

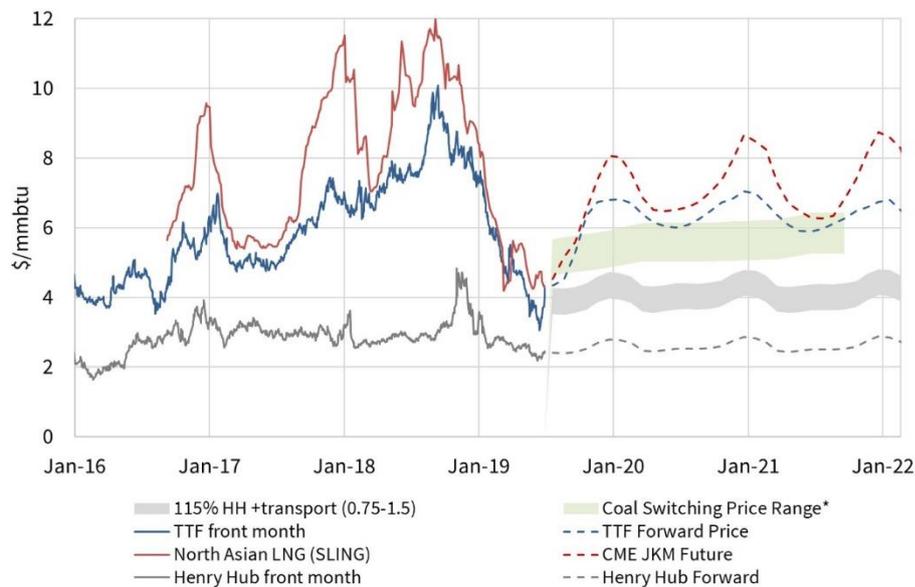
## Q2 2019: TTF volatility commentary

In our last two commentary, we described the sharp fall in TTF prices across Q4 2018 to Q1 2019, with spot prices breaking below 14€/MWh towards the end of March. In Q2-19, prices have continued on the same trajectory, with TTF spot reaching a 10-year low below 10 €/MWh. There has however been a sharp jump in prices since the start of July (back above 13 €/MWh).

The Q2 fall in European hub prices was driven by a combination of bearish fundamentals, including:

- Strong LNG sendouts
- High Russian import volumes
- High Norwegian import volumes
- Unusually high storage inventories (reducing injection demand)
- Falling coal prices dragging down power sector switching levels.

The decline in European hub prices can be seen in a global context in the chart below, which shows TTF relative to JKM (Asia) and Henry Hub (Nth America) price benchmarks.



This chart also shows how TTF levels have now declined below the bottom of the coal-to-gas switching range, sending a strong price signal to run CCGTs ahead of coal plants.

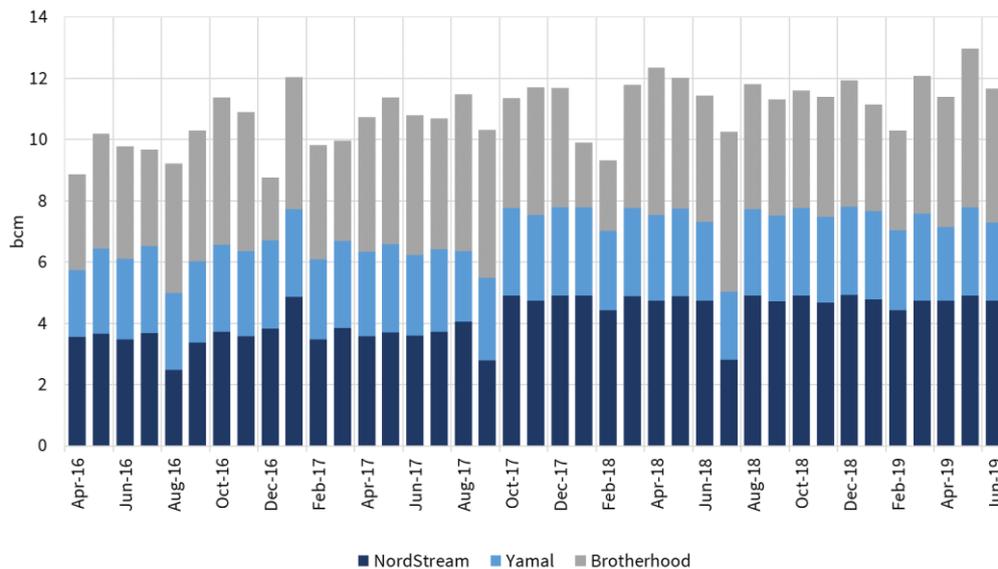
Spot TTF prices fell well into the US export shut in price range by the end of Q2. However it is important to note here that there is limited flexibility in the LNG supply chain to respond to weakening spot prices across a 4-6 week horizon. Spot prices have recovered in July and forward prices are in steep contango beyond August.

