



GECF

# MONTHLY GAS MARKET REPORT

September 2023

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The Gas Exporting Countries Forum (GECF or Forum) is an intergovernmental organisation gathering the world's leading gas producers and exporters, whose objective is to provide a framework for the exchange of views, experiences, information and data, and cooperation and collaboration amongst its Members in gas-related matters. The GECF comprises 12 Member Countries and 7 Observer Members. The Member Countries of the Forum are Algeria, Bolivia, Egypt, Equatorial Guinea, Iran, Libya, Nigeria, Qatar, Russia, Trinidad and Tobago, United Arab Emirates and Venezuela. Angola, Azerbaijan, Iraq, Malaysia, Mozambique, Norway and Peru have the status of Observer Members.

The GECF Monthly Gas Market Report (MGMR) is a monthly publication of the GECF focusing on short-term developments in the global gas market related to the global economy, gas consumption, gas production, gas trade (pipeline gas and LNG), gas storage and energy prices.

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## Highlights

**Global economy:** The global GDP growth forecast for 2023 has been revised upwards by 0.1 percentage points to 2.5% by Oxford Economics. This was driven by the resilience of the global economy in the first half of 2023. However, global economic growth in the second half of 2023 and 2024 is expected to be softer. Global inflation is expected to continue to ease to an average of 6% in 2023 and is anticipated to remain above targeted rates in major economies until 2024 or beyond.

**Gas consumption:** In August 2023, after more than ten months of consecutive declines, EU gas consumption surged, marking a 6.5% year-on-year increase, totalling a staggering 17.5 bcm. This was triggered by the resurgence of the industrial sectors in both Germany and Spain, rejuvenating the EU's energy landscape. Meanwhile, with an impressive 12% y-o-y surge, China's apparent gas consumption reached a remarkable 33 bcm. In the US, gas consumption increased by 0.7% y-o-y, reaching a noteworthy 73 bcm. The ongoing phase-out of coal power plants, a surge in cooling demand due to a heatwave and a drop in natural gas prices, have combined to make gas-fired power plants in the country more appealing than ever.

**Gas production:** Europe's gas production experienced a 10% decrease y-o-y in July 2023, reaching a total output of 15.2 bcm. This decline was primarily attributed to reduced production from the continent's leading producers, namely Norway, the Netherlands and the UK. The seven major shale gas-producing regions in the US recorded a y-o-y production growth of 5% in August 2023, reaching a total output of 86.3 bcm. In August 2023, the global count of gas drilling rigs saw both m-o-m and y-o-y reduction, decreasing by 20 units and 11 units, respectively, to reach a total number of 380 rigs. In July 2023, approximately 490 million boe of hydrocarbon volumes were discovered, with natural gas amounting to 36 bcm. There was a rebound in discoveries in the last two months compared to the beginning of the year.

**Gas trade:** Pipeline gas imports to the EU remained at a relatively stable level in August 2023, experiencing a modest decline of 1% m-o-m, to reach 13.4 bcm. In contrast, global LNG imports witnessed a robust expansion, increasing by 4.3% y-o-y to reach 33.9 Mt. The primary drivers of this growth were the Asia Pacific and MENA regions. Asia Pacific's LNG imports hit the highest monthly import volume since January with China making a significant contribution to this increase. Meanwhile, Europe faced its second consecutive y-o-y decline in LNG imports in August, driven by a substantial premium of Asian spot LNG prices over TTF gas prices and high gas storage levels.

**Gas storage:** Europe has successfully met its underground gas storage filling target by mid-August, well ahead of schedule. The average volume of gas in storage in the European Union in August 2023 was 94.5 bcm, which represents 91% of the total storage capacity in the region. Moreover, in the United States, 65% of the country's gas storage capacity has now been filled, equating to 87.0 bcm. In Asia, the total volume of LNG in storage in Japan and South Korea combined was estimated at 9.2 bcm.

**Energy prices:** Gas and LNG spot prices in both Europe and Asia witnessed bullish trends in August 2023. This surge was primarily attributed to the potential disruption in Australian LNG exports. Additionally, spot price volatility was more pronounced compared to the previous month. The average TTF spot price stood at \$10.7/MMBtu, marking a 12% m-o-m increase. Additionally, the average NEA spot LNG price experienced an increase of 8% m-o-m to reach \$11.7/MMBtu. As the winter season approaches and buying activity from price-sensitive Asian LNG importers increases, it is likely that prices will receive further support.

