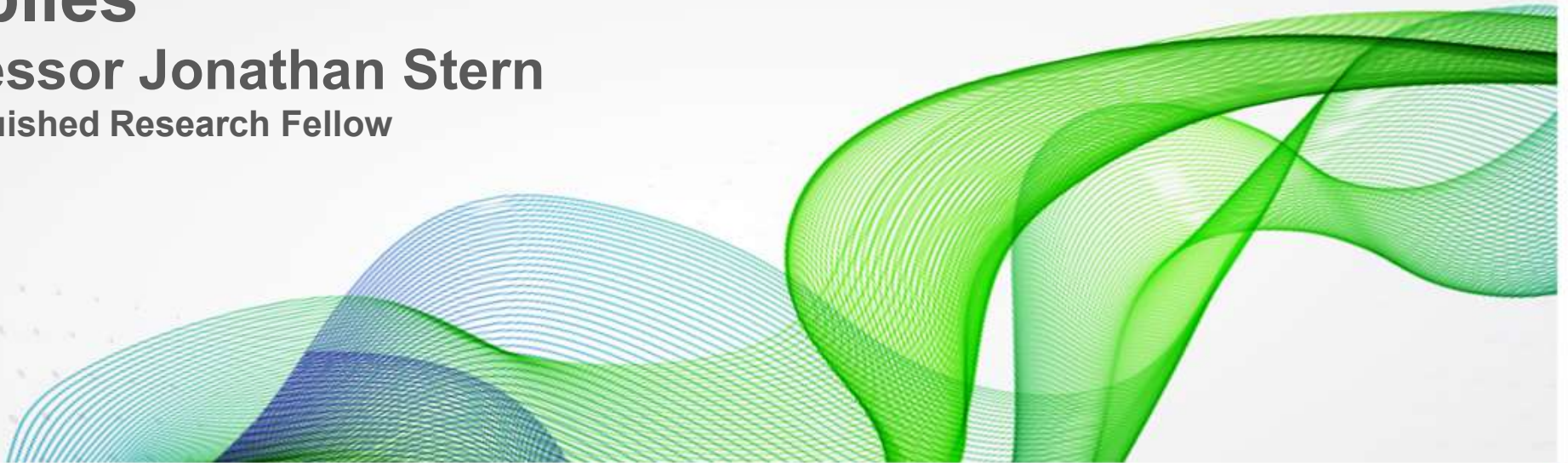




THE OXFORD
INSTITUTE
FOR ENERGY
STUDIES

The Impact on European gas and Global LNG markets of the reduction in Russian gas supplies

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Distinguished Research Fellow





European Gas Supply, Demand and Pricing and the 2022-23 Winter

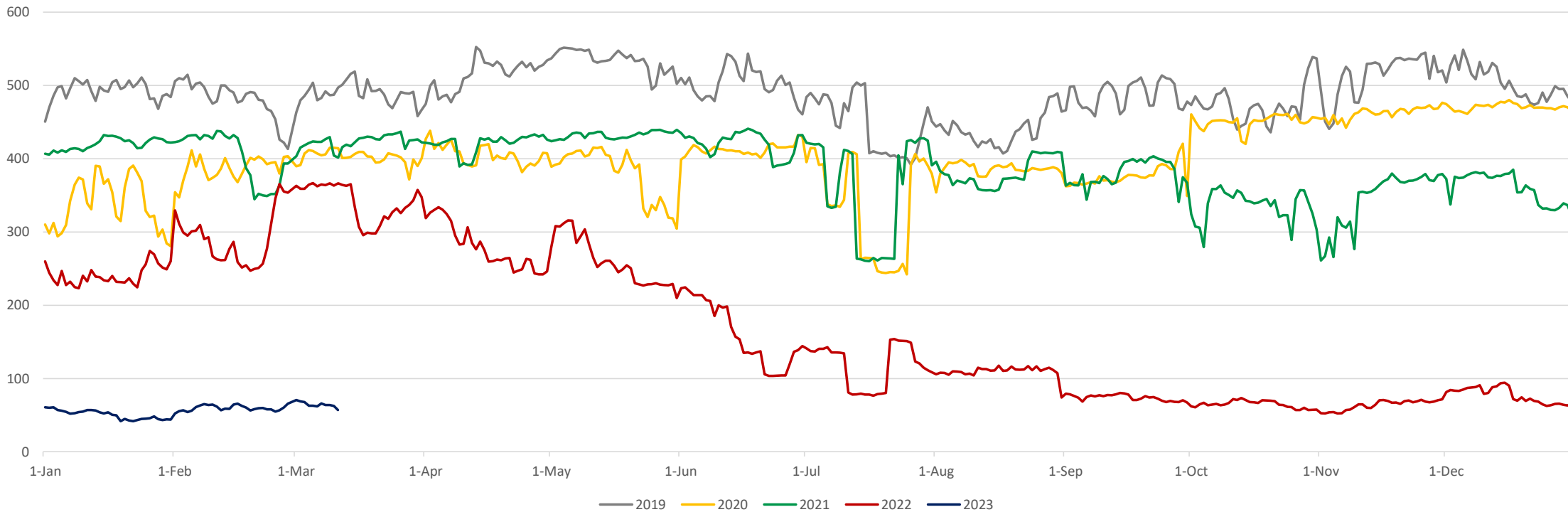
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Russian pipeline gas supplies to Europe in 2022 decline by 80 bcm (56%); only two routes operational

