March 7, 2023

Market Price Report – 2022

Momentum in Supply and Demand & Prices

Gas markets in Europe experienced historically high prices due to geopolitical events that have led to a reorganisation of wholesale supply and have had a significant impact on gas demand and energy costs for industries and residentials.

The second half of 2021 already saw supply risks arising due to low temperatures, low renewable power generation (wind and hydro) and low nuclear availability, which incentivised higher gas demand for electricity. During Q4 2021, Russian gas supply to Europe was already at a five-year low, as problems with the Nord Stream 2 approval process raised and transit issues through Ukraine, due to political tensions, began taking the scene on world level. Russia's moves, even before its invasion of Ukraine, were aimed at drastically reducing additional short-term gas volumes to Europe. European stocks ended the year at a historically low 55% fill rate (17% below the five-year average). In 2021, domestic demand for natural gas in the EU increased by 4.3% over 2020 to 15,834,900 TJ (4,399 TWh), close to historical highs. Switzerland had a record gas consumption of over 40 TWh. Russia supplied the EU-27 countries with a total of more than 42%, either via directly linked infrastructure or via Ukraine and Belarus.

Russian invasion of Ukraine on February 24th, 2022 has led to tighter gas supplies, higher prices and an uncertain outlook. According to IEA[1], the world's demand for natural gas was declining slightly in 2022 as a result of higher prices and market disruptions caused by the still unresolved conflict. This has added further pressure and uncertainty to an already tight natural gas market, especially in Europe. The war has pushed EU governments to seek to reduce their dependence on Russian fossil fuel imports as quickly as possible. The EU has published a set of measures (REPowerEU) aimed at massively reducing Russian gas import volumes into Europe, while remaining consistent with the EU's climate ambitions. Spot gas prices have soared to record highs as European efforts to diversify natural gas supply intensified demand for liquefied natural gas (LNG) cargoes, some of which were diverted from Asia. Average LNG spot prices in Asia were more than four times their five-year average. In Europe, LNG spot prices were five times their five-year average, despite a mild winter.

In Asia, gas consumption grew by 3% in 2022, a marked slowdown from the 7% growth in 2021. Regions such as the Americas, Africa and the Middle East have been less directly affected by gas market volatility, largely due to their reliance on domestic gas production. They have, however, been affected by the wider economic impacts of Russia's invasion of Ukraine, including rising commodity prices, weaker purchasing power and reduced investment due to dented business confidence.

In Europe, consumption in 2022 fell by totally 6%. The residential sector saw a 16% decline. The industrial sector could reduce its consumption by a total of 20%, partly by lower production output but also by substituting gas with other fuels. In contrast, gas used for electricity generation increased by 4% YoY. All of these factors were the consequence of exceptionally mild weather conditions, low hydro and historically low nu-

