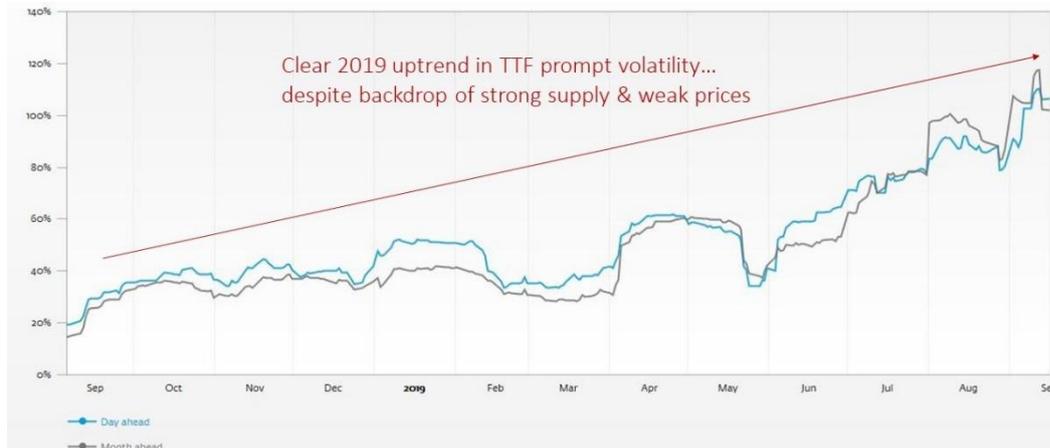


Q3 2019: TTF volatility commentary

We start this quarter's commentary with the simple observation that prompt volatility is rising in 2019. The increase in volatility of both day-ahead and month-ahead contracts can be seen via the 30 day rolling Energystock TTF volatility index in the chart below. Volatility levels ranged from 30-60% across Q1 & Q2. But have significantly increased in Q3 to levels above 100%.

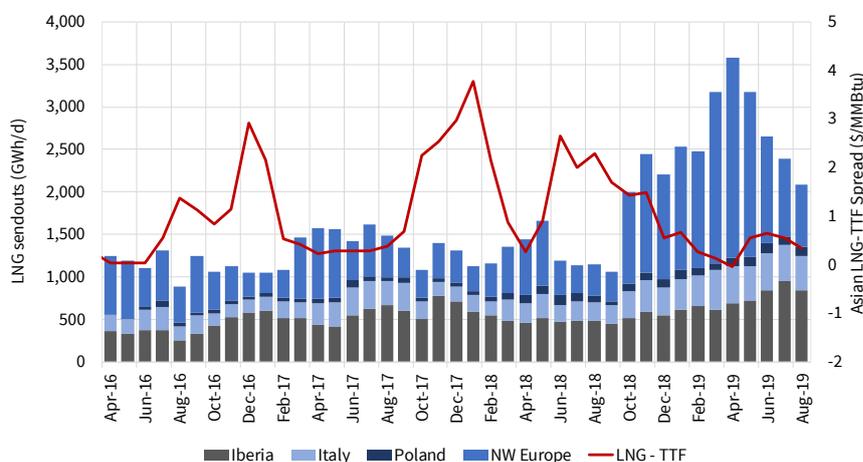


The other key price signal for gas storage, the summer/winter spread, has also been rising this year. Sum-19/Win-19 spreads blew out to above 4 €/MWh as hub prices plunged into this summer. But more importantly, forward spreads have almost doubled since last year, with the Sum-20/Win-20 spread rising to 2.25 €/MWh.

