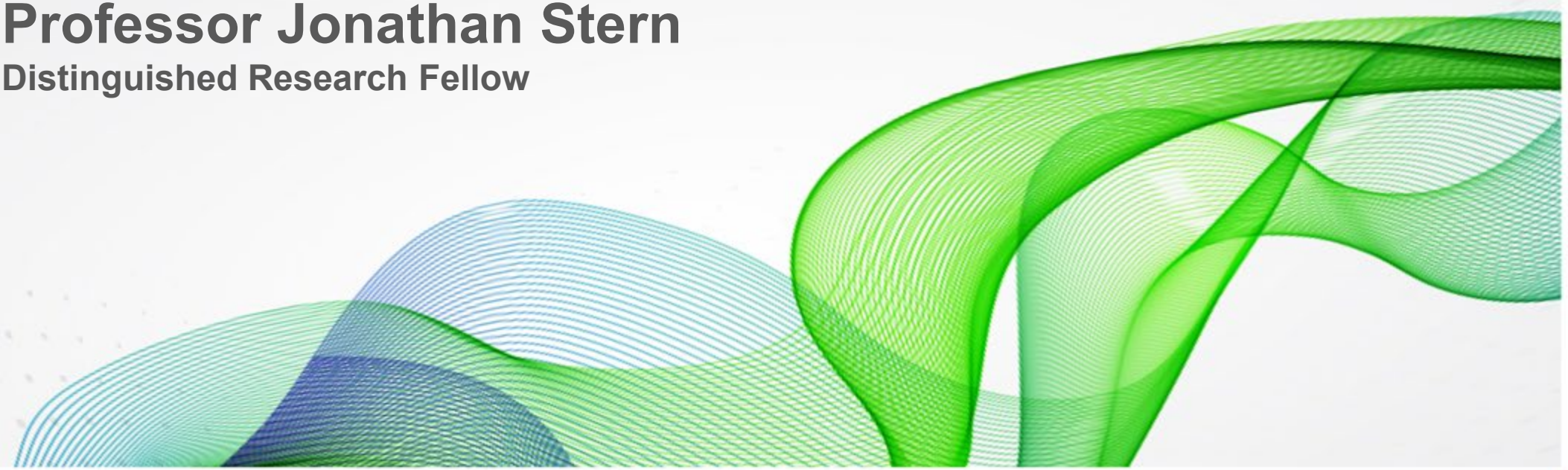
THE OXFORD INSTITUTE FOR ENERGY STUDIES

European Gas Market Challenges: the 2022-23 winter and beyond

Professor Jonathan Stern

Distinguished Research Fellow



AGENDA

European gas supply, demand and pricing and the 2022/23 Winter

National and EU Policy Responses to the Crisis

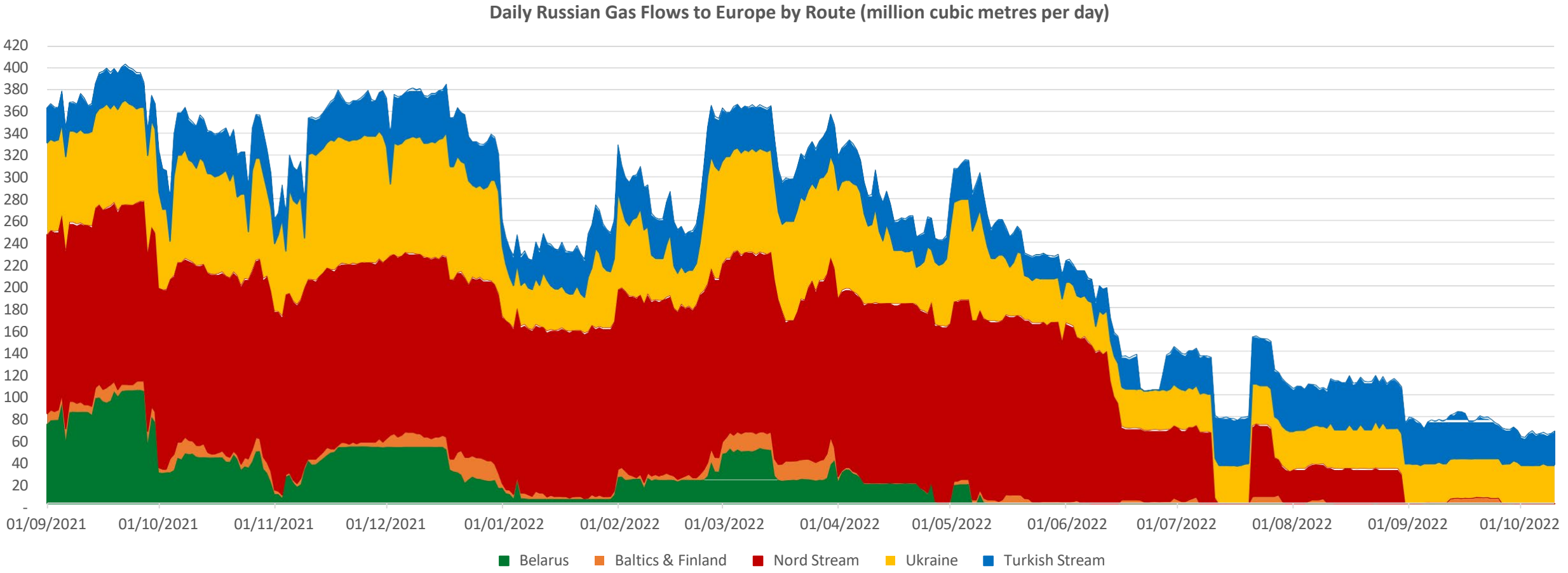
The Outlook to 2030

Summary and Conclusions

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

How much Russian pipeline gas will Europe continue to receive?

Sources: ENTSOG Transparency Platform; Eurostat; Gas Infrastructure Europe (AGSI); Kpler LNG Platform



In October 2022 Europe received 65-75mmcm/day compared with 350-400 mcm/d one year previously; Russian LNG supplies continue