## The 2024 GECF Awards: Call for Nominations



The nomination period for the 2024 GECF Awards is open, from **August 1, 2023, to October 31, 2023**.

The GECF Awards honours the exceptional individuals and esteemed institutions that have demonstrated an outstanding record of accomplishment in the gas sector, under three distinguished categories:

- The GECF Foundation and Advancement Award,*
- The Friend of GECF Award, and*
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For more information, including the criteria for the award categories, as well as the nomination form, please visit our website at:

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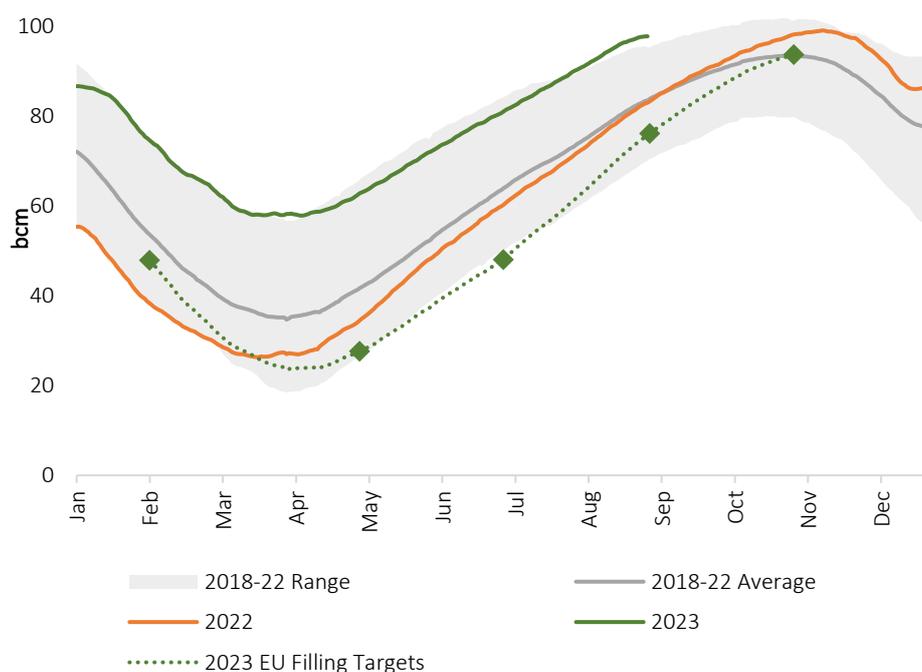
Don't miss this opportunity to recognize outstanding contributions to the gas sector!

## Feature Article: Gas storage in the European Union

The countries of the European Union (EU) collectively oversee underground gas storage sites with a total capacity of 104 bcm. The role of gas storage in the region has gained added significance over the past two years due to the reduction in pipeline gas imports, which subsequently impacted gas prices on the continent.

To ensure that the region maintains sufficient gas reserves for the winter seasons, the European Commission enacted legislation concerning the filling of gas storage sites within the EU member states. Targets for the level of gas in storage were set for February 1, May 1, July 1 and September 1, leading to the goal of achieving 90% filled capacity by November 1, 2023. These milestones, along with the final target, created an expected trajectory for the 2023 gas injection season (Figure 1).