Source: Sharples/OIES
Data from ENTSOG
Transparency Platform

Daily Russian Pipeline Gas Supplies to Europe (MMcm/d)

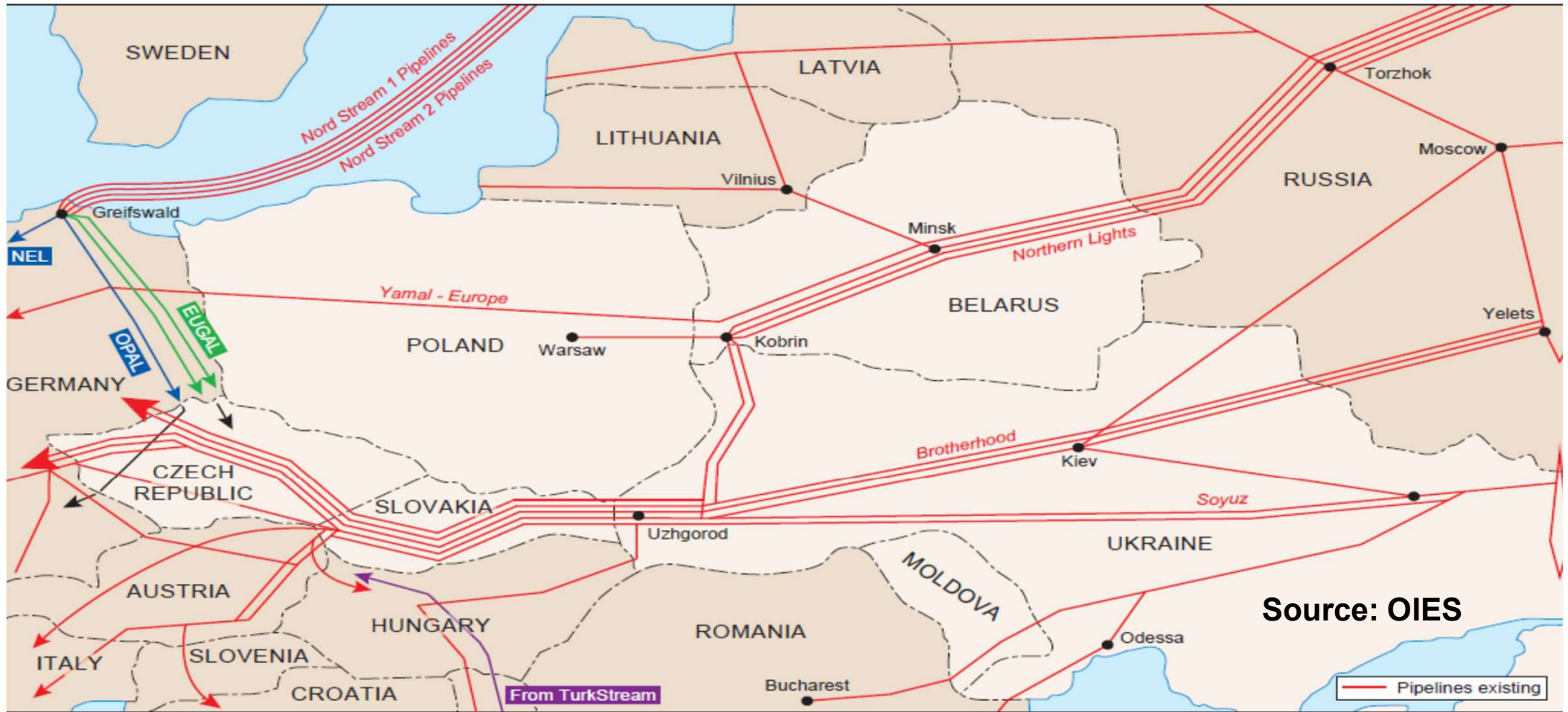


In February 2023 Europe received an average 60mmcm/day compared with 290 mcm/d in February 2022; Russian LNG supplies continue

Source: Sharples, OIES



Russian Gas Supply Route to Europe: Ukraine and Belarus



Yamal Europe pipeline not operating, Ukraine system flowing at around 10% capacity



