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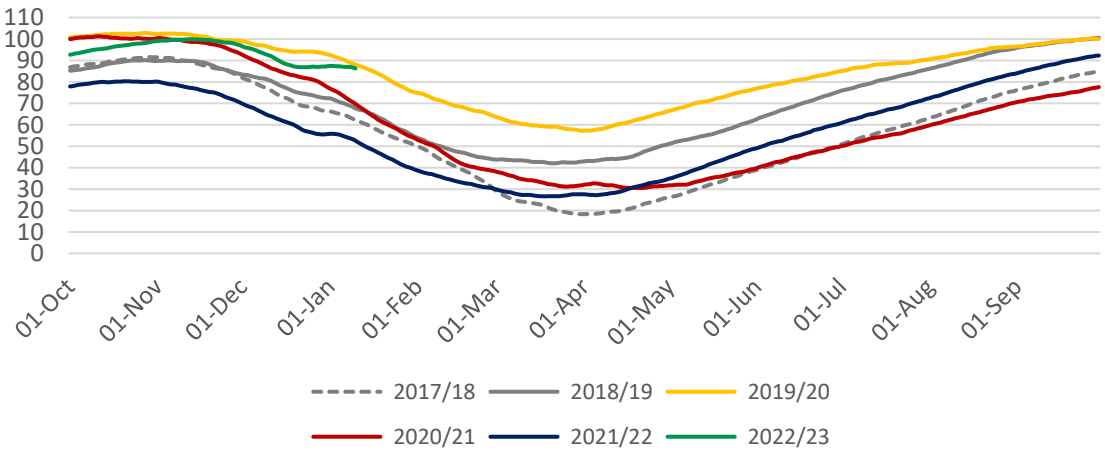
Storage as an indicator of European market tightness

Gas storage, and its vital role in balancing the European gas market, increases in prominence during times of market imbalance. The rapid drawdown of stocks during a period of unusually cold weather in Europe ('The Beast from the East') in Q1 2018 was followed by the use of storage to absorb excess volumes from an oversupplied market in summer 2019 and summer 2020. In Q1 2021, rapid withdrawals from European storage offset the drop in European LNG imports, with cargoes being drawn away to northeast Asia by a spell of very cold weather and a related surge in regional demand. In each of these cases, the rate of storage injection or withdrawal, along with total stock level, has been an indicator of market over-supply or under-supply, with those injections and withdrawals motivated by pricing signals that themselves reflect market conditions.

2022 was different, insofar as the period between 1 April and 1 October saw record net injections despite record high prices. It was not summer oversupply, low prices, and the promise of wide sesasonal spreads that motivated those injections, but a strong concern over likely future market tightness in winter 2022/23. Such was the level of concern that net injections continued throughout October and into mid-November. This record injection through into early winter was made possible by a combination of policy-driven and price-driven demand reductions, robust pipeline supplies from non-Russian suppliers, and record LNG imports with cargoes attracted by high prices. Summer 2023 is likely to see a similar policy-driven push to replenish storage even if conditions for doing so are unfavourable.

Figure 3: European gas storage stocks (Bcm)



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

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In the period between 14 November and 31 December 2022, European net storage withdrawals totalled 12.6 Bcm. This was 8.7 Bcm (41 per cent) lower year-on-year, and 5.5 Bcm (30 per cent) below the average for the same period in 2017-2021. Indeed, 2022 was the first year since 2010 that stocks actually grew between 24 and 31 December. This lower-than-average withdrawal reflects a market that remains relatively well-balanced, albeit with high prices necessary to continue attracting supply.

Looking ahead, there are several signposts to look for. Firstly, storage stock levels in mid-winter (on 1 February 2023) will provide an indicator of how much of a 'buffer' remains to balance the market in the event of a late-winter surge in demand, as happened in late February-early March 2018. Secondly, stock levels at the end of winter (on 1 April 2023) will indicate how much would need to be injected during summer 2023, in order to bring stocks back to capacity by 1 November 2023.

Thereafter, stock levels will be monitored throughout the summer, to assess progress in bringing those stocks back to full capacity by 1 November. It should be remembered that Europe benefitted from unusually benign weather conditions in October and the first half of November 2022, and a repeat of such conditions cannot be guaranteed in 2023. Therefore, Europe needs to be as close to its storage target as possible by 1 October, with stocks as close as possible to filling the 105 Bcm storage capacity.

