

CORNWALL INSIGHT

CREATING CLARITY

Insight paper

Another winter of discontent?

What happens to the UK this winter, and next, if the gas taps from Russia stay turned off?

December 2022



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The authors



Matthew Chadwick, PhD
Lead Research Analyst
Cornwall Insight
m.chadwick@cornwall-insight.com



Jamie Maule
Research Analyst
Cornwall Insight
j.maule@cornwall-insight.com



Luana Graca
Year in Industry Student
Cornwall Insight
l.graca@cornwall-insight.com

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1. Executive summary

Following Russia's invasion of Ukraine in February 2022, heightened geopolitical tensions have resulted in substantial reductions to the levels of natural gas supplied to European nations from Russia. We saw this illustrated, although partly driven by milder than normal conditions, during the first week of November 2022 when Russian piped gas supply to Europe was reduced by over 88% compared to the 2015-2020 average for the same week. Whilst the UK has not historically been heavily dependent on Russian gas supplies, it is still a net importer of natural gas and is therefore exposed to the volatile wholesale prices arising from the scarcity of gas supplies in Europe.

Reduced Russian gas supply to Europe, alongside issues with the French nuclear fleet and Norwegian hydropower supply, are resulting in increasing gas supply demands for power generation, which may result in a price differential that drives high gas interconnector flows from the UK to Europe this winter, continuing a trend of exporting gas that has been in evidence since the summer. The UK has limited gas storage facilities compared to Europe and this – in combination with probable exporting of gas over interconnectors – means it has the potential to be heavily dependent on global cargoes of liquid natural gas (LNG) to meet gas demand over the winter. Fortunately the UK is blessed with LNG terminals with capacity to receive over 50bcm/yr, and National Grid Gas' Winter Outlook indicates that the UK should have sufficient access to global LNG cargoes to meet demand. However, global competition for these cargoes is likely to result in elevated gas prices.

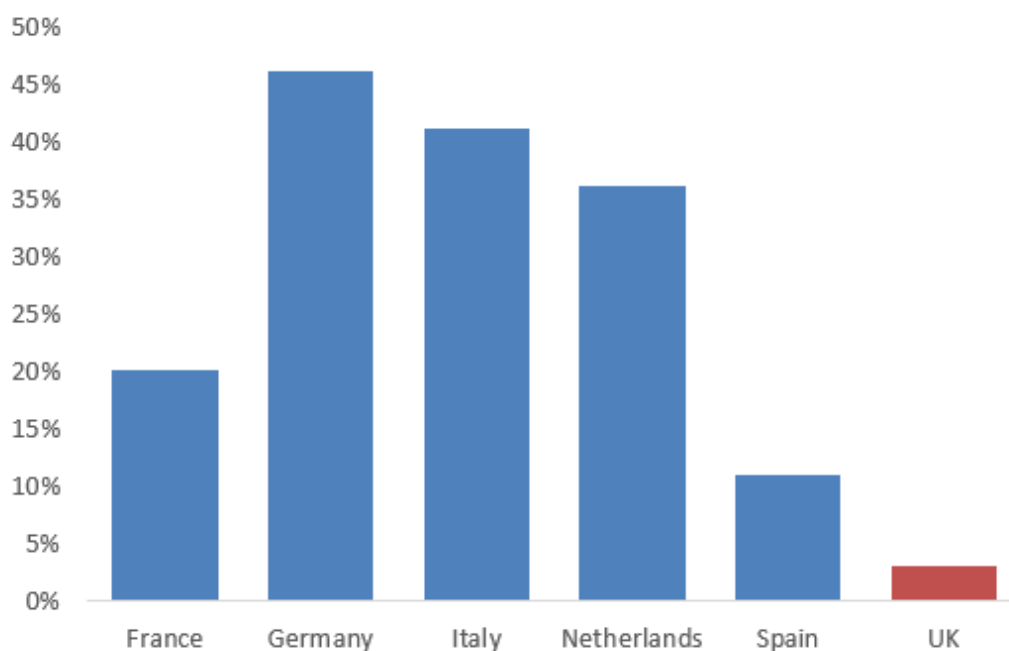
Finally, whilst it seems that the UK will have sufficient gas supplies to last this winter, our long-term gas price forecasts indicate that this is unlikely to be a problem for winter 2022-23 alone. Concerns for gas supply next winter are compounded by a reduction in the seasonal summer-winter spread of gas prices, and uncertainty over the levels of European gas storage at the end of the heating season in April 2023. With reduced pipeline flows from Russia this summer compared to summer 2022, refilling European gas storage is likely to be a more costly and challenging process, especially if gas storage levels are towards the lower end of the historical range by April 2023. Key variables for the gas storage volume we face in April 2023 will be the weather and demand in the remaining months of this winter. The risks for refilling elevate if the remaining months of the heating season are in line with, or colder than, normal seasonal temperatures and if, as a result, demand reaches a limit of elasticity in response to price.