Source: Sharples, OIES

Russian Gas Supply Routes to Europe: Ukraine and Belarus

Source: OIES

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

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

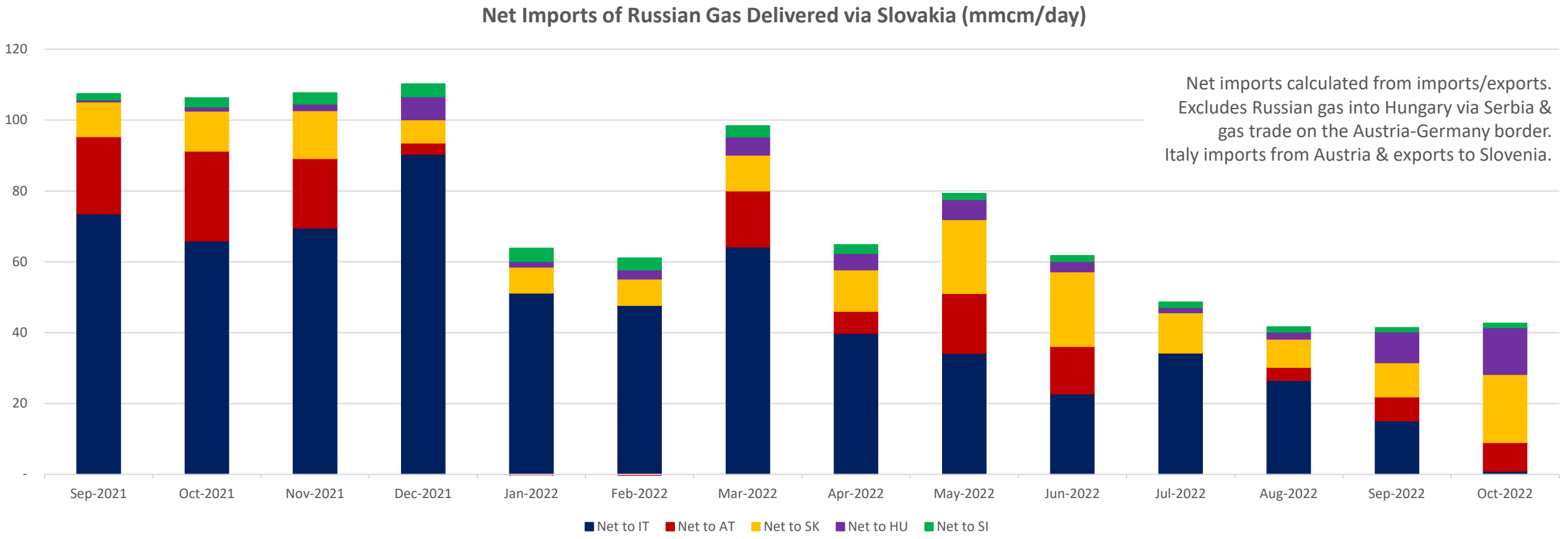
Source: S&P Global Commodity Insights

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

The Blue Stream and Turk Stream Pipelines

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

With Nord Stream already interrupted what happens if Ukrainian Flows Stop?

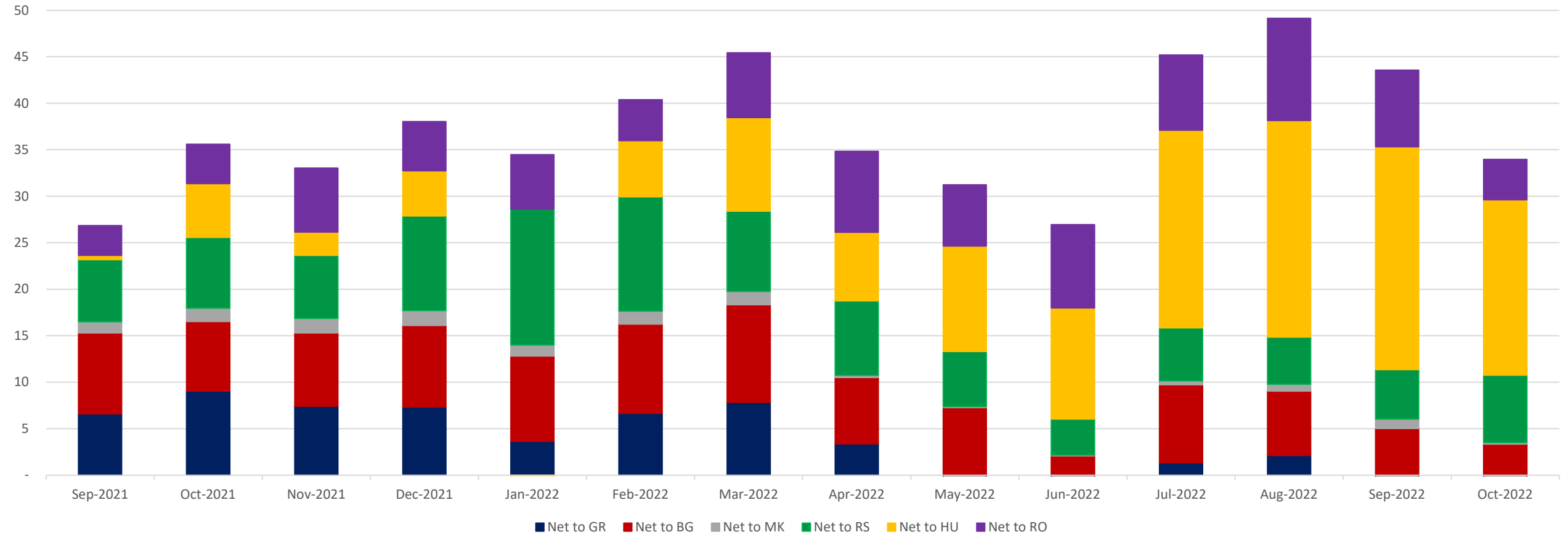


Czech Republic, Slovakia, Austria, and Italy are most seriously impacted

SOURCE: SHARPLES, OIES

What Happens if Flows Via TurkStream Stop?

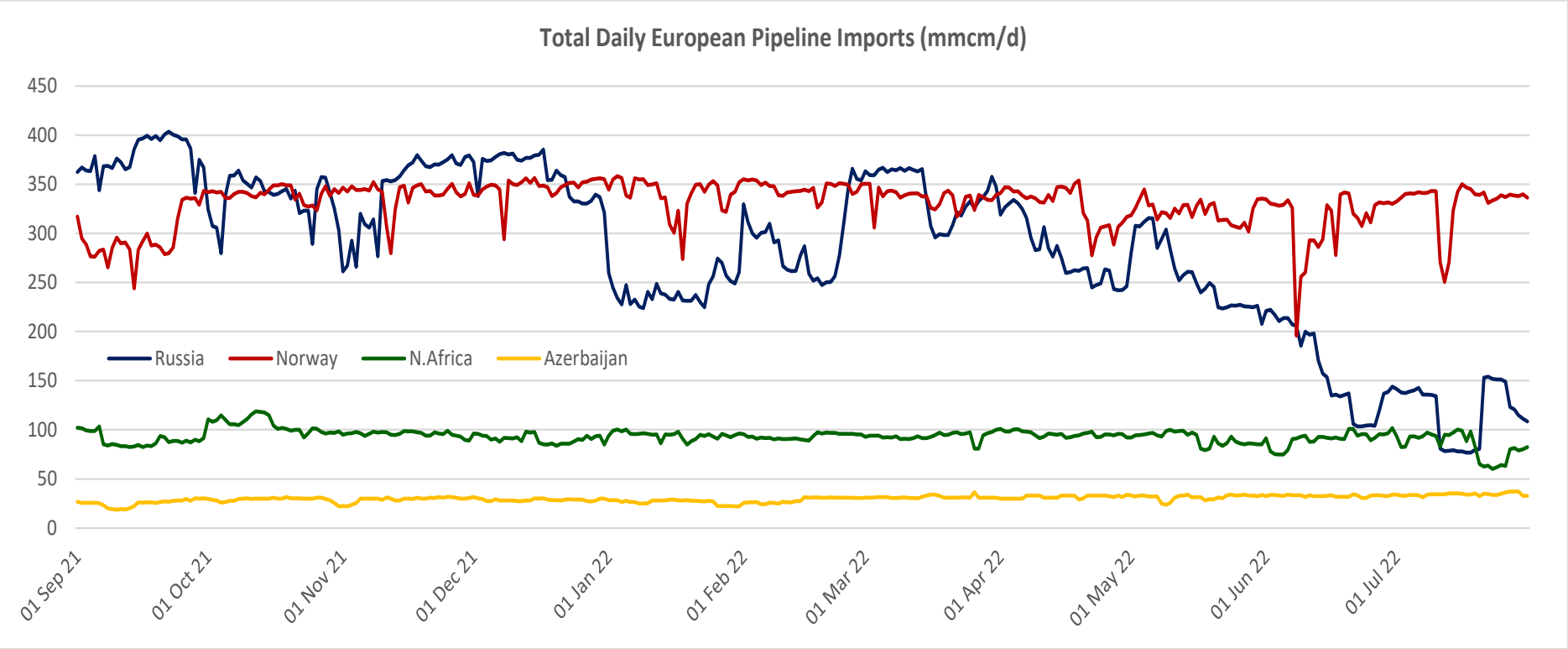
Sources: ENTSOG Transparency Platform; Eurostat; Gas Infrastructure Europe (AGSI); Kpler LNG Platform



