Global gas crisis – implications of the parabolic spike in gas prices

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Executive summary | implications of the parabolic spike in gas prices

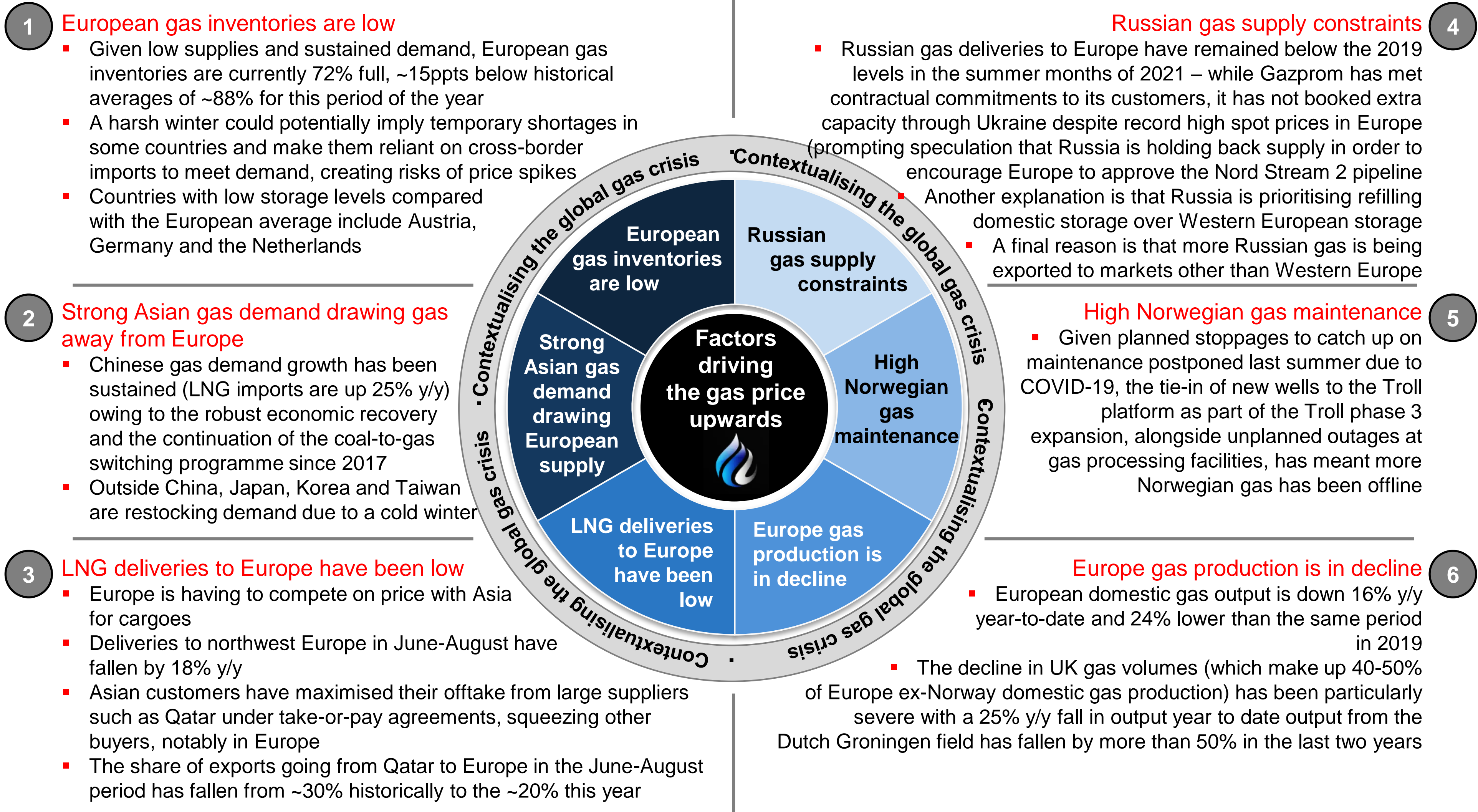
Far reaching impacts of surging gas prices

1	**Drivers of the gas crunch**	▪ Record high gas prices reflect an extremely tight global gas market caused by low supply and high demand – prices to stay elevated for now ▪ Gas prices are in uncharted territory with a relentless rally in European and Asian prices – Europe will begin winter with very tight gas inventories ▪ Core drivers – low gas inventories, strong Asian demand, low LNG deliveries, Russian and Norwegian supply constraints and declining production
2	**Economic impact on inflation**	▪ Europe is very dependent on imported oil and gas – governments are cognisant surrounding price spikes in gas, oil and electricity on inflation ▪ US energy prices will understandably boost headline CPI further, but the more important impact might be on inflation expectations right now ▪ The bigger the inflation impact, net the fiscal absorption measures, the bigger the negative hit to real purchasing power and corporate' running costs
3	**Lessons learnt**	▪ It is tempting to blame economies' over-reliance on fossil fuels or on the contrary, the transition to low-carbon energy for the current situation ▪ The crisis could result in more investment in gas supply (which would take several years), more gas storage, and/or a faster renewables transition ▪ Focus to turn on continuing to live with fossil fuels – making their extraction cleaner/ more efficient until overcoming engineering hurdles on renewables
4	**Implications for energy companies**	▪ Energy companies that comprise a large level of upstream European gas production and have big LNG portfolios are set to gain higher gas prices ▪ High European gas prices are positive for Equinor, which derives ~35% of its upstream production from European gas and is exposed to spot prices ▪ High gas prices are also good news for oil majors with big LNG portfolios, notably Shell and TotalEnergies, which have the highest exposure to LNG
5	**Long-term gas market outlook**	▪ Period until 2025 to be tight given the lack of LNG liquefaction capacity additions due to the dearth of new project approvals a few years ago ▪ The next wave of LNG projects under construction (notably in Qatar) should hit the market in by mid-2020s and push it back into oversupply ▪ Under a "business as usual" scenario, we expect global LNG demand to grow at 3-4% per annum, and roughly double in size by 2040 to over 700mpta
6	**Gas and oil price forecasts**	▪ We forecast gas prices remaining elevated through the winter (and above current spot prices), easing in H1 2022 and normalising in H2 2022 ▪ A severe tightening in global gas supplies presents an unique and acute bullish impulse for oil prices over the winter but we are bearish for 2022 ▪ Knock-on effects of gas crunch may widen the oil market deficit from 1.1m b/d in Q4 2021, to between ~2-3m b/d in Q4 2021, lead to a spike in oil

Drivers of the global gas crunch | crunch is here, and it's not even winter

Unprecedented gas crunch

- **Record high gas prices reflect an extremely tight global gas market caused by low supply and high demand – prices to stay elevated for now**
- **Lessons learned from the crisis could diverge between regions with more gas/LNG supply versus faster energy transition to renewables in play**