New and returning supplies of LNG, new LNG regasification terminals, particularly in the North and West of Europe, and new gas interconnection to move LNG from south to north on the continent, may alleviate the tightness in Europe as we move towards 2025. But until then, with volatility in the energy market set to extend into the future, the UK and other European nations must now consider what long-term strategies can be implemented to reduce their dependence on high and volatile global gas prices.

2. Introduction

Following the Russian invasion of Ukraine in February 2022, many countries across the globe imposed economic sanctions on Russia and sought to divest themselves of dependence on buying Russian goods. One area where this is particularly prevalent is the European gas market, with the EU receiving 140bcm of piped gas from Russia in 2021, roughly 40% of its annual supply. On 31 August 2022 the flow of natural gas to Europe from Russia through Nord Stream 1 was shut off and has yet to restart, with damage sustained to the pipeline on 26 September 2022 likely ruling out further gas supply to European nations through this pipeline over this winter, and the foreseeable future. Compared to other major European countries, the UK receives relatively little of its annual natural gas requirements from Russia (Figure 1), and as such is not directly impacted by the cessation of Russian gas exports to Europe this winter. However, in 2021, more than 60% of the UK's natural gas supply came from imports¹, with this share increasing as indigenous resources decline, and it is therefore indirectly exposed to rising gas prices as European demand for other global natural gas resources increases to replace Russian gas. As such, the UK is effectively importing the price effects of the cessation of Russian gas flows, even though not directly impacted from a gas volume perspective.

Figure 1: Percentage dependence on Russia imports of natural gas for domestic gas consumption in major European countries in 2020.



Source: [IEA](#)

3. European gas deficit

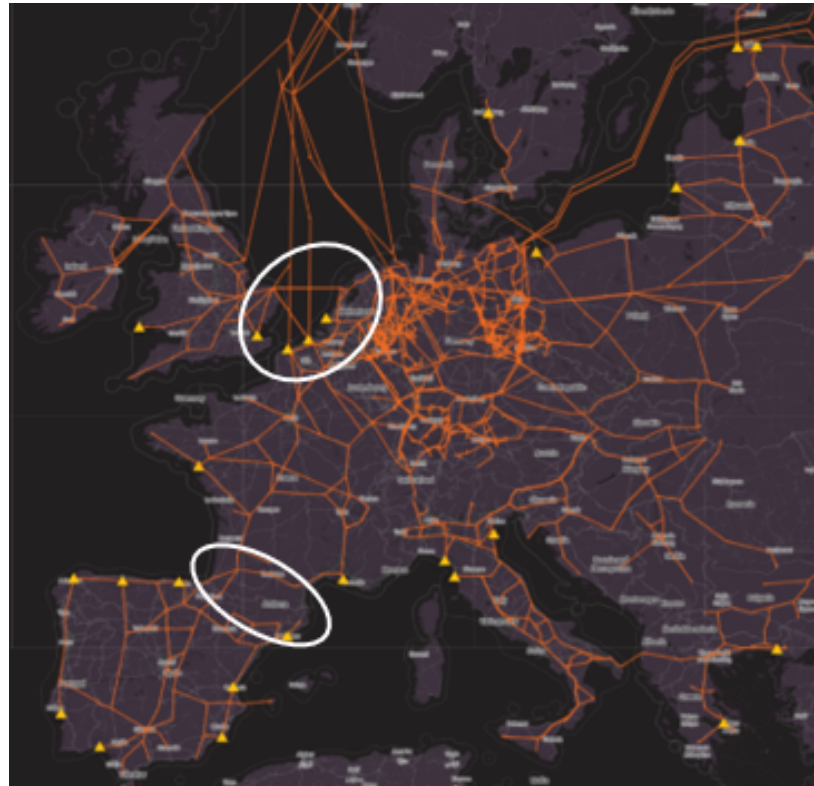
In previous winters (2015-20), Europe has imported an average of 3,076 mcm of natural gas per week from Russia, but in the first week of November 2022 imports from Russia had fallen to only 402 mcm, largely due to the ceasing of all flows through Nord Stream 1. Without the bulk of Russian gas flows seen in previous years, the main non-indigenous supplies of gas into the EU are now from Norway and LNG imports (Figure 2). The primary source (44%) of LNG imports to the EU were from the US in the first nine months of 2022². Increased LNG dependence heightens the global demand and competition for LNG cargoes, and the price that the UK will therefore have to pay to access them. LNG supply to Europe is further complicated by constraints in transport capacity, with bottlenecks between the major import hubs of the UK and Iberian Peninsula and the rest of Europe (white ellipses in Figure 3). The bottleneck between the UK and Europe could present a risk for UK access to gas over the winter when our low levels of gas storage relative to Europe (Figure 4) could put us on the wrong side of a gas transportation constraint.

