

Europe cementing a key role in LNG

Global balancer, price anchor and demand centre in its own right

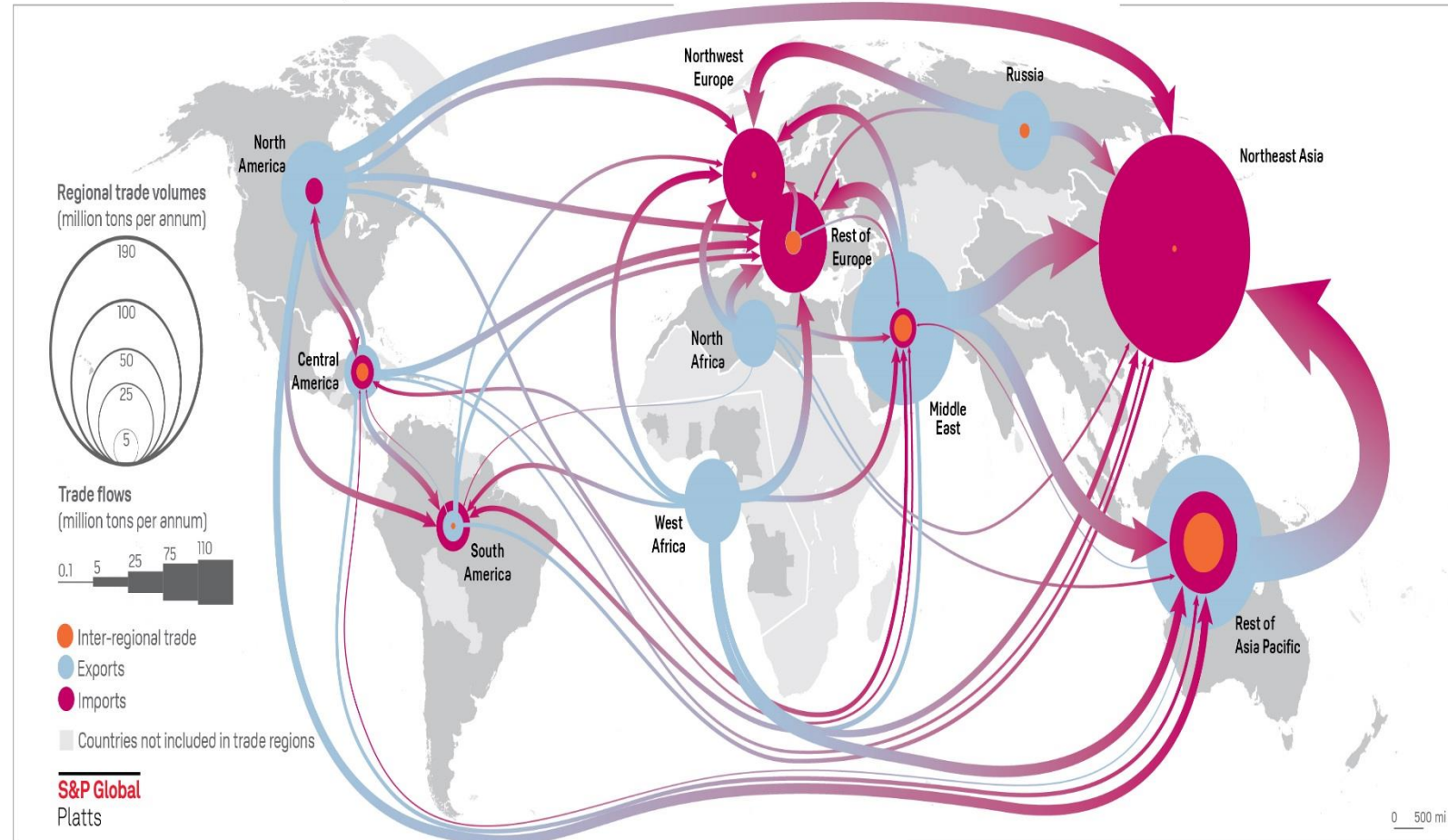
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LNG trade flows gradually shifted from a demand pull into Asia to a supply push into Europe since Q4 -18

