



Gas and power market analysis

October 2019



Disclaimer

This presentation has been provided to you for informational purposes only. This presentation is not advice on or a recommendation of any of the matters it describes. This presentation is not an offer or solicitation by or on behalf of BP p.l.c. or any of its subsidiaries (collectively "BP") to enter into any contractual arrangement. BP makes no representations or warranties, express or implied, regarding the accuracy, adequacy, reasonableness or completeness of the information, assumptions or analysis contained in this presentation or in any supplemental materials. BP accepts no liability in connection with any of such information. BP deals and trades in energy related products and may have positions consistent with or different from those discussed herein.

The information contained in this document shall not be modified, reproduced, distributed or otherwise disseminated in whole or in part in any manner by any party without prior written permission from BP. All rights, including copyright, confidentiality and ownership rights, are reserved.

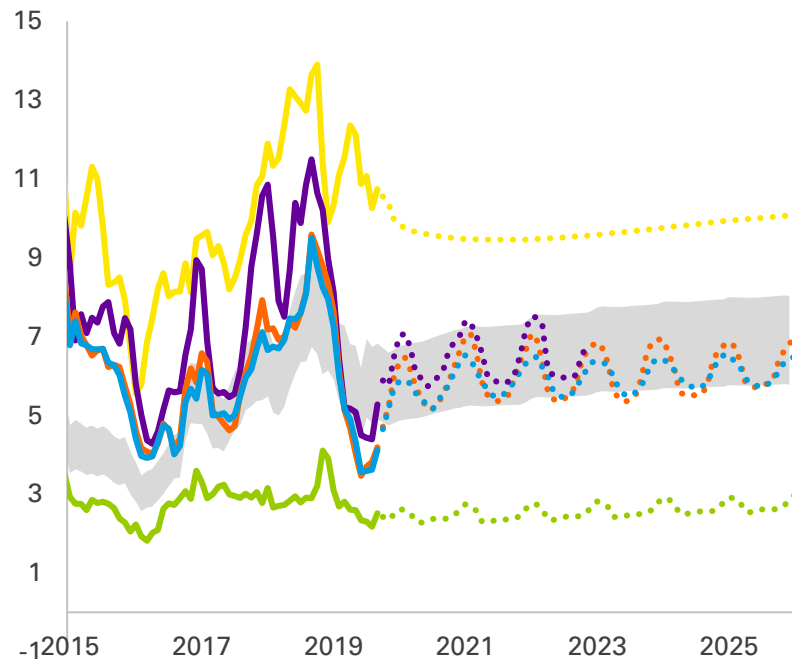


Gas prices increasing but remain low

- A mild winter and strong supply saw NBP, TTF and JKM all fall by over 60% from Sep-18 to Jul-19.
- Prices have increased from Jul-19 lows and have been volatile following news of potential European supply reductions.

