How?

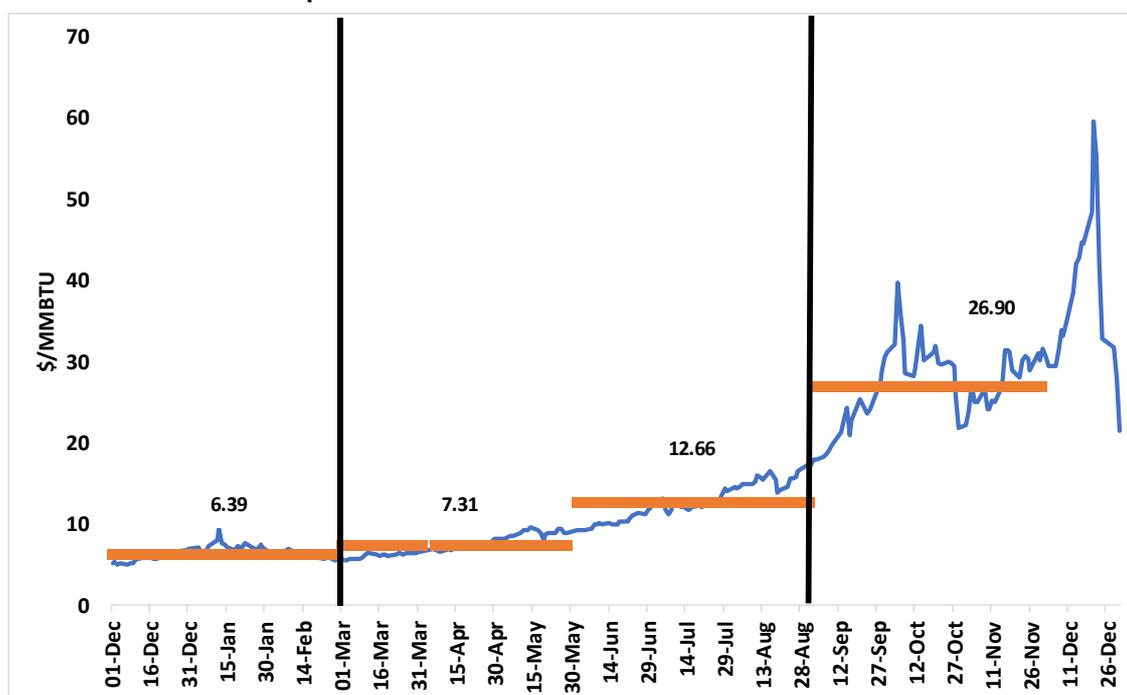


In September 2021, the OIES published a Comment entitled 'Why are gas prices so high?'.¹ The conclusion was that the price rally in 2021 was driven by a collection of fundamental supply and demand factors both in the global LNG market and the European regional gas market. At the beginning of October, the author also published a short piece in the *Financial Times* suggesting that the surging gas prices were likely to encounter a sharp correction.² This has clearly not happened yet, to any great extent, and this Comment will address the reasons why. More recently, Jack Sharples wrote an Insight which looked in detail at the supply side factors impacting European gas prices.³ This reinforced the conclusion that the European gas market in 2021 faced a 'perfect storm' of limitations on supply and a year-on-year rebound in demand in both Europe and elsewhere.

This Comment will seek to combine the above analyses and break down the different periods of 2021 as well as the various drivers that informed the surging European gas prices last year. As will be shown, the factors behind the surging prices changed significantly in Q4 2021. Any possible correction to the rising prices, as some of the earlier constraints unwound, was forestalled as more supply was taken off the market.

Figure 1 shows the development of TTF prices through 2021. The TTF quote is for the month ahead price as this is the most liquid contract for TTF and more reflective of the underlying supply-demand balance in the European market. The dates on the horizontal axis refer to the date of the TTF quote so the December quotes at the beginning refer to the January 2021 contract.