LIQUIFIED NATURAL GAS TRADE FLOW FORECAST, 2019



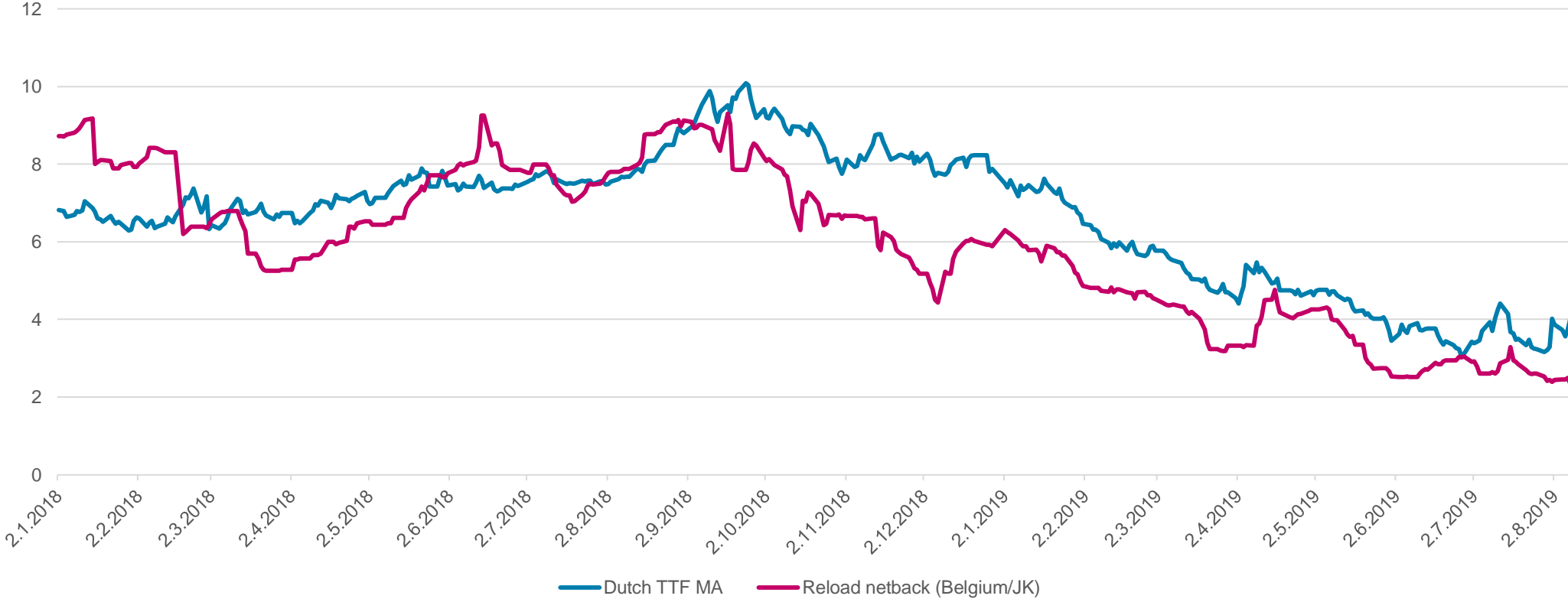
Source: S&P Global Platts

Surging supply and weaker Asian prices accentuates this shift in 2019

This is because reloads from NW Europe to Asia have narrowed

\$/MMBtu

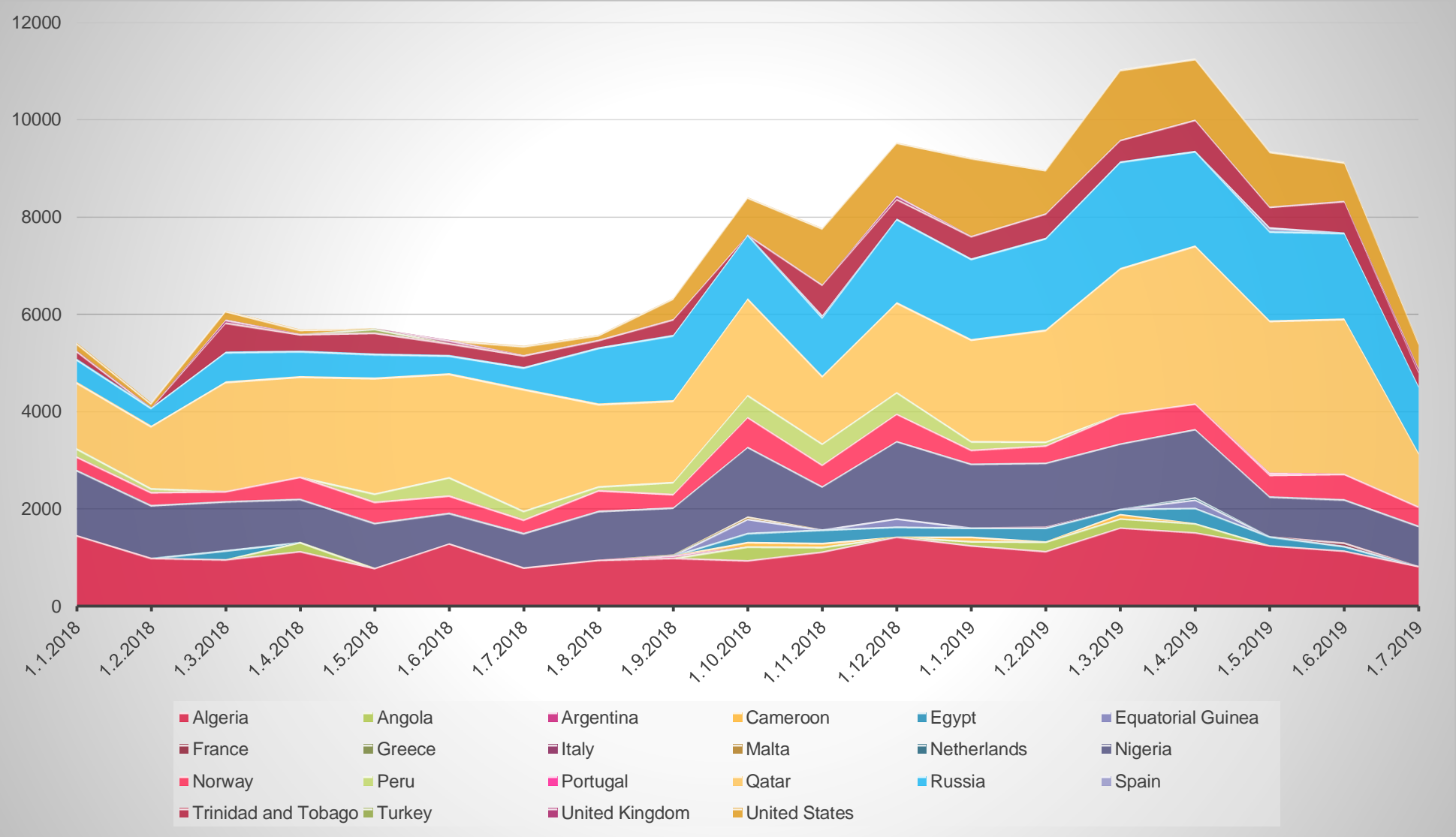
Reload netback from Europe to Asia (including freight cost)