Nord Stream 1 ceased flowing in July 2022, Germany severely affected



**Major sabotage damage to both lines in September 2022
(one string of NS2 still available to flow gas)**



Russian Gas Supply via the Blue Stream and Turk Stream Pipelines



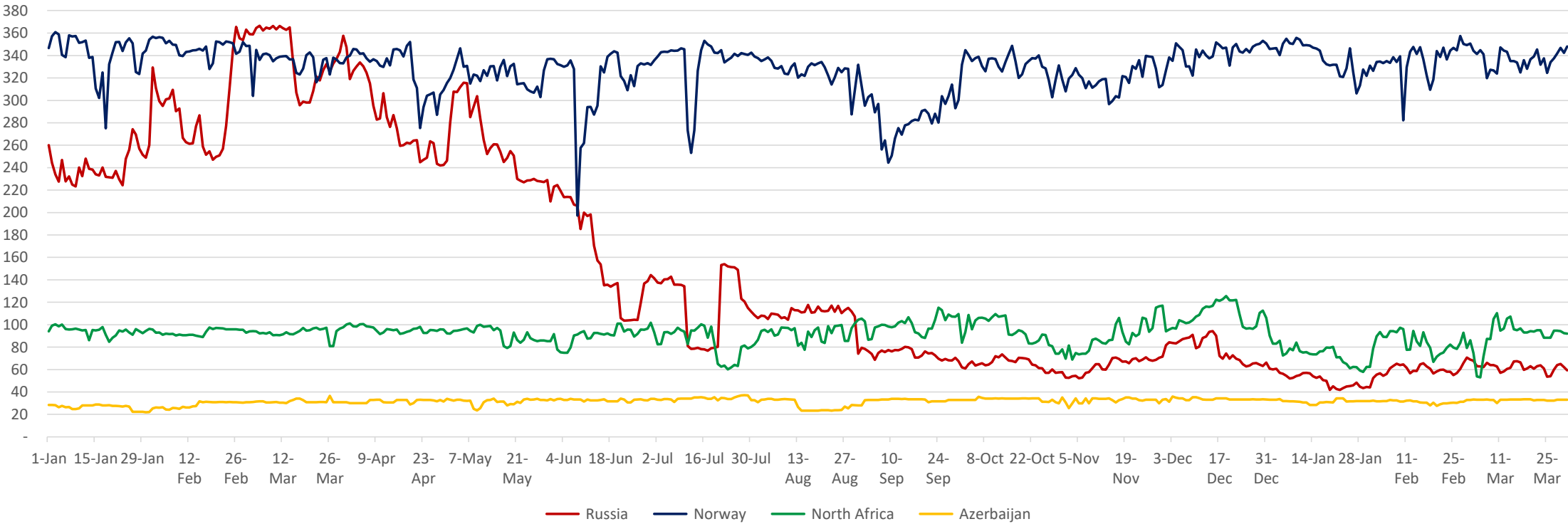
Blue Stream and Turk Stream operating normally flowing gas to Turkey, Balkan countries and Hungary



Pipeline supplies to Europe since January 2022 (mmcm/d)

Source: Sharples/OIES
Data from ENTSOG Transparency Platform

European Pipeline Imports by Supplier Since Jan 2022 (mmcm/d)



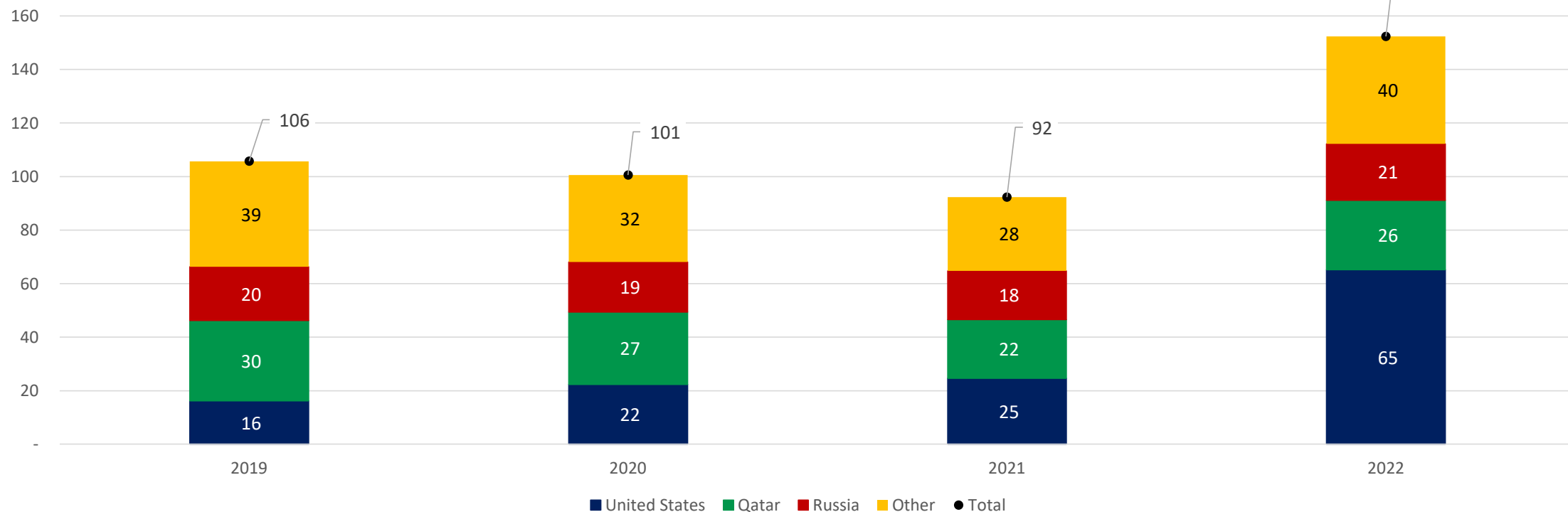
There is very little additional short term supply available from non-Russian pipeline suppliers to Europe. Europe has become much more dependent on LNG