Figure 2: Natural gas volumes (mcm) supplied to Europe from different sources during the first week in November in 2022 compared to the average volumes supplied between 2015-2020.

Natural gas sources	Average volume during first week of November (2015-2020) (mcm)	Volume during first week of November (2022) (mcm)	
Norway	2,626.9	2,641	↔
LNG imports	1,752.5	3,103	↑
Russia – Ukraine Transit	1,441.4	207	↓
Russia – Nord Stream 1	1,011.5	0	✗
Russia – Yamal	746.8	0	✗
Russia – Turkstream	95.4	186	↔
Algeria	653.5	473	↔
Azerbaijan – TANAP	-	232	

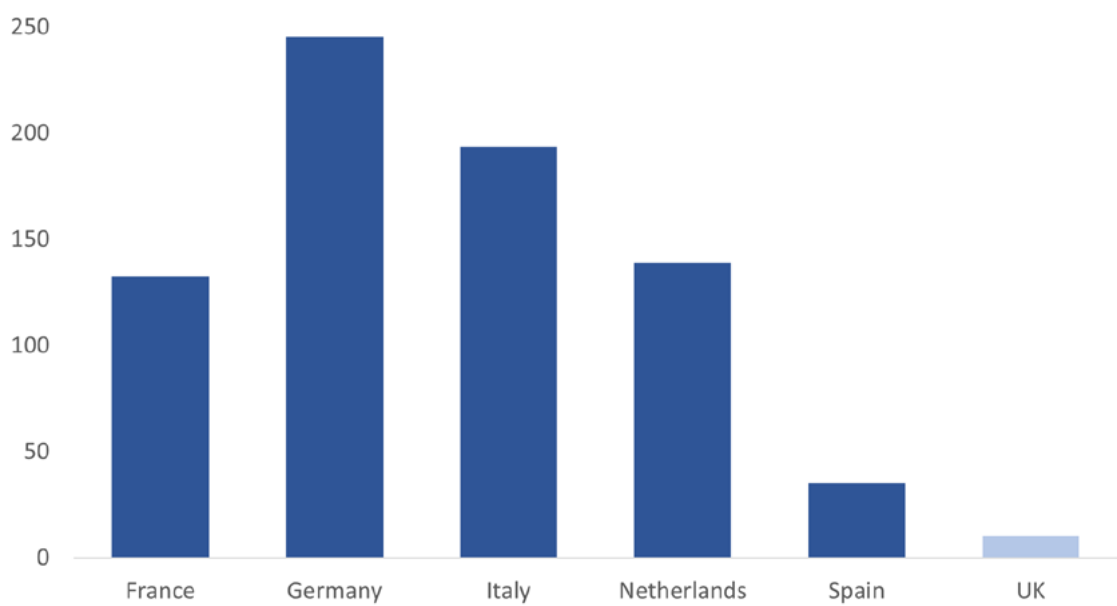
Source: [Entsog](#)

Figure 3: European gas pipelines and LNG import terminals with major bottlenecks marked by white ellipses.