The JKM-TTF spread also started to open up across Q2 after trading at or near parity for most of Q1-19. But the TTF price jump in July has not been fully mirrored by JKM, closing the spread gap again.

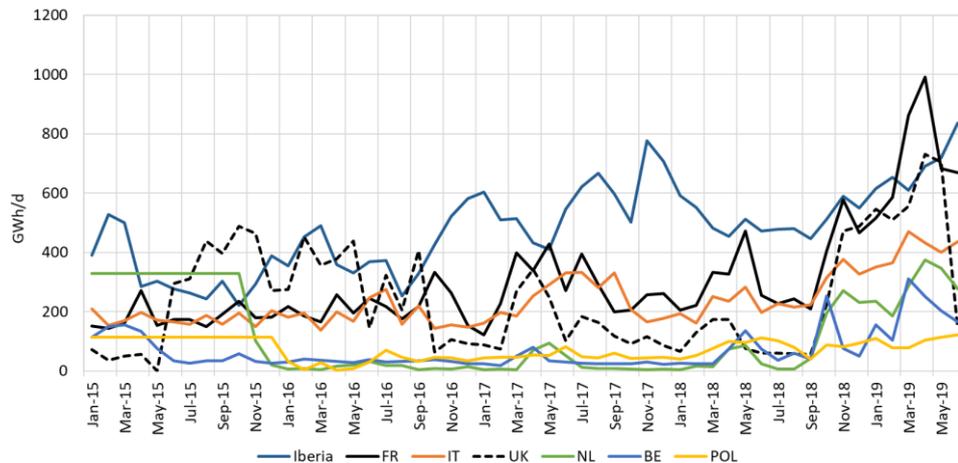
### Supply remains very strong

All sources of gas imports to Europe have continued to flow at relatively high volume across Q2-19.

**Russia:** Flows across all three main supply routes from Russia are at or near maximum capacity levels. Russian imports reached a new record high in May (>420mcm/d) as can be seen in the chart below.



**LNG:** LNG imports recorded their highest ever volume in April (320mcm/d). However total sendouts fell back to 240mcm/d in Jun, mostly driven by reduced flows into the UK terminals (particularly Isle of Grain) as shown in the chart below. Southern European imports have risen into summer helped by hot weather, with Spain having the highest level of sendout across EU countries in Jun.



**North Africa:** Flows are slightly lower year-on-year, but remain relatively stable, with a slight recovery in June (~70mcm/d). Lower exports to Spain and Italy have resulted in higher exports at Pirineos (SP/FR) and Passo Gries (CH/IT).

**NCS:** Norwegian exports remain strong, particularly across June/July (>250mcm/d). However a heavy NCS maintenance schedule should cut volume in Q3-19.

On the production side, the largest field Troll and Ormen Lange will be shut down a longer period than over the past few years.

- Kollsnes offline in August (24th Aug to 4th Sep), with a ~140mcm/d flow impact

- Nyhamna processing plant (incl. Ormen Lange and Aasta Hansteen) will be shut down most of September (8-26th) with a 65mcm/d impact on total deliveries.