Global gas benchmarks

\$/mmbtu

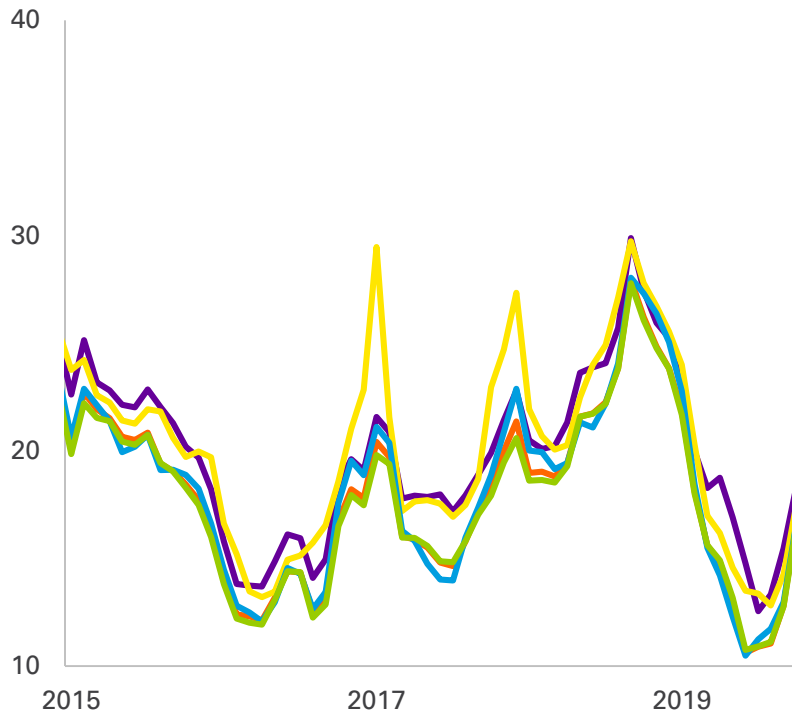


- European coal switching
- Oil parity
- HH
- NBP
- JKM
- TTF

Futures as of 04/10/19

European gas benchmarks

€/MWh



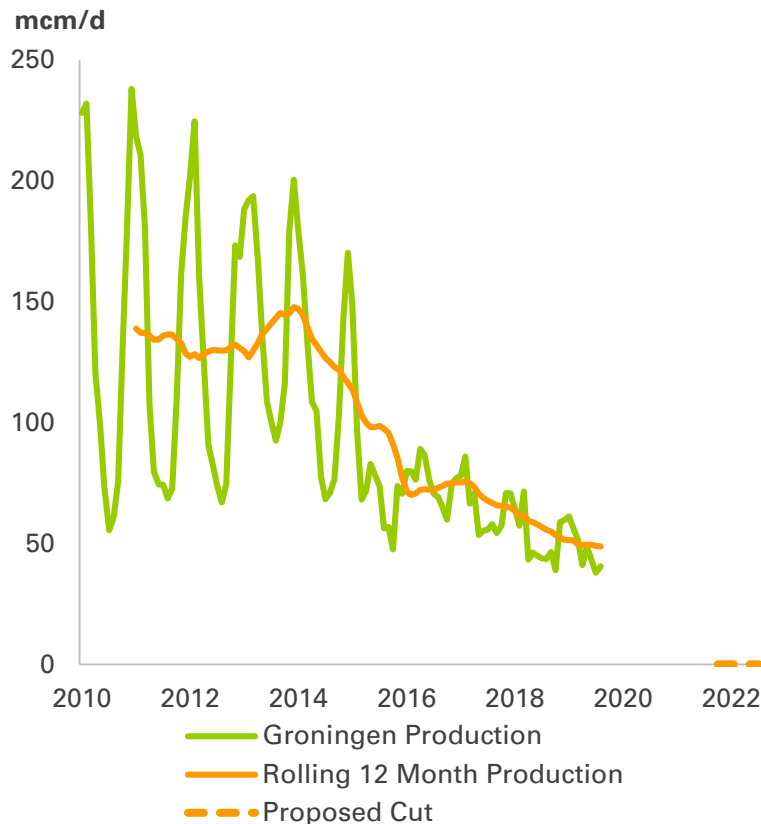
- PEG
- PSV
- PVB
- NBP
- TTF

PEG = French gas
PSV = Italian gas
PVB = Spanish gas
NBP = British gas
TTF = Dutch gas

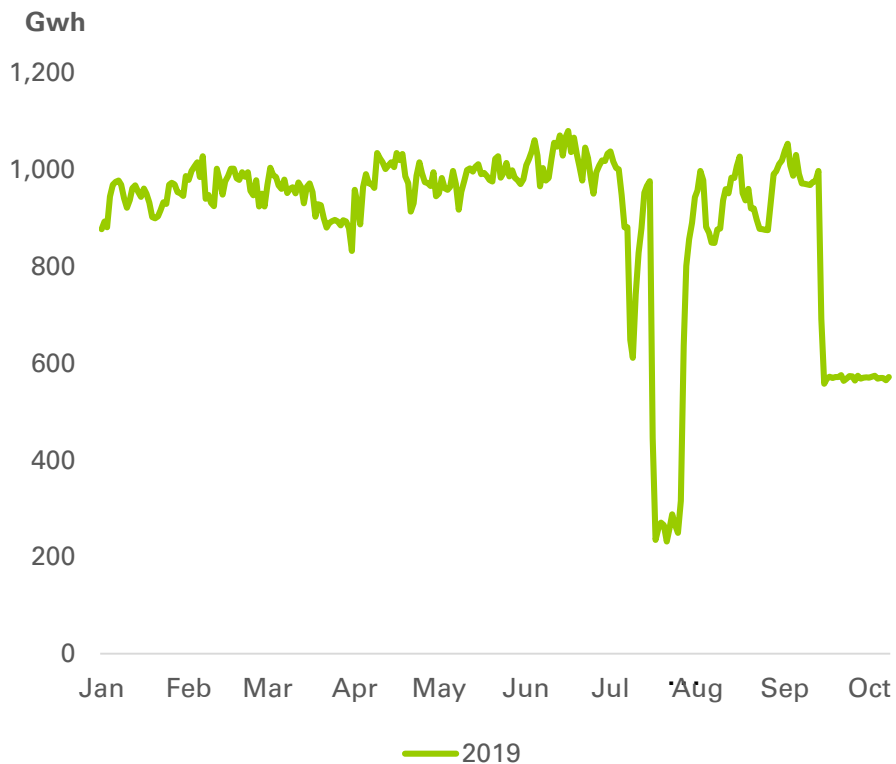
European gas supply – Groningen & OPAL

- Groningen – Gas extraction will stop mid 2022 from the Groningen gas field, following ongoing earthquakes in the area, rather than the previously expected date of 2030, according to a Dutch government announcement during Sep-19.
- OPAL – On 14-Sep-19, the ECJ overruled an EU decision allowing Gazprom to ship more gas via the OPAL pipeline. This led to a 40% flow rate decrease since 14-Sep-19, or about 400Gwh.

Groningen gas production



OPAL flows to the Czech Republic





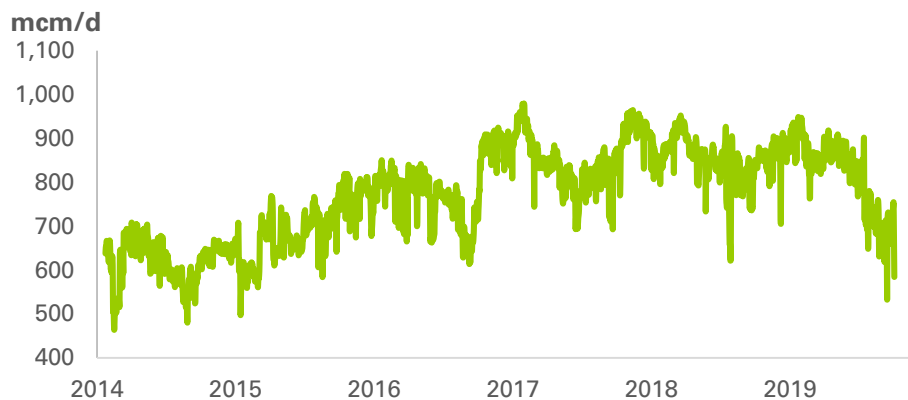
European pipeline imports falling

Pipeline flows into Europe have fallen with pipeline maintenance, high storage inventories and strong LNG supply.

