

ACER



European Union Agency for the Cooperation
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Wholesale Gas Markets Monitoring 2021

Key developments

February 2022

Public



In 2021, ACER's gas market monitoring will focus on two themes, published separately:

1. [The Gas Wholesale Market volume](#) on market functioning, including the ACER Gas Target Model metrics and the market effects of gas network codes
2. [The Gas Sector Decarbonisation volume](#) on the presence and costs of low-carbon gases

As a primer, this document provides an overview of the EU gas wholesale market trends in 2021, assessing:



- *gas demand and supply;*
- *use of gas infrastructure;*
- *gas prices and price convergence levels among gas hubs;*
- *total traded volumes at EU gas hubs.*

To deepen and personalise the analysis for the main trends in 2021, [access here](#) dynamic charts on market trends

Key EU policy goals: promote renewable and low carbon gases and strengthen the gas sector's resilience



- I. The **European Green Deal**¹ aims to make Europe climate neutral by 2050. This requires **more renewable electricity and gas technologies** and **increasing energy efficiency**.
- II. In December 2021, the EC issued the **Hydrogen and Decarbonised Gas Package**² to **align the current EU legislation with the gas sector's decarbonisation targets**. It aims at:



1. Promoting renewable and low carbon gas production and network access, while avoiding stranded assets
2. Fostering organised markets and cross-border trade for renewable and low-carbon gases
3. Ensuring a more secure functioning of the internal gas market





→ **By 2030:** hydrogen to be traded in liquid markets with at least 2x40 GW of installed electrolyser capacity, meeting an estimated **10%** of gaseous energy demand

¹https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

²https://ec.europa.eu/commission/presscorner/detail/en/IP_21_6682

Gas demand and supply

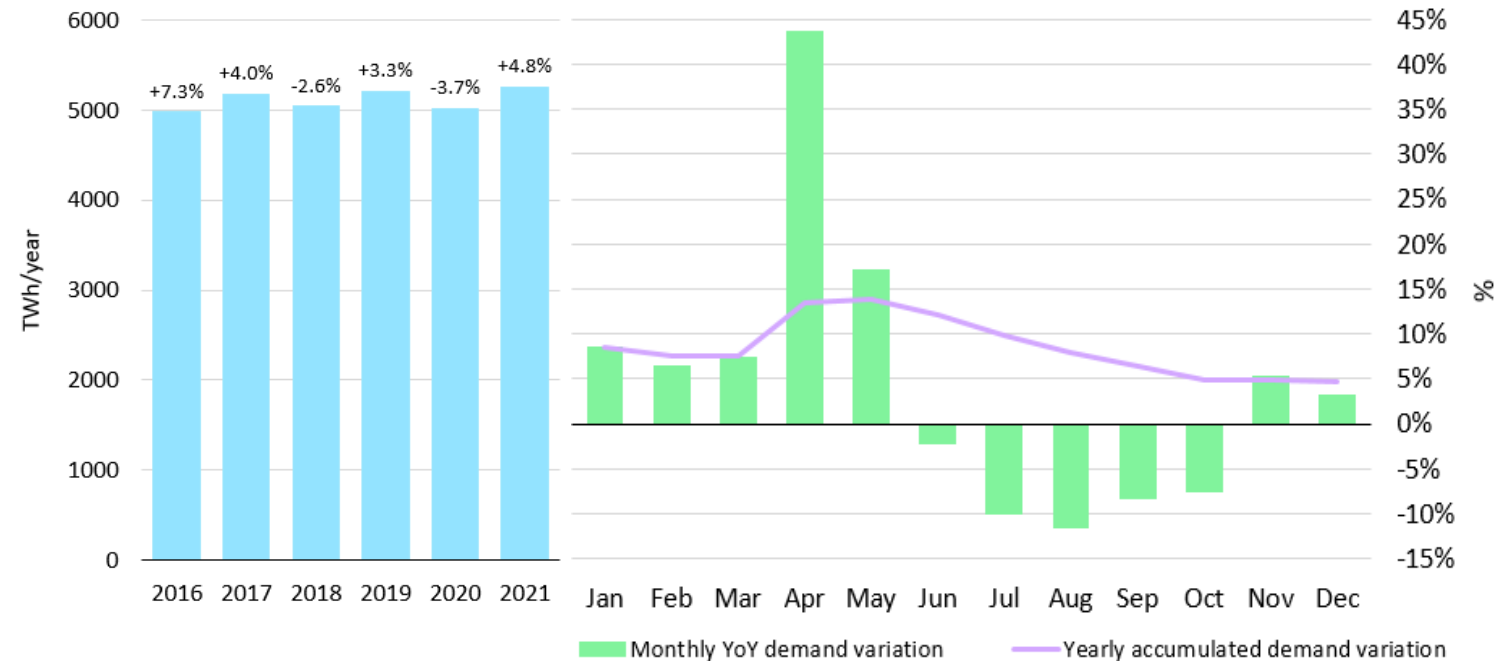
EU+UK: Gas consumption rose by 4.8% from 2020, with notable variation between semesters

- 
 In **Semester 1** demand rose by **12% YoY**, due to economic recovery, a prolonged winter and growing demand of gas for power generation
- 
 In **Semester 2** demand fell by **-3% YoY**, due to dropping gas-fired generation and industrial consumption amid record-high gas prices



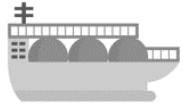
→ Overall, **gas consumption for power generation** dropped by **-4% YoY*** in the EU, as coal-fired power generation became more cost-competitive to gas in the second semester

Percentage changes in gas consumption in the EU+UK – 2016-2021 and 2021 vs 2020 – TWh/year and %



* Data for January-November, as December data was not available in time for publication.
Source: ACER Calculations based on Eurostat data, completed with data by ENTSOG TP, Enagas and Trading Hub Europe.

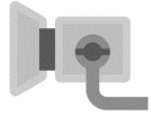
EU dependency rose amid shifting LNG and pipeline flows to different external suppliers



- **LNG imports** decreased by **-16%** YoY to cover 17% of gas supply, in spite they recovered from Q4 2021.

→ **The US** was the largest LNG supplier (28%), followed by **Qatar** (24%) and **Russia** (20%)

→ *The relevance of LNG will increase through the decade*



- **Pipeline supply** remained modest, well below the levels of 2019.