Figure 1: The gas storage filling trajectory in the EU during 2023



Source: GECF Secretariat based on data from AGSI+ and the European Commission

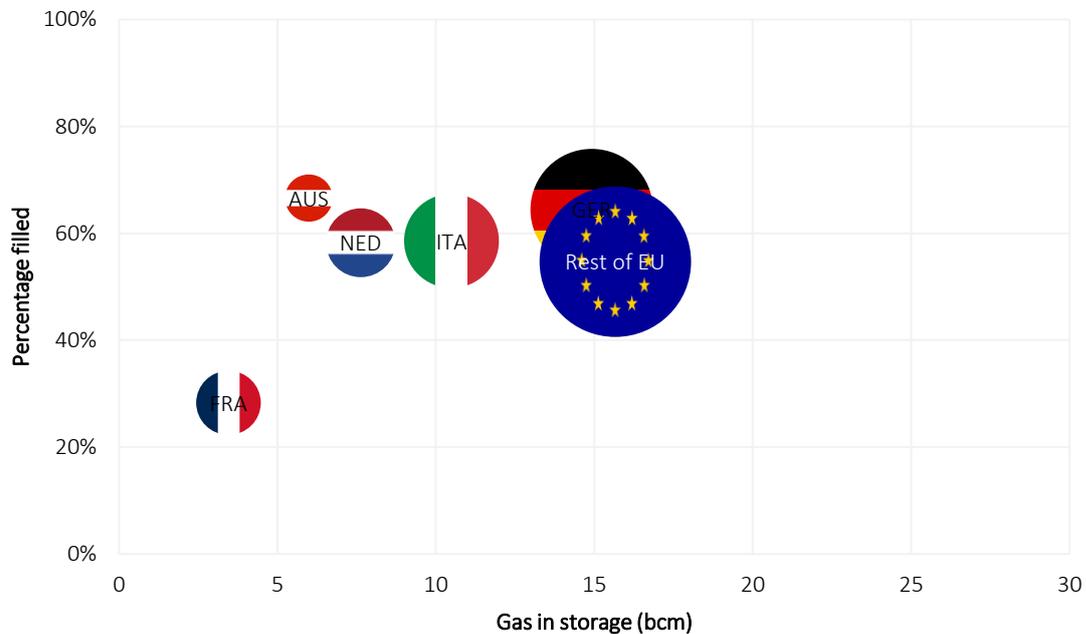
However, due to the milder-than-expected winter conditions and the measures implemented by the European Commission to reduce gas demand, the region ended the winter season of 2022/23 with 58 bcm of gas in storage. This quantity exceeded the five-year average by 23.5 bcm and surpassed the EU's filling trajectory by 35 bcm. Consequently, the net gas injection season for 2023 only required 35 bcm to reach the November 1 target, compared to the 65 bcm injected in 2022.

The distribution of the EU's underground gas storage capacity in the top five countries by size is as follows: Germany with 23 bcm, Italy with 18 bcm, Netherlands with 13 bcm, France with 12 bcm and Austria with 9 bcm. The remaining EU countries have a combined storage capacity of 28 bcm.

Figure 2 illustrates the gas storage levels in these top five countries and the rest of the EU combined. In these charts, the sizes of the circles correspond to the relative capacity of underground gas storage sites within each country.

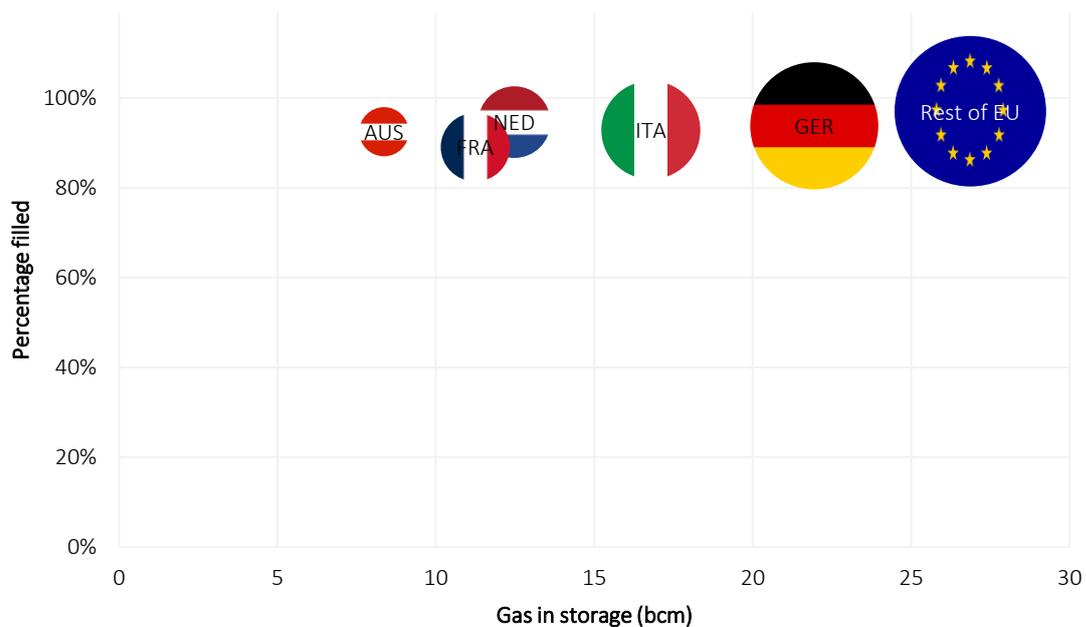
Figure 2: Storage levels in the top EU countries

