Wholesale Gas Markets Monitoring 2021

Key developments

February 2022
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

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

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* 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%

Source: ACER calculation based on ENTSOG TP and GIE, complemented with Eurostat and JODI data.
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

Source: Reuters and ACER calculation.
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 ampleness) 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

Source: ACER calculation based on GIE and ICIS Heren data.
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

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

- **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)

→ 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

Source: ACER calculation based on GIE.
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.

⚠️ 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.

Source: ACER calculation based on ENTSOG TP and GIE.
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 %

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.

Source: ICIS Heren, ENTSOG and ACER calculation.
Various actors and gas hub prices: unpacking 2021

Growth in global and EU gas demand made global LNG supply tighter; EU LNG deliveries became scarcer and costlier, setting a higher price reference at EU gas hubs

Spring and Summer 2021

Steady pipeline supply did not respond to surging demand; maintenance in key Norwegian and Russian gas pipelines

Summer 2021

Uncertainty on supply going forward in winter led to record-high prices

December 2021

Low gas in storage - resulting from ample withdrawals in winter and reduced injections in summer - contributed to press gas prices upwards

Spring and Summer 2021

Prices rose again as increased LNG imports did not fully offset low pipeline flows

Mid-January 2022

Gazprom’s comments impacted prices: e.g. limiting storage refills or ceasing exports to the EU via Yamal

Autumn 2021

Prices plunged (relatively) due to lower heating and industrial demand as well as an increase in LNG cargoes

End of December 2021

Source: ICIS Heren and ACER consideration.
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

Source: ACER calculation based on GIE and ICIS Heren.
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.
Gas trading activity was affected by the high-price risk environment

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

Source: ACER calculation based on Trayport and REMIT.
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.