Serbia and Hungary would be most seriously impacted

SOURCE: SHARPLES, OIES

Pipeline supplies to Europe in 2021/22 (mmcm/d)

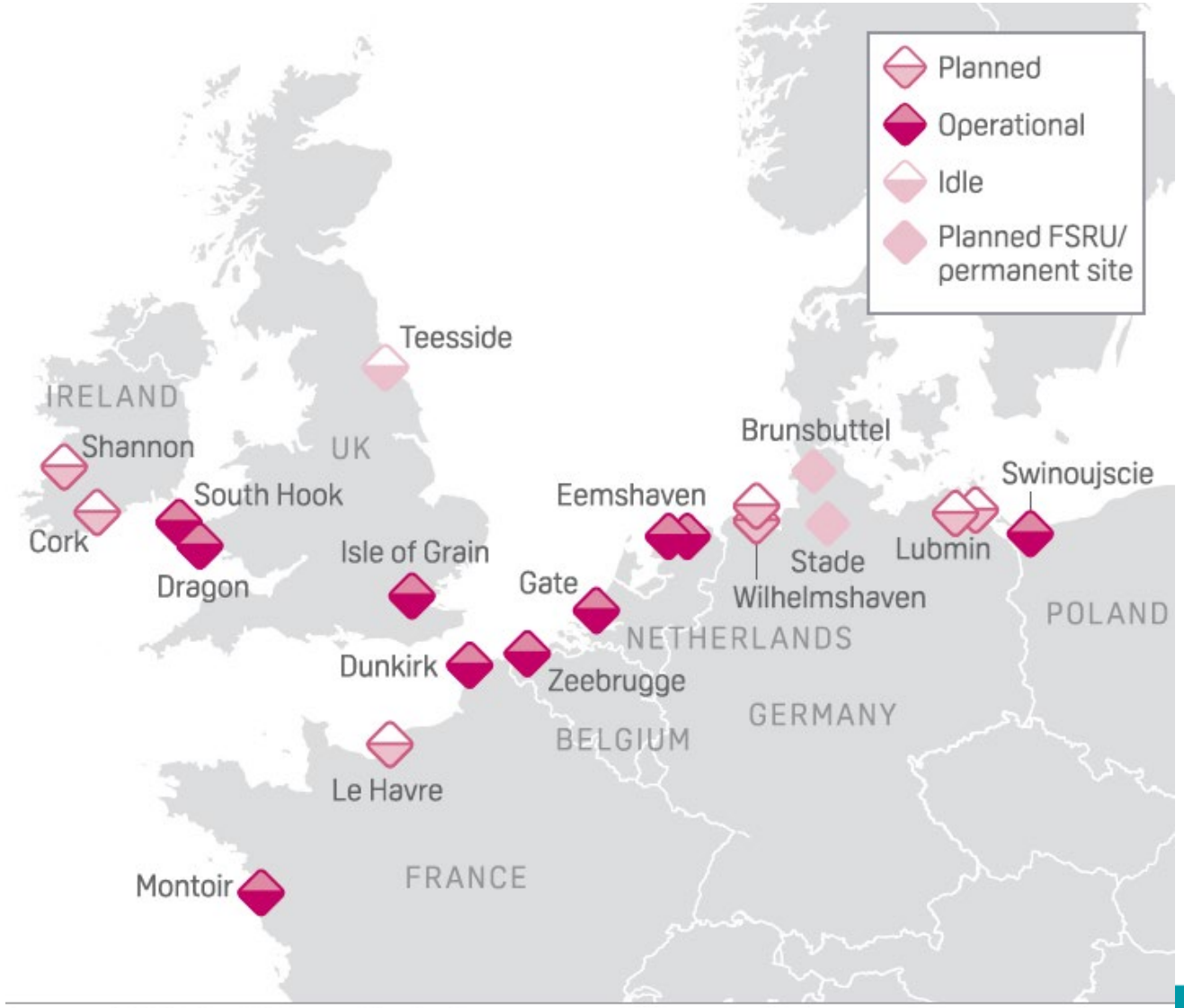


Data from ENTSOG

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

SOURCE: SHARPLES, OIES

Major increase in LNG new import capacity in NW Europe



Source: S&P Global Commodity Insights

European Floating Storage and Regasification Units:

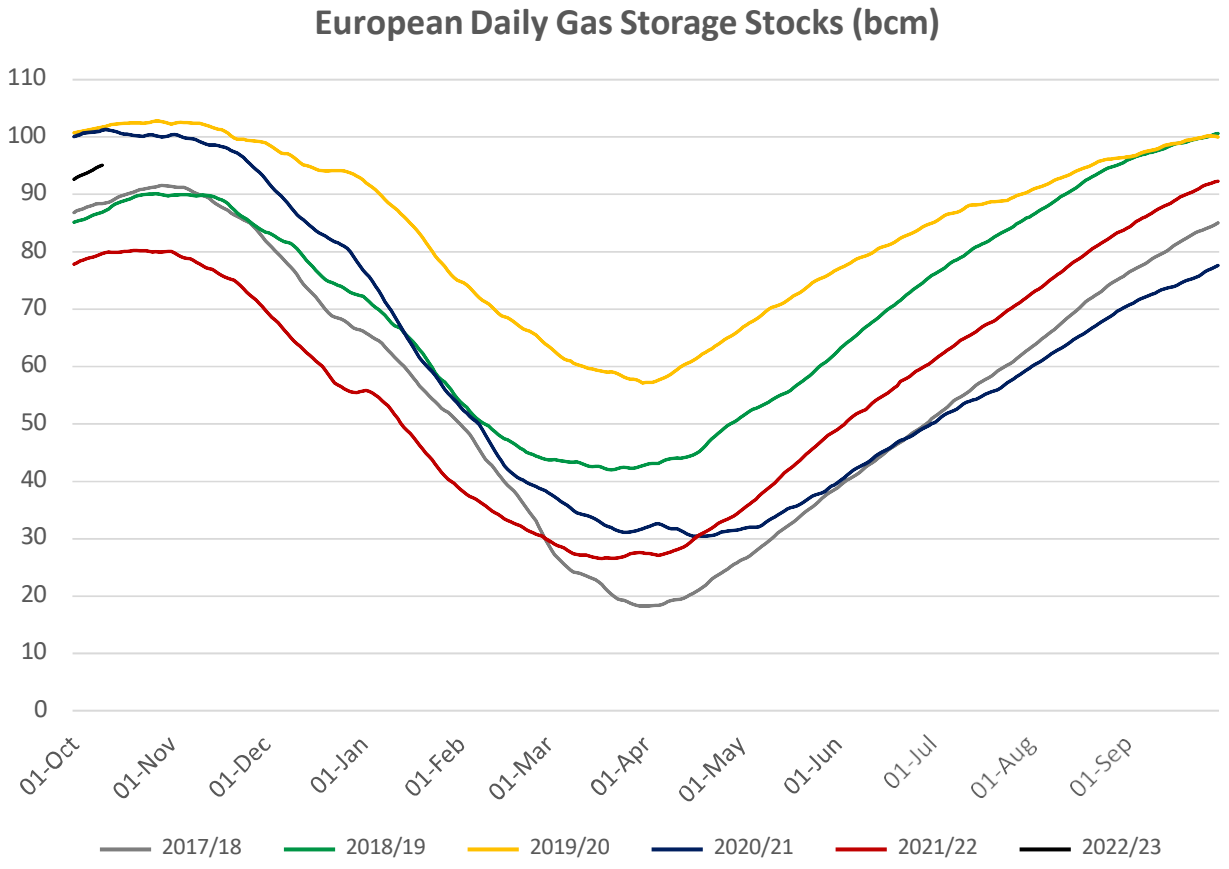
- Germany – six FSRU, three operational by early 2023, others by end 2023; three land-based terminals by 2026
- Netherlands – two FSRUs started operations in 2022
- Poland – one FSRU 2025
- Greece – two FSRUs 2023
- Finland/Estonia – one FSRU – Q4 2022
- Italy – two FSRUs: Q2-2023 and Q3 2024
- Albania – one FSRU