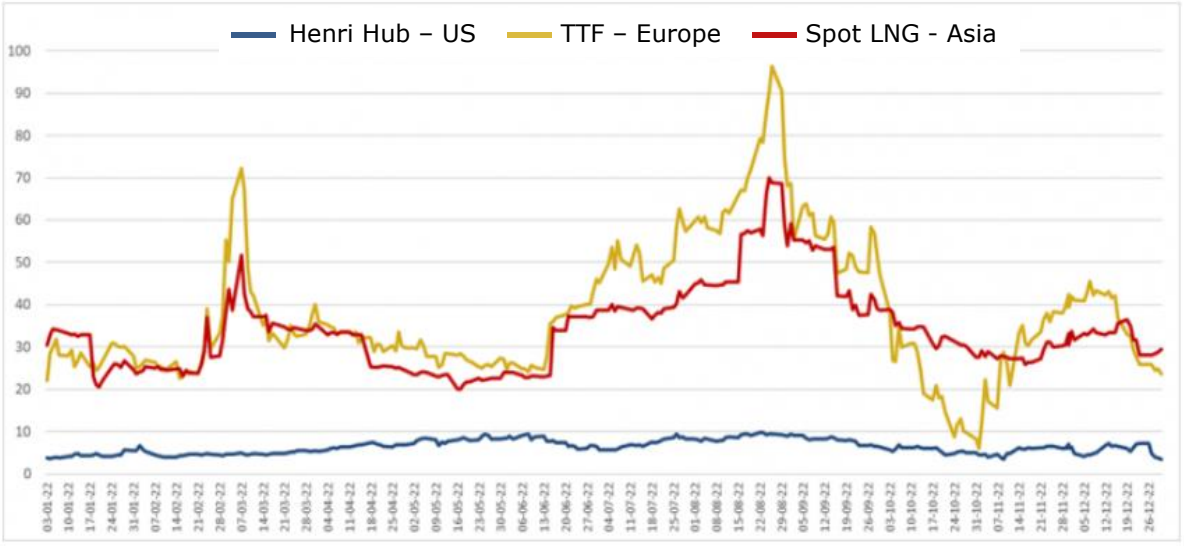
[1] IEA: International Energy Agency

clear electricity (France) generation availability, as well as major gas saving efforts made by industries and residentials. The European gas industry has been able to adapt surprisingly quickly to its dependence on Russian gas imports.

Russian gas imports were reduced by 90% YoY from 2021 levels. The lost import volumes could be replaced by increased supply from Norway (+20% YoY), North Africa (+12%) and a big share of LNG (+65%). The construction of new LNG import capacities, mainly in Germany, Poland, France and other countries, allowed Europe to accommodate additional LNG supply, mainly from the US and Asia, while Chinese gas demand was still dampened by lower industrial output and the Covid-19 restrictions that were recently lifted.

All of these circumstances resulted in extreme volatile markets which reached new historic price levels, particularly in Q3 2022, and a sharp price fall in Q4 2022 with sufficient gas reserves being on stock at year-end.

Spot gas price evolution 2022



In Q1 2022, TTF spot prices averaged €98.4/MWh and were 2.7% up from the previous quarter and 4.3 times higher than in Q1 2021 (€18.5/MWh). Market tensions were lower in Asia, as LNG demand declined under the combined effects of relatively mild temperatures, fuel switching in response to uncompetitive LNG prices, Covid-induced lockdowns in China and abundant LNG storage inventories in Northeast Asia. In January and February, TTF spot prices fell from their record highs of December (€183/MWh) as market fundamentals improved. However, when the invasion of Ukraine began, European spot prices spiked to a new record of €212/MWh (settlement price) and €345/MWh (daily high) on March 7th. The month of March witnessed extreme market volatility amid market anxiety during the Ukraine war and the geopolitical crisis. In Asia, spot prices during Q1 2022 averaged €97.1/MWh and were respectively 12% lower than in Q4 2021 and more than three times higher than in Q1 2021. In the United States, the Henry Hub average has increased by 140% during Q1 2022 (€38.6/MWh) vs Q1 2021 (€16.05/MWh) reaching

its highest level since September 2008, reflecting strong winter demand, growing LNG exports and below-average storage stocks in the US.

Western European gas demand in Q1 2022 decreased by 10.6% vs Q1 2021 while industrial demand dropped by 15.8% and residential by 12.5% YoY. In contrast Gas-to-Power demand increased by 3.6% as Q1 2022 was colder than Q1 2021. Russian exports to Western Europe dropped by 29.9 % during Q1 2022 vs Q1 2021, but were at same levels as Q4 2021. Already in Q4, Gazprom was no longer offering volumes in the spot and forward markets to Europe and was just sticking to its long-term contractual commitments. LNG demand in Asia declined under the combined effects of relatively mild temperatures, fuel switching in response to uncompetitive LNG prices, Covid-induced lockdowns in China and abundant LNG storage inventories in Northeast Asia. European storage stocks ended at very low 27.2% as of March 31st, 2022.

In Q2 2022, TTF spot prices averaged €97.6/MWh, moderately down compared to the previous quarter but still at record seasonal levels. TTF spot prices reduced from previous record levels in March until beginning of June. Then Russian gas supply cuts through the Nord Stream pipeline propelled prices to levels not seen since record highs in early March. In addition, the shutdown of the Freeport LNG plant in the United States, following a fire on June 8th reduced the availability of LNG supply in the Atlantic basin. TTF spot prices reached again €150/MWh on June 29th. TTF day-ahead prices during Q2 2022 were 2.9 times higher vs Q2 2021. Henry hub prices in the US averaged €24.1/MWh during Q2 2022, while they were at €8.5/MWh during Q2 2021, an increase of 186% YoY. Asian market prices tracked the rise in European prices in a context of tightening global LNG supply. In addition, an exceptional heat wave in Japan brought about strong tensions on the electricity and LNG markets.