European LNG Imports by Source, 2019-22

Source: Sharples/OIES
Data from Kpler LNG Platform

EU-27 Plus UK LNG Imports (Bcm of natural gas equivalent)

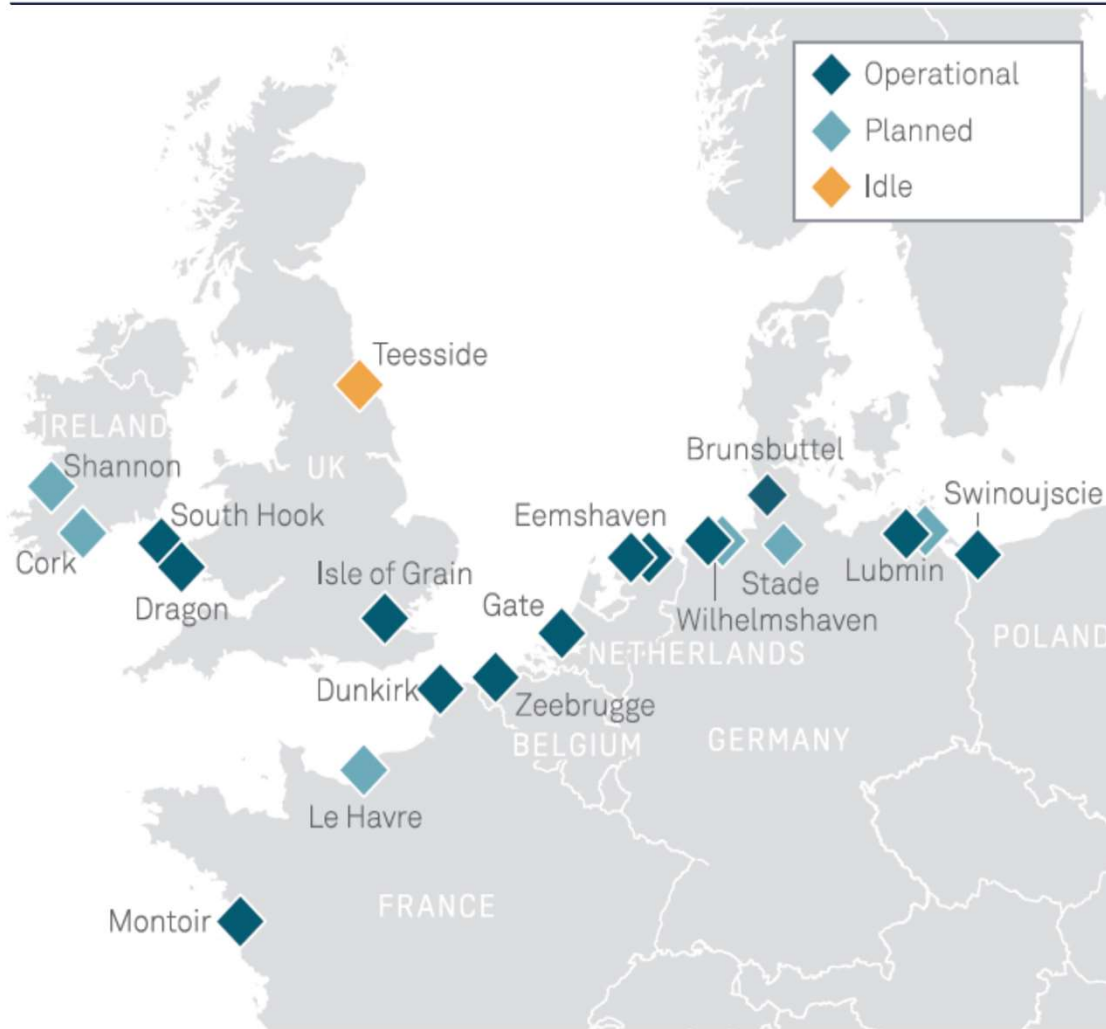


European (EU+UK) LNG imports increased from 92 bcm in 2021 to 152 bcm (118mt) in 2022; two thirds of the increase came from the US

Source: Sharples, OIES



Major additional LNG FSRU import capacity in North West Europe



New European Floating Storage and Regasification Units (FSRUs)

- Germany – six FSRU, three operational by early 2023, others by end 2023 (37 bcm by 2024); three land-based terminals by 2026
- Netherlands – two FSRUs started operations in 2022
- Poland – one FSRU 2025
- Greece – two FSRUs 2023
- Finland/Estonia – one FSRU – started Q1 2023
- Italy – two FSRUs: Q2-2023 and Q3 2024
- Albania – one FSRU