Figure 1: TTF month ahead prices 2021



Source: Argus Media

The year is divided into three periods – Q1 last winter, the summer (Q2/Q3) and Q4, the current winter. In Q1, TTF prices averaged \$6.39/MMBTu, which was seen as a relatively low winter price, despite the

¹ Fulwood, M. and Sharples, J. (2021). Why are gas prices so high? OIES, Oxford Energy Comment.

<https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/09/Why-Are-Gas-Prices-So-High.pdf>

² Fulwood, M. (2021). Surging gas prices likely to encounter a sharp correction. *Financial Times*. 1 October

³ 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. OIES, Oxford Energy Insight. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/12/Insight-108-Supply-Side-Factors-in-European-Gas-Prices.pdf>

fact that the weather was very cold in the northern hemisphere and LNG was being dragged away from Europe to Asia. LNG prices spiked in Asia in Q1 – as discussed in an earlier OIES Comment by the author⁴ - but TTF prices barely moved. In the summer, prices gradually increased reaching an average of \$12.66/MMBtu in Q3, as supply and demand tightened globally, while in Q4, prices surged to average \$26.90/MMBtu for reasons discussed below. It should also be noted that in December, the January quotes surged even more before falling back sharply at the end of the year.

The analysis below will consider these three periods separately to explain the drivers. The surging prices in Europe reflect not just what is happening in the European gas market but also the global market, primarily LNG, because of Europe's role as the balancing market. Europe's diversity of supply with indigenous production, pipeline imports and LNG imports, as well as the large storage capacity together with the liquid trading market, means Europe is ideally placed to act as the balancing market.

The analysis is based on the tightness or otherwise of the European market as determined by underlying demand in Europe, how much indigenous production Europe has and the volume of pipeline imports into Europe. In respect of the LNG market, the demand for LNG outside Europe compared to the change in available LNG capacity determines the effective tightening or otherwise of the global market for traded gas. The whole market is then balanced by using any spare LNG export capacity,⁵ changes in Europe's LNG imports and changes in European storage.

For each period a chart is shown which illustrates the tightening of the market by each factor. A tightening is a negative number in red and an easing is a positive number in blue. The market tightens as a result of increasing demand or a reduction in supply, while an easing of the market would come from lower demand or more supply, such as an increase in LNG export capacity. In respect of balancing the market, European storage plays a key role and here any increase in withdrawals and/or reduction in injections is an increase in supply and vice versa.

The European and LNG markets are separated in the charts. Any 'shortage' in the LNG market can be met by reducing European LNG imports – in effect a source of supply. However, this corresponds to a reduction in supply to Europe, thereby tightening this market.

The comparison takes the situation in each period of 2021 and compares it to the situation in 2019, which was the year before COVID-19 impacted the market. 2019 was a period of declining and low gas prices as LNG supply rose sharply through the year and excess supply partly ended up in European storage.

For the purpose of this analysis, Europe includes non-EU countries such as the Balkan states, UK, Norway, Switzerland and Turkey.

Q1 winter

Figure 2 illustrates the changes between Q1 2021 and Q1 2019. The drivers were as follows:

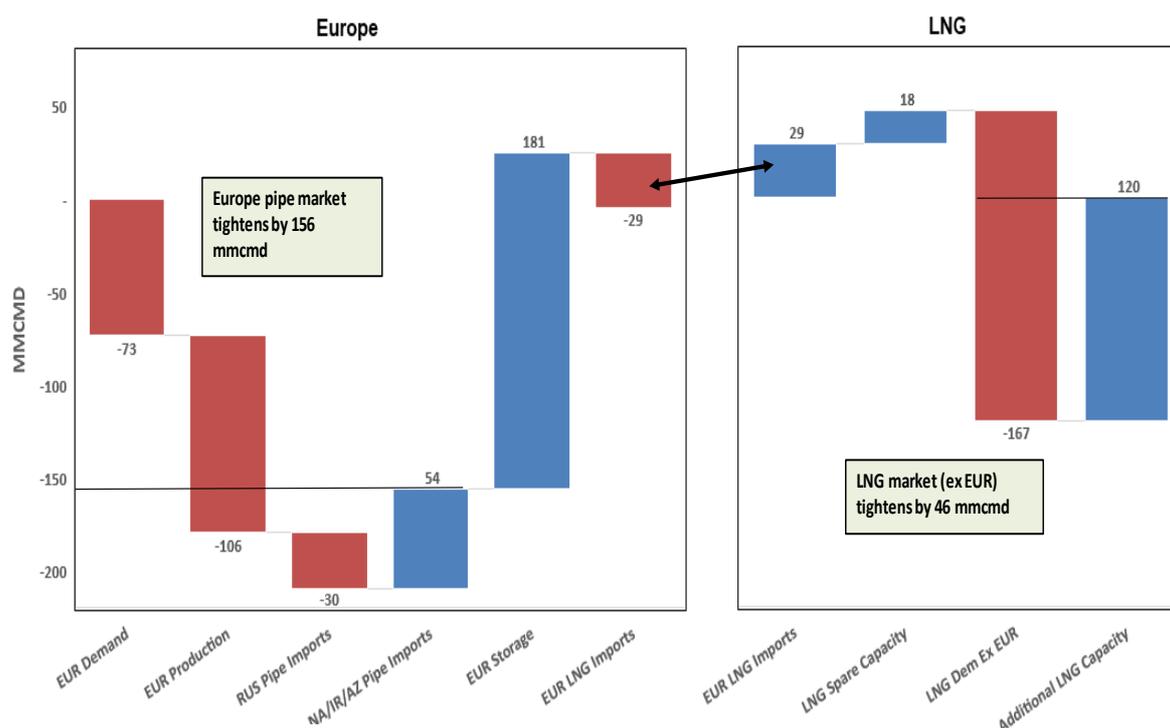
- Underlying Europe gas demand was higher by some 73 MMcm/d, reflecting the cold winter weather and also the beginning of rapidly rising gas demand in Turkey;
- European production was 106 MMcm/d lower as UK production declined, plus lower Norwegian flows and the continued decline in Groningen output;

⁴ Fulwood, M. (2021). Asia LNG Price Spike: Perfect Storm or Structural Failure? OIES, Oxford Energy Comment. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/02/Asia-LNG-Price-Spike.pdf>

⁵ LNG export capacity is defined here as available LNG export capacity which is the nameplate capacity at each plant adjusted for maintenance (planned or unplanned), any technical or feedgas issues but also the ability of some plants to produce more than nameplate

- Pipeline imports from Russia were slightly lower than in 2019, with booked transit capacity from Ukraine lower but partly offset by higher flows to Turkey via Turkstream – a more detailed analysis of imports from Russia is considered below;
- The lower pipeline imports from Russia were more than offset by higher pipeline imports from Algeria, Iran (into Turkey) and Azerbaijan.

Figure 2: market tightening Q1 2021 v Q1 2019



Source: Kpler, IEA, ENTSOG, Gas Storage Europe, Argus Media

LNG demand outside Europe was some 167 MMcm/d higher compared to 2019, driven by Asia. This was, in part, a reflection of the cold weather, but also of rising imports into Central and South America. However, some 120 MMcm/d of additional LNG export capacity was available, reflecting the run up in US export capacity which began in 2019, partly offset by issues at other LNG plants.