1 European gas inventories are low

- Given low supplies and sustained demand, European gas inventories are currently 72% full, ~15ppts below historical averages of ~88% for this period of the year
- A harsh winter could potentially imply temporary shortages in some countries and make them reliant on cross-border imports to meet demand, creating risks of price spikes
- Countries with low storage levels compared with the European average include Austria, Germany and the Netherlands

2 Strong Asian gas demand drawing gas away from Europe

- Chinese gas demand growth has been sustained (LNG imports are up 25% y/y) owing to the robust economic recovery and the continuation of the coal-to-gas switching programme since 2017
- Outside China, Japan, Korea and Taiwan are restocking demand due to a cold winter

3 LNG deliveries to Europe have been low

- Europe is having to compete on price with Asia for cargoes
- Deliveries to northwest Europe in June-August have fallen by 18% y/y
- Asian customers have maximised their offtake from large suppliers such as Qatar under take-or-pay agreements, squeezing other buyers, notably in Europe
- The share of exports going from Qatar to Europe in the June-August period has fallen from ~30% historically to the ~20% this year

4 Russian gas supply constraints

- Russian gas deliveries to Europe have remained below the 2019 levels in the summer months of 2021 – while Gazprom has met contractual commitments to its customers, it has not booked extra capacity through Ukraine despite record high spot prices in Europe (prompting speculation that Russia is holding back supply in order to encourage Europe to approve the Nord Stream 2 pipeline
- Another explanation is that Russia is prioritising refilling domestic storage over Western European storage
- A final reason is that more Russian gas is being exported to markets other than Western Europe

5 High Norwegian gas maintenance

- Given planned stoppages to catch up on maintenance postponed last summer due to COVID-19, the tie-in of new wells to the Troll platform as part of the Troll phase 3 expansion, alongside unplanned outages at gas processing facilities, has meant more Norwegian gas has been offline

6 Europe gas production is in decline

- European domestic gas output is down 16% y/y year-to-date and 24% lower than the same period in 2019
- The decline in UK gas volumes (which make up 40-50% of Europe ex-Norway domestic gas production) has been particularly severe with a 25% y/y fall in output year to date output from the Dutch Groningen field has fallen by more than 50% in the last two years

(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Macrobond, Refinitiv Eikon, MUFG Research

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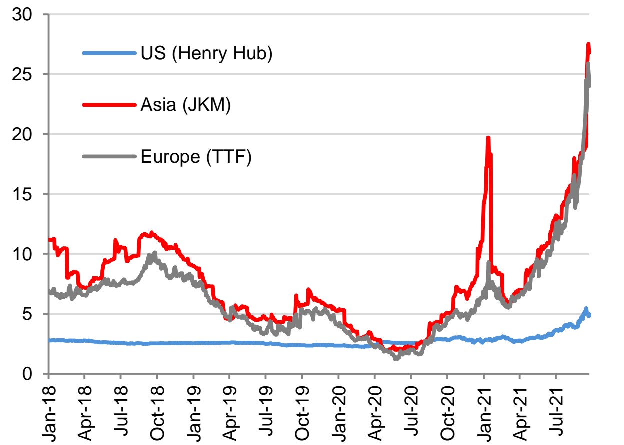
Global gas crunch in charts | contextualising the crunch

Charting the main recent developments behind the global gas squeeze

- **Gas prices are in uncharted territory with a relentless rally in European and Asian prices – Europe will begin winter with very tight gas inventories**
- **Given low inventories and falling temperatures over the winter, the gas crunch is leading to fears that Europe will be severely undersupplied**

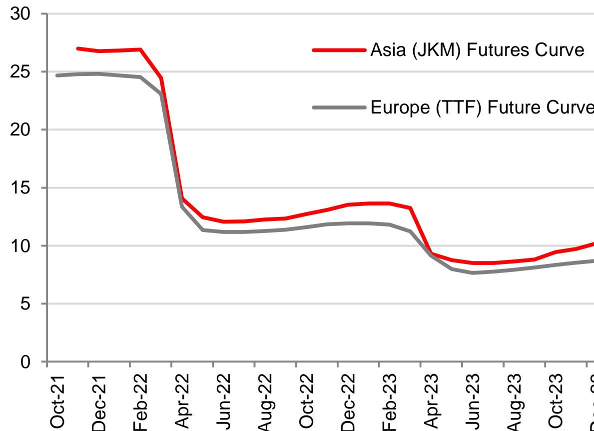
Gas prices are parabolic in Europe and Asia

US Henry Hub, Asia JKM LNG and Europe TTF (USD/mmBtu)



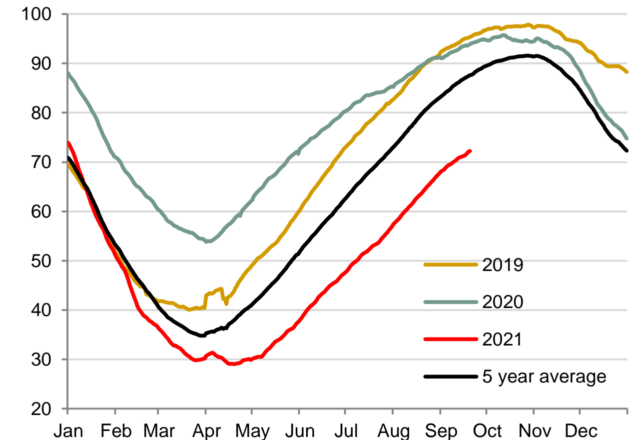
Futures signal elevated prices until Q2 2022

Asia JKM LNG and Europe TTF Futures Curve (USD/mmBtu)



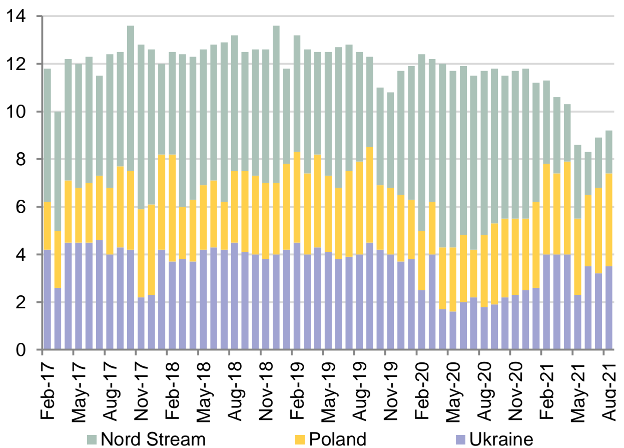
2021 is seeing below average gas inventories

Natural gas inventories in Europe (% of Total)