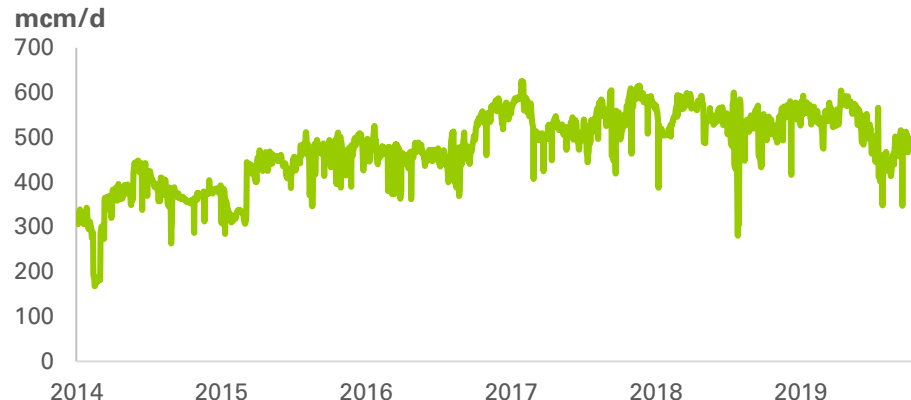
- Algerian imports fell from over 100 mcm/d in Jan-19 to 40 mcm/d, where they have remained steady.
- Russian and Norwegian imports have fallen, resulting in a significant total European pipeline imports reduction in 3Q19.