On April 1, 2023:



Source: GECF Secretariat based on data from AGSI+

On August 31, 2023:



Source: GECF Secretariat based on data from AGSI+

Prior to the implementation of the European Commission’s filling regulations in 2022, the price of natural gas in the region had a direct correlation with the level of gas in storage.

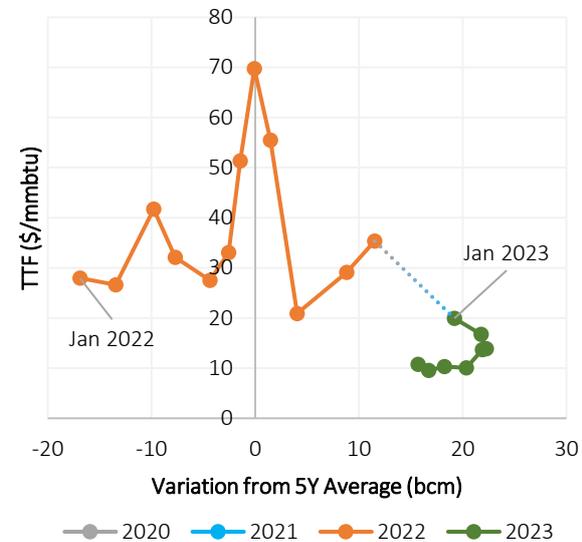
Storage site operators would purchase gas at lower prices during the summer, intending to resell it when prices escalate during the subsequent winter. However, this dynamic has now reversed, with TTF hub prices now experiencing significant fluctuations influenced by various factors, including the rate of stock build within the region.

This was initially observed in 2022 when EU countries were assiduously filling their storage sites, keeping the EU’s impending target in mind (

Figure 3). As a result, the delta between the current level of gas in storage and that of the five-year average declined over the summer months, eventually closing completely by August.

Simultaneously, the TTF price skyrocketed during the rush to secure gas for storage. Prices then experienced a significant decline in the two months that followed before the anticipated increase during the winter. Given the already elevated level of gas in storage by April, the gas storage season of 2023 necessitated a slower stock build, resulting in reduced demand for gas purchases. This was reflected in the downward pressure on the TTF price.

Figure 3: Correlation between TTF and filling of UGS sites in the EU



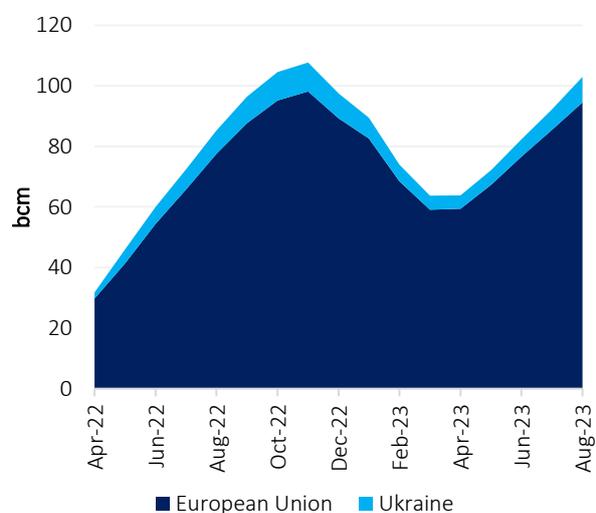
Source: GECF Secretariat based on data from AGSI+ and Refinitiv Eikon

With the region meeting its filling target well ahead of the November 1 deadline, this may contribute to keeping the TTF prices at these lower levels, at least until gas demand begins to rise again during the 2023/24 winter period.