Western European gas demand in Q2 2022 was down by 14.3% vs Q2 2021 while industrial demand dropped by 17.6% and residential demand by 22.2% YoY. In contrast, Gas-to-Power demand increased by 3.9%, fuelled by low French nuclear availability. Russian exports to Western Europe dropped by 63.4% during Q2 2022 vs Q2 2021. The flows took a dive in early June before stabilizing at weak levels from mid-June. Russia insisted on payment in roubles, while the contracts provided for payment in dollars or euros. This dispute ended in the curtailment of Russian supply to those countries that did not accept the new payment terms. The missing Russian volumes were mainly compensated by Norwegian (+14% vs Q2 2021) and LNG (+43% vs Q2 2021) supplies during Q2 2022.

The European Commission started to take measures to secure gas supply to Europe during the winter season. Minimum filling thresholds for October 2022 (minimum filling rate of 80%) were introduced, forcing market players to fill up storage, which at the beginning of Q2 2022 was at low levels. Storage injections were forced to their maximum despite uneconomic conditions (summer 2022 prices higher than winter 2022 prices) and the 5-year average level of 59% could be reached by the end of June.

In Q3 2022, the European benchmark TTF price more than doubled compared to Q2 2022, reaching in average €199.14/MWh compared to €97.6/MWh. This was 311% higher than the same period one year earlier (€48.43/MWh). Against the background of a tightening global LNG market, Asian spot prices increased under upward pressure from European prices. The Asian spot price jumped by 71% to €160/MWh compared to Q2,

influenced by the European supply crisis, with the TTF standing as a price setter in the global market. The Henry Hub price averaged €26.9/MWh (+115% YoY) but remained at extremely low levels compared to Europe and Asia.

In Europe, the collapse of Russian gas deliveries (-71% in Q3 2022 vs Q3 2021), disruptions in Norwegian supplies (field maintenance) and growing concerns about the risk of a gas deficit next winter caused a sharp rise in gas prices in Q3 2022. During August, the TTF price exploded with peaks over €330/MWh on August 25th. Tensions soared following the announcement of a complete shutdown of Nord Stream 1 on September 1st. Nord stream 2 work was completed but the pipeline has never been operational. In addition, heat waves in Q3 increased the need for gas-fired power generation to compensate for low hydro and French nuclear generation output. Besides, lower water levels in the Rhine disrupted deliveries of coal and oil products in Germany.

Gas demand in Western Europe fell further in Q3 2022 by 7.8% vs Q3 2021 while industrial demand dropped by 23.5% and residential by 17.8% YoY. In contrast, Gas-to-Power demand was up +21.1% fuelled by aforementioned electricity availability. Russian exports to Western Europe dropped almost completely since September 1st. There were still small flows via Ukraine and the TurkStream pipeline, but they accounted for less than 10% compared to previous European supply levels. On September 26th, a series of clandestine bombings and subsequent gas leaks occurred on the Nord stream 1 and 2 pipelines. The pipelines have been destroyed since then and restarting them could be impossible due to corrosion.

Although LNG imports have remained strong in Europe (+130% YoY), they alone have not been able to compensate for the lack of Russian gas and the constraints on Norwegian supply. However, LNG has since become the biggest contributor to European supply stack, with the US taking the lion's share (46%) in Q3 2022 compared to 33% in Q3 2021. The increase in US LNG was driven by a very large price spread between Henry Hub and European prices. Qatar also increased its exports to Europe by 18% reaching a 20% share in the supply stack.

Storage injections were robust during Q3 2022, reaching a fill rate of almost 90% by October 1st, 2022. This level, paired with lower consumption and increased nuclear availability in France, sparked bearish market sentiment in September.