Europe pipeline imports

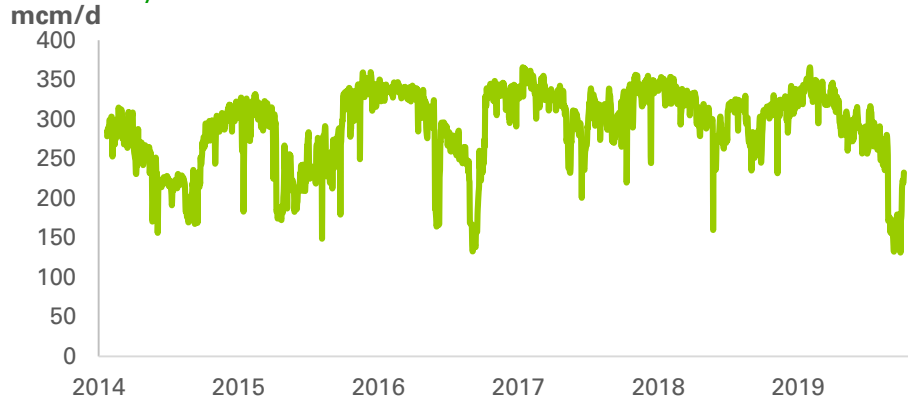
Total



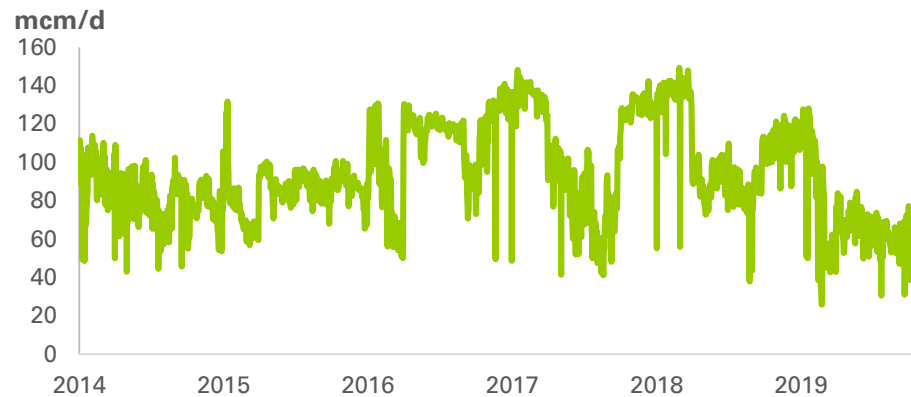
Russia



Norway



Algeria

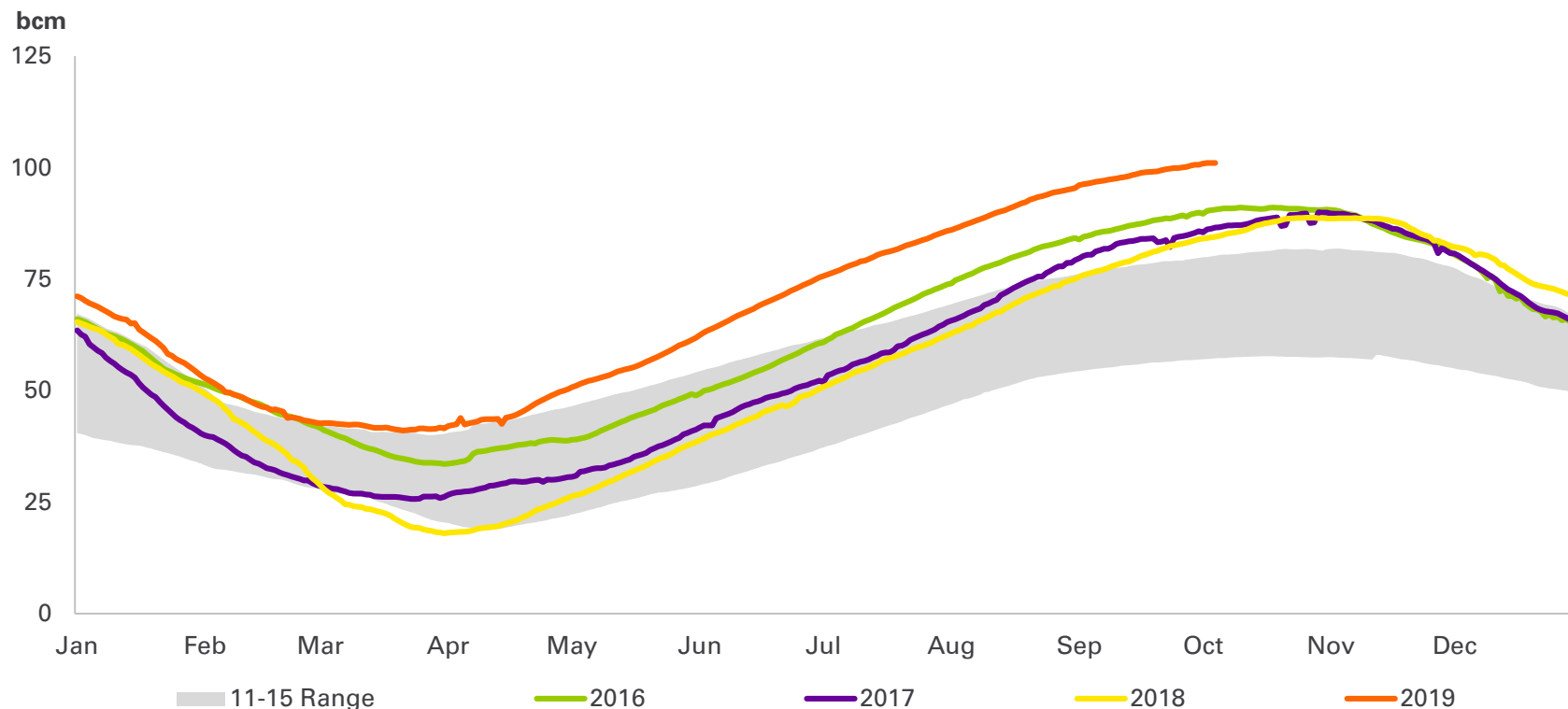




European gas inventories have built significantly above historic average levels

- A mild winter reduced the need for storage withdrawals, compared to 2018 where extreme weather caused storage levels to fall to their lowest in recent years.
- European gas inventories were on average 22 bcm higher year-on-year across 3Q19 with injections supported by strong LNG imports and pipeline supply in Europe.
- Consequently, storage levels are close to capacity.

European GIE storage



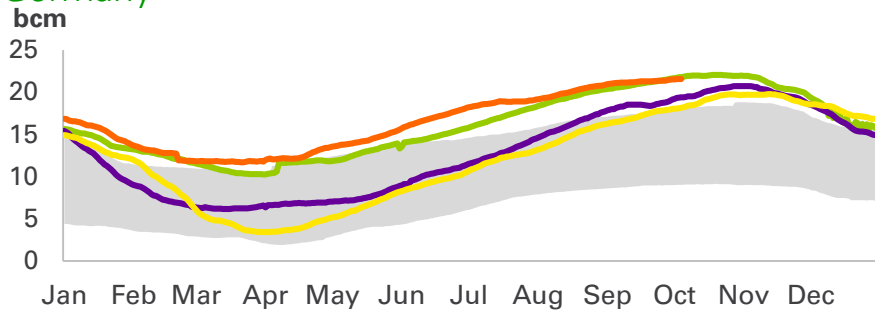
N.B. data from GIE does not incorporate all storage facilities in each country, but rather can be used as a proxy for total storage
Source: Gas Infrastructure Europe



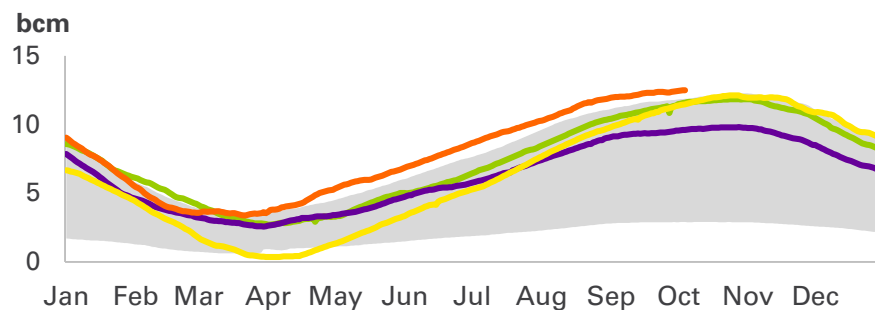
Strong European Storage injections

Germany, France and Spain have sustained high inventories whilst Italy, UK and the Netherlands tracked close to average levels.