On the terminal side, several maintenance will impact deliveries to the UK

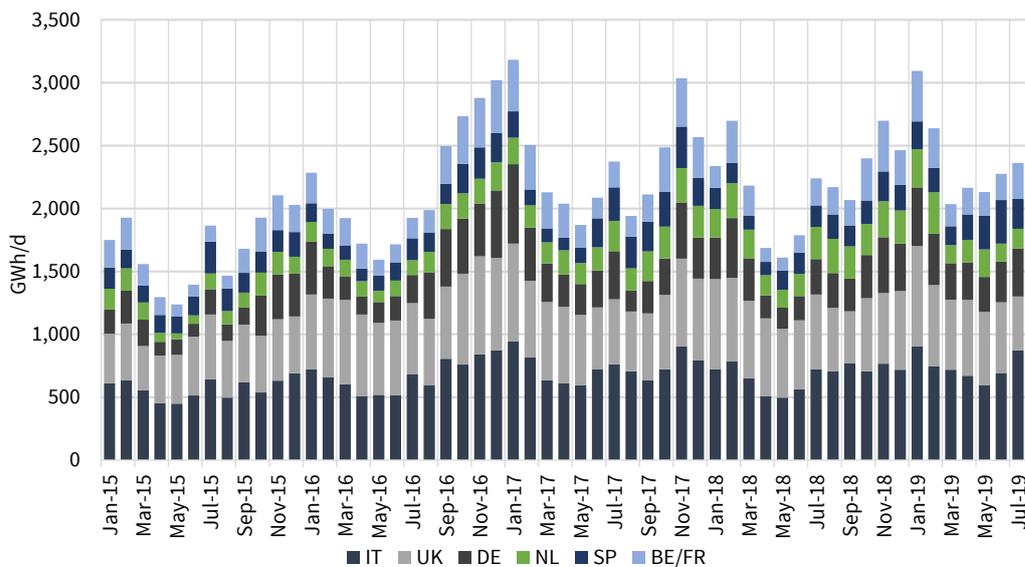
- Entry Segal (10-23rd Aug, -14mcm/d)
- Easington full shut down of capacity (71mcm/d) from 10-24th Sep coinciding with Nyhamna shut down.

## Demand response

The ability of Europe's hubs to absorb high volumes of gas supply has been focused on the switching of coal for gas plant across European power markets.

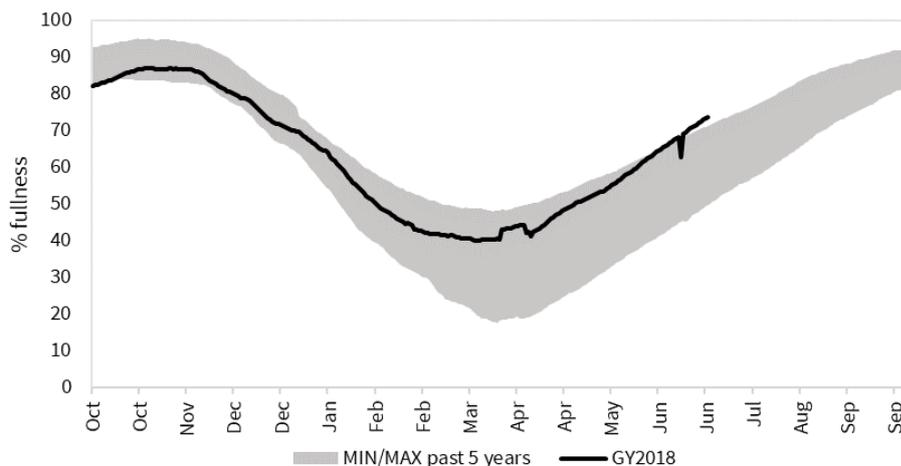
German Baseload clean spark spreads (CCGT generation margins) increased to 5€/MWh (~10€/MWh for PK CSS) by the end of Q2-19. In contrast Baseload dark spreads remained in negative territory around 5€/MWh (~0€/MW for PK CDS), being relatively stable across Q2-19.