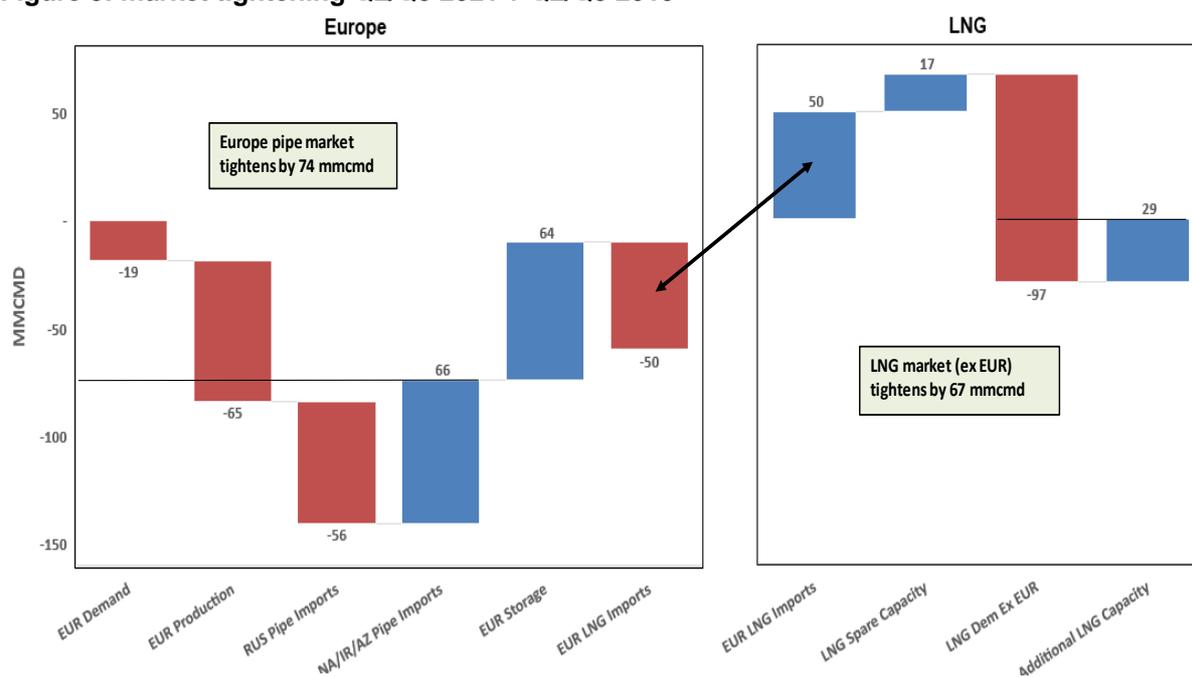
Overall, there was a considerable tightening of the European piped gas and global LNG market amounting to some 202 MMcm/d in Q1 2021. This was equivalent to around 10 per cent of European demand in Q1 or around 14 per cent of total LNG trade in Q1, to give an idea of the scale of the tightening.

The additional supplies required for the market to balance came from utilizing spare LNG export capacity, resulting in a large reduction in LNG imports into Europe compared to 2019, but also in big increase in storage withdrawals in Europe of around 180 MMcm/d. As noted earlier, despite this significant tightening of the market, TTF prices barely responded, reflecting the fact that European storage was almost totally full at the beginning of the 2020/21 winter, so large storage withdrawals could be easily accommodated. By the end of December 2020, the amount of gas in storage was still higher than in any other year apart from 2019 and some 10 Bcm above the pre-2019 average (over the quarter the 10 Bcm of 'extra' storage is equivalent to 110 MMcm/d). Despite the large withdrawals in Q1 2021, the end March storage figure was 31.5 Bcm, slightly higher than the pre-2019 average, so was not, at that stage, a big cause for concern.

Q2/Q3 summer

That situation began to change, however, during the summer with prices rising steadily. As Figure 3 shows, underlying European demand was slightly higher while European production continued to be much lower, with lower Russian piped imports offset by higher Algerian, Iranian and Azerbaijan imports.

Figure 3: market tightening Q2/Q3 2021 v Q2/Q3 2019



Source: Kpler, IEA, ENTSOG, Gas Storage Europe, Argus Media

LNG demand outside Europe continued to grow strongly in the summer, reflecting underlying growth in China as well as strong growth in Japan and Korea especially as they restocked their LNG tanks in advance of the upcoming winter. In addition, low hydro output in Brazil and Chile plus lower Argentine gas production increased Central and South American LNG demand. While LNG export capacity was higher in 2021 compared to 2019, the overall market tightening amounted to some 140 MMcm/d – equivalent to 13 per cent of European demand in the period or 11 per cent of total LNG trade.