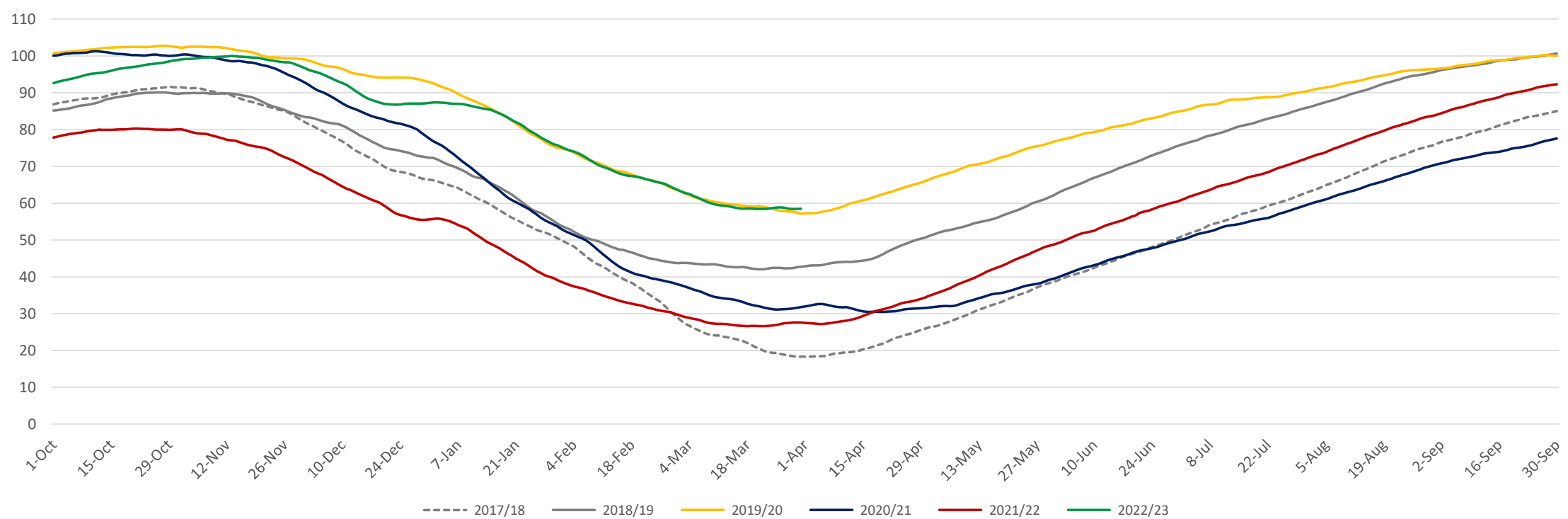
ESTIMATED ADDITIONAL EUROPEAN REGASIFICATION CAPACITY:

- By end-2023 ~ 50 bcm
- By late 2020s an additional ~50 bcm



Record level of European gas storage at the end of winter 2022/23

European Daily Gas Storage Stocks (bcm)



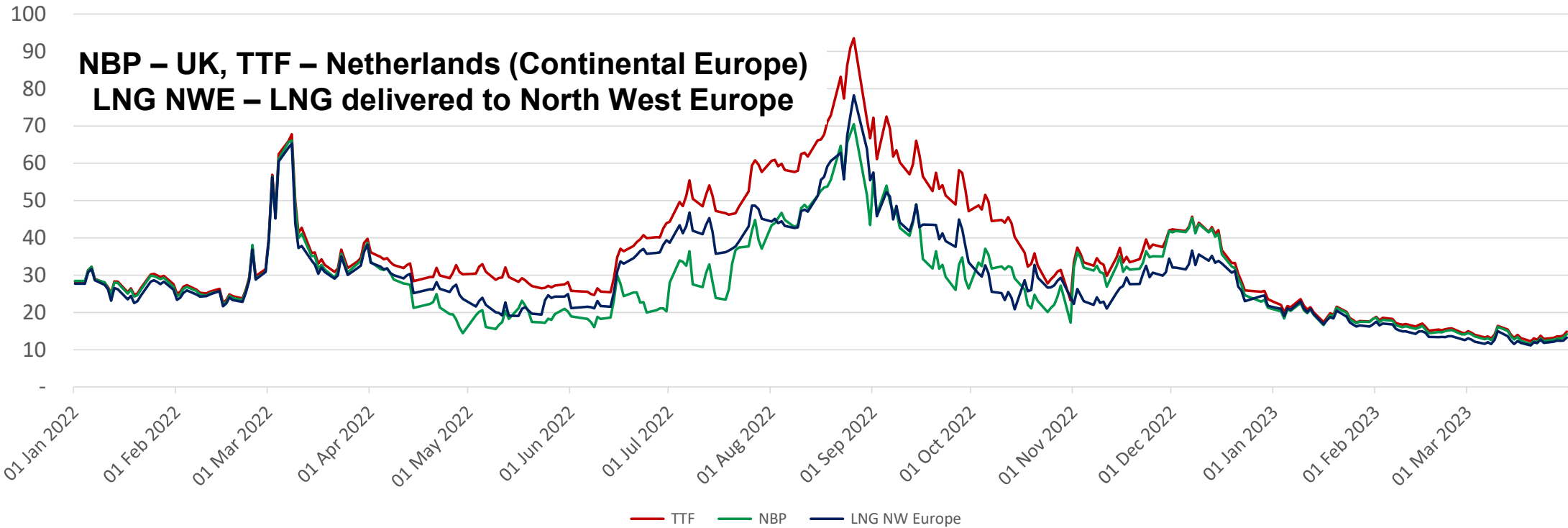
EU total storage on 1 April was 55.5% full. In the 'Top 5' (72% of EU capacity): Germany (64%), Italy (58%), Netherlands (58%), France (28%), Austria (64%)