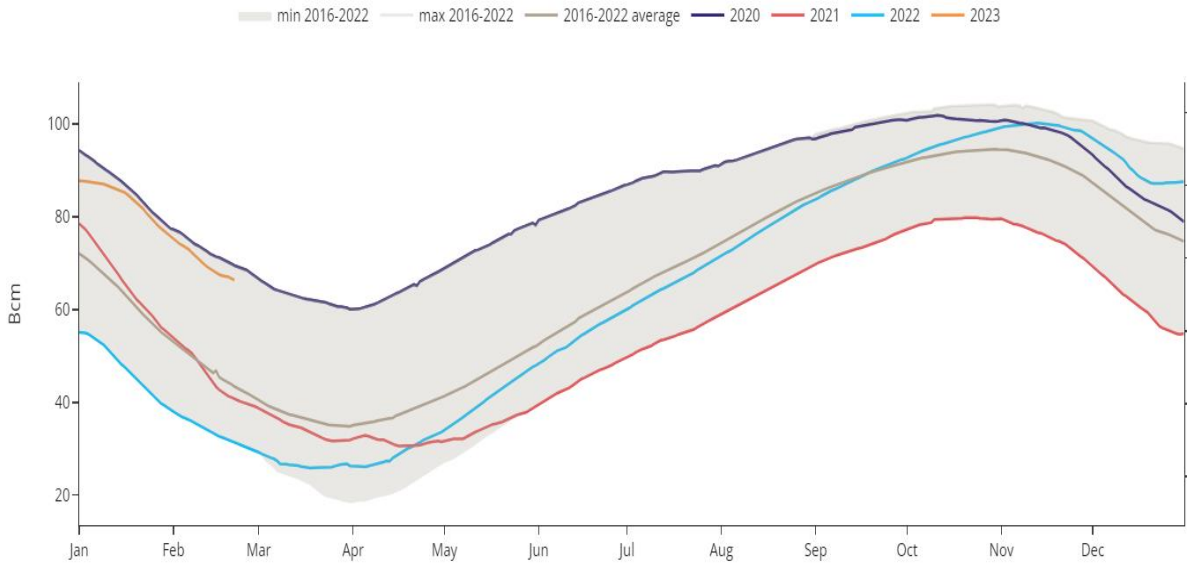
In Q4 2022, the benchmark European TTF price halved compared to Q3 2022 reaching an average of €94.24/MWh compared to €199.14/MWh. Although the Russian-Ukrainian crisis persisted, Russian gas supplies to Europe were at their lowest and the LNG market remained tight, average TTF and Asian prices fell back to the same levels as in Q4 2021. These averages mask irregular trends that reflect extreme variations in weather conditions. After peaking at over $320/MWh in August, the European TTF price fell sharply until the end of October, the hottest month on record, before rising again in the following weeks as temperatures dropped. Since mid-December, the exceptionally mild weather and the slowdown in economic activity ahead of the Christmas holidays have led to a fall in consumption and prices. The latter have lost half of their value over the period and now stand at €65-70/MWh, i.e. levels seen before the war in Ukraine and even before the winter of 2021-22. Asian spot prices remained strongly correlated with European prices as the global LNG market remained tight. However, short-term volatility was lower in the Asian market, where weak demand, especially in China, and high levels of LNG

stocks capped market prices. The US Henry Hub spot price averaged 42% above the Q4 2021 level at €20.41/MWh vs €14.37/MWh.

Gas demand in Western Europe kept on declining in Q4 2022 with -21.4% vs Q4 2021, while industrial demand dropped by 24.2% and residential demand by 21.4% YoY. Even Gas-to-Power demand fell by 9.3%, as very mild weather conditions, strong wind output and better French nuclear availability took larger shares in electricity generation.

European storage facilities could even be replenished during Christmas break as the collapse in spot prices allows. European storage stocks were 83.4% full at the end of 2022, being at historic high fill rate.

The Evolution of European Storage



Medium- and Long-term Gas and LNG Outlook 2023

Cedigaz, the International Gas Association, has just released its « Medium- and Long-Term Gas and LNG Outlook 2023 », which provides projections on natural gas and low-carbon gas markets to 2050. Cedigaz' Reference Scenario assumes a strong acceleration of the energy transition towards a low-carbon economy, incorporating specific government targets and commitments to reduce CO_2 emissions, corresponding to a global warming of 2.1 °C by 2100. The evolution of the world energy mix is driven by strong energy efficiency improvements, fast expansion of clean electrification and low-carbon technologies. Cedigaz 2.1 °C Scenario highlights that natural gas and low-carbon gases will play an important role in a decarbonizing global energy system.

Natural gas will be gradually supplanted by low-carbon gases in OECD markets, whereas in non-OECD markets, especially in Asia, both natural gas and low-carbon gases will grow significantly over the long term. Additional investments in new international gas and LNG projects are needed to meet future global demand.

Achieving carbon neutrality, energy security and sustainability will require profound changes in global gas dynamics and a rebalancing of global gas flows towards Asia. Decarbonization efforts imply the reduction of all greenhouse gases, including methane emissions, along international supply chains. The expansion of low-carbon gases, especially hydrogen, requires a supportive and appropriate policy and regulatory framework, as well as an adaptation of natural gas infrastructure to a future low-carbon economy.

Sources: *Global Energy Review 2021 and 2022 (IEA), Natural Gas Information Overview- Statistics report 2022 (IEA 2022), Cedigaz (2022), ICE Europe (2022), EnergyScan.*