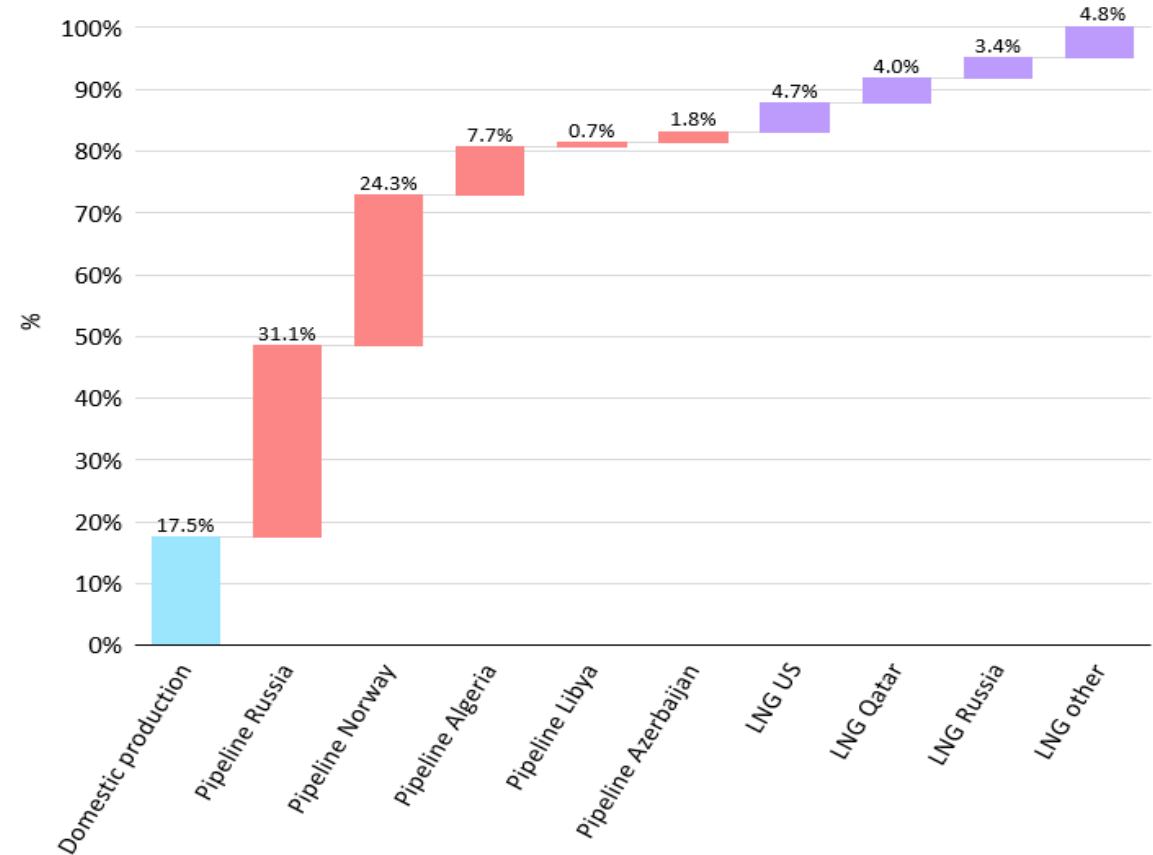
→ **Domestic EU+UK** gas production continued to decline (-13% YoY) to cover only 17% of supply. However, the high gas prices reactivated the profitability and interest of some fields in Q4 2021

→ **Russian** pipeline supply remained the largest supply source, despite volumes dropping by -3% YoY

→ **Norwegian** pipeline supplies increased slightly YoY, mostly as a result of higher flows in Q4 2021

→ **Algerian and Azerbaijani** pipeline supply rose sizeably, together covering 10%

EU+UK gas supply portfolio by origin – 2021 – %



LNG deliveries were highly determined by the developments in global gas markets

- From Q1 to Q3 2021, global competition for LNG constrained arrivals into the EU, which acts as the global 'swing market'

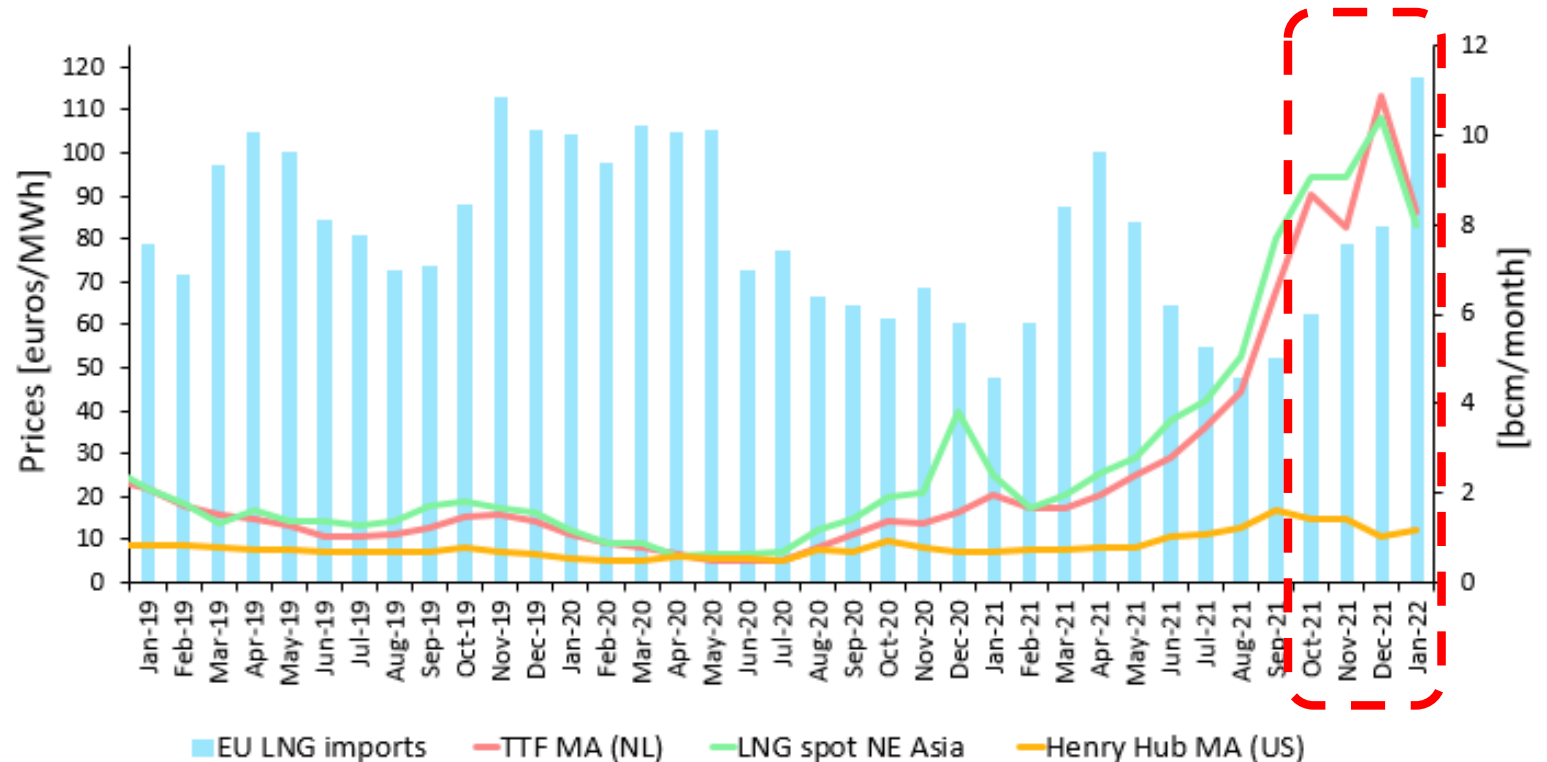


- In Q4 2021, EU LNG imports recovered (+32% YoY) as an outcome of lower deliveries to Asia, improving global production and strong price signals set by EU hubs