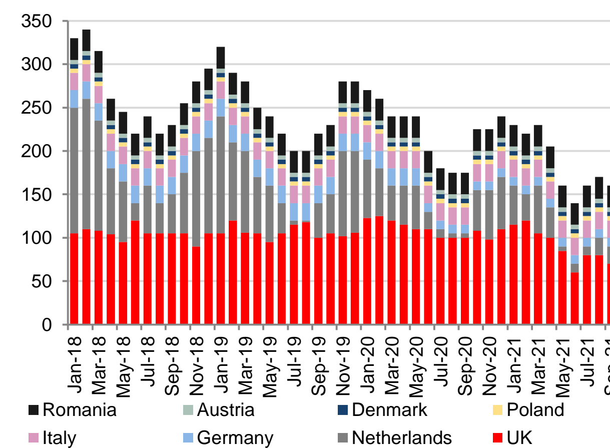
Russian gas exports to Europe have slowed

Russian gas exports by route to Europe (bcm)



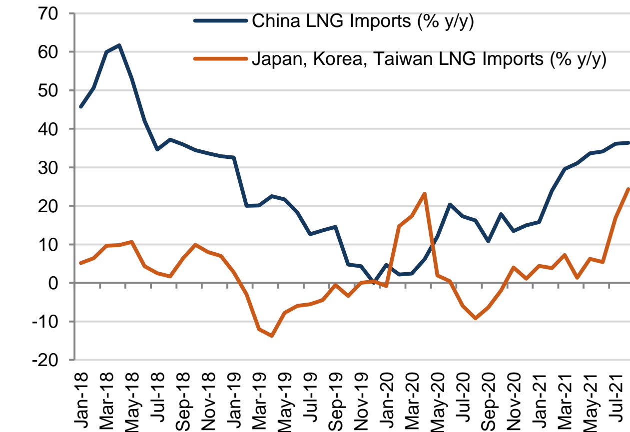
Europe gas production is in marked decline

European domestic gas output (mcm/d)



Asian gas demand sucking gas from Europe

China vs Japan-Korea-Taiwan LNG imports (% y/y, 3 month rolling average)



(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Macrobond, Refinitiv Eikon, MUFG Research

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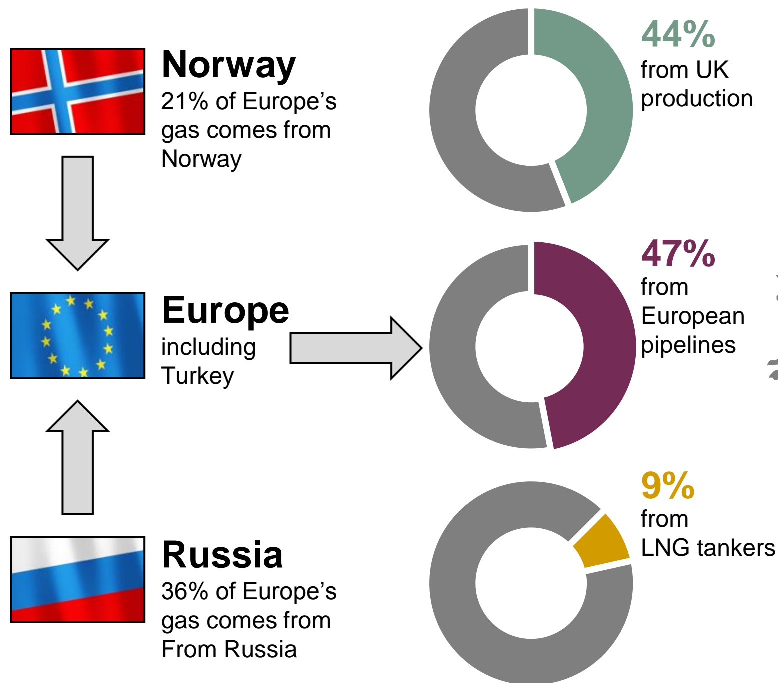
Gas crunch in the UK | more precarious than the rest of Europe

UK at a disadvantage relative to its European peers on gas storage

- **UK gas storage levels are above average at >90%, but this figure is meaningless since UK storage capacity is only 1% of total European storage**
- **UK's lack of storage capacity and collapse in LNG imports recently are two factors that differentiate its situation from its European counterparts**

Contextualising the UK's gas crisis

Where does the UK's gas come from?



X Storage capacity (Bcm)

1.9
14.2
2.4
22.7
3.5
0.8
3.5
3.6
3.7
5.9
12.4
3.4
18.6
0.4
0.3
3.4

Magnitude and implications of the UK's gas storage position relative to its European peers

- Europe's four largest storage holders – Germany, Italy, the Netherlands and France – have gas storage capacity equivalent to 25-37% of annual consumption while the UK's storage capacity is equivalent to 2% of its annual demand
- This means that the UK relies more on pipeline and LNG imports (on top of its own production) than its peers

(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Gas Infrastructure Europe, Macrobond, Refinitiv Eikon, MUFG Research