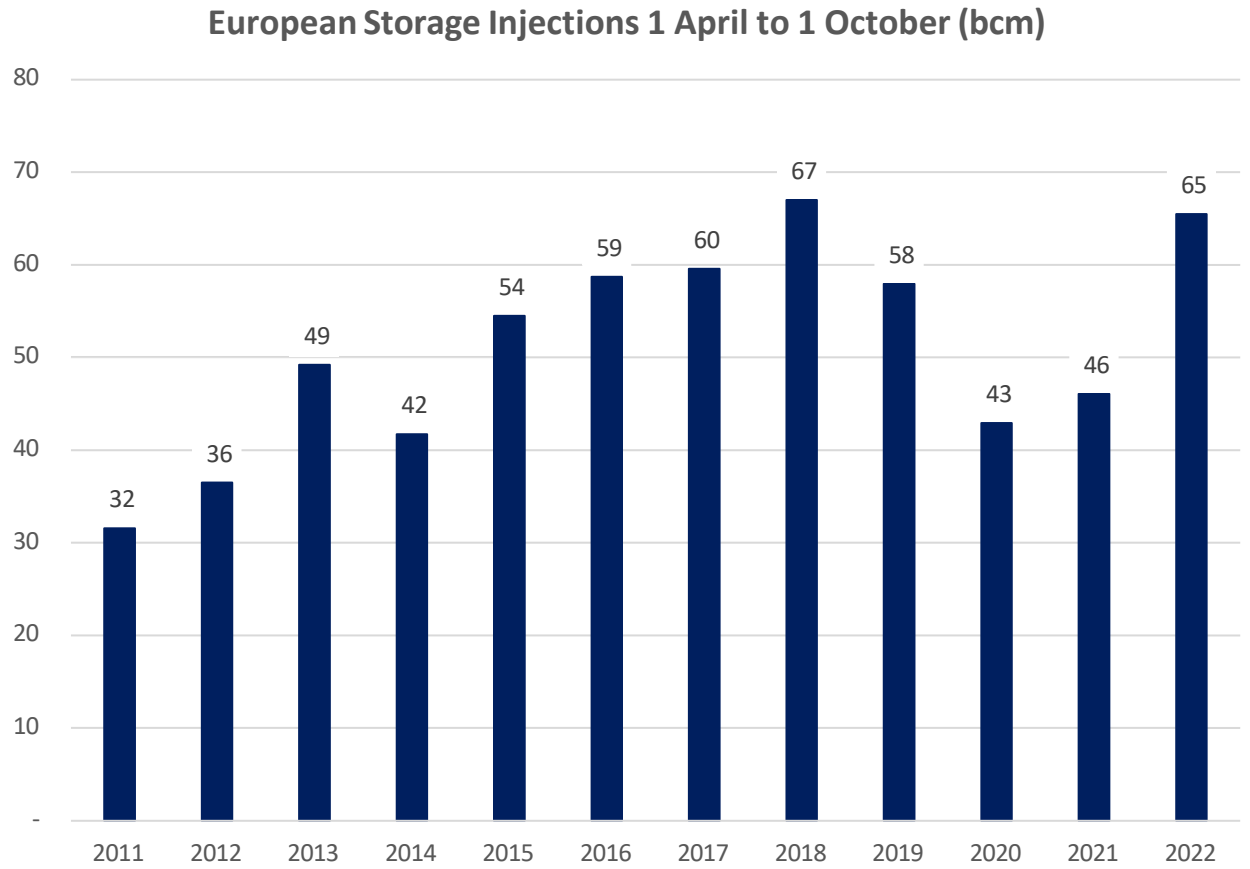
ESTIMATED ADDITIONAL EUROPEAN REGASIFICATION CAPACITY:

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

European Gas Storage: this winter and 2023/24

Sources: ENTSOG Transparency Platform; Eurostat; Gas Infrastructure Europe (AGSI); Kpler LNG Platform

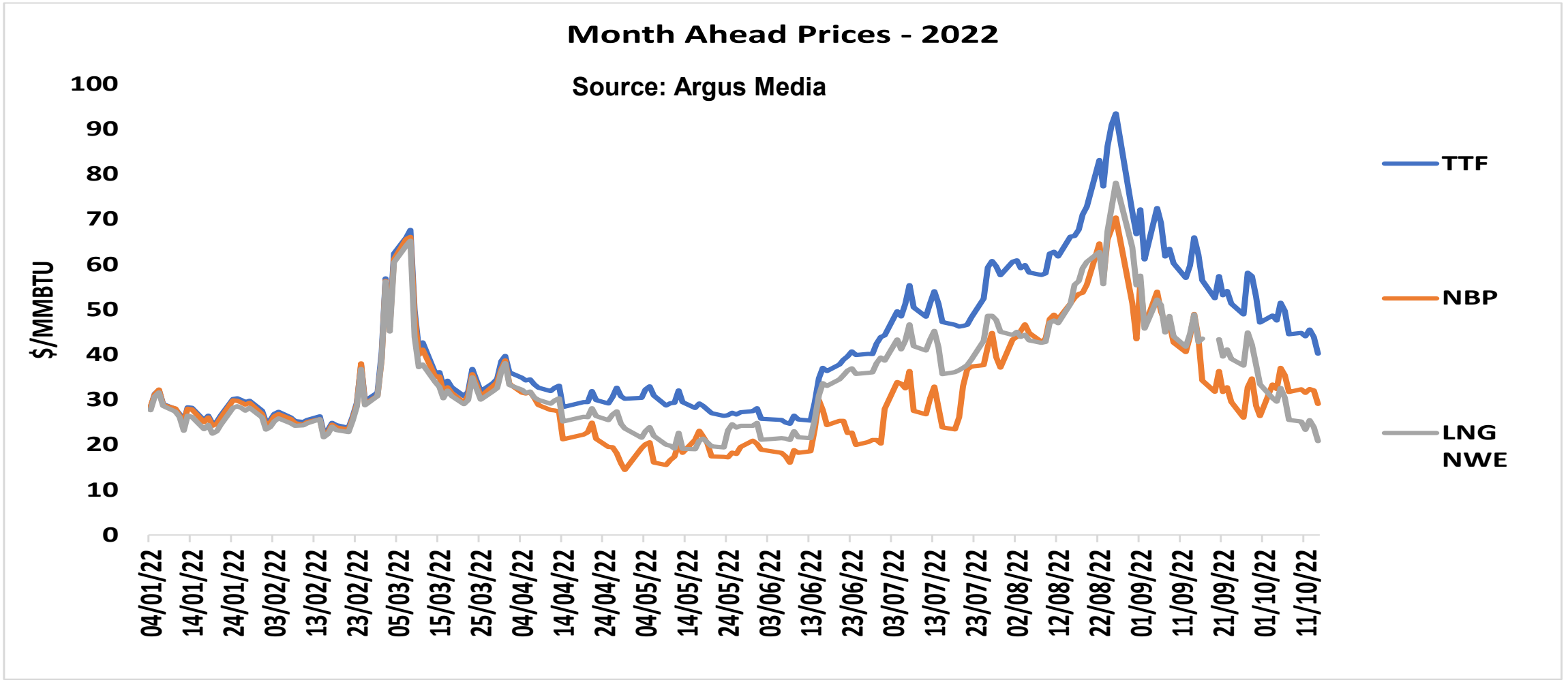




Storage levels in early November were 95% full. If levels are below 40% at the end of the winter, it will be difficult to refill for winter 2023/24 without Russian gas. Europe needs `normal temperatures', demand reduction, and no additional supply problems