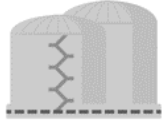


→ However, the extra LNG was insufficient to fully offset the effects of lower pipeline flows and lower underground storage stocks on prices

International Gas Front Month price comparison and EU LNG imports – 2019-2021



Lower LNG and Russian flows induced a higher reliance on storage withdrawals

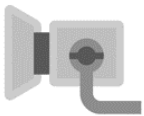


- **Larger storage withdrawals were needed to meet improving demand and offset falling LNG deliveries, strongly reduced Russian pipeline supply and declining domestic production.**

→ At the beginning of April 2021, EU storages' were over thirty percentage points lower than in April 2020

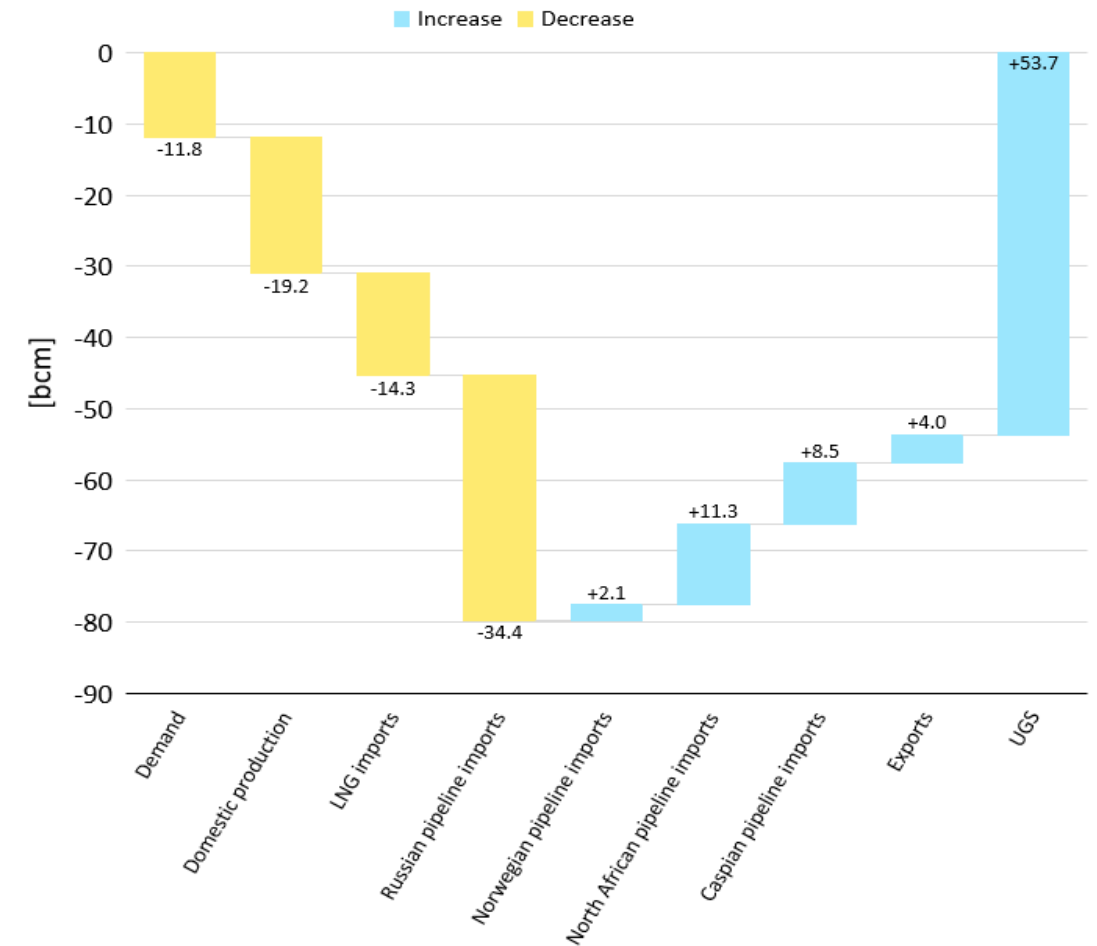
→ Lower volumes were injected during the summer amid constrained supply and narrow seasonal hub spreads

- The larger demand and higher prices in Asia drew LNG away from EU shores from Q1 to Q3 2021.



→ While EU LNG deliveries recovered in Q4 2021, it coincided with Russian pipeline flows plunging by -25% YoY in a very tense political climate

Changes in gas supply to the EU – 2021 vs 2019 – bcm*



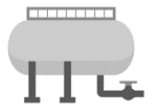
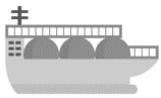
*Decreases (i.e. supply tightness) result from higher demand and/or lower supply. Increases (supply apleness) result from lower demand and/or higher supply. For storages, any increase in withdrawals and/or reduction in injections is an increase in supply and vice versa. For exports, lower exports from the EU elsewhere are an increase of available gas.

Source: ACER calculation based on ENTSOG TP and GIE.