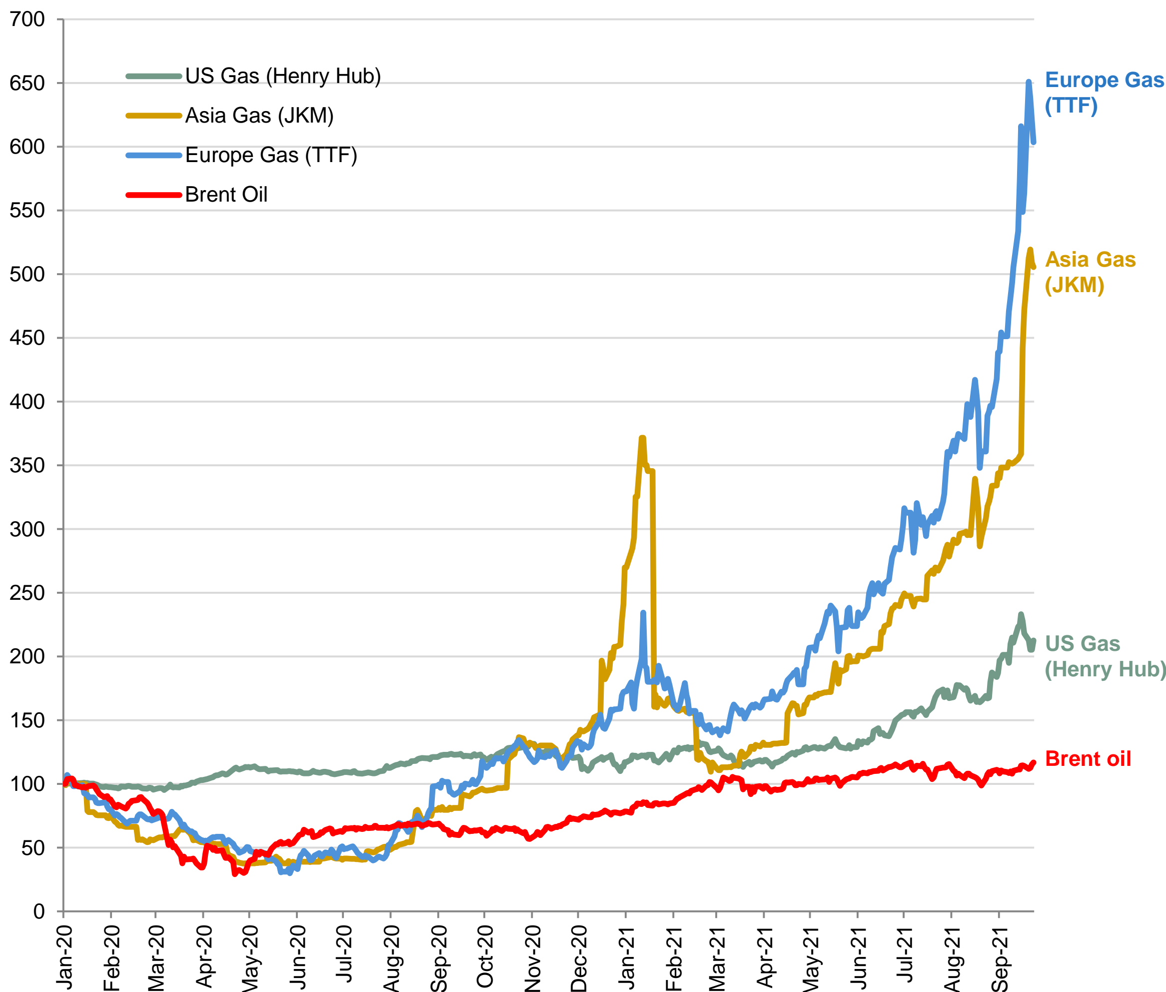
Gas vs. oil | gas is structurally more cyclical and volatile than oil

Gas price surge dwarfs the oil price rise since last summer

- **We are witnessing a spectacular reversal from a year ago when gas prices troughed at all-time lows during summer 2020 due to COVID-19**
- **From summer 2020, gas prices have risen between 5-7x, outdoing the 2x increase in Brent oil prices from their April 2020 trough**

Gas prices (Europe, Asian and US) have significantly outperformed oil prices since 2020

Brent crude oil and natural gas prices, rebased 100 = 1 January 2021



Gas is more cyclical and volatile than oil

1 Project cycle times are longer in gas than oil

- It takes four to five years to launch new LNG liquefaction capacity, with investments designed to increase domestic or piped gas capacity taking up to 3 years
- There is no short-cycle gas/LNG production whereas short-cycle oil production takes the form of US shale (~10% of global liquids output), conventional infill wells and tie-backs

2 "Gas OPEC" doesn't exist for supply management

- There is no such thing as a "gas OPEC" to manage the global gas market in times of over/under supply
- Up until recently, Russian pipeline gas to Europe was seen as marginal spare capacity that could be increased if needed when prices were high and/or supply was inadequate – in turn, higher Russian supply could cap prices around contract prices
- Current events distressingly demonstrate that this market view is no longer accurate (if it ever was)

3 Gas demand has limited price elasticity

- Gas demand has very limited price elasticity outside of power generation (where gas can be substituted by coal or oil) and the industrial sector up to a point
- Gas demand is fairly inelastic in the residential and commercial sectors where demand is driven much more by weather than price
- In contrast, global oil demand is sensitive to changes in oil prices

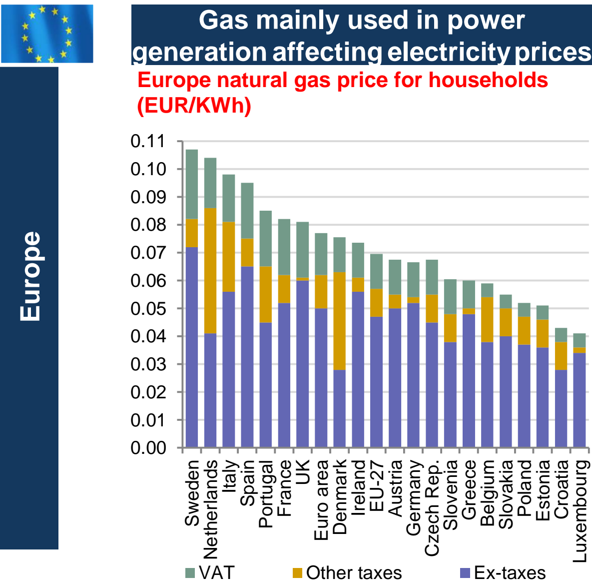
(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Macrobond, Refinitiv Eikon, MUFG Research

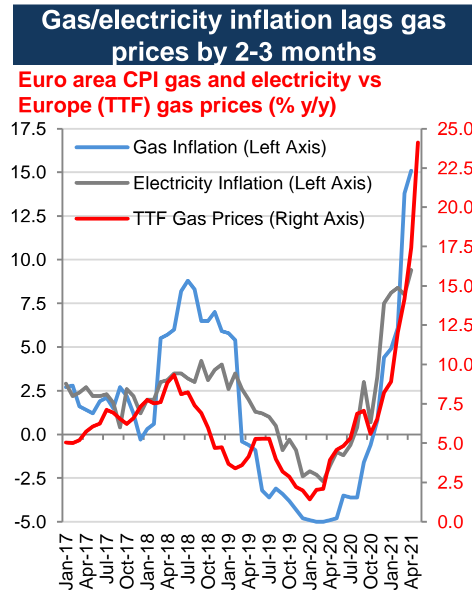
Economic impact from higher gas prices | inflation boost or consumption hit?