The impact of the crisis on European gas prices, 2022/23

Source: Sharples/OIES
Data from Argus Media

Front-Month TTF and NBP Hub Prices vs LNG Landed in NW Europe (EUR/MWh)



European prices spiked in August/September 2022, by early April 2023 they had returned to pre-invasion levels (below 15 USD/MMBtu)

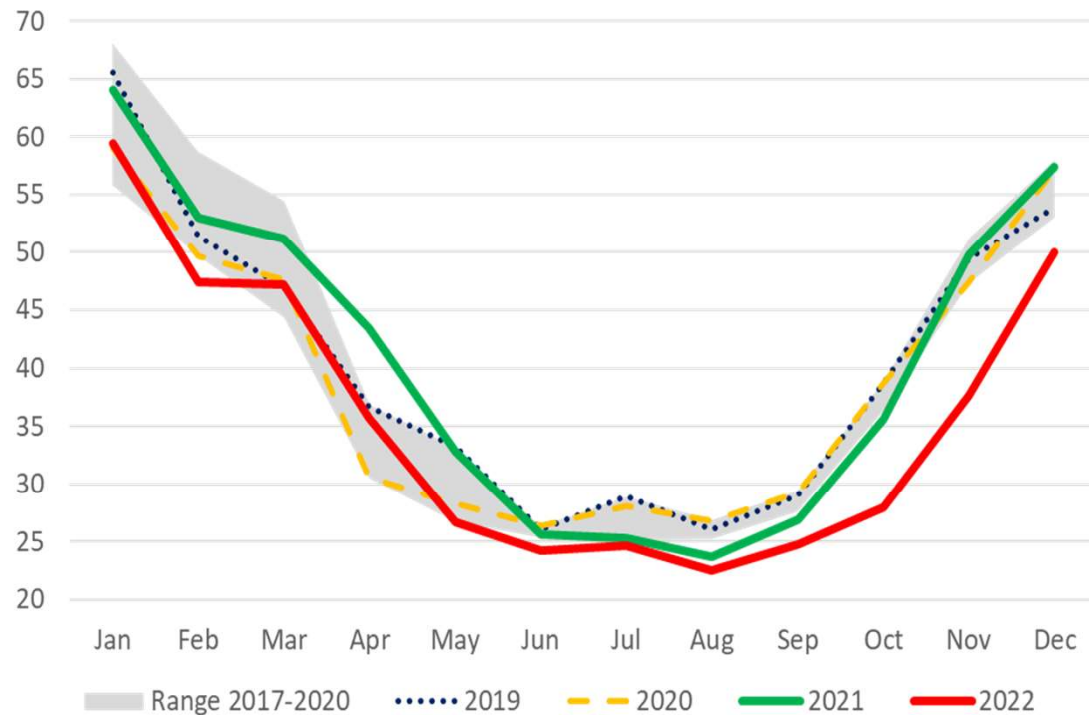
Source: Sharples, OIES



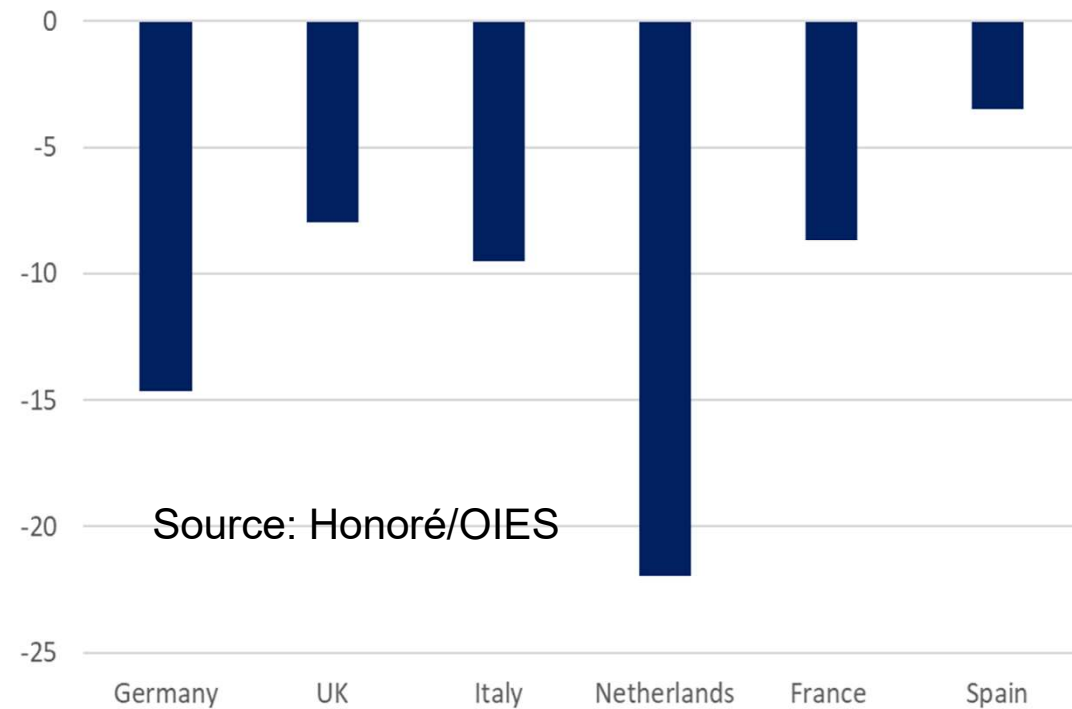
European Gas Demand 2019-22

Sources: Data from IEA, Eurostat, EntsoG, GRTgaz, Terega, NCG, Gaspool, SNAM, Enagas, NationalGrid, A. Honoré's assumptions and calculations

Monthly gas demand in the EU27 + UK, bcm



Gas demand in key markets, 2022 vs 2021, %



Source: Honoré/OIES

- **OECD European gas demand was relatively resilient in 2021**
- **Demand fell 12.5% in 2022 due to mild temperatures, high prices and consumer behaviour**
- **Demand reduction in all sectors except electricity generation which increased**



Summary, Winter 2023/24 and looking further ahead





European Gas Market 2022/23 SUMMARY

Europe has performed well to avert a gas security crisis **but at high cost:**

- Insistence on high summer storage fill was responsible for European prices spiking around \$100/mmbtu; this panicked politicians into creating a `maximum price mechanism`
- Governments may have spent nearly €1 trillion to subsidise prices for households and businesses and developing additional LNG supply
- Demand reduction is mostly the result of high prices and recession (government policy less important)

and has been lucky:

- Mild weather in winter months
- Flat/declining demand for LNG in Asia: especially China but also Japan, Korea, South Asia

The result is that prices have fallen to well below the EU `market correction mechanism` price which is unlikely ever to operate



Winter 2023/24 looks manageable without major shortage/ crisis (OIES Gas Model)

ASSUMPTIONS:

- **If** European gas production and imports (pipeline and LNG) are similar to 2022
- **If** gas demand is not more than 5% higher than 2022, then...
- at current levels storages can be refilled to 90% by October/November 2023

BUT THIS REQUIRES:

- Continued mild weather (no prolonged cold periods)
- All 2022 supply to continue without serious interruption including:
 - Russian gas imports flowing at late 2022 levels
 - Norwegian pipeline gas remaining at current levels
 - Steady increase in LNG imports + limited price competition with Asian (Chinese) buyers

Results will also depend on availability of non-gas power sources (nuclear, hydro, wind, solar); price impact on industrial demand



Looking further ahead the European situation becomes much easier BUT ...