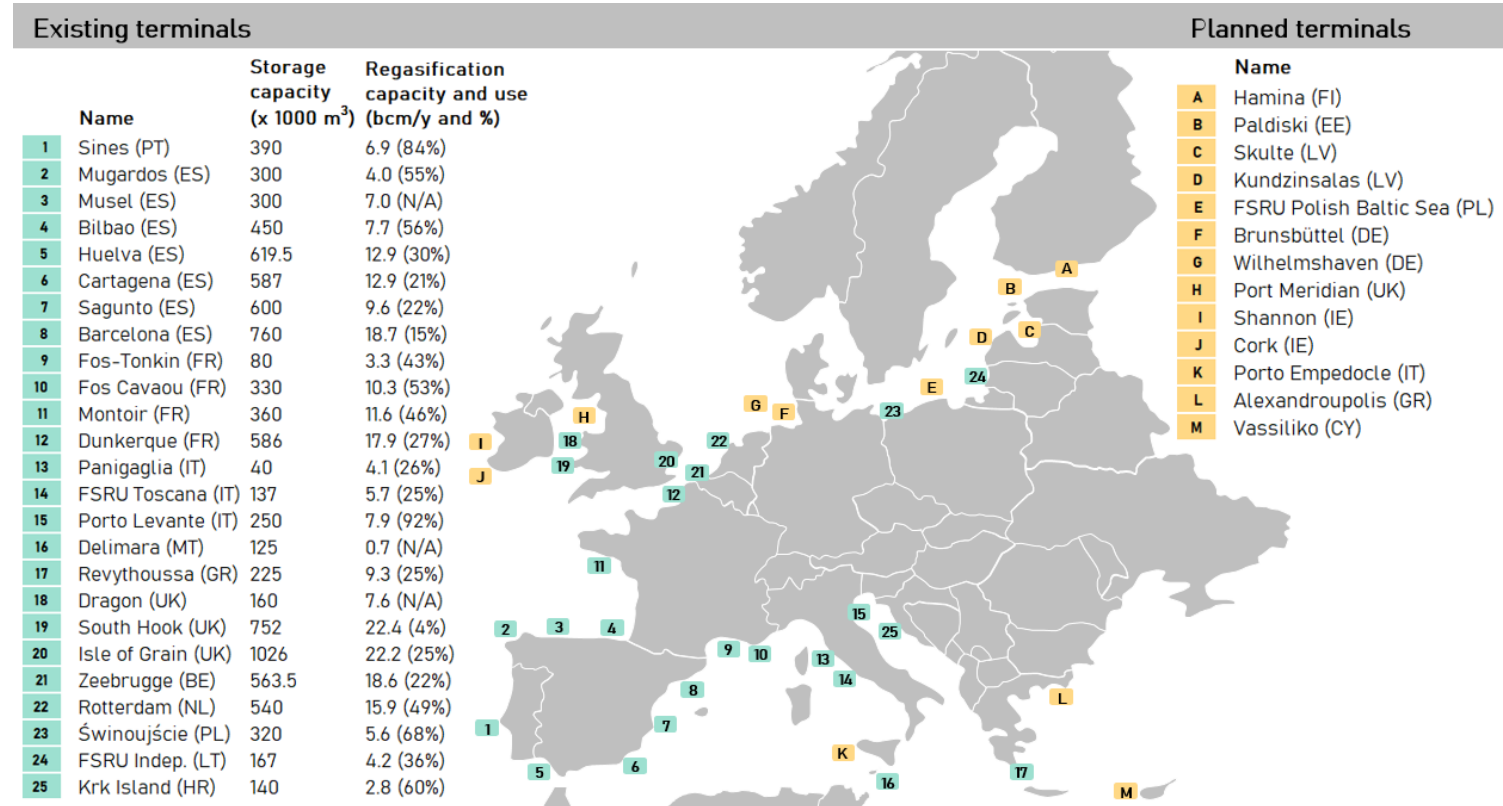
Gas infrastructure use

Differences in LNG terminals' use, linked to contractual arrangements

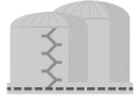
- The utilisation of LNG terminals is shaped by:
 - the regional significance of LNG to meet demand
 - liquidity of the interconnected hubs
 - tariff levels, access conditions and contractual arrangements
- EU+UK terminals' regasification capacity use was **37%** (-8 percentage points YoY), with wide variation:
 - in some countries, LNG imports are more price-responsive but also more volatile
 - in others, LNG deliveries are steadier as they are more reliant on long-term contracts



Overview of European LNG terminal capacities and use per MS – 2021



Storage stocks reached record low levels, resulting from higher withdrawals and lower injections than in past years

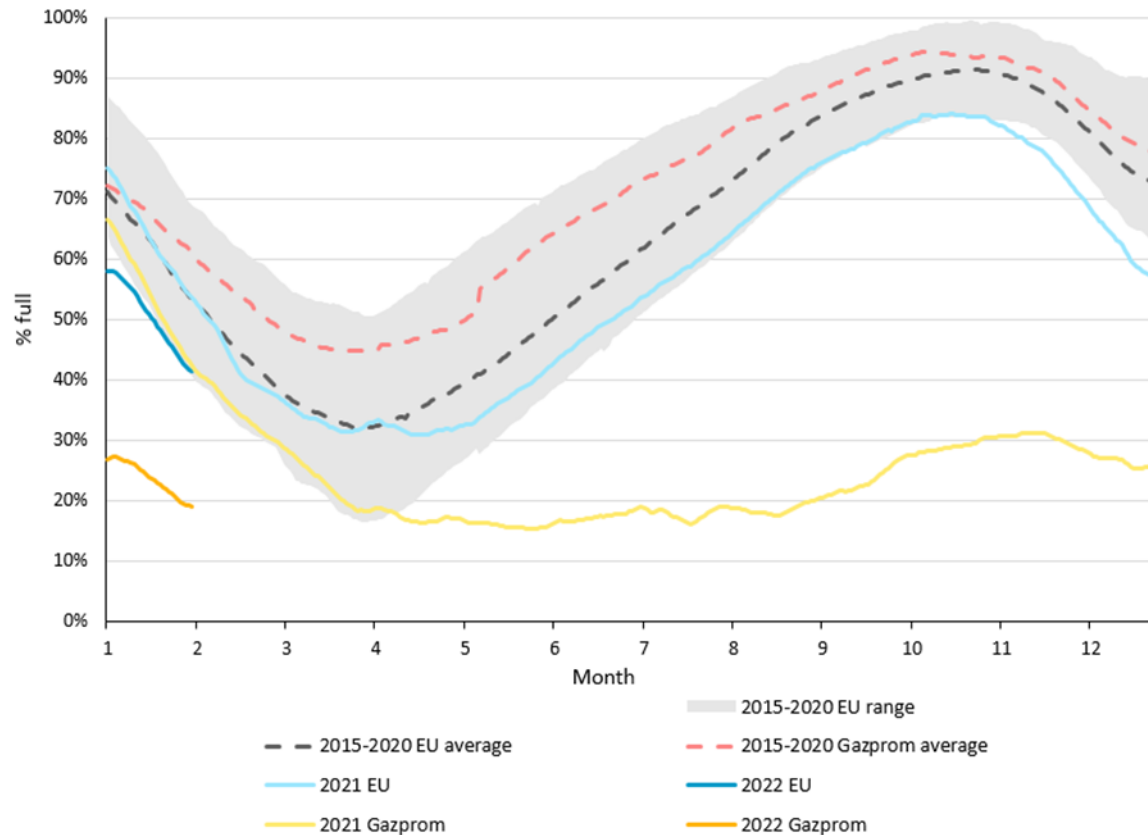


→ Storage facilities are both a guarantee to security of supply as well as a price management tool