In recent months, the EU has been presented with an opportunity to access additional underground gas storage capacity in Ukraine. Ukraine possesses 31 bcm of storage capacity, surpassing the capacity of any single EU country. Approximately 25 bcm of this capacity is located in western Ukraine, near the border with Poland and Slovakia.

Ukraine’s state gas company, Naftogaz, has offered up to 10 bcm of capacity to the EU, potentially increasing the EU’s access to gas storage sites by an additional 10% (Figure 4).

Figure 4: Combined gas storage in the EU and Ukraine



Source: GECF Secretariat based on data from AGSI+

# 1 Global Perspectives

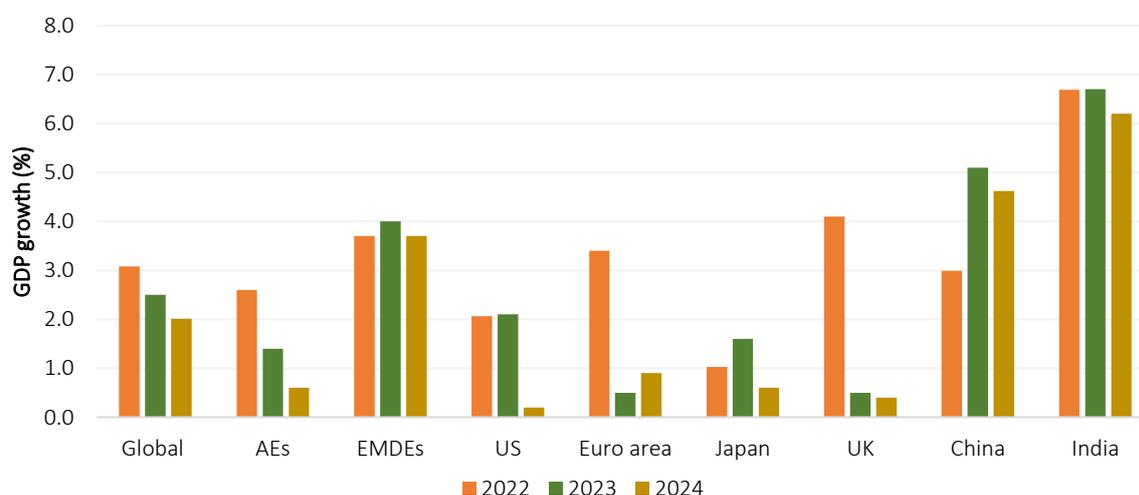
## 1.1 Global Economy

In its World Economic Prospects September 2023 report, Oxford Economics raised its projection for global GDP growth in 2023 by 0.1 percentage points to 2.5% because of the resilience of the global economy in the first half of 2023. However, growth in the second half of 2023 and 2024 is expected to be softer. In this context, the global GDP growth forecast for 2024 has been maintained at 2% (Figure 5).

The outlook for GDP growth in Advanced Economies (AEs) has been adjusted slightly upwards by 0.1 percentage points, with an expected growth rate of 1.4% in 2023. However, the GDP growth forecast for 2024 has been maintained at 0.6%. In the US, the GDP growth forecast has been raised by 0.1 percentage points to 2.1% in 2023. The US economy continues to perform better than expected, with modest growth anticipated in Q3 2023. This performance has been largely driven by strong consumer spending and a robust labour market. However, the possibility of mild recession in Q4 2023 still exists due to tightening monetary policies. In the Euro area, GDP growth has been revised downward by 0.2 percentage points to 0.5% in 2023. Economic growth in the Euro area is expected to stagnate in the second half of 2023 as activity in the industrial sector remains subdued and financing conditions tighten, with no major growth engines to drive the economy. As for Japan, its GDP growth forecast for 2023 was revised upwards by 0.6 percentage points to 1.6%, reflecting strong momentum in the first half of 2023.

GDP growth in Emerging Markets and Developing Economies (EMDEs) has also experienced an upward revision by 0.1 percentage points, leading to a projected GDP growth rate of 4% in 2023. This revision was driven by better-than-expected growth in Q2 2023. However, domestic and external demand is expected to weaken, resulting in softer GDP growth of 3.7% in 2024. China's GDP growth forecast has been maintained at 5.1% in 2023 and 4.6% in 2024. Recent policy measures will continue to support growth, however, the economy continues to face downside risks including weak external demand and a downturn in the property sector. In contrast, India's GDP growth has been revised upwards by 0.7 percentage points to 6.7% in 2023.