Source: [EntsoG](#)

Figure 4: Maximum natural gas storage (TWh) levels in major European countries.



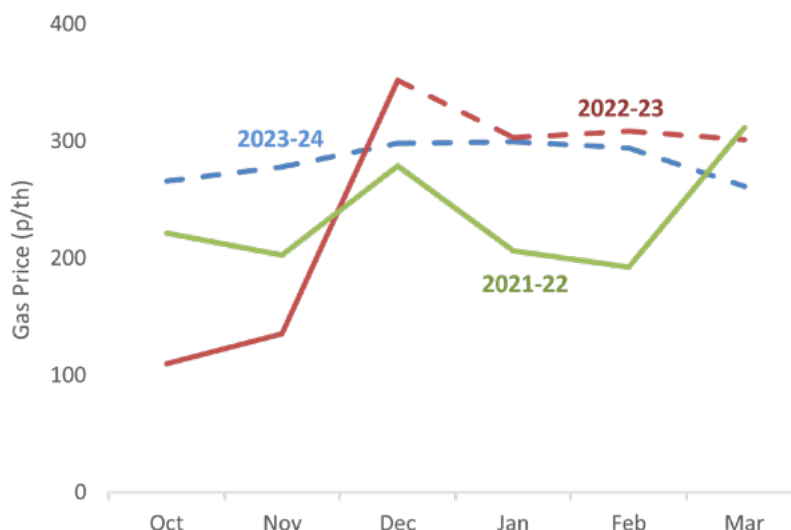
Source: [GIE](#)

4. UK outlook

National Grid Gas' Winter Outlook³ forecasts that the UK demand for natural gas will be higher than previous winters, driven predominantly by high interconnector exports to continental Europe. As discussed in section 3, these high exports are largely due to European gas shortages, which drive up the gas price on the continent and create a positive price differential relative to the UK market. Additionally, there have been issues with the French nuclear fleet and Norwegian hydro energy supply that have further increased demand on gas supply for power generation. These high interconnector exports are evidenced by the exit capacity bookings already in place for this winter for the relevant links. National Grid forecasts indicate that despite the increased gas demand this winter, the UK should have sufficient access to LNG cargoes to avoid a supply deficit, with only the cold winter (equivalent to 2010-11) scenario requiring interconnector gas imports from continental Europe.

Whilst it appears unlikely that the UK will face a shortage of gas supply this winter, the dependence on global LNG cargoes, and continental European imports if the winter is particularly cold, will push up the price of gas in the UK relative to the price of previous winters, including winter 2021/22 when prices were already elevated from past seasonal norms. The mild conditions during October and November helped keep day-ahead gas prices lower than last winter (Figure 5), although still over double the pre-2021 historical average. However, the colder temperatures at the beginning of December have resulted in a surge in day-ahead gas prices to c.150% of the average price for last winter (Figure 5). Our modelling indicates that wholesale gas prices are expected to remain elevated for the rest of this winter, compared to last, and that this is not a single winter problem, with high winter gas prices maintained in 2023-24 (Figure 5) and unlikely to return to pre-2021 'normality' this decade (Figure 6). This is further emphasised by the gas futures contract prices for winter '24, which are substantially elevated compared to their value throughout 2021, even if they are reduced from the August 2022 peak⁴.

Figure 5: Average monthly wholesale gas prices* for the winters of 2021-22, 2022-23, and 2023-24.