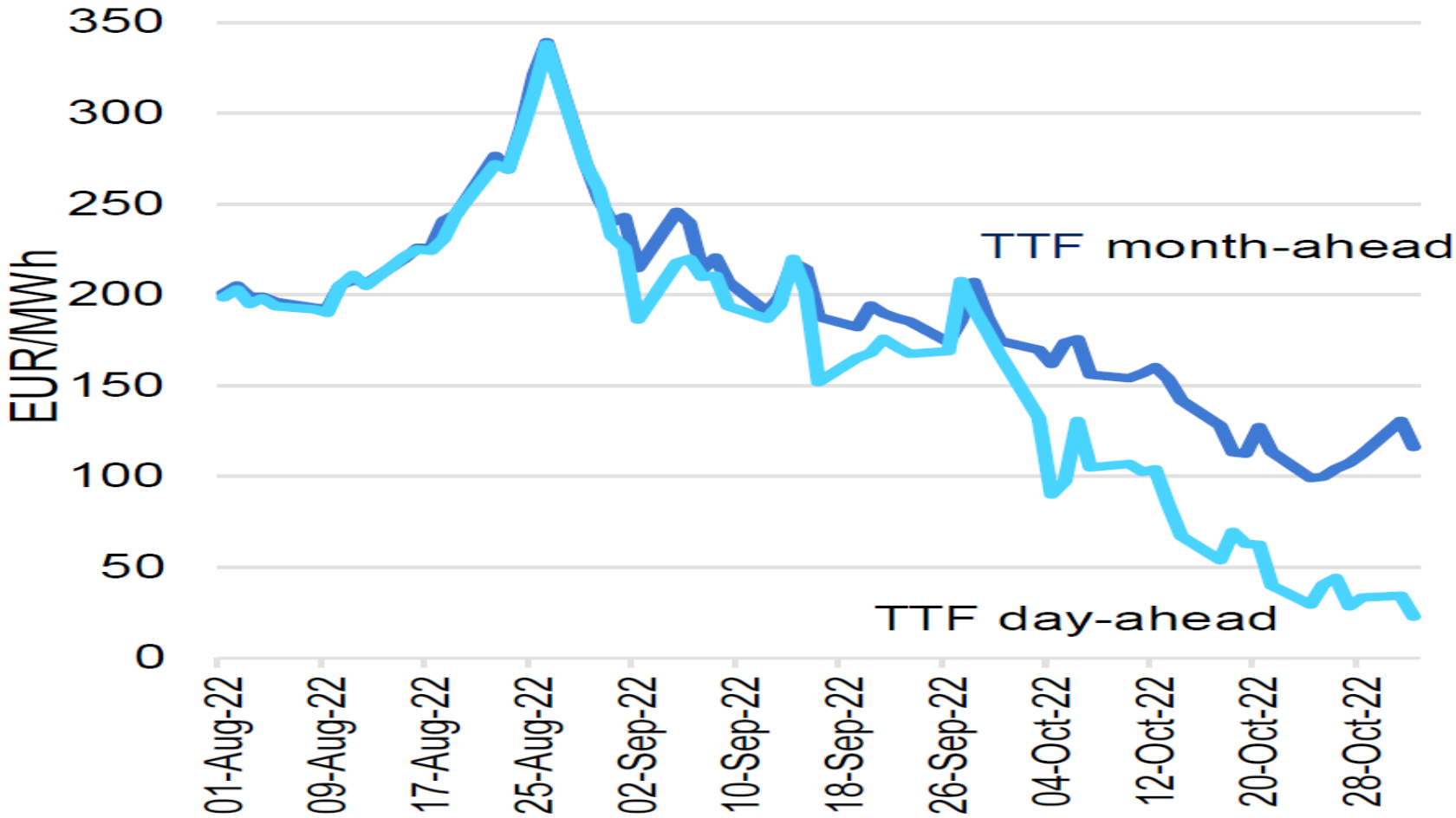
Source: Sharples, OIES

The impact of the crisis on European gas prices



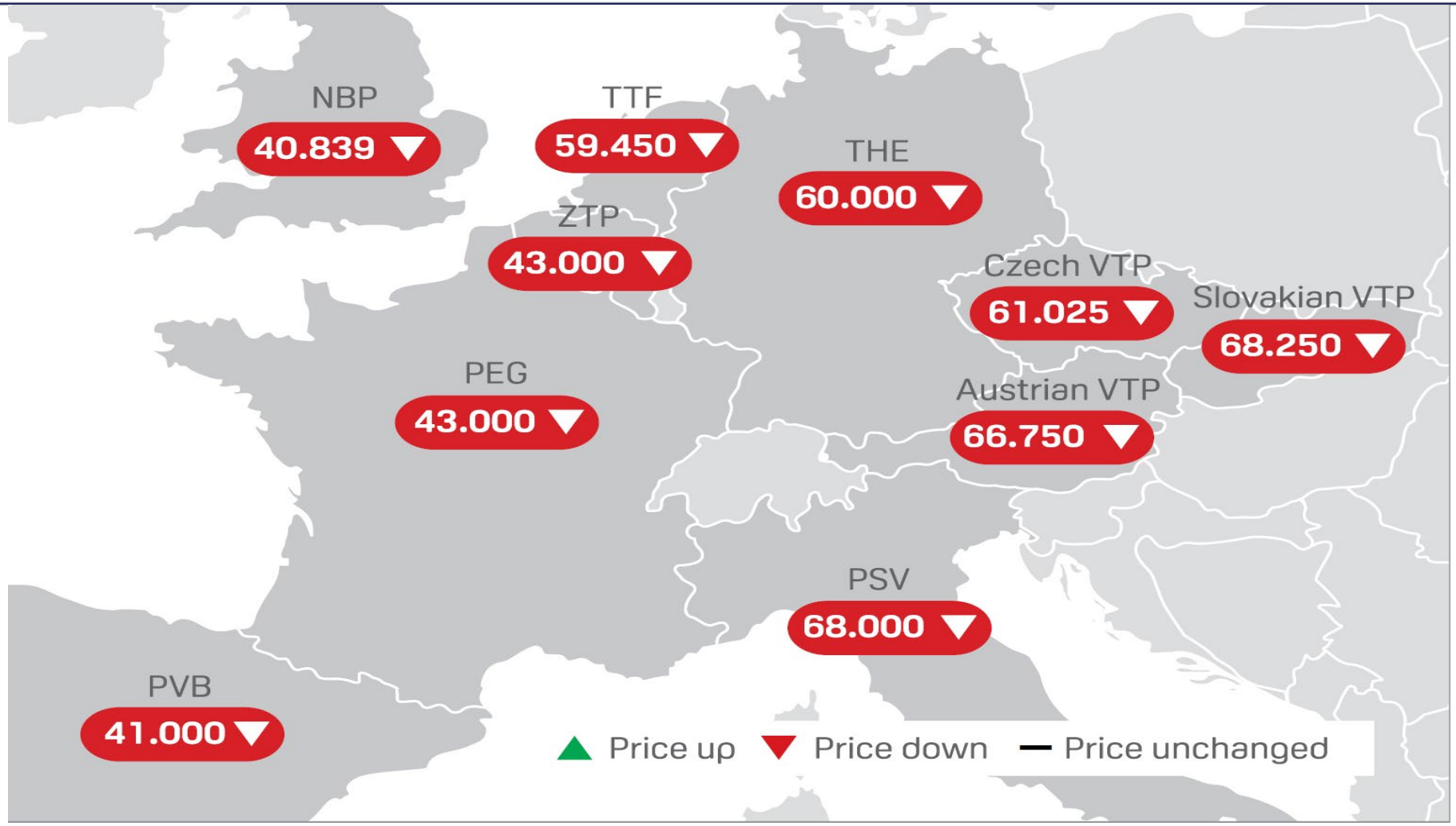
NBP – UK, TTF – Netherlands (Continental Europe), LNG NWE – LNG delivered to North West Europe