The additional supply to balance the market came again partly from utilizing spare LNG export capacity but increasingly from lower LNG imports into Europe (50 MMcm/d) and by injecting much less into European storage (64 MMcm/d). The lower injections into storage were now becoming a big cause of concern for the market and by the end of September there was some 77.5 Bcm in European gas storage – some 8 Bcm below the pre-2019 average and 20 Bcm below the September 2020 figure. It is not too much of a surprise, therefore, that this market tightening resulted in rising prices through the summer.

Q4 winter

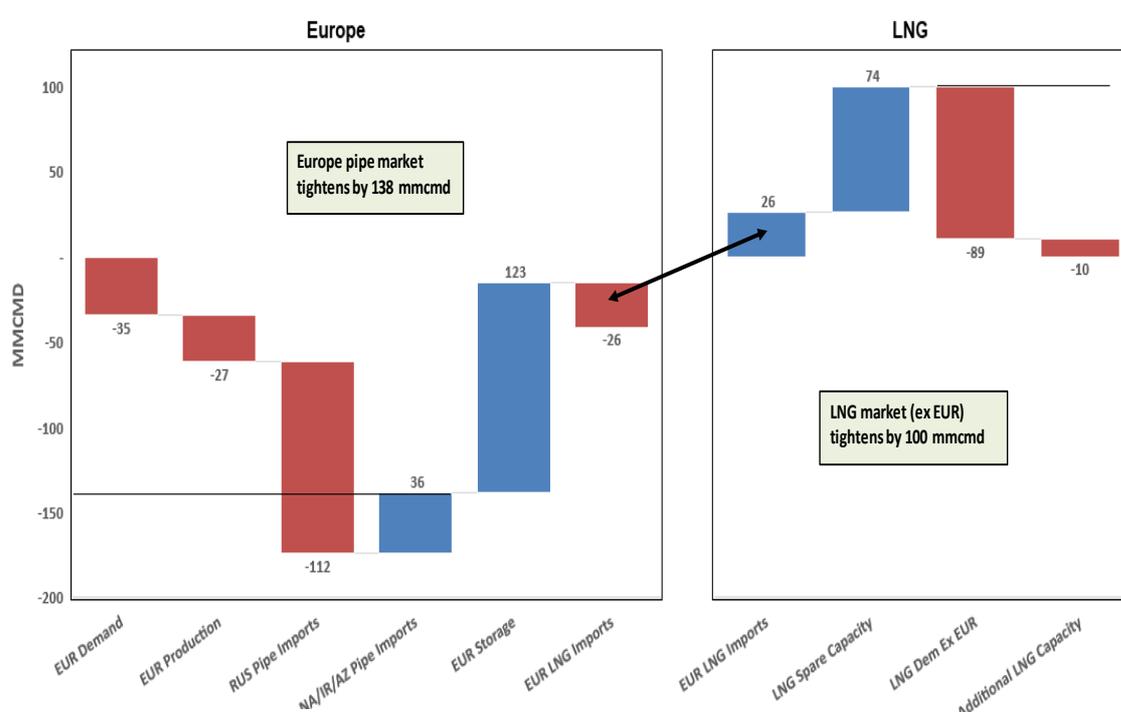
There was worse to come however. As noted in Figure 1, TTF prices jumped sharply in Q4 of 2021, but the drivers were somewhat different:

- European demand was some 35 MMcm/d higher than in 2019, despite some response to higher prices reducing demand;
- European production continued to be lower by some 27 MMcm/d, notwithstanding some recovery in Norwegian production;

- Piped imports from Russia, however, were sharply down by 112 MMcm/d, with significantly lower flows on the Yamal Europe route (see below for further detail);
- Although piped imports from Algeria, Iran and Azerbaijan were higher, they were unable to offset the lower pipeline imports from Russia as they had done in Q1, Q2 and Q3 of 2021.