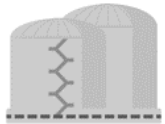
- In Q1 2021, declining LNG arrivals and a prolonged winter required larger-than-usual storage withdrawals
- In Q2 and Q3 2021, injections were rather limited (-15% YoY); LNG remained attracted by higher-priced Asian markets, while narrow seasonal spreads reduced the cost-effectiveness of injecting gas into storages
- **At the beginning of Q4 2021**, stocks were at record low levels (-15 bcm in comparison to October 2020)

Evolution of EU's and Gazprom's EU storage stocks – 2015-2021 – % full



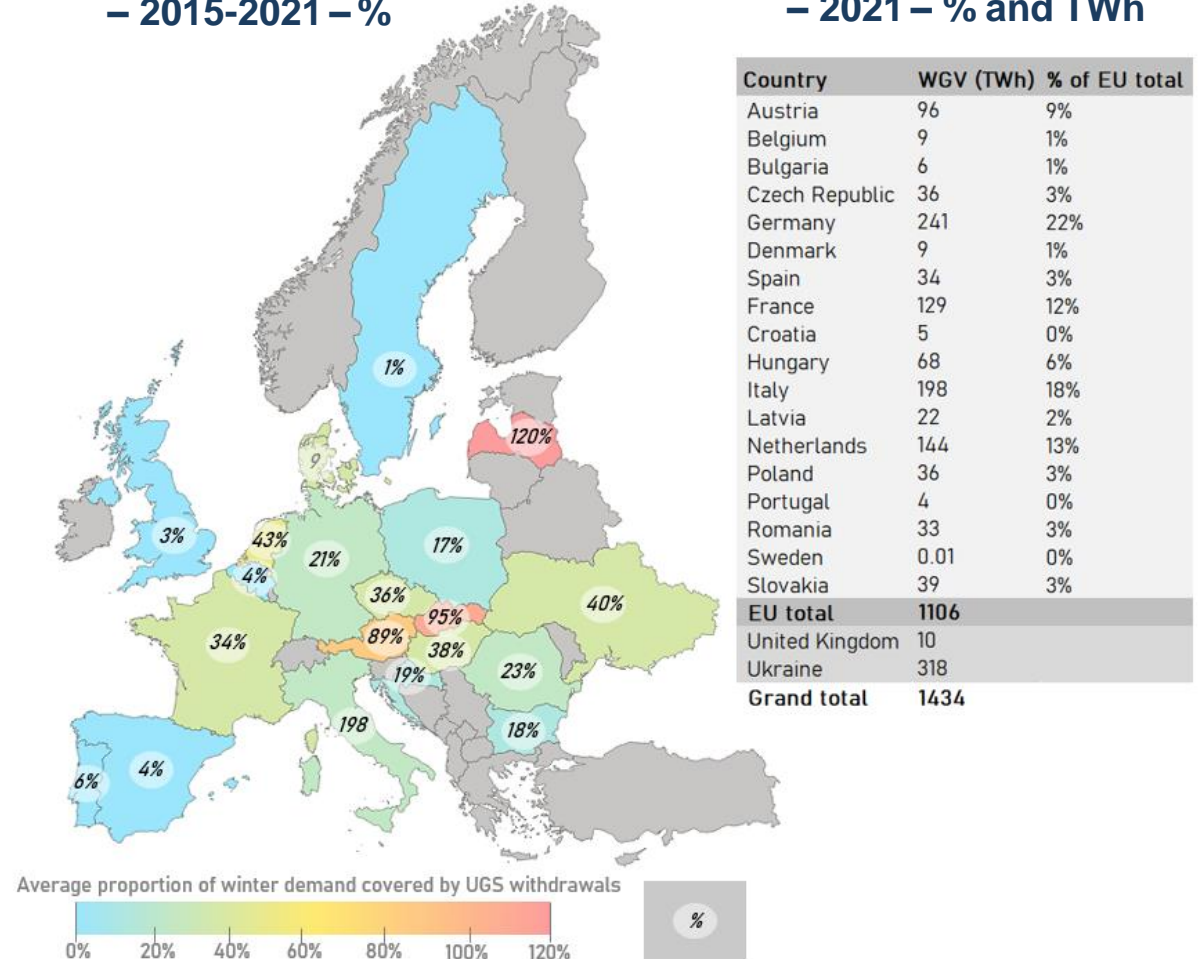
→ *Gazprom's significantly lower-than-average gas stocks in the EU were the major driver of the overall low level of EU gas storages in winter 2021-2022*

Underground gas storage plays a key role in satisfying regional winter gas demand



- The size and **relevance of UGS in satisfying winter gas demand** varies significantly across Europe
- On average for the previous six winters, storage withdrawals accounted for **26%** of EU winter gas demand
- The interconnectivity of gas infrastructure allows UGS to play a key role in ensuring regional security of supply
 - *For example, Latvia's UGS supports neighbouring MSs to meet winter demand via cross-border pipeline flows*