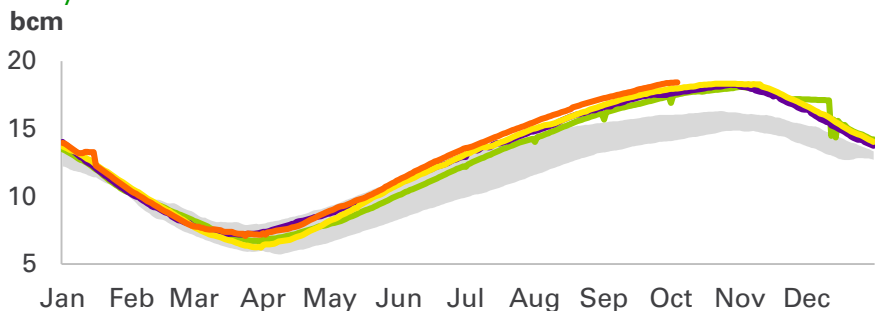
Germany



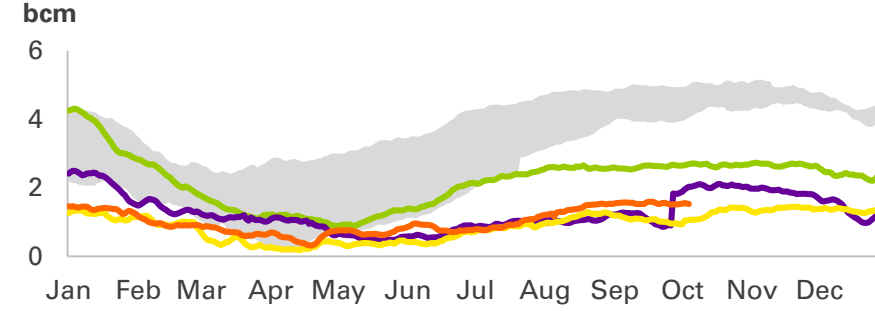
France



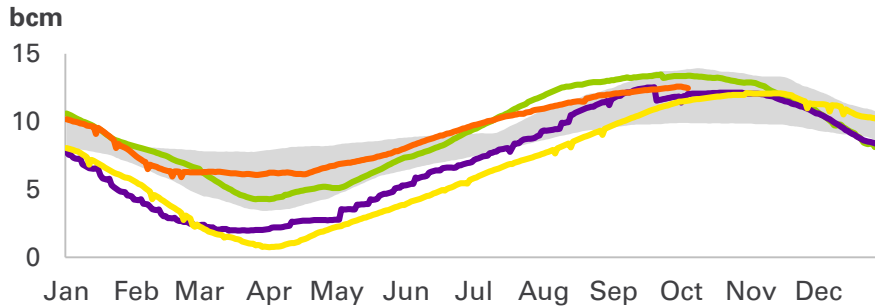
Italy



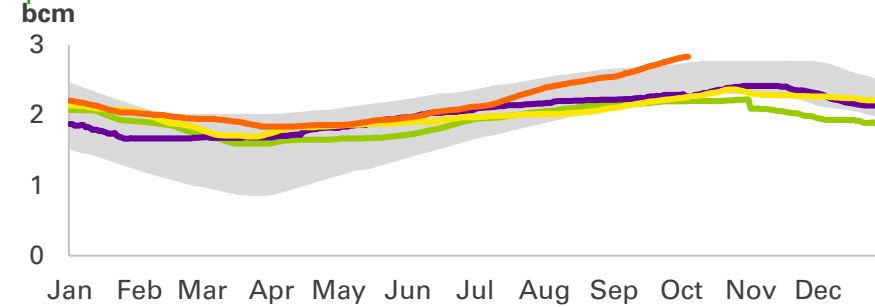
UK



Netherlands



Spain



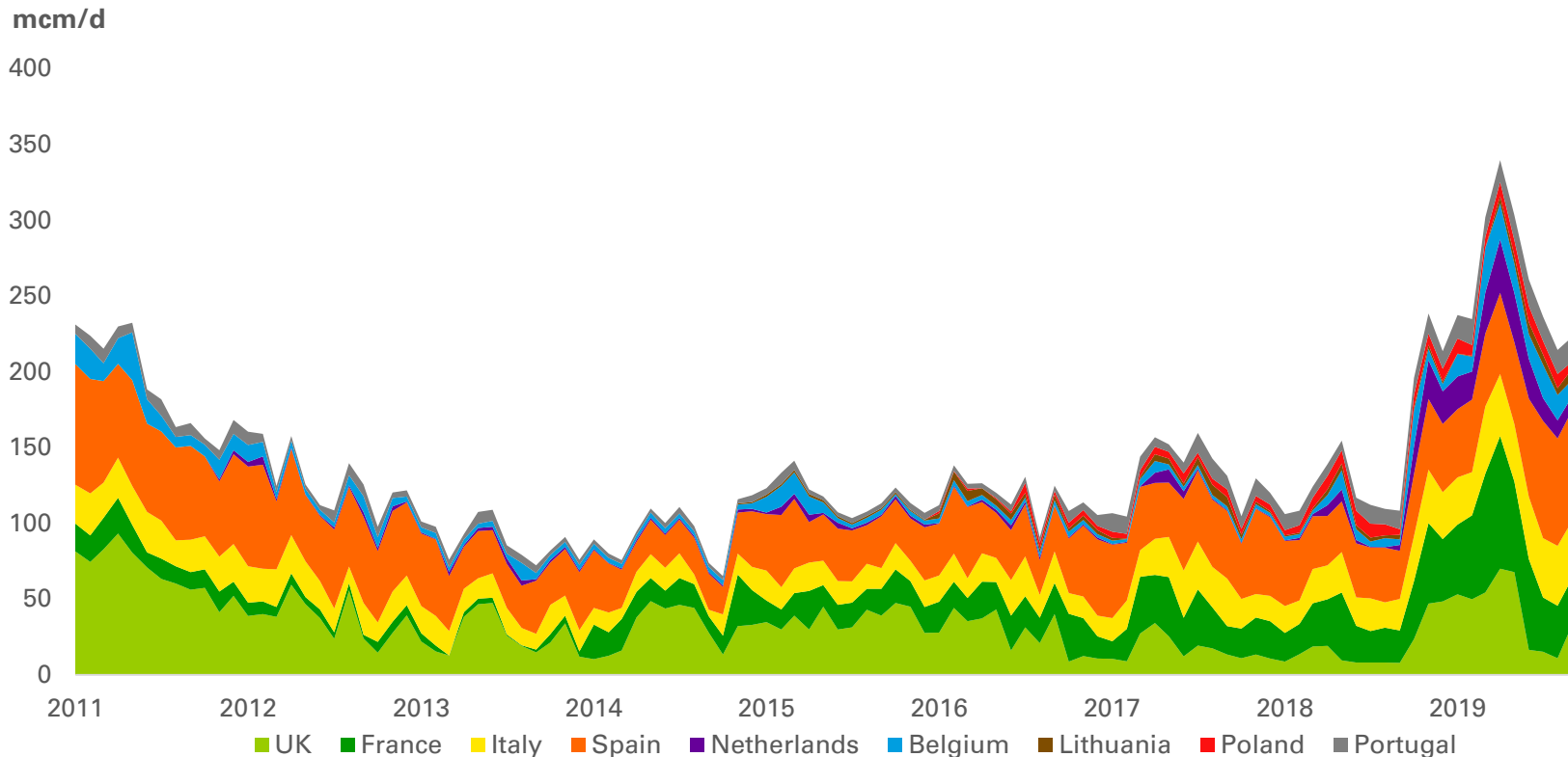
N.B. data from GIE does not incorporate all storage facilities in each country, but rather can be used as a proxy for total storage
Source: Gas Infrastructure Europe