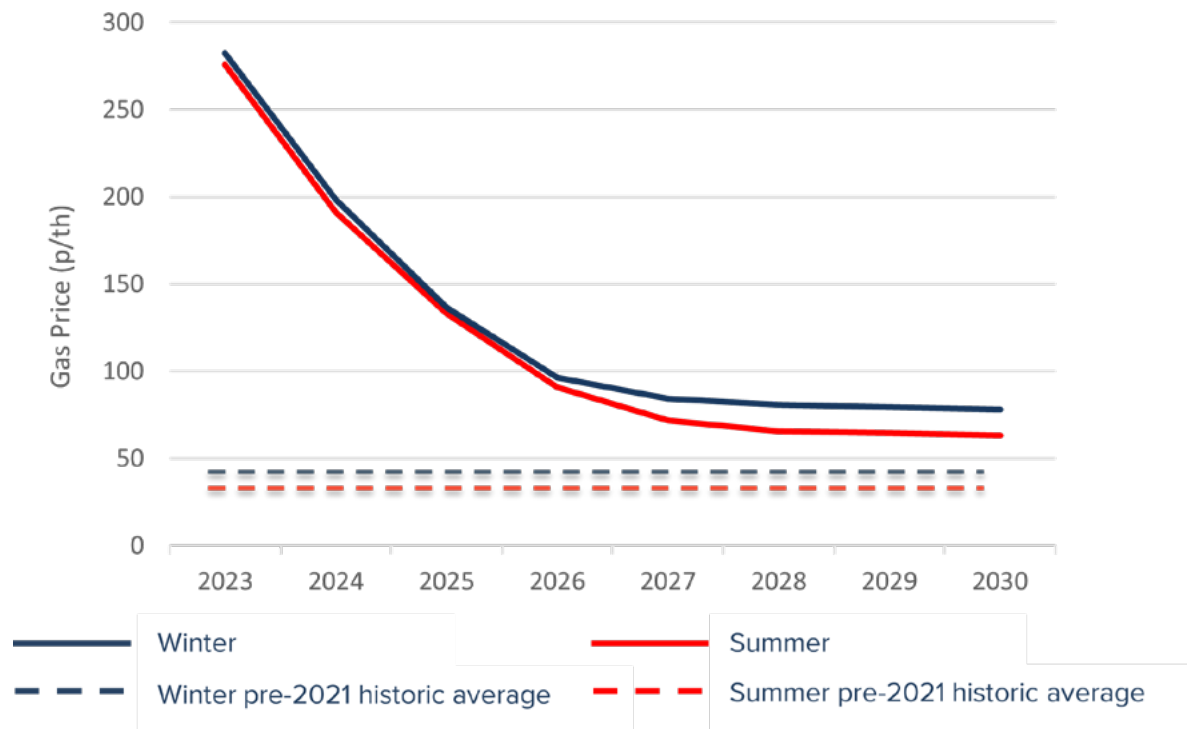
Source: Cornwall Insight

*Solid lines represent actual day-ahead prices for past and current months and dashed lines are forecasts for future months.

³ [National Grid Gas](#)

⁴ [ICE Futures Europe](#)

Figure 6: Average wholesale gas prices for the summers and winters from 2023-2030.



Source: Cornwall Insight

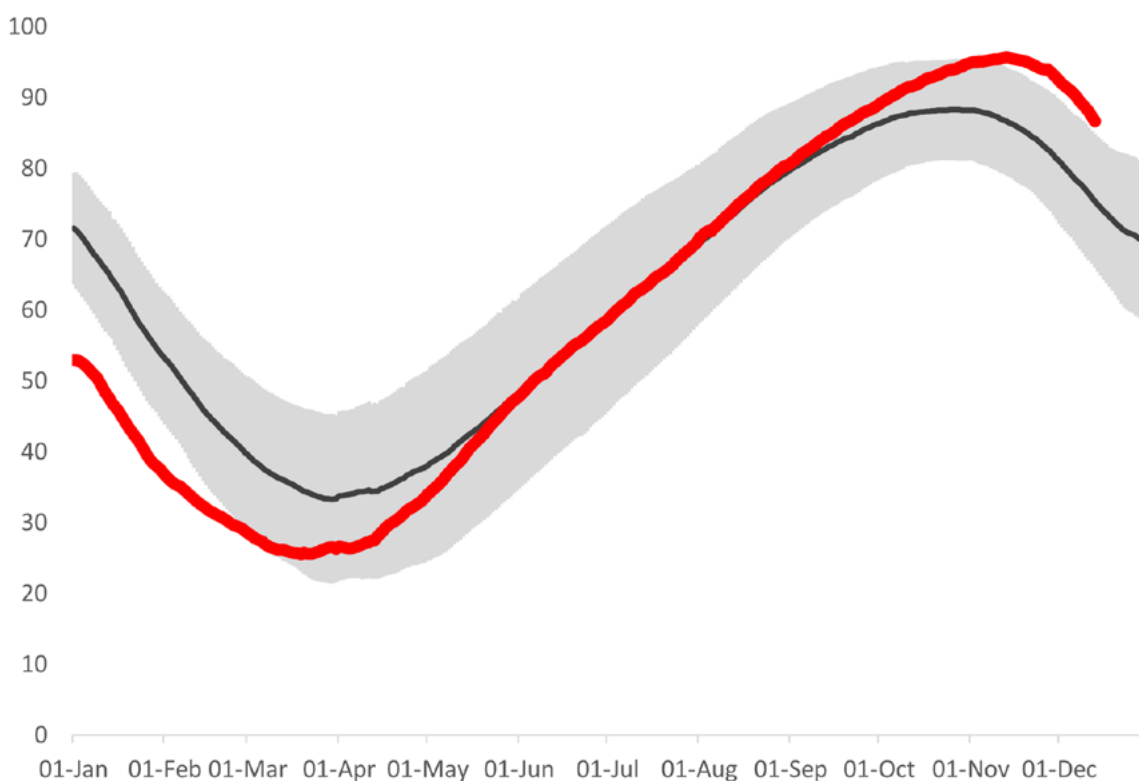
The problems for next winter are exacerbated by the high gas prices forecast for summer 2023 (averaging 275p/th), which, alongside reduced pipeline flows from Russia relative to summer 2022 and limited new infrastructure additions to increase LNG import and regasification to continental Europe, increase the risk that refilling storage across Europe will be a more costly and challenging process. A key factor for gas prices during both summer 2023 and next winter will be the levels of European gas storage at the end of this heating season in April 2023.