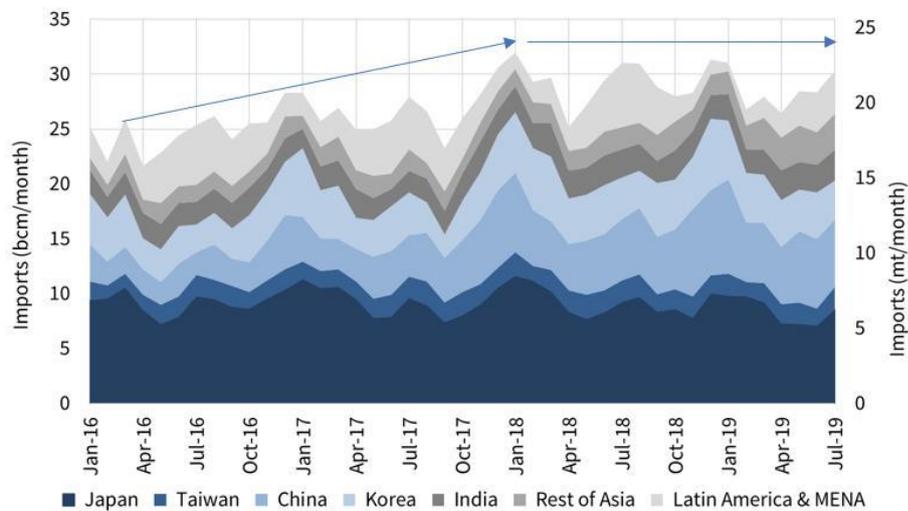
The combination of rising prompt volatility and seasonal spreads is breathing some life back into storage capacity value in 2019. In today's commentary we are going to look at some of the drivers behind these dynamics.

Weak LNG demand, weak prices

2019 has been a story of interconnected markets. Q1 & Q2 2019 saw a relentless decline in hub prices as Europe absorbed high volumes of LNG cargoes which were surplus to Asian requirements. The surge in LNG imports into Europe can be seen in the chart below.



The main driver of rising European LNG imports in H1-19 was the stalling of Asian LNG demand growth. Of the Big 5 Asian buyers (Japan, Korea, Taiwan, China & India), only Chinese demand increased (H1-19 vs H1-18), and at a slower rate than over the last 3 years. This led to net zero growth in Asian LNG demand as shown in the chart below.



Global LNG supply on the other hand rose 12% (H1-19 vs H1-18). The resulting surplus of cargoes is what has driven the big increase in LNG imports into NW European hubs across Q1 & Q2. And hub prices have steadily declined to incentivise enough demand response to absorb these volumes.

Steady price declines have been replaced by more volatile price dynamics across Q3-19. While US export shut in levels (Henry Hub + 1.0 – 1.5 \$/mmbtu variable transport cost) have supported forward TTF prices, there has been significant price ‘noise’ on a within-month basis across Q3-19.

This instability reflects European hubs being buffeted by the ebbs & flows of LNG imports, while at the same time needing to clear hubs via spot gas prices inducing enough response from switching in the power sector.

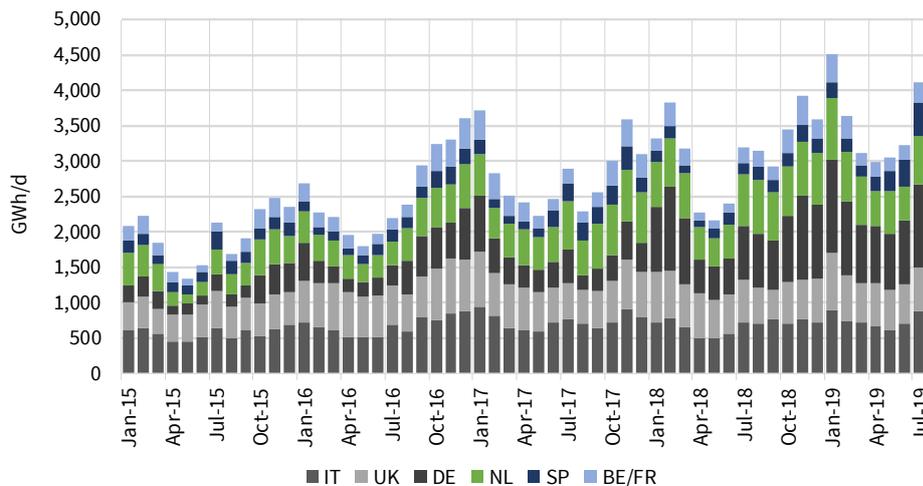
Why the power sector remains key

Although LNG import volumes have fallen in Q3-19 vs early this year, the ability of NW European hubs to absorb these volumes has diminished with weaker summer gas demand (& low storage injection demand).