Expect higher inflationary pass-through from energy in the months ahead

- **Europe is very dependent on imported oil and gas – governments are cognisant surrounding price spikes in gas, oil and electricity on inflation**
- **US energy prices will understandably boost headline CPI further, but the more important impact might be on inflation expectations right now**

Europe

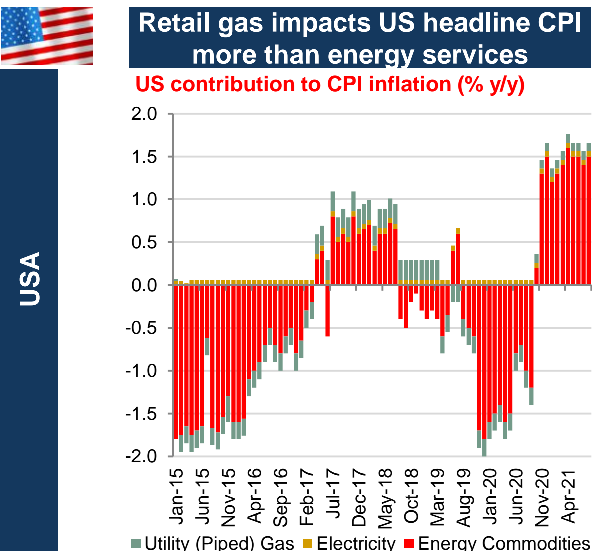


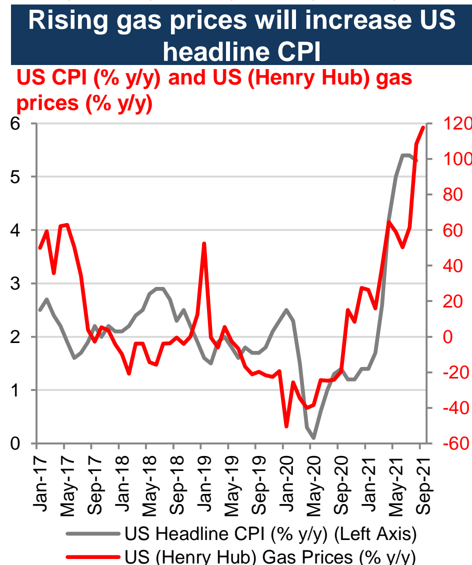


Comments on Europe

- Europe emains highly reliant on imported oil and gas – will experience higher energy passthrough – this will be evident as gas is used as a primary power generation input in several countries, with Italy, Spain, the UK and Germany relying more than others, thus impacting final electricity prices as well
- The most noticeable impact near-term is on households and corporate utility bills, and many European governments have available instruments to soften the impacts of higher prices
- Historical relationships suggest that Eurozone gas and electricity retail prices lag natural gas prices (TTF) by five or six months – the estimated elasticity is ~10% for gas and ~5% for electricity prices, though these elasticities diminish sharply when large price increases occur, likely reflecting government interventions or temporary margin compression

USA





Comments on the US

- In the US, rising energy prices will evidently boost headline CPI, but the more important impact might be on inflation expectations in an environment of broad price increases
- The pass-through of higher energy prices to core inflation is low with the most impacted items being airfares, but this is expected to rise further with a recovery in travel demand
- Higher energy prices could exert a drag on US real GDP growth – notably given that consumption of electric power and gas may be relatively inelastic to price changes
- The more significant impact could be if disruptive winter weather leads to disruptions in power, as occurred in Texas last year – this could add to already existing supply-chain issues that have recently been constraining the pace of economic growth

(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Macrobond, Refinitiv Eikon, MUFG Research

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Lessons learnt | more gas projects needed and the energy transition requires time

How can global markets avert energy crises and price volatility in the future?

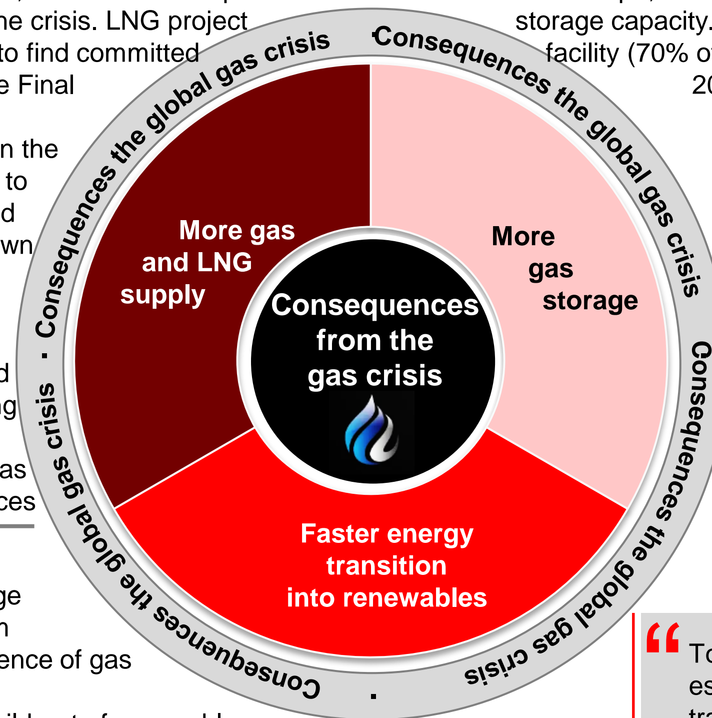
- **It is tempting to blame economies' over-reliance on fossil fuels or on the contrary, the transition to low-carbon energy for the current situation**
- **The crisis could result in more investment in gas supply (which would take several years), more gas storage, and/or a faster renewables transition**

1 More gas and LNG supply

- The supply crunch might encourage LNG buyers to sign up to more long-term oil-linked contracts in order to minimise exposure to high and volatile spot LNG prices
- In our view it is more likely Asian buyers, rather than European customers, will draw this lesson from the crisis. LNG project sponsors might therefore find it easier to find committed buyers and get their projects across the Final Investment Decision (FID) line
- A wave of new LNG project sanctions in the 2022-23 timeframe would not do much to help the current tight situation and could result in more oversupply five years down the line
- We see risks of overcapacity in the second half of this decade from 2026 onwards – new project approvals would increase the likelihood of this happening
- On a lower scale, high gas prices will encourage investment in existing gas production in areas exposed to gas prices

2 More gas storage

- The current market tightness might encourage some governments to increase gas storage capacity and ensure that this capacity is adequately filled
- In Europe, the UK would probably benefit most from increasing storage capacity. It is worth recalling that the Rough gas storage facility (70% of UK storage capacity at the time) was closed in 2017 and was not replaced by additional capacity
- However, it could be politically difficult for governments and companies to build new gas storage if European public opinion believes that overreliance on hydrocarbons is the culprit
- East Asian countries (China, Japan, South Korea and Taiwan) could decide to increase storage, which would create additional gas demand for restocking in coming years and could perversely prolong the current shortage



3 Faster transition into renewables

- Rising fossil fuel prices could encourage European countries to move away from hydrocarbons faster to reduce dependence of gas and coal
- In practice, this would entail a faster build-out of renewable power generation (solar and wind), increasing battery capacity and accelerating hydrogen projects in order to manage the issue of renewables intermittency, upgrading transmission and distribution infrastructure, and incentivising households to switch from gas to electric heating or heat pumps – but who would pay for such upgrades?