On 31 December 2022, European storage stocks were just over 87 Bcm, which was almost 32 Bcm higher than on 31 December 2021 and just over 14 Bcm higher than the 31 December average for 2017-2021. The average storage withdrawal in Q1 in 2018-2022 was 37.4 Bcm, peaking at 48.1 Bcm in Q1 2018 and reaching a low of 28.1 Bcm in Q1 2022. If that Q1 2018-2022 average withdrawal were to be repeated in Q1 2023, Europe would have around 50 Bcm left in storage on 1 April 2023. If the maximum or minimum storage withdrawals (in the cold and mild Q1s of 2018 and 2022, respectively) were to be replicated in Q1 2023, Europe would be left with a minimum of 39 Bcm and a maximum of 59 Bcm in storage on 1 April 2023.

'Average' withdrawals in Q1 2023 would leave net injections of 50 Bcm sufficient to bring stocks back to full capacity by the start of winter 2023/24. The 'Mild Q1' or 'Cold Q1' withdrawals would mean summer net injections of 40 Bcm or 60 Bcm would be needed to bring storage back to full capacity. For comparison, European net injections in summer 2022 were around 72 Bcm.

In Q1 2023, the supply-demand balance that will determine withdrawal volumes will be rather different to recent years. Demand looks set to be lower, Russian pipeline supplies also lower, and LNG imports higher. If pipeline supply from Russia remains at the December 2022 level (78 MMcm/d), the year-on-year decline in Russian pipeline supply to Europe in Q1 2023 will be 19.2 Bcm. In a benign scenario, continued subdued demand and robust LNG imports could offset that loss. For example, if LNG imports in Q1 2023 were maintained at the level of Q4 2022, the year-on-year increase in Q1 2023 would be 5.6 Bcm. Similarly, demand in Q4 2022 was 20 per cent lower year-on-year. Even if demand in Q1 2023 were just 10 per cent lower year-on-year, this would imply a drop of 14.9 Bcm. If non-Russian pipeline imports were to remain unchanged year-on-year, this balance - with lower demand and higher LNG supply fully offsetting lower Russian pipeline supply - would allow storage withdrawals in Q1 2023 to also remain virtually unchanged year-on-year, and the 'Mild Q1' scenario would be achieved.

In a more challenging scenario, a surge in European gas demand and Asian LNG demand, combined with the year-on-year decline in Russian pipeline supply, could make the drawdown of storage stocks more substantial. For example, if non-Russian imports (pipeline and LNG) and production remained at the level of Q1 2022 (thus reversing the gains in LNG imports in recent months), demand returned to the level of Q1 2022, and Russian pipeline supply remained at 57 MMcm/d (the average for the first half of January), a net withdrawal of 49 Bcm would be required to achieve a physical balance on the European market – a withdrawal volume similar to the 'Cold Q1' scenario noted above.

It is also possible to conceive of an extremely challenging scenario, in which cold weather across the northern hemisphere brings European demand back to the level of Q1 2018 and causes LNG imports to decline by 10 per cent year-on-year in the face of strong demand from Asia, while the other 'challenging scenario' assumptions regarding production and pipeline imports remain unchanged. This would require storage withdrawals of 72 Bcm. If Russian pipeline supplies halted in mid-January, Q1 2023 storage withdrawals in this 'extremely challenging' scenario would rise to 77 Bcm.

As a result, although prices remain of critical interest because they may rise or fall dramatically in the space of a day or several days, storage stocks are a more fundamental indicator of market balance even though they may take weeks and months to be accumulated or drawn down. If Europe were to approach mid-August with stocks well short of the 1 October target, even a concerted effort to build stocks would be hampered by constraints on daily injection capacity. Conversely, if Europe were to begin winter 2023/24 with storage relatively full, this buffer would last for several months. This slow-moving nature of storage – akin to a very large concert hall with very few, narrow entry-exit doors – means that progress towards replenishing stocks in mid-to-late summer 2023 is likely to influence market sentiment (and, by extension, forward prices) for winter 2023/24.

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