Source: S&P Global Platts

In addition Russian and US LNG flows to Europe increased strongly since Q4 2018

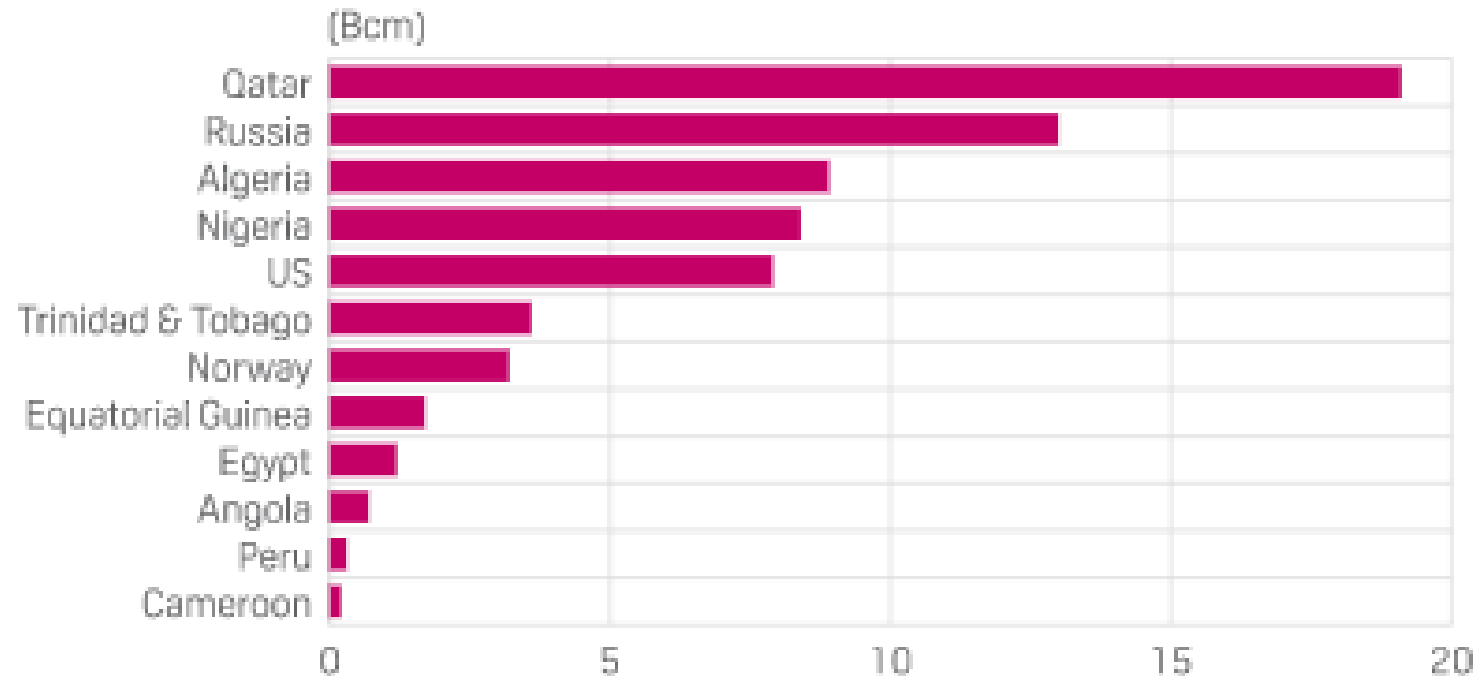
NW Europe LNG imports by source country (Bcm/y)



Source: S&P Global Platts Analytics

Russia steadily rising in the ranks of European LNG suppliers: a trend likely to persist with coming new capacity

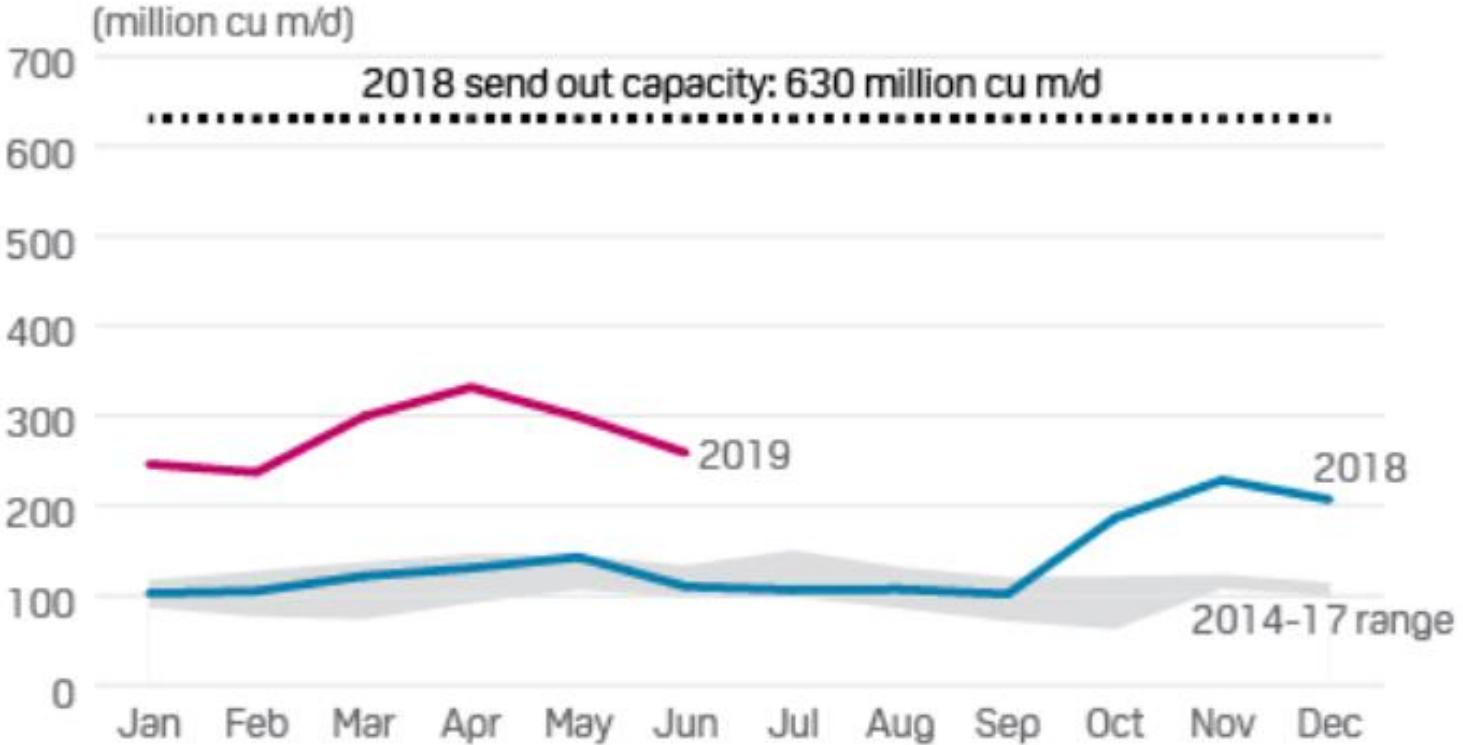
LNG INTO EUROPE: COUNTRIES OF PROVENANCE IN 2019