LNG demand outside Europe continued its growth in China, Central and South America plus the ASEAN countries, but available LNG export capacity was actually slightly lower than in Q4 2019. 2019 saw significant growth through the year but since then, available capacity has stalled as the rising US LNG export capacity has been offset by issues at numerous LNG plants in Norway, Nigeria, Trinidad, Peru, Angola, Equatorial Guinea, Indonesia, Papua New Guinea, some West Australian and even, for a period, in Qatar.

Figure 4: market tightening Q4 2021 v Q4 2019



Source: Kpler, IEA, ENTSOG, Gas Storage Europe, Argus Media

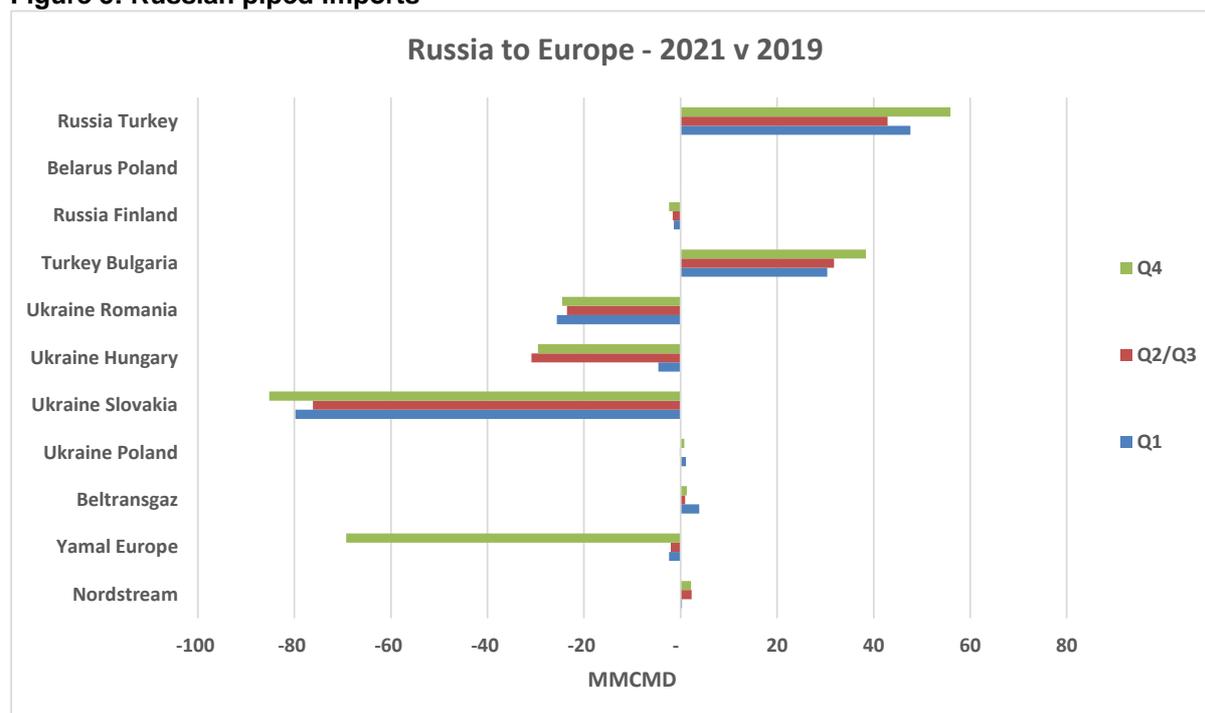
Overall, the effective global market tightening was some 238 MMcm/d, equivalent to 14 per cent of European demand or around 17 per cent of total global LNG trade. To put it another way, the equivalent to taking some 240 LNG cargoes off the market.

The rise in LNG export capacity resulted in quite a lot of unutilized capacity by Q4 2019. But by Q4 2021 it was almost fully utilized, representing a rise of 74 MMcm/d. European LNG imports were 26 MMcm/d lower and European storage withdrawals were higher by some 123 MMcm/d than in 2019.