LNG send-outs remain strong

- During 2019 European send-outs have more than doubled year-on-year, as strong global LNG supply and slower LNG demand growth in Asia resulted in a wave of LNG cargoes heading into Europe.
- After reaching a record ~340 mcm/d in April 2019, send-outs have retracted although still remain historically high.

Monthly European LNG send-outs



N.B. data does not incorporate all regasification facilities in Europe, but rather can be used as a proxy for LNG send-outs
Source: Official TSO Statistics

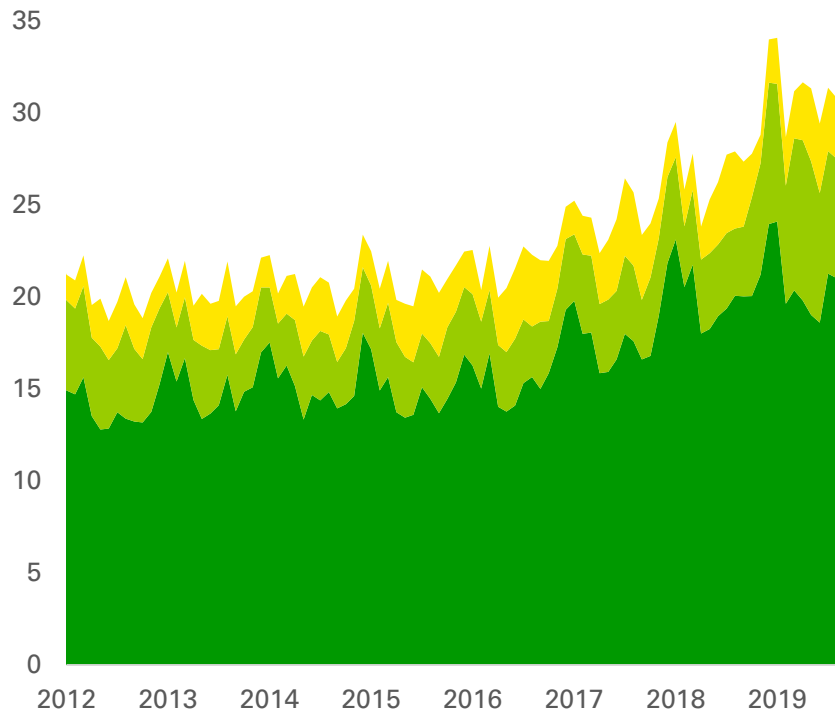


Global LNG supply and demand

- Asian LNG demand has grown 6% year on year, compared to a 16% growth in year on year Global LNG Production.
- This growth rate discrepancy helps explain why more LNG cargoes are heading to Europe, increasing European supply.