Note: Including Turkey.

Regasification capacity utilization up to 70% in NW Europe

EUROPEAN LNG SEND OUT BOOSTED BY LNG ARRIVALS SINCE Q4-18*



*Turkey not included

- LNG import terminals in Europe (built and planned) gain momentum

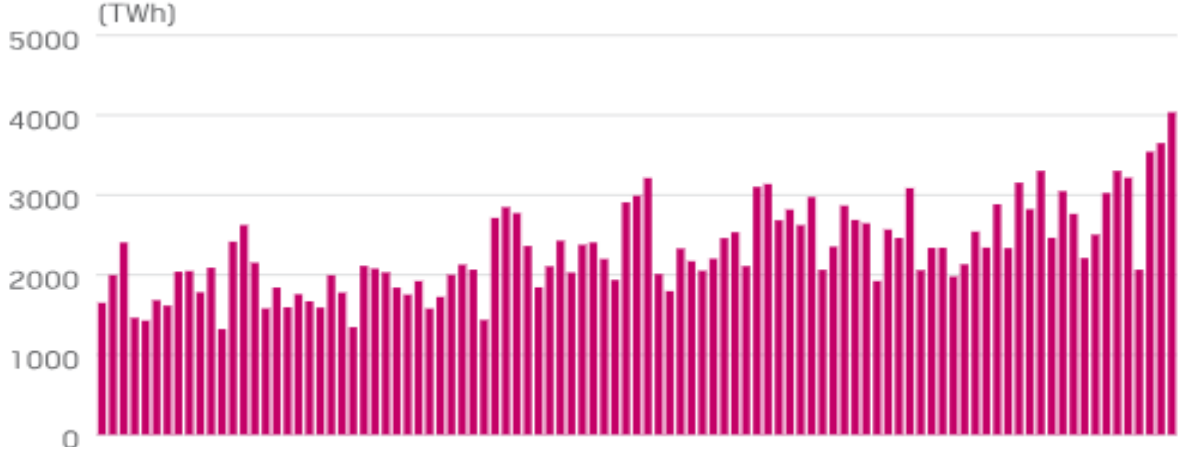
Europe is a key LNG balancing market, price anchor and demand hub

- 100 Bcm/year of storage
- 220 Bcm/year of regasification
- More than 20 LNG regasification
- Liquid hubs, liquid NBP and TTF

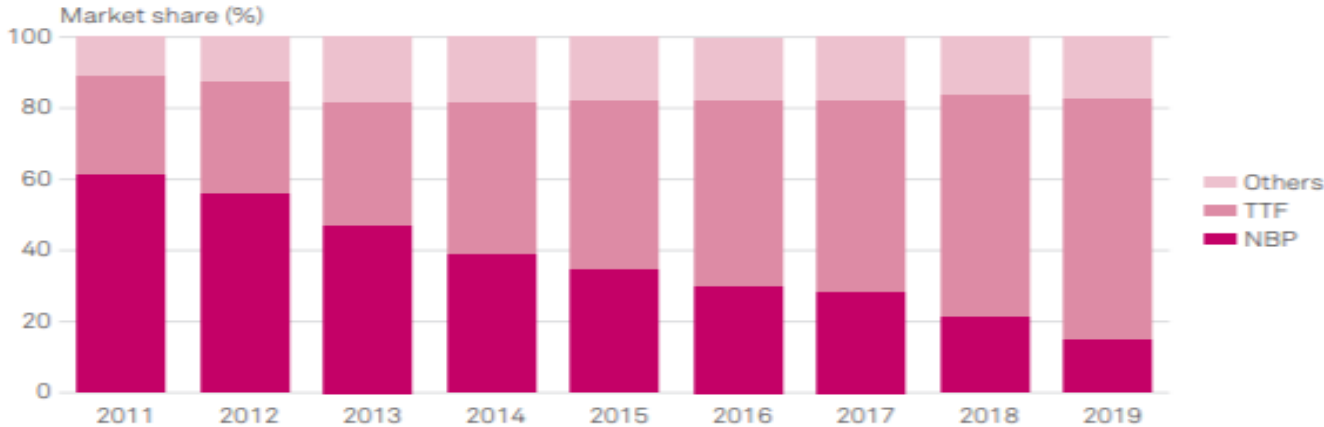
Liquidity has surged, especially at the TTF