> "Today's situation is a reminder to governments, especially as we seek to accelerate clean energy transitions, of the importance of secure and affordable energy supplies – particularly for the most vulnerable people in our societies. Well-managed clean energy transitions are a solution to the issues that we are seeing in gas and electricity markets today, not the cause of them."
>
> **Dr. Fatih Birol, IEA Executive Director**

(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, IEA, Macrobond, Refinitiv Eikon, MUFG Research

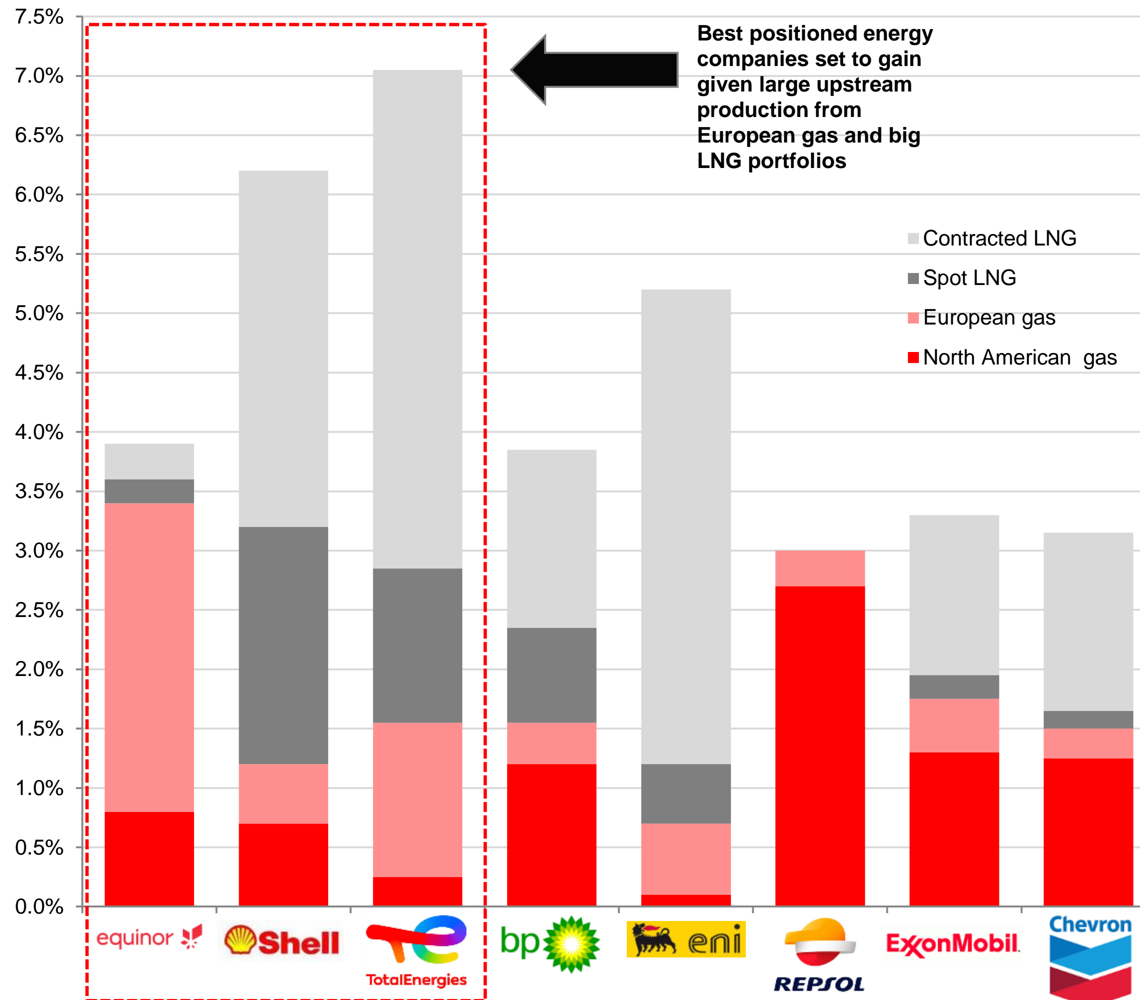
Implications for energy companies | Equinor, TotalEnergies and Shell to gain most

Some better positioned than others

- **Energy companies that comprise a large level of upstream European gas production and have big LNG portfolios are set to gain higher gas prices**
- **Markets should be cognisant not to overstate the companies' exposure to global LNG prices for three core reasons outlined below**

Some energy companies stand to gain from the gas price surge

Exposure to a USD1/mbtu change in gas prices – North American, Europe, spot LNG and oil-linked LNG, as a % of cash flow from operations (CFFO)



Comments

- High European gas prices are positive for Equinor, which derives ~35% of its upstream production from European gas and is almost fully exposed to spot prices – however, its above-average exposure to European gas is offset by its lack of exposure to LNG
- High gas prices are also good news for oil majors with big LNG portfolios, notably Shell and TotalEnergies, which have the highest exposure to LNG
- However, markets should be cognisant not to overstate the companies' exposure to global LNG prices:
  1. First, about 60-80% of both supermajors' LNG sales are linked to oil prices and are not exposed to spot LNG prices – oil-linked LNG prices typically have a 3-6 month time-lag vs crude oil and are set to rise sequentially in Q3 2021 vs Q2 2021 but not to the same extent as spot gas prices
  2. Absence of a spread between Europe and Asia might limit the scale of arbitrage profits
  3. It is not possible to have much insight into the companies' trading positions – for example, trading losses might arise if significant amounts of equity LNG production was offline during the third quarter, forcing them to buy expensive LNG cargoes on the spot market to meet contractual obligations

(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Macrobond, Refinitiv Eikon, MUFG Research

Long-term gas market outlook | tight market until 2024, oversupply from 2025

2020s may prove to be a decade of two halves

- **Period until 2025 to be tight given the lack of LNG liquefaction capacity additions due to the dearth of new project approvals a few years ago**
- **The next wave of LNG projects under construction (notably in Qatar) should hit the market in by mid-2020s and push it back into oversupply**

Gas market fundamentals mostly tight until 2025

1 Tight market near-term was already expected

- Before recent events, we expected the period from 2022-25 to be quite tight given the lack of LNG liquefaction capacity additions – LNG capacity growth over this period is set to be well below the typical rate of global LNG demand growth due to the dearth of new project approvals a few years ago
- The current situation could prolong and exacerbate the tightness in the next couple of years, low stocks at the end of 2021-22 winter will need to be replenished