Global LNG Demand

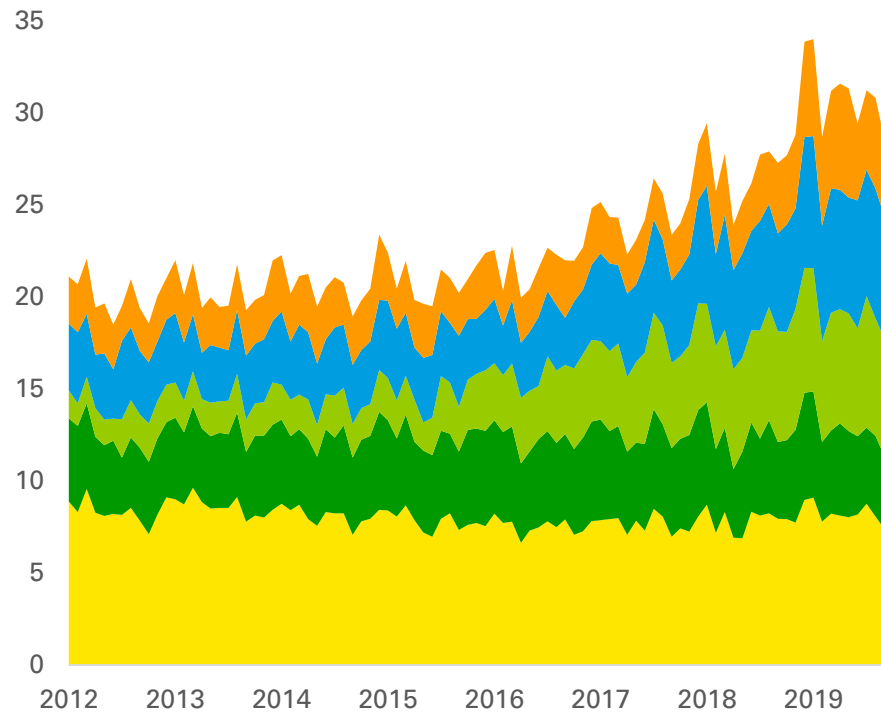
MT/month



■ Asia ■ Europe ■ Rest of World

Global LNG Production

MT/month



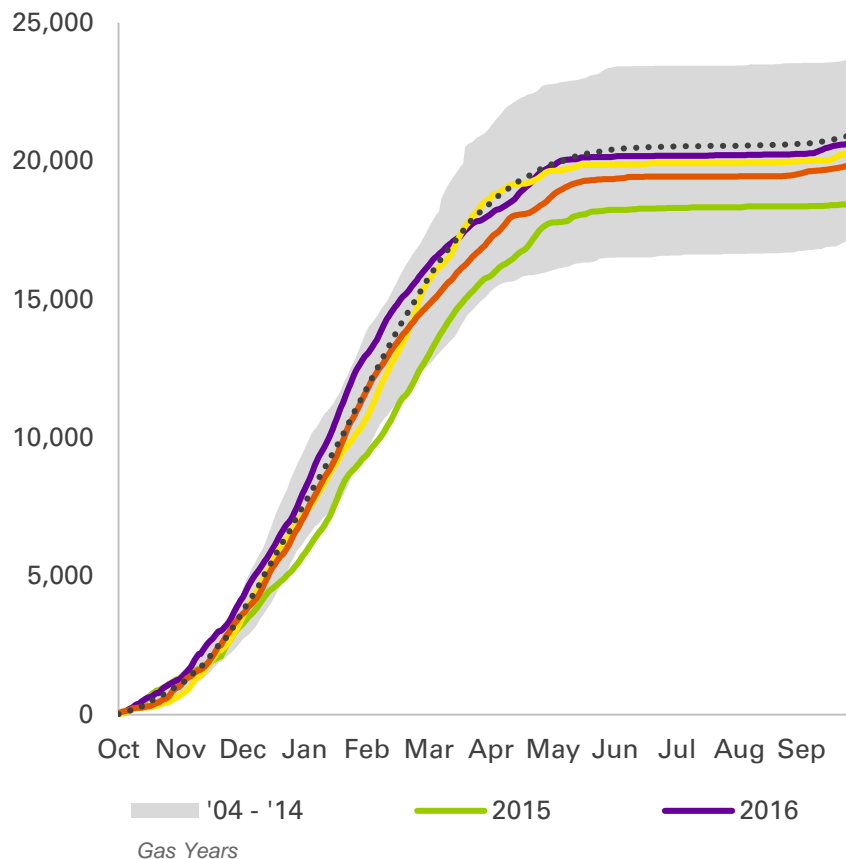
■ Middle East ■ Asia ■ Australia ■ Atlantic ■ Rest of World



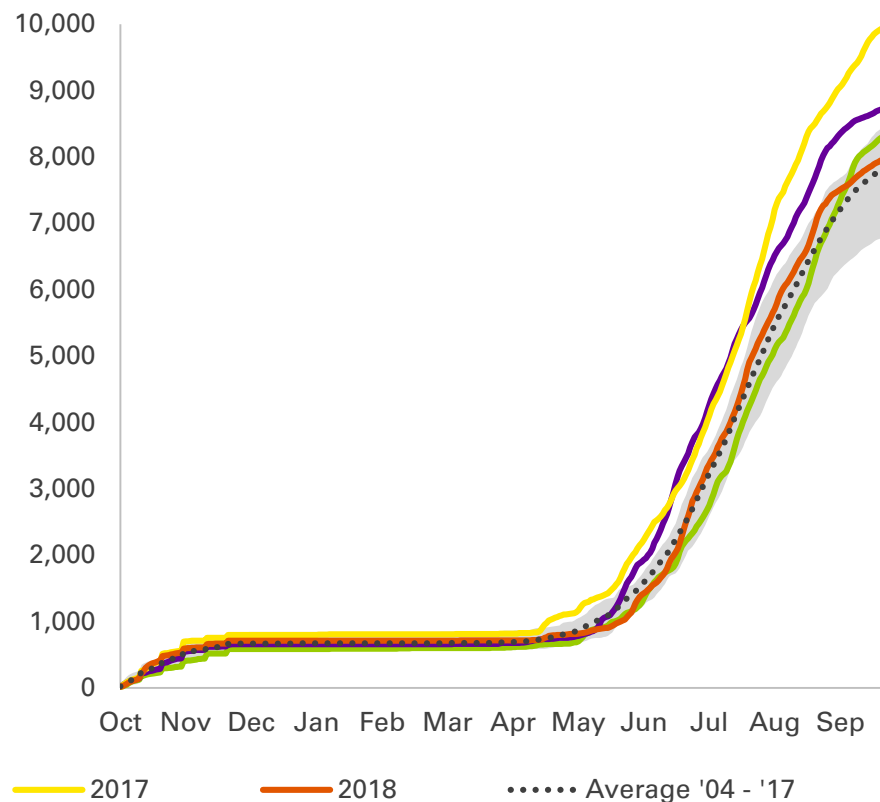
European heatwave in June followed a mild winter

- A mild winter across Europe resulted in below average HDDs contributing to a reduced need for storage withdrawals.
- In late June 2019 much of Europe experienced a heatwave during which France hit a record temperature of 45.9°C, resulting in a spike in CDDs across many European countries.