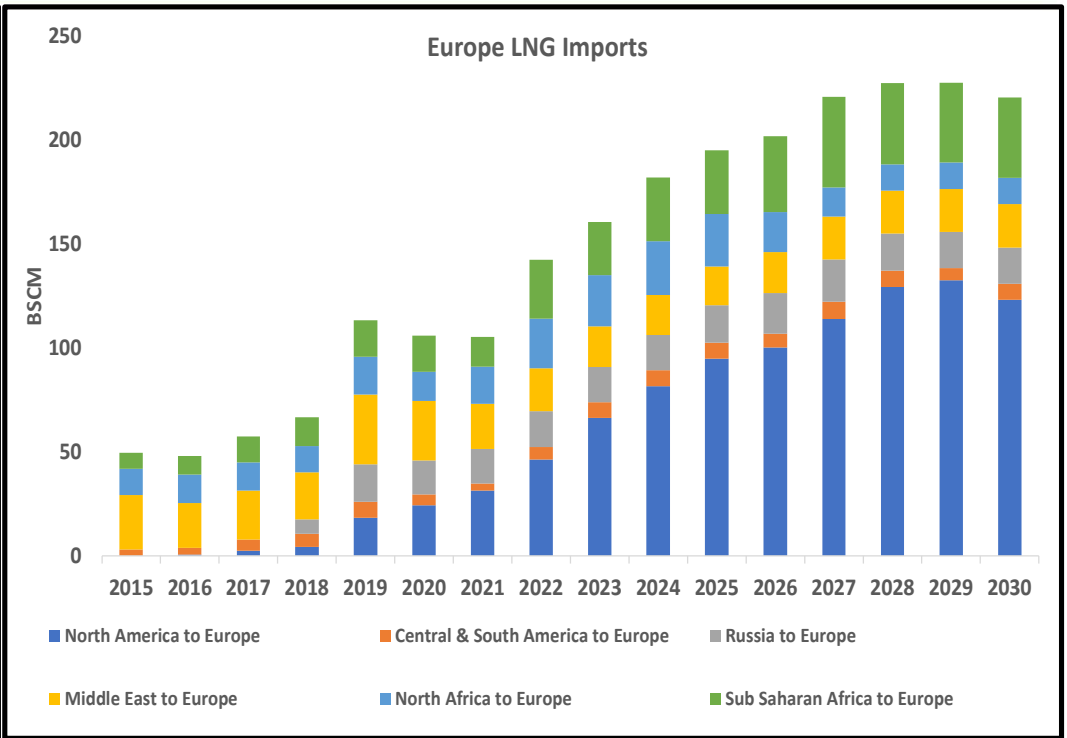
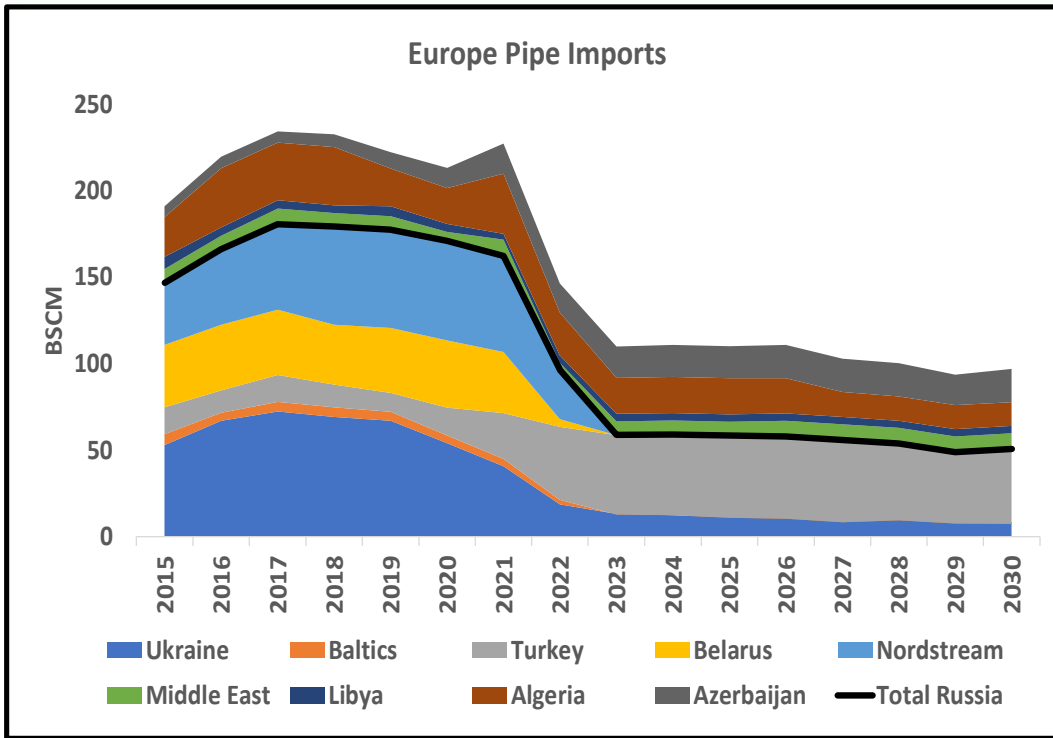
- Europe will need to compete aggressively for LNG supplies in winter months and ensure storage is filled
- European LNG imports peak around 2030 as gas starts to be phased out for decarbonization reasons
- High (above \$15/mmbtu) and volatile European gas and LNG prices continue until 2025 after which more `normal' price (8-12/mmbtu) more likely – in early April TTF forward curve at \$14-19/mmbtu for 2023-25

LONGER TERM – late 2020s and into the 2030s – much will depend on:

- Whether there can be a political resolution with Russia about gas (unlikely without a settlement of the Ukraine conflict) but pre-crisis import levels no longer possible
- Falling domestic production and reduced Russian imports means that much higher European LNG imports will increase significantly through 2030 even if demand falls
- Progress towards verified measurement of GHG emissions from natural gas imports will be important in determining how quickly unabated gas is phased out



OIES Central Scenario: net European (including Turkey) LNG imports double by 2030 creating direct competition with Asia



PIPELINE GAS: Russia flows do not recover and North Africa flows fall.
LNG: net European imports rise to over 200 bcm (147mt) by 2027 ~ double the 2021 level.

SOURCE: OIES Gas Model



THANK YOU

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A thick teal horizontal bar with rounded ends is located at the bottom of the slide.