2 Risks of overcapacity from 2025 onwards

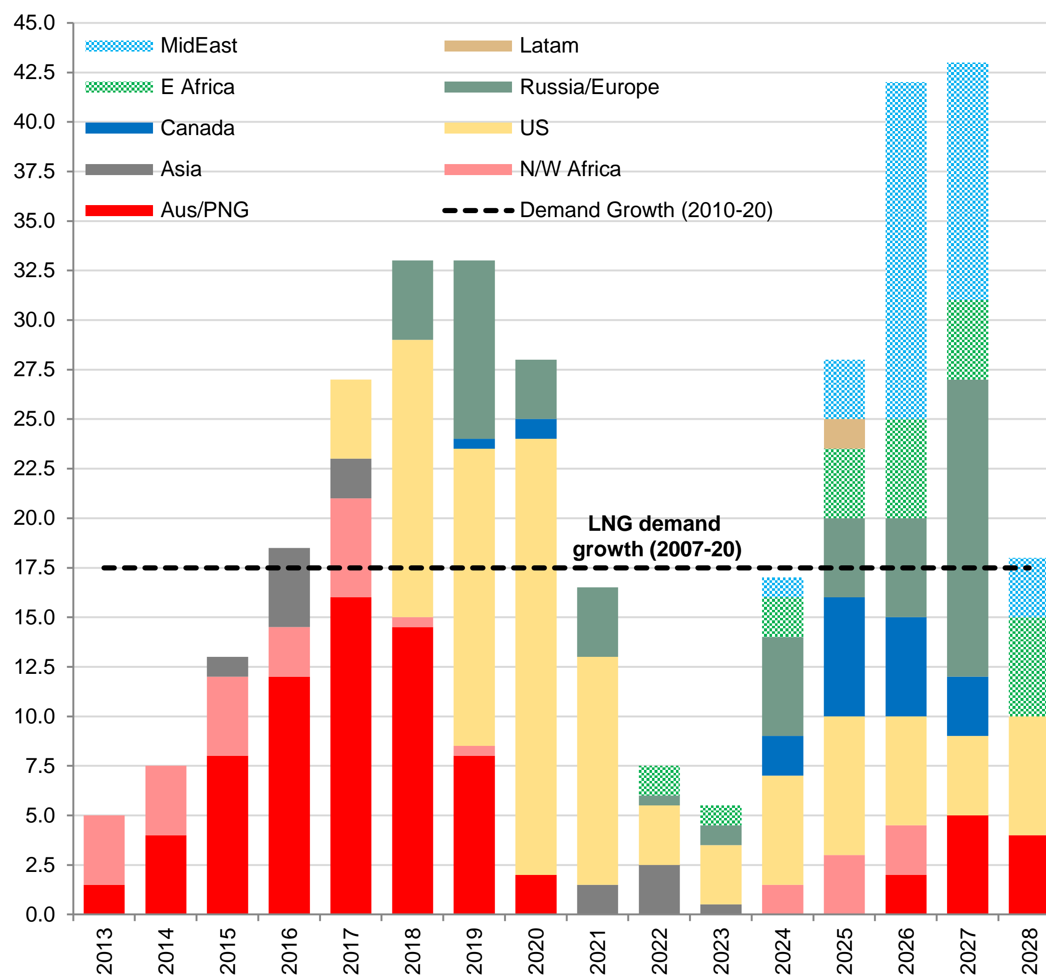
- Next wave of LNG projects under construction should hit the market in by mid-2020s and push it back into oversupply given the sheer velocity of new supply growth outpacing demand growth
- Final Investment Decision (FID) on the 33mtpa Qatar LNG expansion announced in February 2021 marks it all but certain that the market will be oversupplied in 2026-27 – over the 2026-28 period, risks that US utilisation could return to lows seen in 2020

3 Long-term gas demand outlook

- Under a "business as usual" scenario, we expect global LNG demand to grow at 3-4% per annum, and roughly double in size by 2040 to over 700mpta – much of this driven by Asia and Europe
- This is more bullish than the IEA's Sustainable Development Scenario (SDS), which has gas demand peaking in 2030 and falling precipitously thereafter in accordance with meeting net zero targets by 2050

Some energy companies stand to gain from the gas price surge

Global LNG capacity additions, approved and potential projects (mtpa) vs. 2008-20 demand growth



(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Macrobond, Refinitiv Eikon, MUFG Research

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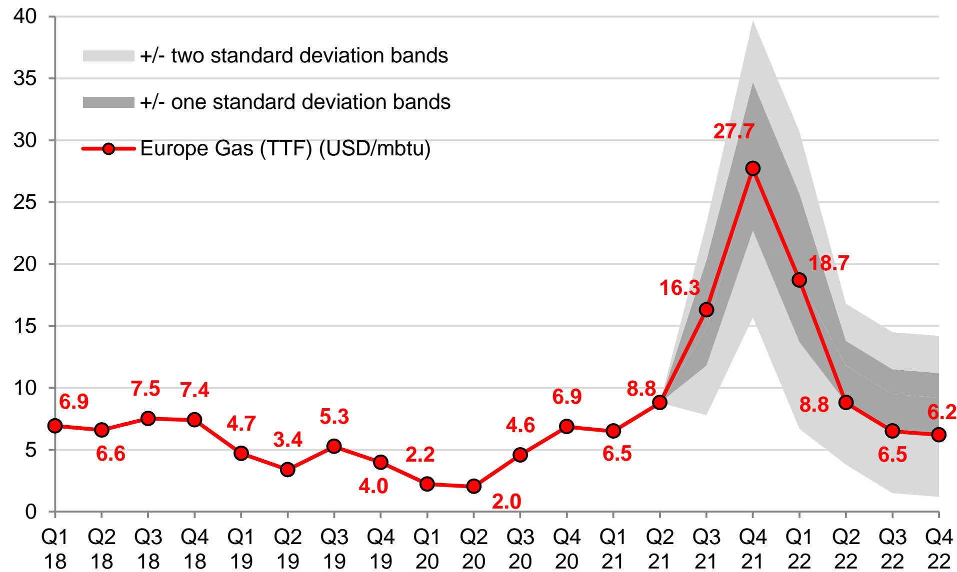
Gas price forecasts | winter risk premium but normalisation in 2022

Price momentum has been remarkable but not unreasonable

- **We forecast gas prices remaining elevated through the winter (and above current spot prices), easing in H1 2022 and normalising in H2 2022**
- **A severe tightening in global gas supplies presents an unique and acute bullish impulse for oil prices over the winter but we are bearish for 2022**

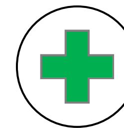
MUFG remains bullish over the winter on gas prices …

Europe Gas (TTF) price with forecasted standard deviation bands (USD/mbtu)



	USD/mbtu	Quarter Averages								Annual Averages		
		Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	2021	2022	2023
MUFG	US (Henry Hub)	2.7	3.0	4.2	6.0	5.0	4.8	5.0	5.2	4.0	5.0	3.9
MUFG	Asia (JKM)	9.1	9.7	16.8	28.8	19.5	9.6	7.4	9.3	16.1	11.5	7.6
MUFG	Europe (TTF)	6.5	8.8	16.3	27.7	18.7	8.8	6.5	6.2	14.8	10.1	5.6
Futures	US (Henry Hub)	---	---	---	5.1	5.2	4.0	3.6	3.7	---	4.1	3.3
Futures	Asia (JKM)	---	---	---	24.9	24.1	12.7	11.9	12.8	---	15.4	9.9
Futures	Europe (TTF)	---	---	---	64.5	67.2	64.5	67.2	64.5	---	8.6	7.1