Europe Cumulative HDDs



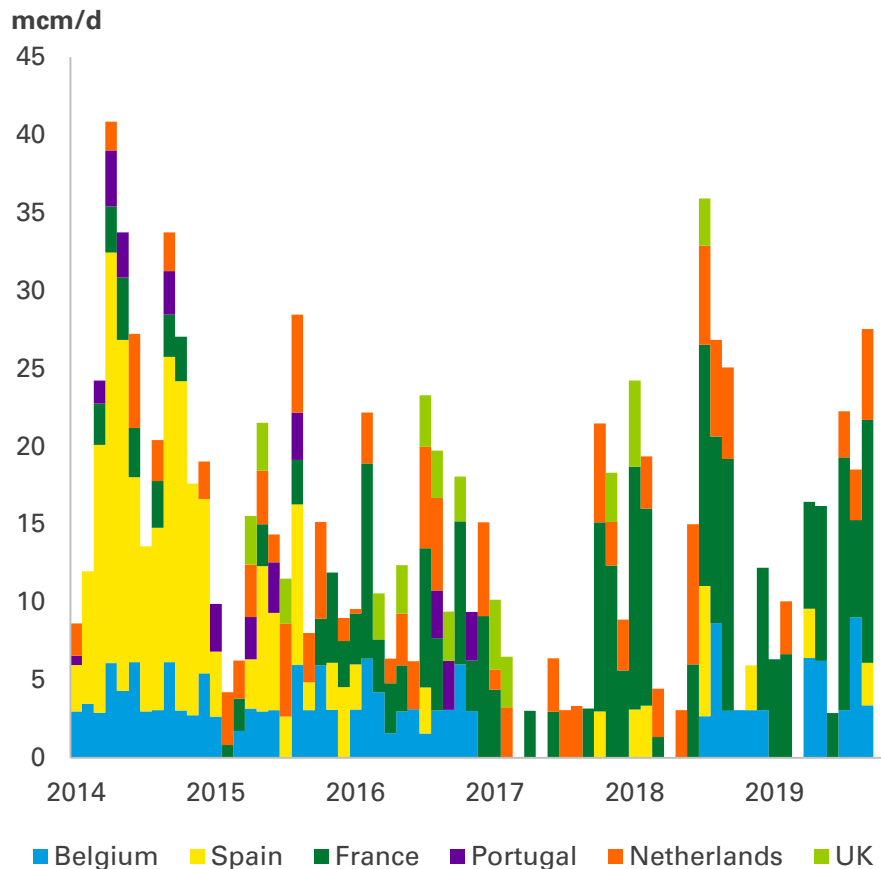
Europe Cumulative CDDs



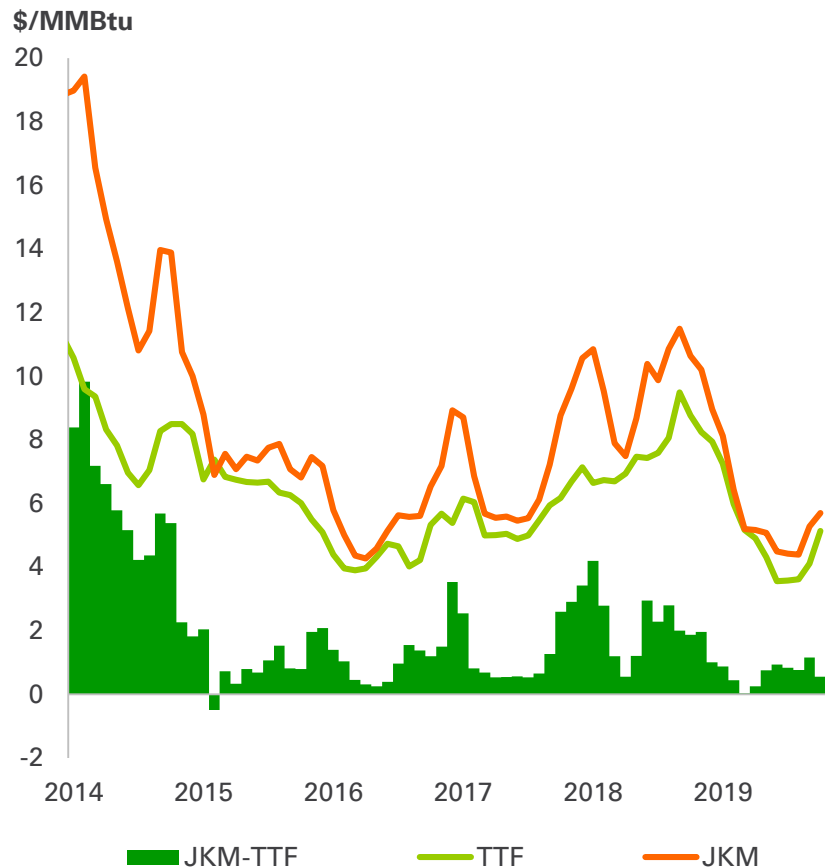
JKM-TTF spread widened slightly in 3Q19 but remains historically narrow

The spread has widened in 3Q19, creating some arbitrage opportunities, albeit demand in Asia remained lacklustre hence subduing reloads.

European LNG reloads



JKM-TTF spread





Carbon prices fall following recent highs

Volatility in EUAs continues, with prices rising over 15% from Jan-19 to Aug-19, but since decreasing, with Oct-19 prices lower year-on-year. Despite this prices remain high, giving support to European gas prices.

EUA carbon futures