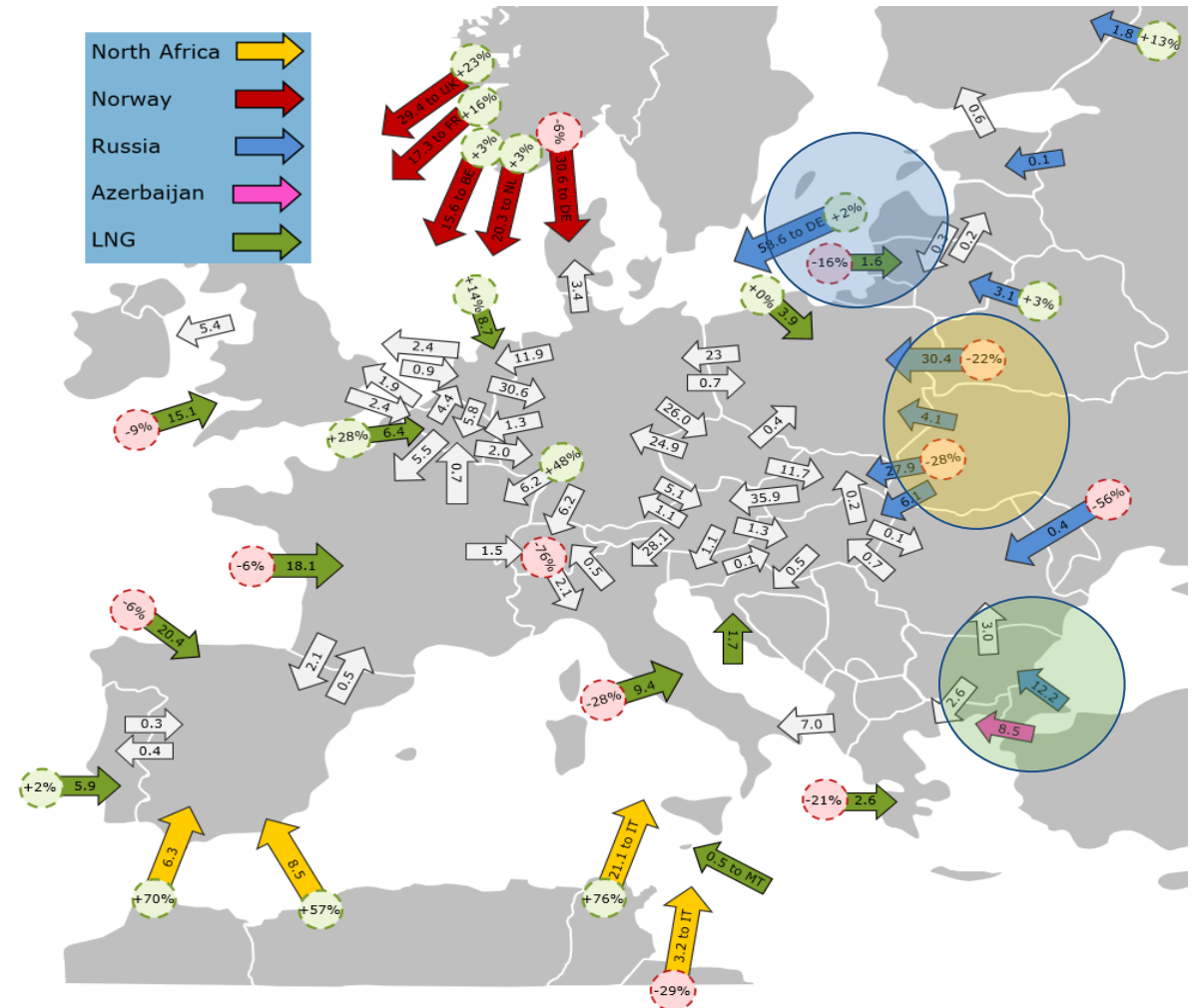
Average proportion of winter demand covered by storage withdrawals – 2015-2021 – % **Working Gas Volumes (WGV) by country and their relative EU percentage – 2021 – % and TWh**



EU gas system proved resilient to accommodate flows in response to price signals

- No major infrastructure bottlenecks were registered as long as cross-border gas supply was available
- LNG deliveries became more variable
- Russian gas supplies kept strong across **Nord Stream**, decreased across the **Polish and Ukrainian** corridors and increased via **Turk Stream**
- In the South Eastern part of Europe, **TAP** offered supply diversification

EU cross-border gas flows and LNG imports – 2021 – bcm/year



→ Even if serious supply disruptions were not registered, the **security of supply was limited** by the restricted pipeline supply and the lower-than-usual storage levels

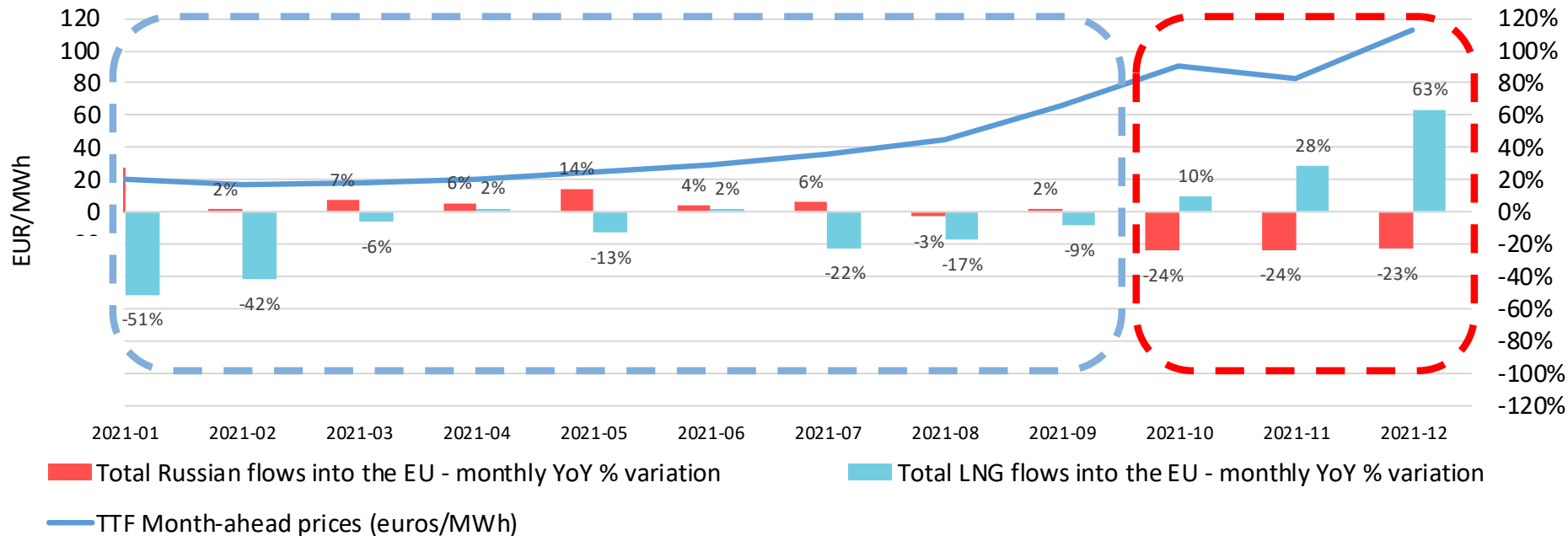
Gas prices and trading activity

A number of interlinked factors moved gas hub prices up to record high levels from Q2 2021

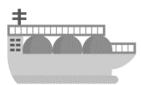


- The high gas prices resulted from demand and supply fundamentals. Additionally, anxiety about potential supply shocks going forward played a contributing role; this ‘tension’ impacted forward prices

EU gas front month prices vs LNG and Russian gas imports YoY changes – 2021 – euros/MWh and %



- EU LNG deliveries recovered in Q4 2021
- The extra LNG was insufficient to offset the effects of lower pipeline flows and lower underground storage stocks