Helped by LNG imports growth

OTC LIQUIDITY BREAKS ABOVE 4,000 TWh MARK



TTF'S SHARE OF OTC MARKET GROWS FURTHER, CEMENTING ITS ROLE AS PRIMARY HUB FOR LNG PRICE INDEXATION AND HEDGING

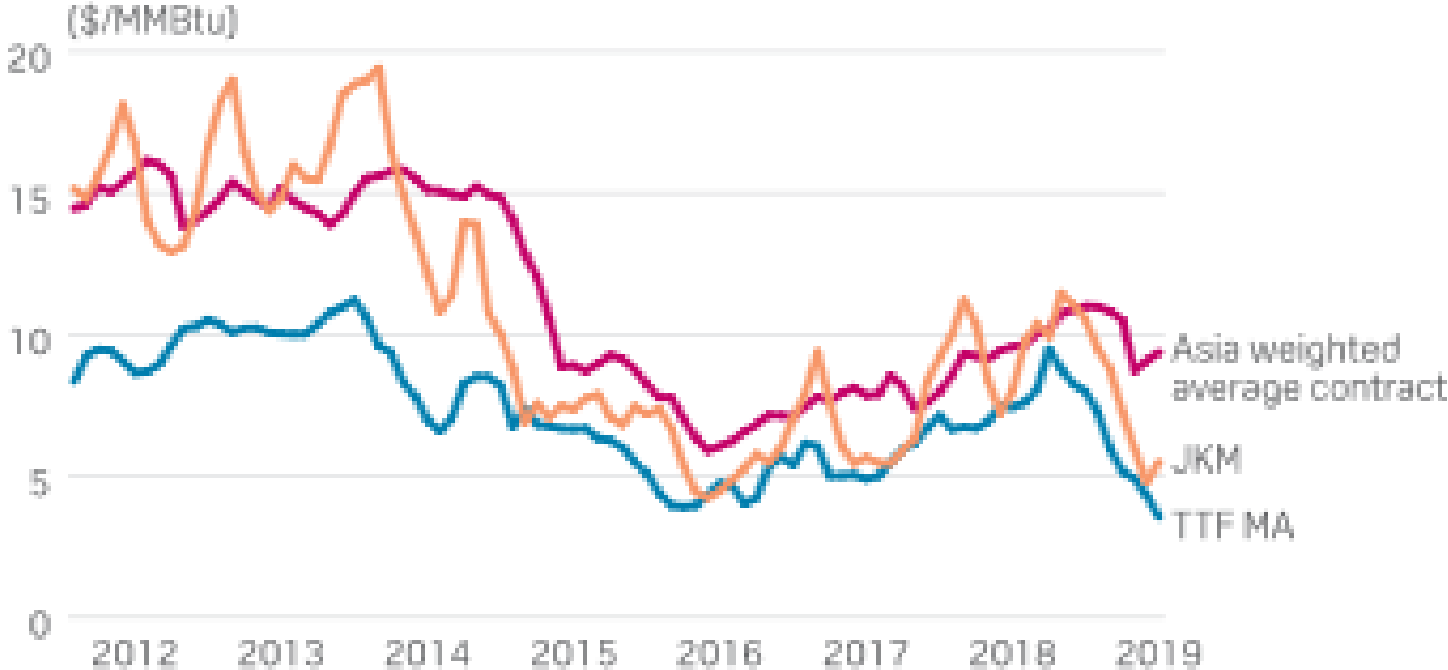


Source: S&P Global Platts Analytics, LEBA

- TTF becomes a reference to hedge even for the global LNG markets
- Several LT SPAs linked to TTF