TTF Prices August-October 2022 – month ahead and day-ahead: significant increase in volatility



Day-Ahead prices collapse due to full storage, low demand and limited LNG import capacity, but prices strongly influenced by short term weather

European Day-Ahead Prices at Market Hubs, November 4, 2022 (€/MWh)



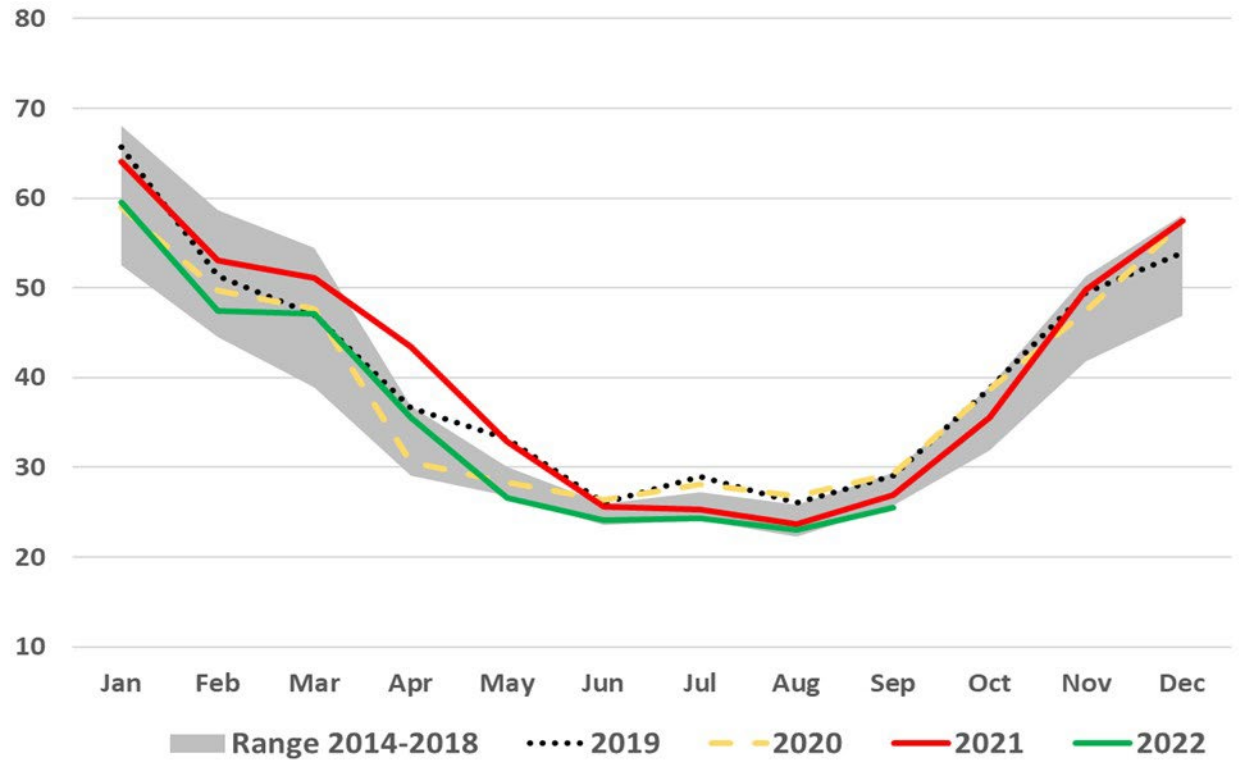
Source: S&P Global Commodity Insights

Note Regional Price Differences: UK, Belgium, France more correlated with UK NBP; central/eastern Europe and Italy with Dutch TTF

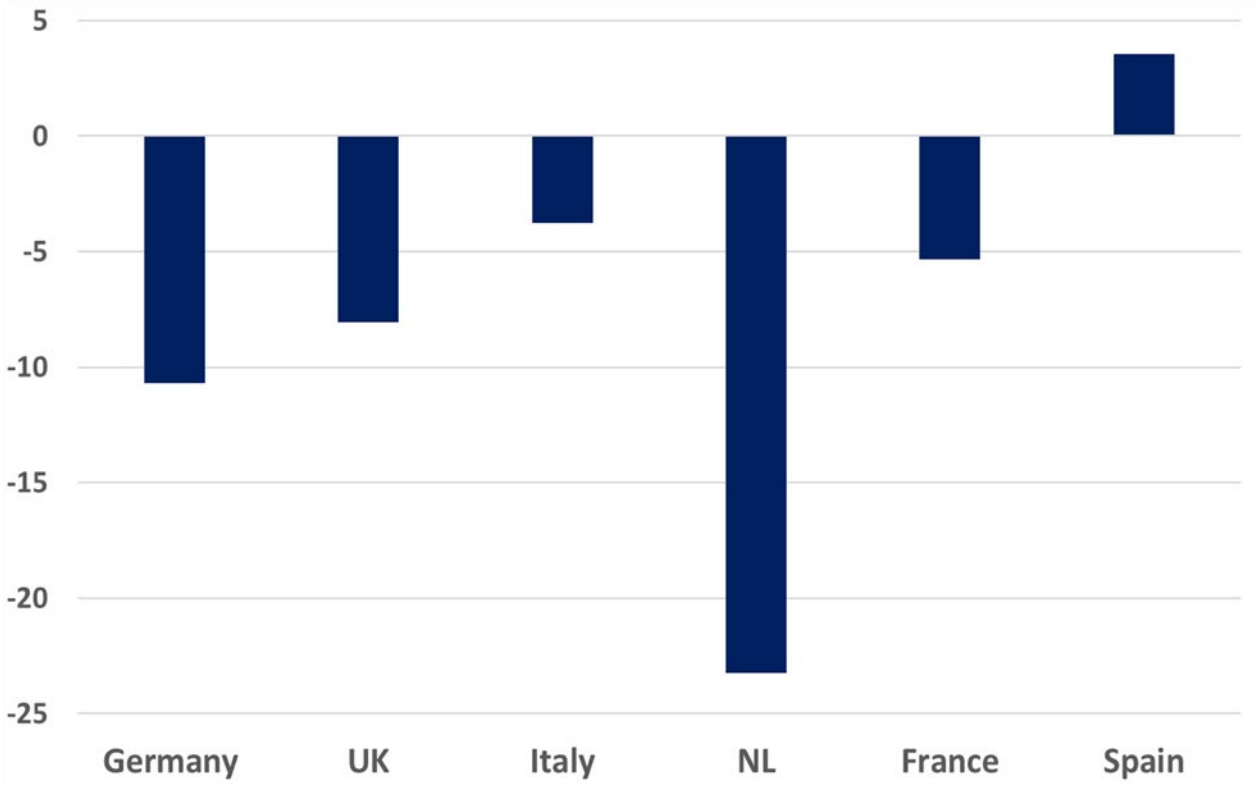
European Gas Demand

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

Monthly gas demand in EU27 + UK, 2019-2022 (bcm)