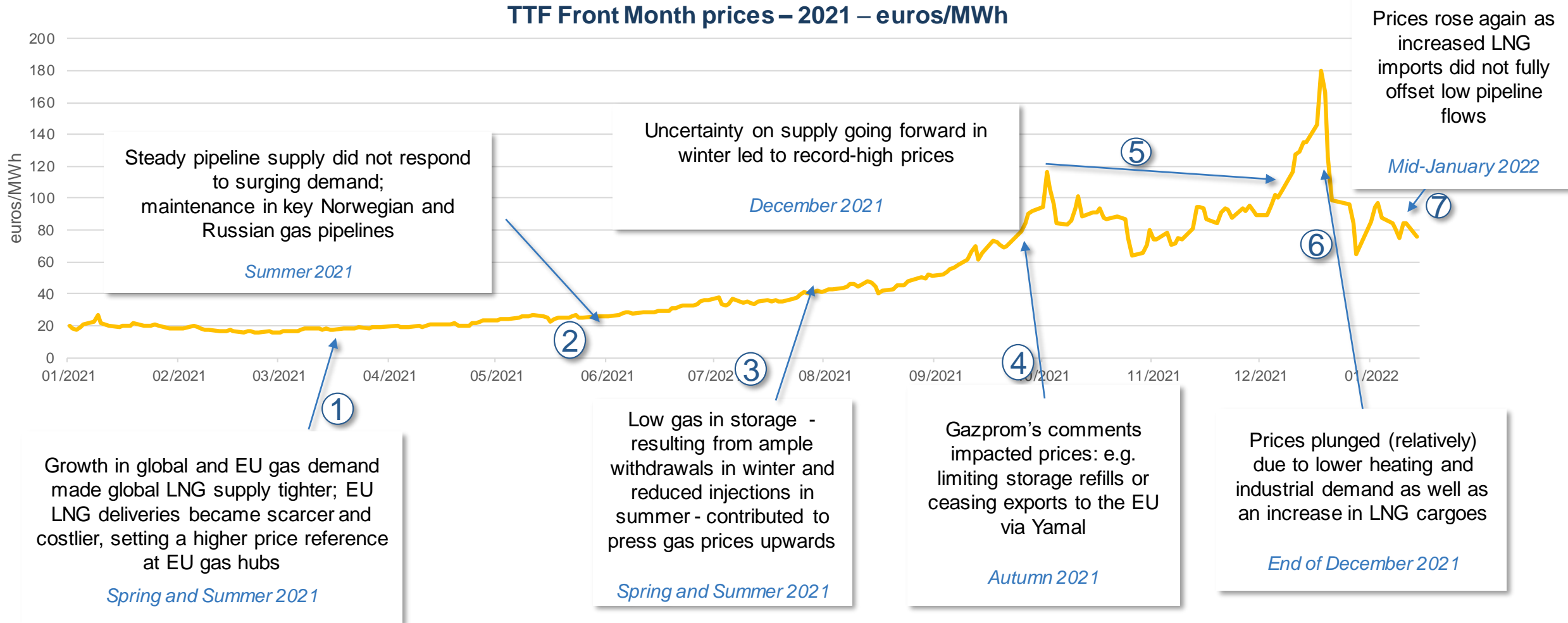


Main driver: Scarce (and thus relatively expensive) LNG supply.

Additional drivers: Lower pipeline flows exacerbated by record-low storage stocks; increased ‘tension’ an additional factor.



Various actors and gas hub prices: unpacking 2021



Fast price hike induced record-high price volatility

- **Prices vary due to** LNG landing and aggregated pipeline supply, but also other factors (shifting results of capacity auctions, RES-E generation, weather)



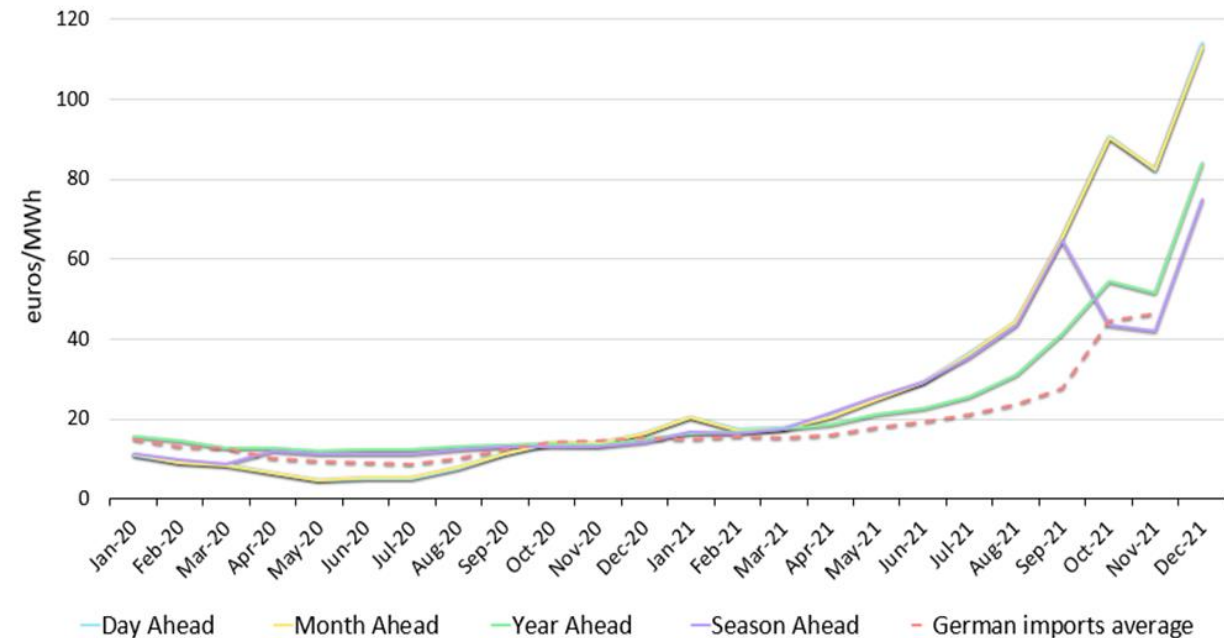
- **Spot and prompt hub products** showed a large premium compared to **hub** forwards in Q4 2021, due to the uncertainty on supply going forward in winter
- Overall, **long-term contracts maintained lower prices**, depending on their specific formulas and time-lagged indexations

- The correlation of gas prices with other energy commodity prices differed:



- **Electricity** prices rose due to gas prices, as gas is often the electricity marginal price-setter
- **Coal and carbon prices** heavily influenced gas prices, while the correlation of gas with oil prices weakened

Evolution of TTF spot and forward hub prices vs German cross-border import prices – 2020-2021 – euros/MWh



Record-high gas prices did not overturn the price alignment between MSs' hubs

Overall, a **strong price alignment** between MSs' gas hubs was observed.