Gas burn in the power sector has risen from 180mcm/d in Feb to 215mcm/d in June. An increase was observed in most countries, with a particularly pronounced increase in Italy in Jun-19. The evolution of power sector demand is shown in the chart below.



## Storage dynamics

Unusual storage dynamics in 2019 have also influenced hub pricing dynamics. European storages are currently around 75% full, with inventories sitting above the 5 year range as shown in the chart below. High storage inventory levels into the summer has meant there is limited storage injection demand, another factor weighing on hub prices.



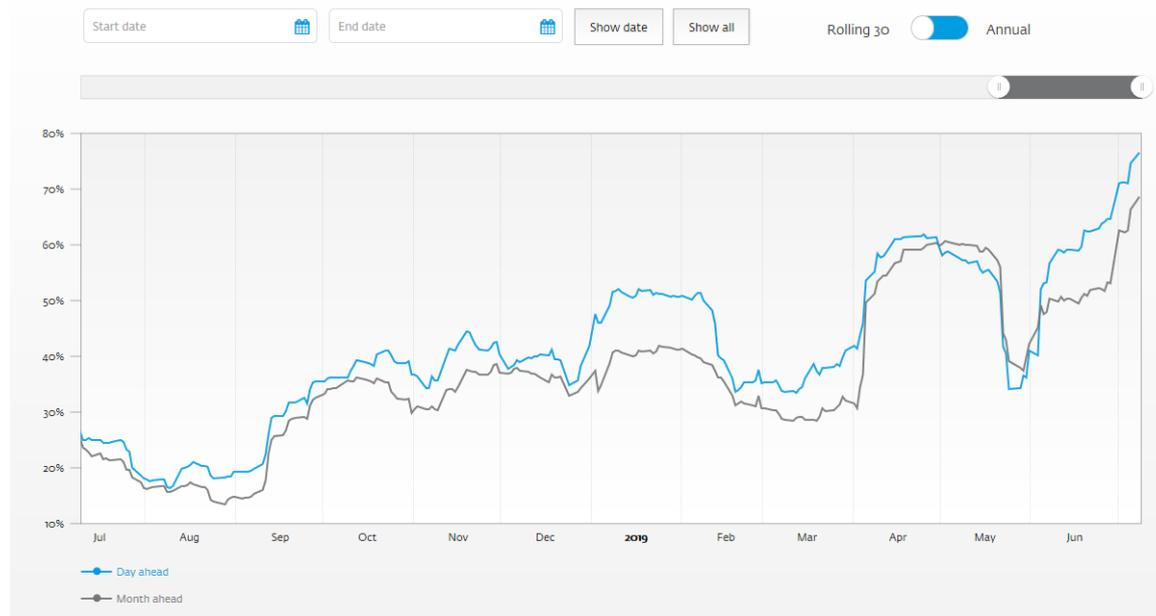
### Recovering storage price signals

Current year TTF seasonal hubs price spreads continued to increase in Q2. But more importantly, TTF spreads for next year widened to 2.2 €/MWh. NBP spreads for next year appear to be stabilising around 10 p/th.

Q2-19 has shown a significant recovery in Day Ahead and Month Ahead volatility, with volatility rising particularly in April and in June as can be seen in the Energystock Volatility Index chart below.

– Historic volatility

– Historic volatility settings



In April, the increase in volatility was driven by a mix of cold weather events and NCS outages. A steep decline in TTF prices in June also supported volatility as has the jump back in prices in July.

Higher volatility is typically associated with tighter markets and higher prices. It is interesting to note that in 2019, volatility has been rising in a well supplied, falling price market. The increasing role of LNG import fluctuations in the European supply mix is contributing to this dynamic.