…. owing to four underlying reasons

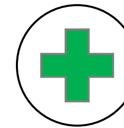


Extreme market deficit with low inventories

- Extremely tight market – low supply and high demand
- European inventories are 72% full, ~15ppt below normal
- Market rebalancing will occur only through higher prices

Uncertainty around Europe's LNG imports

- Europe continues to be outbid on LNG price from Asia
- Heavy maintenance in Australia and Russia linger on
- Strong S. American demand has reduced European flow



Uncertainty on Russia's Nord Stream 2 pipeline

- Nord Stream 2 pipeline likely to start only in Q1 2022
- Risks of a delay to H2 2022 if EU delays approvals
- Russia may exercise a "value over volumes" strategy

Hurricane season to temporarily curtail supply

- US Gulf Cost experiencing above normal hurricanes
- 3-5 major hurricanes are expected until end-November
- Disruptions to US LNG exports to spook markets

…. but risks abound, notably in relation to the winter weather

Will the winter weather prove mild or harsh?

- Normal temperatures signals storage <15ppt average
- Colder than normal pushes storages <20-25ppt average
- Most vulnerable – Germany, Netherlands and the UK
- Mild and windy winter offers respite – markets trust 14 day weather forecasts from ECMWF (key to watch)

(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Macrobond, Refinitiv Eikon, MUFG Research

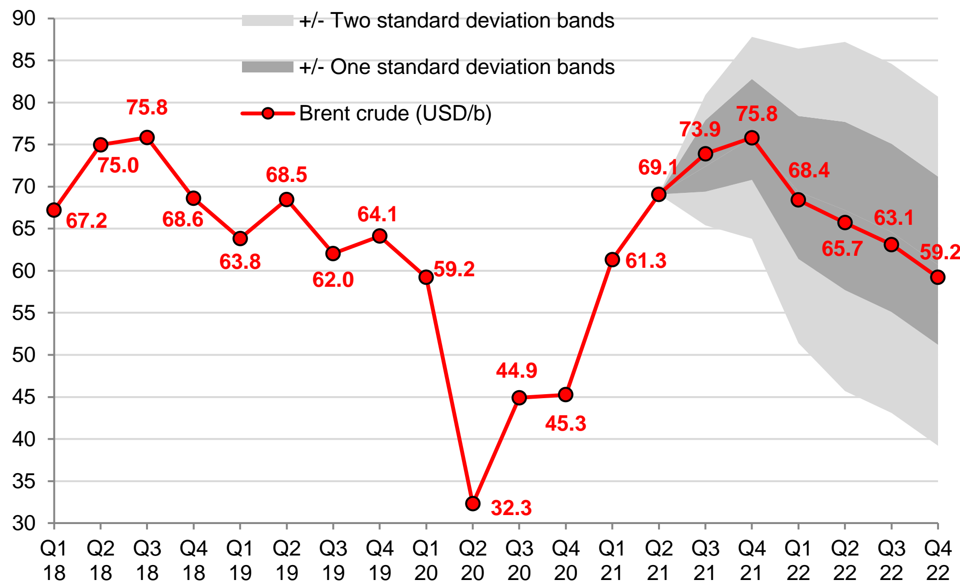
Oil price forecasts | cyclically bullish oil in Q4 2021, bearish in 2022

Cyclically bullish oil near-term, bearish

- **Severe tightening in gas supplies presents a unique and acute bullish impulse for oil markets as an even wider deficit depletes inventories**
- **Knock-on effects of gas crunch may widen the oil market deficit from 1.1m b/d in Q4 2021, to between ~2-3m b/d in Q4 2021, lead to a spike in oil**

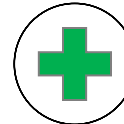
MUFG remains bullish in Q4 2021 on oil prices …

Brent with forecasted standard deviation bands (USD/b)



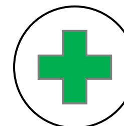
	USD/b	Quarter Averages								Annual Averages		
		Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	2021	2022	2023
Brent	MUFG	61.3	69.1	73.9	75.8	68.4	65.7	63.1	59.4	70.0	64.1	58.2
Brent	Consensus	---	---	72.0	70.9	70.0	66.3	66.0	67.0	71.0	71.2	66.4
Brent	Futures	---	---	---	77.2	74.8	73.0	71.4	70.0	---	72.3	65.5
WTI	MUFG	58.1	66.1	71.1	72.5	65.0	62.4	60.7	56.1	67.0	61.1	55.4
WTI	Consensus	---	---	70.0	68.0	67.0	64.3	64.0	64.0	66.6	68.5	62.7
WTI	Futures	---	---	---	73.6	71.8	70.0	68.1	66.6	---	69.1	61.3

…. owing to three underlying reasons …



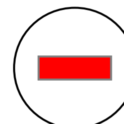
Tight market deficit with firm backwardation
- Market has remained in firm deficit since July 2020
- Sharp backwardation signals ongoing market tightness
- Oil inventories continue to be markedly drawn down

Gas-to-oil switching
- Knock-on effects of gas crunch, spurs tighter oil market
- Conceivable capacity for gas-to-oil switching at 1.9m b/d (1.3m in power and 0.6m b/d in industry)

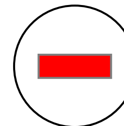


Ebbing COVID-19 concerns and reopenings
- Delta concerns are ebbing with lower hospitalisations
- Mobility restrictions are easing in key geographies
- Mass vaccinations across EMs is picking up

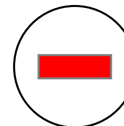
…. but bearish in 2022 for four core reasons



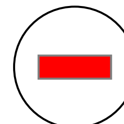
Market deficit will pivot towards a surplus
- Higher supply from OPEC+, shale, Iran and Libya
- Normalised demand profile – already close to pre-virus
- Steady build-up of oil inventories from 2022



Higher supply – OPEC+, Iran and shale growth
- Steady OPEC+ output rises to accelerate by year-end
- Iranian and Libyan barrels likely to return near-term
- Green shoots amongst US shale growth emerging



US dollar appreciation and fading stimulus
- Fed's hawkish stance signals probable 2022 hikes
- USD strength creates negative feedback loop – lower trade, weaker EM trade balances, less oil demand



Oil major's capex is rising and ESG
- IOCs are strategically raising capex post-virus
- Increasing shift towards incorporating ESG metrics
- Corporate reallocation from oil spending to take time

(Source) Bloomberg, BP Statistical Review, CEIC, Company filings, Macrobond, Refinitiv Eikon, MUFG Research

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