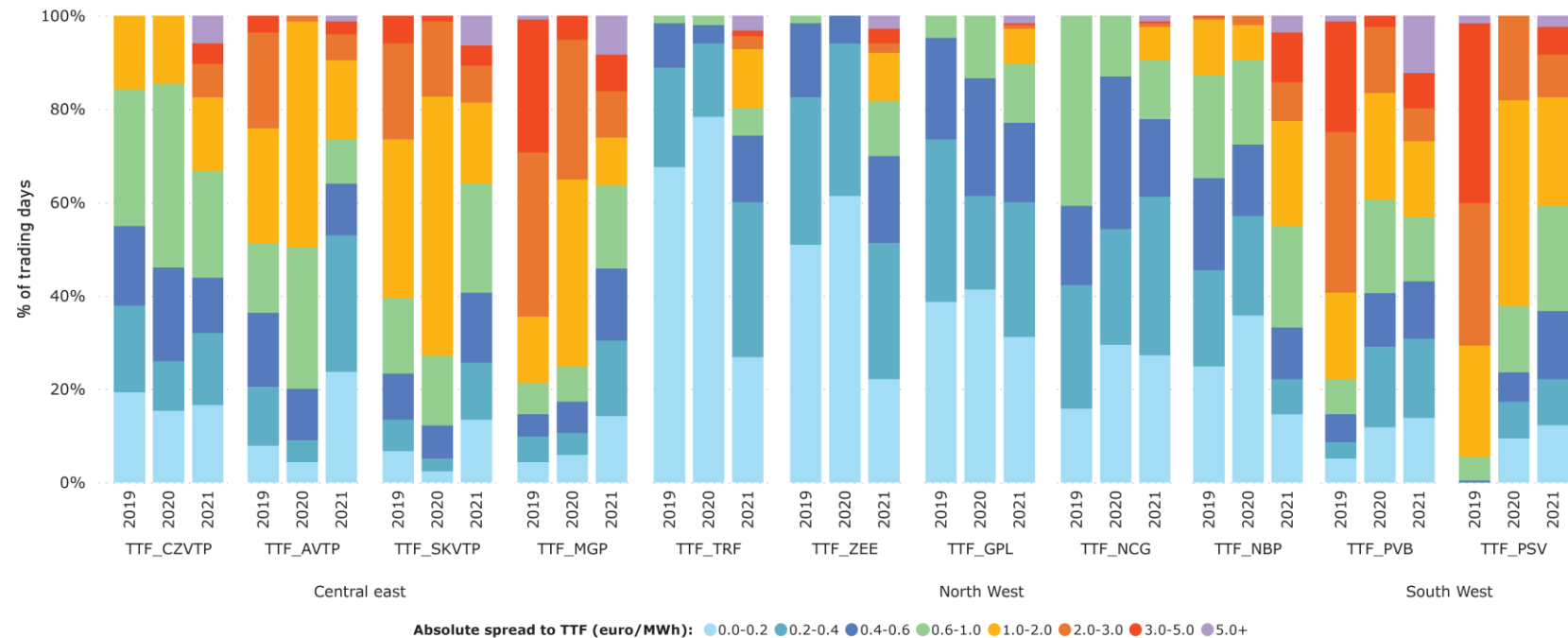
→ **The record-high price volatility** and distinct market fundamentals brought price differences slightly higher YoY



Price convergence remained the **highest in Northwest Europe**, while **notable improvements** were observed in select **Central, Eastern and Southern hubs**

→ Some became cheaper than their Northwest counterparts, benefitting from long-term contracts and/or additional LNG deliveries

Day ahead price convergence between TTF and selected EU hubs – 2019–2021*



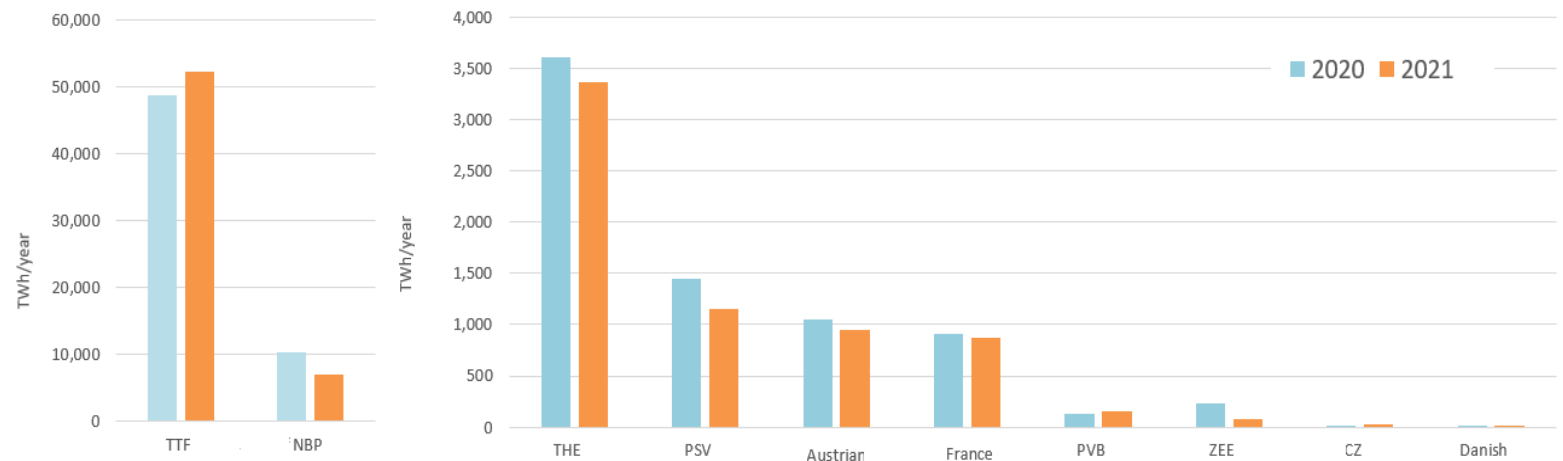
*The columns and colours relate to the % of trading days within the given price spread range.
Source: ACER calculation based on ICIS Heren.



EU hubs' traded volumes remained, **on average, at similar levels** to 2020.

- Trading activity fell YoY at hubs; however, the increase at TTF entirely offset that trend
- The record price rise and the high-risk environment limited trading activity in Q4 (-7% YoY)
- Liquidity migrated from over-the-counter markets towards the centrally cleared gas exchanges

Evolution of traded volumes at a selection of EU gas hubs – 2020–2021 – TWh/year



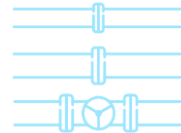
Conclusions

Progress...

An ambitious strategy to decarbonise the gas sector was released by the EC in December 2021; low-carbon gases' uptake is expected to significantly rise in the years to come

The integrated gas market proved its resilience and no major bottlenecks were registered despite the various shifts in European supply

A **strong price alignment** between MSs' gas hubs was observed in the face of record high prices. That underlines the aptness of the internal gas market



... and setbacks.

The events of 2021 call for some reflection of how the so-far-effective **market design can better hedge extreme price environments**

Security supply margins narrowed in view of the lower LNG deliveries and restrained pipeline supply. That was exacerbated by the lower-than-average underground storage levels

Prices rose to historically high levels, impacting on consumers' bills and leading to some **industrial demand destruction and gas-to-coal switches**