Pipeline imports from Russia

Piped imports from Russia were considerably lower in Q4 2021 compared to Q4 2019 and were running at a much lower rate than in the first three quarters of 2021. As noted, this was largely due to lower flows on the Yamal Europe route. Figure 5 compares the changes between 2021 and 2019 for the different Russian export routes to Europe by the three periods.

Figure 5: Russian piped imports



Source: IEA, ENTSOG, Argus Media

For most routes the changes between 2021 and 2019 were consistent through the year. Flows via Ukraine were much lower, reflecting the lower transit capacity booking.⁶ These were partly offset by sharply increased flows to Turkey utilizing Turkstream to both meet the rising demand in Turkey but also to accommodate the diverted flows from the Ukraine route for both Turkey itself and other southeast European markets.

On the Yamal Europe route, flows were some 69 MMcM/d lower in Q4 2021 than in Q4 2019, in contrast to the previous three quarters where there was little difference. The reasons for the sudden reduction in flows from Russia along this route can be debated. The lower flows have been ascribed to geopolitical motives to put pressure on the European Commission to approve Nordstream 2. Russia has also claimed that it has been rebuilding its own storage stocks and also the demand has been high in Russia as a result of the cold weather. However, as of early November, Russia had filled its storage and, according to data from Argus Media, by 29 December some 12.6 Bcm had been withdrawn from Russian storage in Q4, the lowest level of withdrawal since 2015, leaving stocks significantly higher than at the end of 2020, despite the very cold weather in Russia. This does suggest that, while Gazprom is reportedly meeting its nominations from European buyers, it is holding potential spot supplies off the market for either geopolitical or economic (to keep the price high) reasons or a bit of both. Gazprom ceased selling gas on its Electronic Sales Platform on 13 October 2021.⁷

Conclusions

The surging gas prices in Europe in 2021 came in three phases. In Q1 the cold northern hemisphere winter weather and supply constraints from European production tightened the market by some 203 MMcM/d or some 18 Bcm of gas overall. However, the impact on TTF prices was muted since European

⁶ In 2020 the transit capacity booked under the five-year transit contract was 178 MMcM/d and in 2021 this fell to 110 MMcM/d (and will remain at that level until 31 Dec 2024)

⁷ <http://www.gazpromexport.ru/en/esp/sales/>

storage was in good shape and could relatively easily accommodate the increased withdrawals. The 'surplus' of gas in European storage at the beginning of 2021 effectively reduced the tightness of the global market by more than half, reducing the impact on prices.

The continuation of strong Asian, as well as Central and South American, demand for LNG in the summer, however, combined with continued supply constraints for LNG and European production, meant that Europe was unable to restock at anywhere near a normal rate thus putting upward pressure on TTF prices. The effective market tightening was some 140 MMcm/d – lower than in Q1 – but with storage at low levels, following the removal of 'surplus' stock, the September TTF settlement price reached over \$15/MMBtu.

The real shock to the market, however, came in Q4 when gas flows from Russia along the Yamal Europe route dropped sharply to less than a third of normal levels. The market was still in a delicate balance, even without the reduction in flows along this route, with growing LNG demand outside Europe, continuing LNG supply and European production constraints, although there was a slight easing in both. The lower Yamal Europe flows, however, tipped the market over the edge and rather than TTF prices being in the \$15 to \$20 per MMBtu range – still very high by historical standards – they rose to \$30 or above and averaged almost \$27/MMBtu for the whole of Q4.

Europe is the world's balancing market for gas and has been able to absorb most of the shocks to the global gas market. However, just like the annual service on an old car which requires the shock absorbers to be renewed, Europe requires more supply to renew its storage to absorb any more shocks. LNG demand outside Europe will continue to rise but LNG supply is increasing as more US plants come on stream and the multiple supply issues in 2021 begin to unwind. However, for supply to Europe to materially increase will require increased flows from Russia, either along the Yamal Europe route or along Nordstream 2, following approval.