The principal response mechanism to soak up surplus LNG is gas for coal plant switching across Europe’s power markets. But there have been several periods across Q3-19 where the power sector has struggled to provide adequate switching response even at very low gas prices. The coal fleet has effectively been ‘switched out’ (aside from plants with must run constraints such as CHP).

In a situation like this, large swings in gas prices may be required to induce relatively small incremental changes in gas demand (e.g. hub prices need to fall to levels that induce peaking tranches of power capacity to run). This creates an inherently instable set of pricing dynamics.

The chart below shows how power sector demand has picked up into Q3-19, induced by switching at lower gas prices, with most of the European CCGT fleet running baseload.



Some unique Q3-19 factors

As well as the two 'macro' market drivers, LNG imports and switching, there have been a number of other factors or events that have contributed to price volatility in Q3-19:

1. **Maintenance:** There have been significant maintenance outages across Aug-19 & Sep-19 impacting Norwegian & Russian imports as well as Cheniere's US export terminals. These have contributed to fluctuations in flows and supported price recovery in Sep-19.
2. **Groningen:** The Dutch government announced an accelerated reduction in production, with a lower than expected cap for gas year 2019 and zero production from 2022.
3. **French nukes:** EDF shocked the market with its announcement of further potential reactor discrepancies within its French nuclear fleet. While it is now clear this is likely to have a limited outage impact, the initial news sent shock waves through gas and power markets, with the Win 16-17 nuclear outages still a relatively fresh memory.
4. **OPAL:** The ECJ ruled that Gazprom's access to the key OPAL pipeline (allowing gas from Nord Stream to follow into Germany) would revert to a 50% cap. This has caused a shift in Russian flows from Nordstream towards the Ukraine route. It also supports Ukraine's negotiating position on the key transit agreement (due to expire at year end).
5. **Other commodity prices:** A rise in coal prices in Sep-19 has pushed up switching levels and contributed to a recovery in hub prices this month. This price uplift has been reinforced by the attack on Saudi oil facilities causing a big spike in Brent prices.

While each of these factors on its own could be considered a 'one-off', the combination of them has driven up volatility across Q3.

5 factors to watch into winter

We finish this quarter's commentary by flagging 5 factors to keep on your radar screen as Win-19 progresses.

1. LNG imports: Weakening Asian LNG demand and the resurgence of LNG imports into Europe has been the primary factor impacting the European gas market supply & demand balance over the last 12 months. Will a seasonal increase in Asian demand pull LNG away from Europe across Win-19, or will high import volumes continue?
2. Coal & carbon: Switching in the power sector is the mechanism driving hub prices. So movements in coal & carbon prices, the key components of coal plant variable cost, feed directly into gas price levels.
3. Economic weakness: A deepening manufacturing recession is taking hold across Europe, with Germany hit particularly hard. This could be the trigger for broader economic recessions developing into 2020. Gas demand, particularly industrial demand, will reflect economic weakness.
4. Weather: As domestic gas production in Europe declines, the gas market is becoming more dependent on longer and less flexible supply chains (e.g. LNG, Russia). Storage inventory is at high levels into Win-19, but any prolonged periods of cold weather can result in price volatility as supply chains respond.
5. Outages: Much of Europe's upstream & midstream gas infrastructure is ageing. This increases the chances of unplanned outages that can result in a temporary supply shock. These are often correlated with cold weather periods, increasing the impact on market prices.

These 5 factors in combination are likely to be key to determining whether the trend of increasing prompt volatility and seasonal spreads continues into 2020.