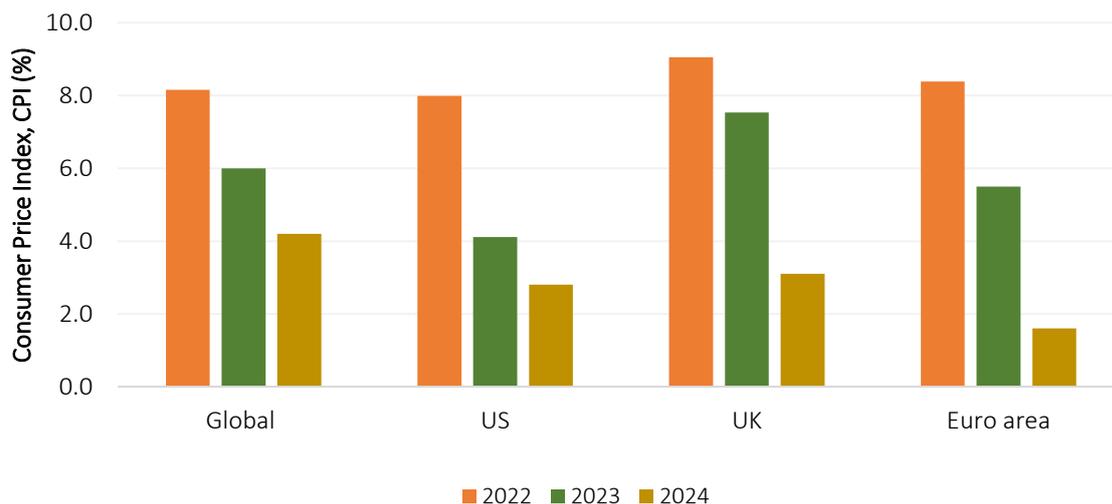
Figure 5: GDP growth forecast



Source: GECF Secretariat based on data from Oxford Economics

Inflation will continue to ease in most economies, although the pace of decline will vary depending on the timing of monetary policy tightening. Weaker commodity prices will also support lower inflation. However, headline inflation is still anticipated to remain above targeted rates in major economies until 2024 or beyond. According to the latest forecast from Oxford Economics, global inflation is projected to decrease from 8.2% in 2022 to 6% in 2023, followed by a further reduction to 4.2% in 2024. Specifically, in the US, inflation is projected to average 4.1% in 2023, with a decline to 2.8% in 2024. In the Euro area, inflation is anticipated to average 5.5% in 2023, followed by a subsequent decline to 1.6% in 2024. The UK is expected to experience inflation averaging 7.5% in 2023, before decreasing to 3.1% in 2024 (Figure 6).