Growing influence of Dutch TTF gas hub in LNG pricing

JKM SPOT DELINKS WITH ASIAN CONTRACTS, FALLS NEAR TTF

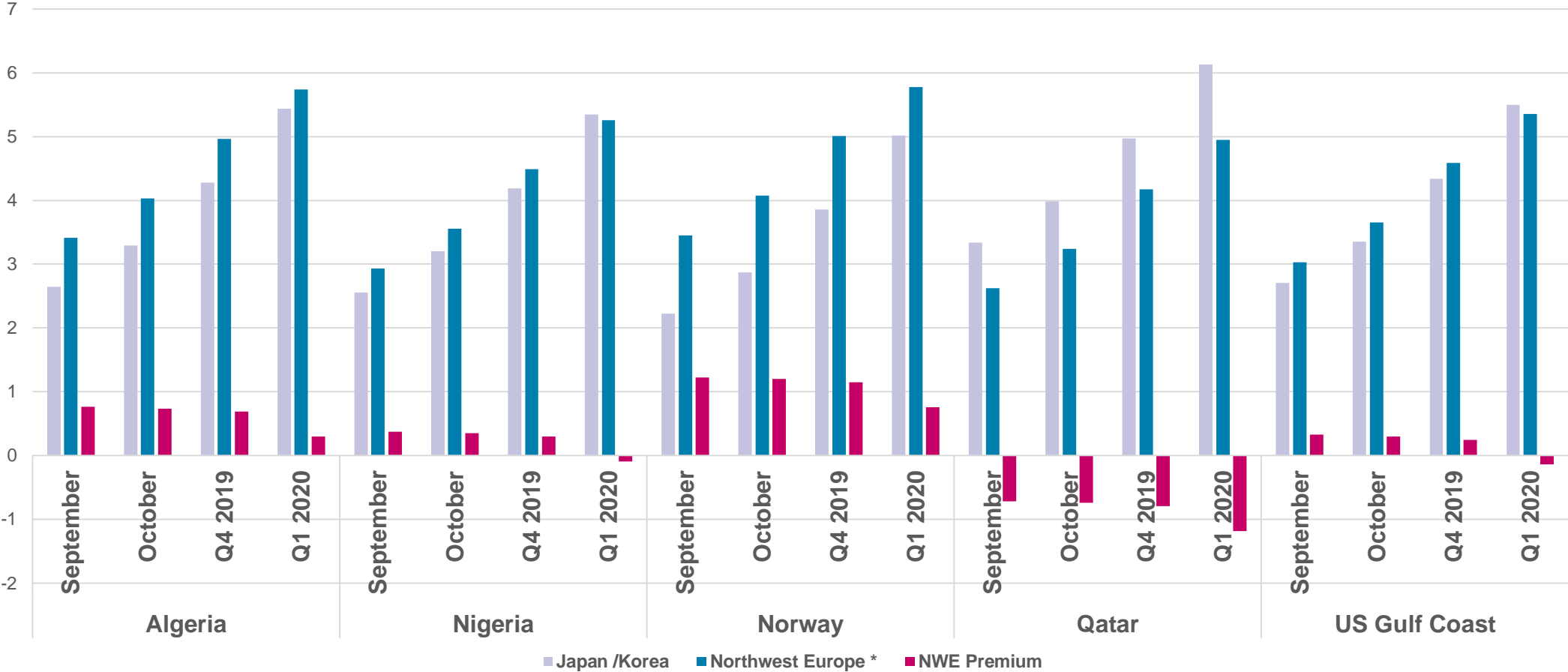


- Europe supports LNG prices in low demand periods, summer
- But this summer, JKM falls further from traditional Asian oil-linked contracts

Source: S&P Global Platts Analytics

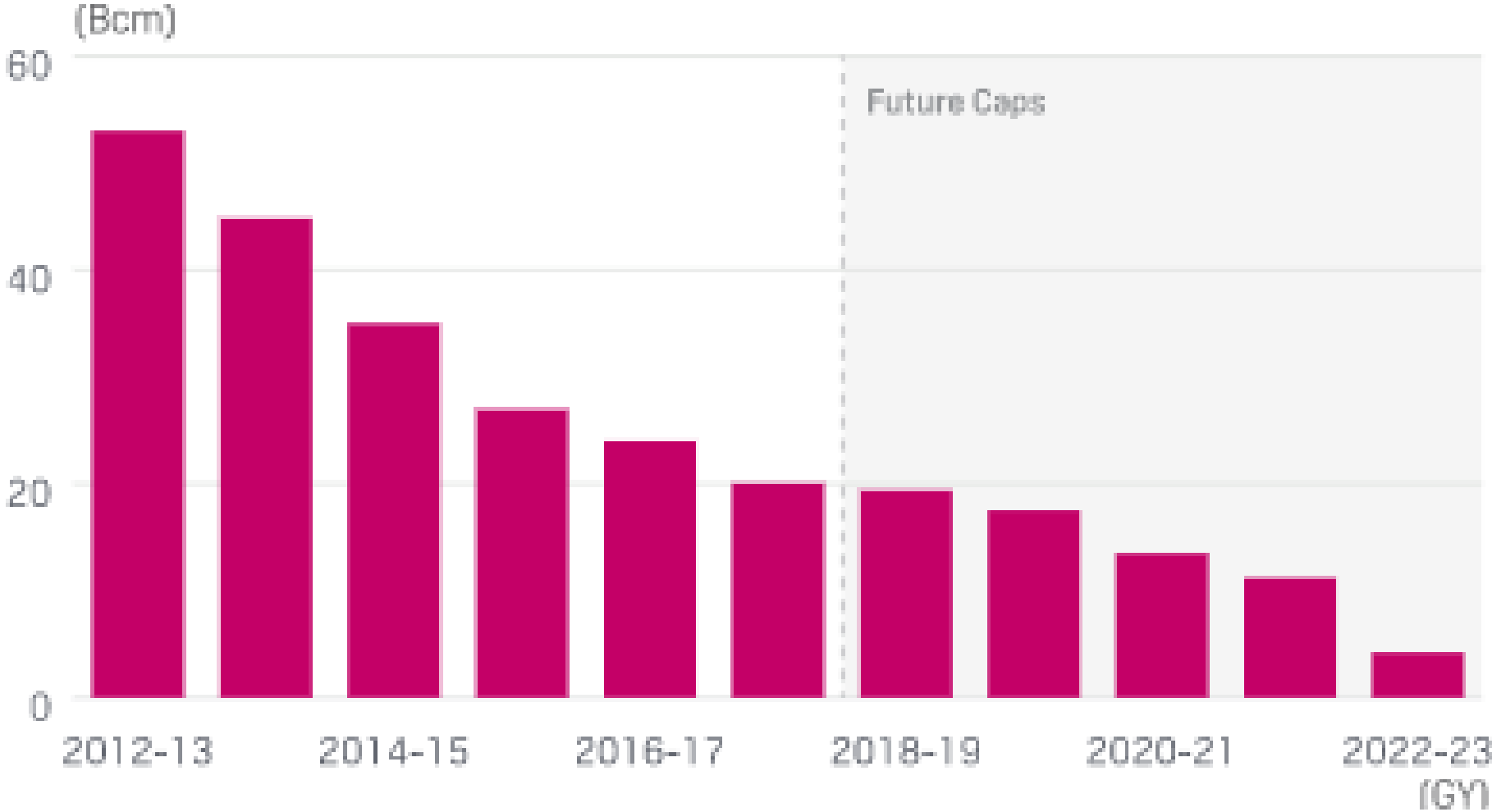
Weak demand in Asia could be short-term: JKM/TTF spread could widen