Change in gas demand in key markets, Jan-Sept 2022 vs 2021 (%)



- **Gas demand in 2021 was relatively resilient, even when gas prices rose to high levels**
- **Gas demand collapsed in 2022 (almost -10% in Jan-Sept) – but with variations between countries - as a result of warm weather and continued high gas prices**

Source Honoré, OIES

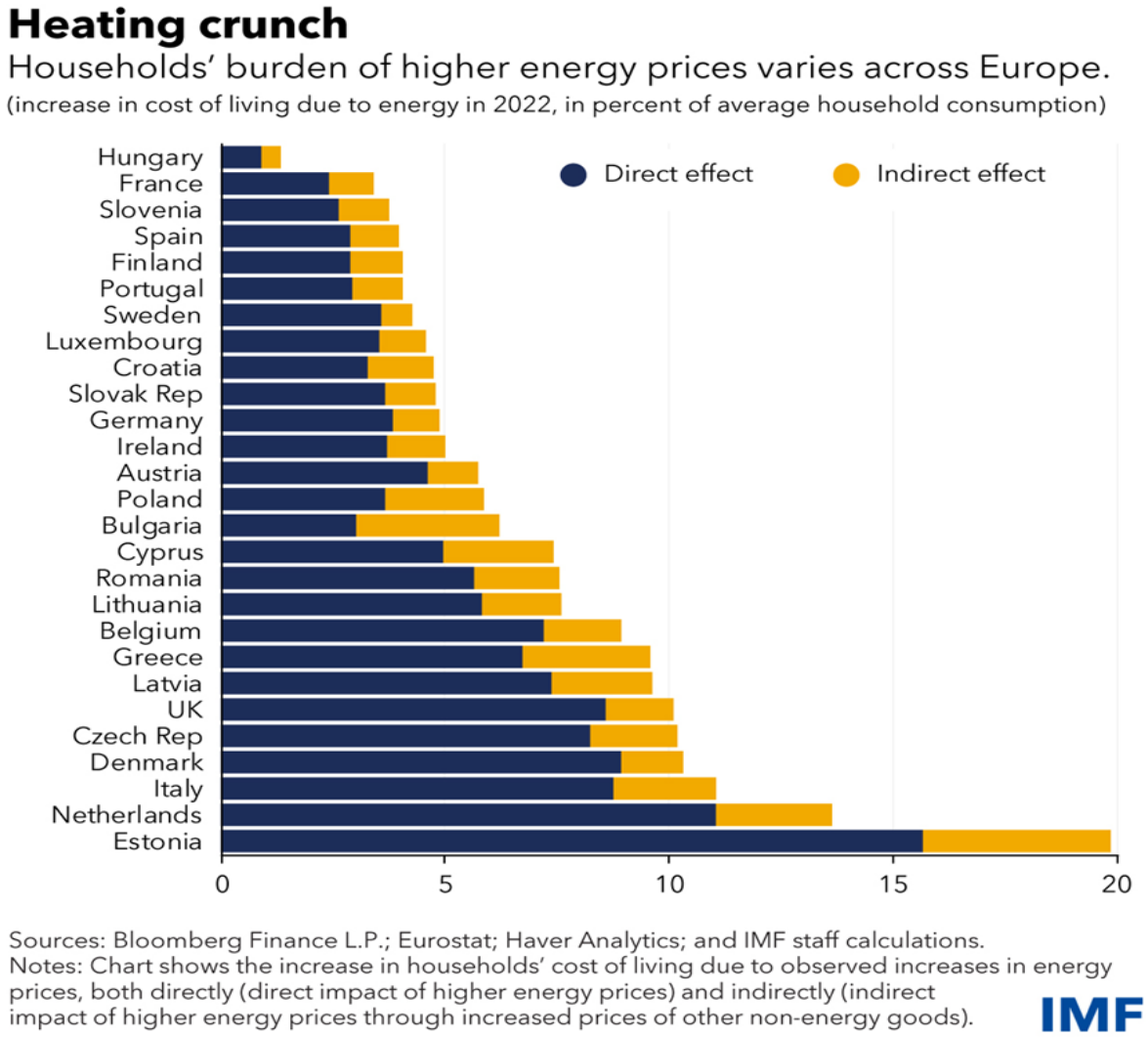
European Gas (and Power) Demand Outlook

- **Overall Gas Demand** in Europe (EU27 + UK) declined by about 10% (40-50 bcm) in the first 9 months of 2022
- **Power Sector**
  - usually the first (and main) source of flexibility for short-term gas demand response but this has not been happening in 2021 nor in 2022
  - strong demand for electricity coupled with low availability of French nuclear and hydro
  - high levels of gas (and coal) have been needed to generate electricity, despite record high gas and EU ETS prices
- **Industrial Sector**: Many sectors - chemicals, fertiliser, ceramics, paper, automotive, are contracting due to high gas prices; some re-locating to the Middle East and the US
- **Residential Sector**: countries with the biggest residential heating sector are most vulnerable to low winter temperatures: UK, Netherlands, Hungary, Slovakia, Italy, Belgium, Germany

Outlook is short term recession and de-industrialisation followed by slow recovery

Source: HONORÉ/OIES

Additional cost of living increase in 2022 for households from higher energy prices (%)



- Many households are seeing a cost of living increase greater than 10% due to energy bills
- Measures to contain high prices have been different across Europe: retail price caps and direct payments (especially households); priority for vulnerable groups; support for businesses
- Measures cost billions of Euros in government subsidies: Germany 200bn, Italy 50bn, Netherlands 16bn, France 70bn, Spain 27bn, Greece 13.5bn, UK >100bn
- To raise extra money `windfall profits' taxes on oil and gas producers and renewable/nuclear generators

National and EU Policy Responses to the Crisis

European Union Energy/Climate Law and Regulation

Pre-Crisis: "Fit for 55": EU Climate law agreed to reducing emissions by 55% compared to 1990 by 2030 and net zero by 2050 including:

- Revision of the EU Emissions Trading System (EU ETS); non ETS Effort Sharing Regulation
- Introduction of Carbon Border Adjustment Mechanism (CBAM)
- Revision of the Energy Taxation Directive
- Higher renewable energy targets under the EU Renewable Energy Directive (RED II)
- Stricter targets for **heating**, vehicles, **efficiency**, **carbon removals, infrastructure**, and fuels for aviation and shipping, rules on land use, forestry and agriculture

Post-Crisis:

- **May 2022 - "REPower EU": reduce dependence on Russian gas; increase LNG imports; switch from gas to other fuels**
- **July 2022 - "Save gas for a safe winter": 15% voluntary demand reduction from 1/08/2022 to 31/03/2023; mandatory in a supply emergency ('Union Alert')**

But the gas (and electricity) crisis has required more detailed policy responses

European Commission Proposed Regulation on: gas purchases, exchanges of gas across borders and reliable price benchmarks*

Specific Objectives:

1. **To establish an energy platform [for] common purchase of natural gas and LNG**
2. **To establish a daily LNG price assessment/benchmark and an organised market for secondary capacities (European Agency for the Cooperation of Energy Regulators (ACER)**
3. **To establish a maximum dynamic price for spot transactions at the TTF**
4. **To accelerate marketing of unused long-term capacities in the gas/LNG flows**
5. **To support in avoiding congestion (contractual and physical) of the existing pipelines and LNG terminals**
6. **To create a default solidarity mechanism..in an emergency leading to a very severe shortage of gas; to define in this context specific provisions regarding gas-fired power**
7. **To allow..exceptional measures to reduce `non-essential consumption' of protected customers provided it does not reduce the production of vulnerable customers**
8. **To address the possibility of a regional emergency with major disruptions and supply shortages, so that the Union is prepared to rapidly apply different solidarity mechanisms..to mitigate the emergency situation**

*COM(2022) 549 final, Strasbourg 18.10.2022

European Commission Proposals – more details on the key objectives

- Coordinated joint purchasing of gas – especially for refilling storages – via an Energy Platform
- A daily benchmark price for LNG: `which better reflects the price the EU pays for its gas imports'; ACER will publish price assessments on all LNG transactions
- A temporary intra-day volatility mechanism aimed at limiting large electricity and gas price movements within a trading day: `a time-limited measure to manage excess volatility in gas and electricity derivatives markets'
- A gas market correction mechanism to establish a maximum dynamic price for spot transactions at the TTF – other gas trading hubs may be linked to the corrected TTF via a dynamic price corridor.* This should allow for over-the-counter gas trades, not affect EU's security of gas supply and intra-EU flows..not affect the stability and orderly functioning of energy derivative markets (futures)

* 15 EU member states support this wholesale price cap

These are proposals. There is no clarity on whether they will be agreed and how they will operate in practice

What are the options for governments if the TTF price remains at levels significantly above $25/mmbtu (current forward price for 2023?

OPTION 1. Governments continue to bear the cost of subisides:

- protecting customers and utility suppliers from hardship and bankruptcy
- focussing on those who genuinely cannot pay and hoping for a quick fall in prices post-winter

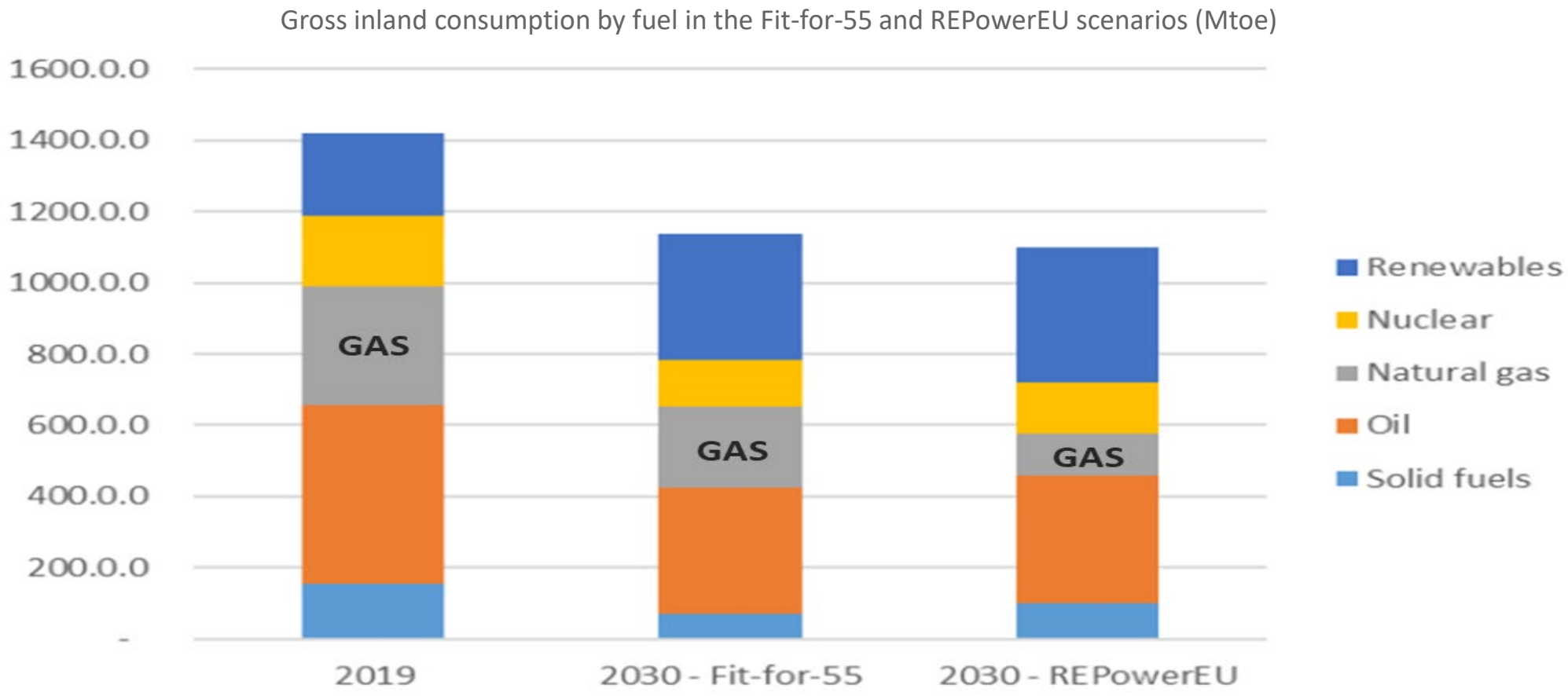
Option 2. Governments impose a cap based on a maximum price or a different index (JCC/JKM/HH+) and run the risk of:

- further reducing supply availability
- limiting TTF's liquidity and benchmark credibility
- threatening viability of existing forward trades and contracts
- `encouraging' demand/disincentive to saving and efficiency

- **If the financial consequences of Option 1 become too great, then Option 2 may become inevitable despite negative consequences**
- **Option 2 measures suggest a new era of government control, threatening the continuation of the liberalised and competitive gas market**

The Outlook to 2030

Lower gas demand already expected due to Fit for 55 package



EU gas demand will fall and not recover to pre-crisis levels

SOURCE: HONORÉ, OIES

Long(er) term implications for the gas and power sectors in Europe

- Accelerated energy transition implies declining demand for natural gas in Europe BUT..
- Short term security problems require signing long term gas contracts which conflict with greenhouse gas reduction targets
- Reliance on intermittent renewables means need for investment in flexibility, including batteries and storage (e.g., hydrogen, CCS-gas)
- Electricity market design is a major problem - competitive markets or government control?:
  - marginal electricity pricing
  - investment in storage
  - demand-side response
- Important to reflect consumer preferences and ability to self-supply, limiting the potential to recover excessive central system costs and raising risks of stranded assets

Source: OIES:/Robinson

Summary and Conclusions

Summary

- Winter 2022/23 looks difficult but manageable unless we have very cold temperatures, although there could still be problems in central European countries
- Winter 2023/24 looks more difficult, especially if Winter 2022/23 is very cold because of the problem of refilling storage without substantial volumes of Russian gas
- In both winters – but especially 2023/24 - gas rationing cannot be ruled out
- By 2026-27 - and possibly earlier if Europe suffers severe recession – European gas supply and demand will come into balance and prices will moderate

Conclusions

- European gas prices are likely to remain above $15/mmbtu for at least two years on average – but periods of much higher and lower prices are likely ie greater volatility
- European gas demand will fall faster than previously anticipated and will not recover
- LNG will become a far more important source of gas supply for Europe:
  - imports reach over 220 bcm by late 2020s compared to just over 100 bcm in 2020
  - more than half the increase will be in north west Europe (Germany, Belgium, Netherlands)
  - this will create competition with Asian buyers until the market rebalances and possibly even after rebalancing

THANK YOU

jonathan.stern@oxfordenergy.org