There are a variety of swing factors that could impact on European gas storage levels at the end of this winter and the beginning of next, with knock-on consequences for gas supply and prices next winter. The weather this winter will have a substantial impact on the levels of European gas storage that remain going into the summer, and the amount, and subsequent cost, of refilling that is therefore required before next winter. Another key factor is the level of demand elasticity that is seen this winter. We have already seen considerable reductions in consumption, particularly amongst industry consumers but there is a practical and economic limit to this reduction, with industries needing to maintain a minimum level of demand to avoid widescale and permanent de-industrialisation. The weather will also play an important role in demand elasticity, with a subsistence level of demand required by households to stay warm and healthy during the winter.

If we face a particularly cold winter, there is further disruption of limitations to gas supply, or power demand for gas increases, and storage levels are consequently drawn down to the lower end of the historic range (Figure 7) then refilling storage back

to an equivalent level to the start of this winter by the start of next will require another summer of anomalously high injection rates. There is also substantial uncertainty around how much gas demand there will be from the Asian market in coming seasons, with a wide range of possible scenarios linked to developments in China's zero-Covid policy. Having seen a relatively suppressed demand for LNG in 2022, increased Chinese competition for global LNG supplies in 2023 could drive up prices and make it harder for Europe to access LNG for refilling storage.

Figure 7: European gas storage level (%) in 2022 (red line) compared to the historic (2015-2021) mean (black line) and standard deviation (grey shading).



Source: Cornwall Insight, [GIE](#)

With high and volatile gas prices looking like an issue for multiple winters, and the tightening and reduction in the scale of government support schemes for both businesses and households, the question remains of what can and will be done to protect consumers? For households, the implementation of more targeted social tariffs⁵ could help alleviate the risks for the most vulnerable consumers. Similarly, on 28 November 2022, the UK government announced the ECO+ scheme⁶, providing support and renewed focus on improving energy efficiency in households. On the business side, more could be done to incentivise energy efficiency and demand reductions through tax rates or grant schemes. Overall, the current energy crisis could present a valuable opportunity to consider long-term policies in order to align net zero ambitions with protections for vulnerable households and businesses and tackle two of the major obstacles to decarbonisation – the decarbonisation of space heating, and the reduction in emissions from the industrial sector. We will be returning to options for how to unlock these opportunities in future papers.

⁵ [Cornwall Insight](#)

⁶ [GOV.UK](#)

CORNWALL INSIGHT

CREATING CLARITY

Cornwall Insight

Level 3, The Union Building

51-59 Rose Lane

Norwich Norfolk

NR1 1BY

T 01603 604400

E enquiries@cornwall-insight.com

W www.cornwall-insight.com



www.cornwall-insight.com