Asian/European netback comparisons



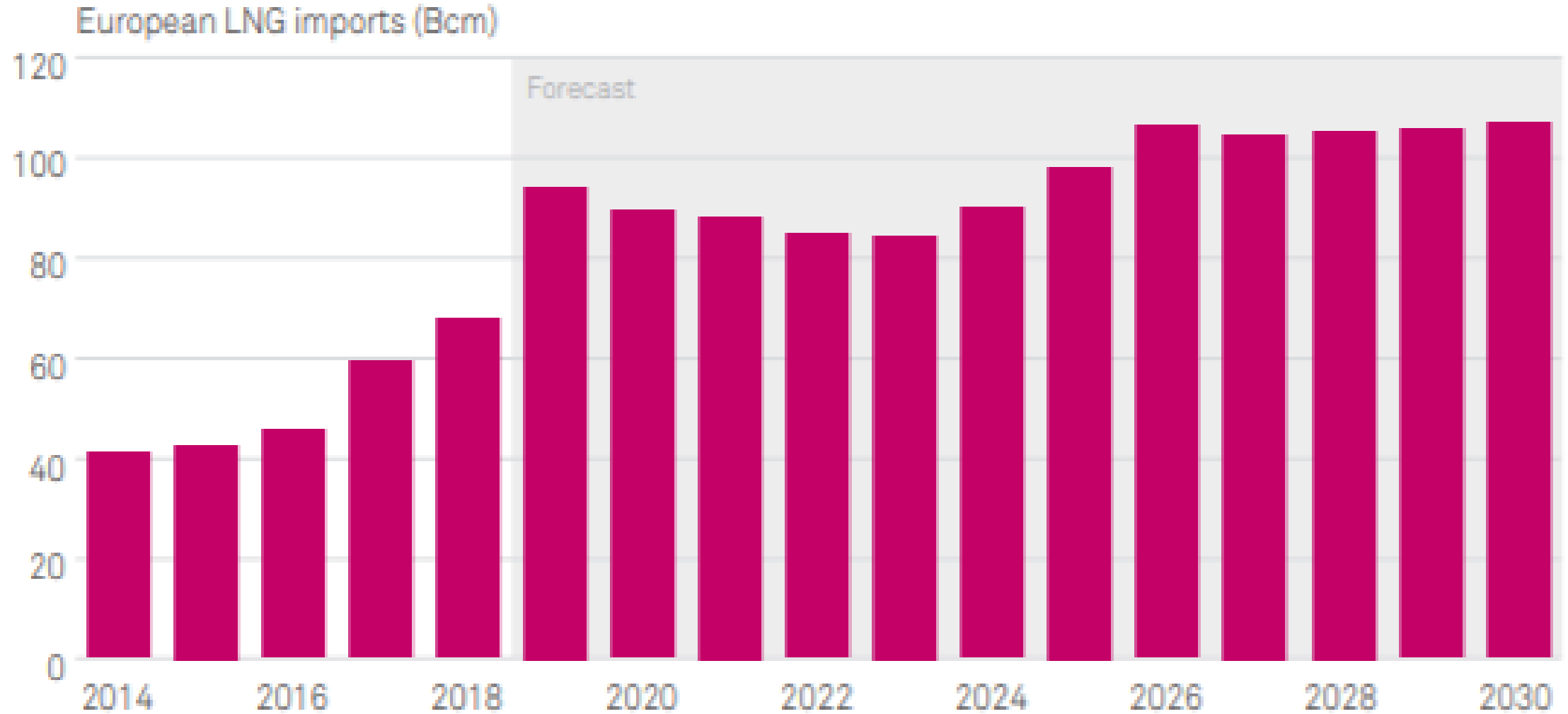
Source: Platts

But Groningen production in Europe set for rapid decline: More gas/LNG imports will be needed



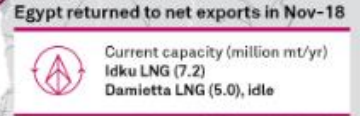
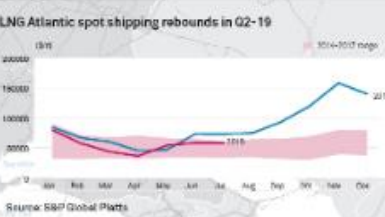
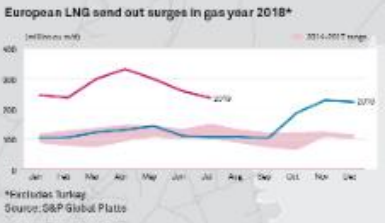
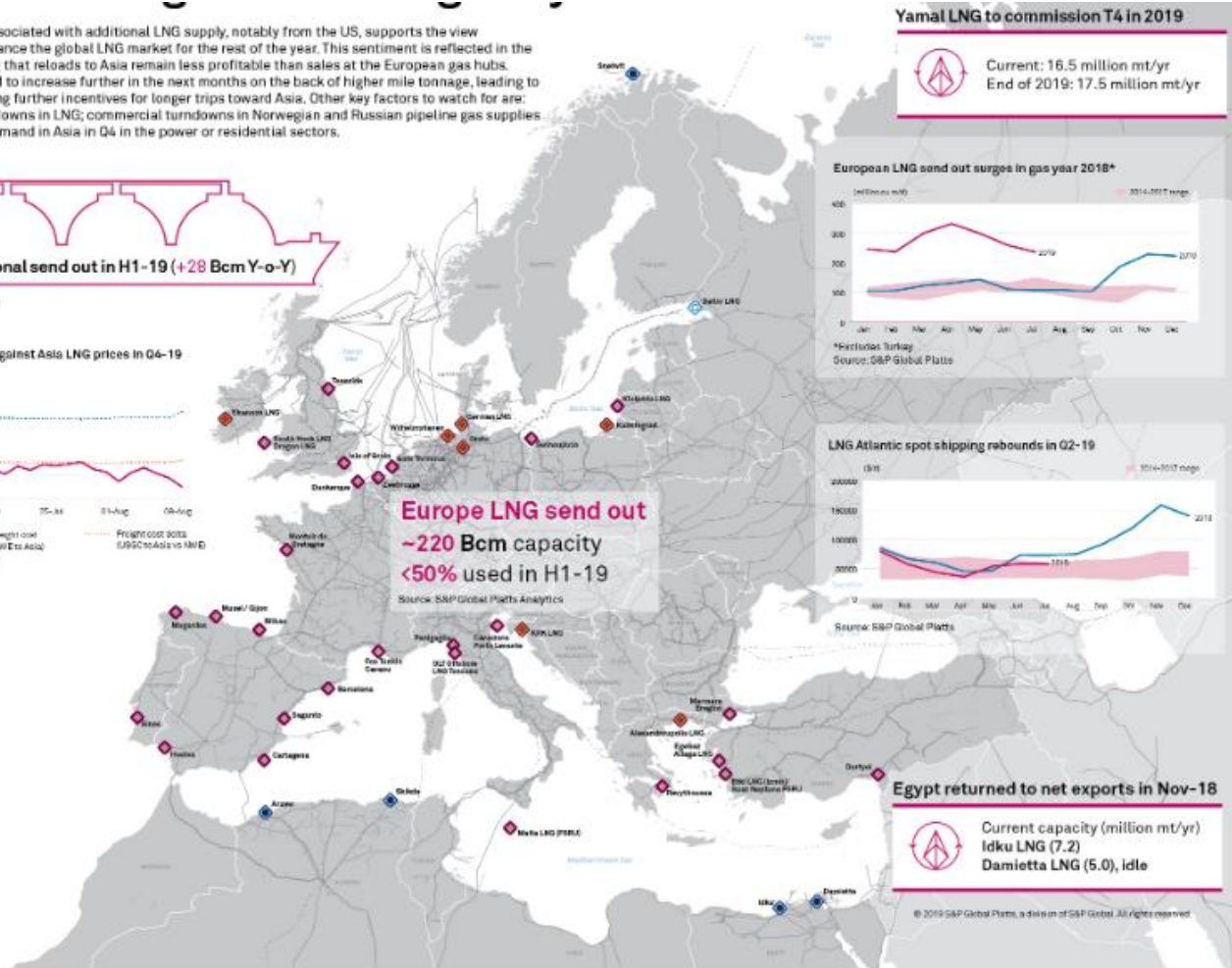
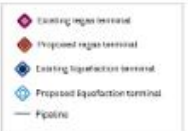
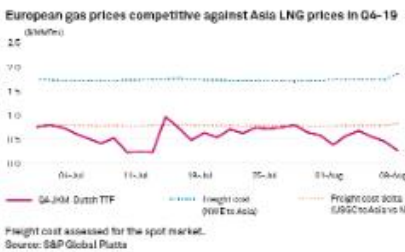
Source: NAM, Dutch Government

European domestic production declines and coal is phased out from energy mix will support LNG imports



New import LNG terminal projects in Europe: Economics, not just politics?

Tepid demand growth in Asia associated with additional LNG supply, notably from the US, supports the view that European gas hubs will balance the global LNG market for the rest of the year. This sentiment is reflected in the current forward curve indicating that reloads to Asia remain less profitable than sales at the European gas hubs. LNG shipping rates are expected to increase further in the next months on the back of higher mile tonnage, leading to tight ship availability, and limiting further incentives for longer trips toward Asia. Other key factors to watch for are: any price-sensitive supply turn-downs in LNG; commercial turn-downs in Norwegian and Russian pipeline gas supplies to Europe; and an increase in demand in Asia in Q4 in the power or residential sectors.



- Germany: <https://blogs.platts.com/2019/07/23/german-lng-does-market-need-them/>

The EU has also provided some initial support for four other LNG projects:

- the Shannon LNG terminal in Ireland
- the Alexandroupolis terminal in Greece
- the Gothenburg LNG terminal in Sweden
- and a capacity extension of the Swinoujscie plant in Poland

LNG as a fuel: medium and small scales

- IMO 2020: Growing consensus that LNG is the best solution: no equivalent alternatives now that can match LNG's emissions profile and scalability, but things can change
- LNG business diversifying its operations into small scale LNG in order to create multiple income streams.



European small scale LNG market expected to grow

- **Supported by IMO 2020**
 - **Still small part of the market**
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- European small scale LNG market is expected to grow from Eur1,902.6 million (2020) to Eur5818.7 million by 2030 at a CAGR of 11.8%
 - The road transport fuel segment likely to be the largest segment in 2020
 - The marine fuel segment is expected to emerge as the fastest growing segment, over the forecast period
 - Some key companies: Engie; Fluxys S.A.; Gazprom; Novatek; Linde Gas; Skangas; Gasrec; Gasnor; Wärtsilä Corporation; General Electric; and LNG Gorskaya LLC, among others