Figure 6: Inflation rates

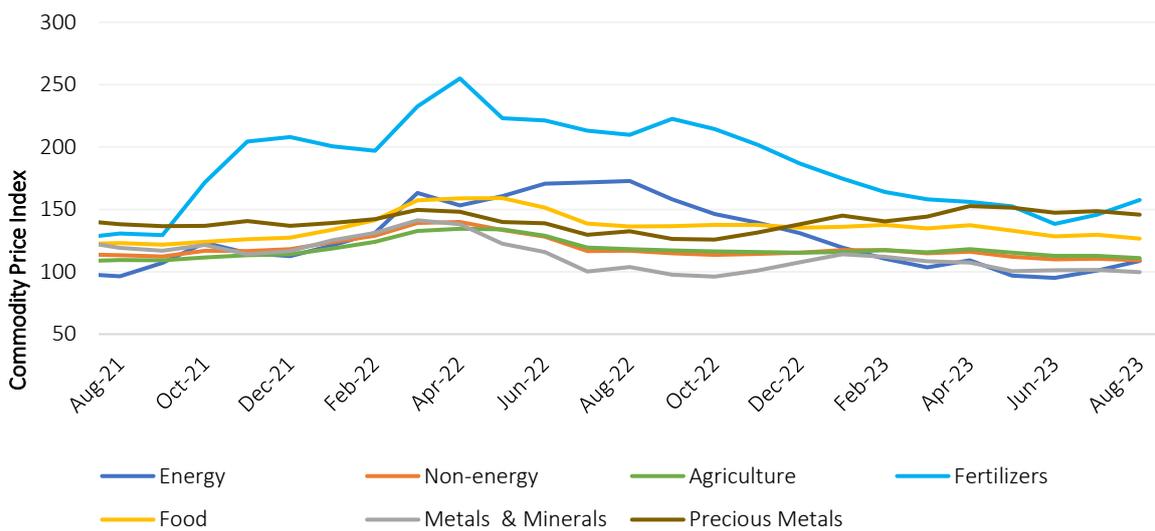


Source: GECF Secretariat based on data from Oxford Economics

In August 2023, commodity prices in the energy sector increased for the second consecutive month, while prices in the non-energy sectors reversed gains observed in the previous month. The energy price index increased by 8% m-o-m, but was 37% lower y-o-y. This uptick was primarily driven by bullish oil and gas prices during the month. Additionally, coal prices in Europe also increased compared to the previous month.

On the other hand, the non-energy price index experienced a decrease of 1% m-o-m and was 7% lower y-o-y. Within the non-energy sectors, the agriculture and precious metals price indices both declined by 2% m-o-m. Additionally, the fertilizer price index increased for the second consecutive month by 8% m-o-m after a period of decline. However, it remained 25% lower y-o-y (Figure 7).

Figure 7: Monthly commodity price indices



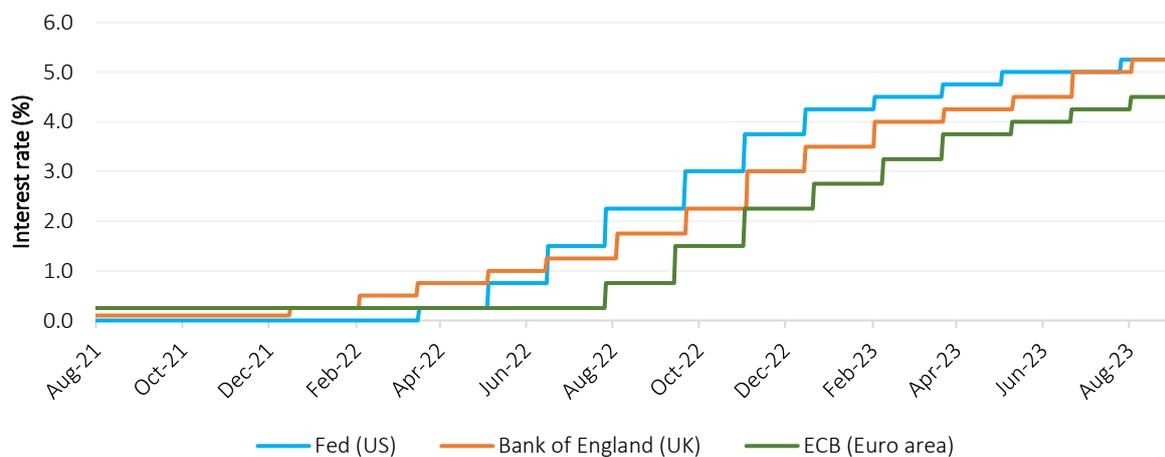
Source: GECF Secretariat based on data from World Bank Commodity Price Data

Note: Monthly price indices based on nominal US dollars, 2010=100. The energy price index is calculated using a weighted average of global crude oil (84.6%), gas (10.8%) and coal (4.7%) prices. The non-energy price index is calculated using a weighted average of agriculture (64.9%), metals & minerals (31.6%) and fertilizers (3.6%).

The US Federal Reserve (Fed) is expected to maintain its benchmark interest rate within the range of 5.25% to 5.50% at the upcoming meeting in September 2023. The most recent hike occurred at the end of July 2023 (Figure 8). Nevertheless, there is a possibility of a further increase before the year’s end.

The European Central Bank (ECB) raised its key interest rates by 0.25 percentage points on August 2, 2023, which brought interest rates on the main refinancing operations, marginal lending facility and deposit facility to 4.25%, 4.5% and 3.75%, respectively. Similarly, on August 3, 2023, the Bank of England (BOE) also raised its key interest rate by 0.25 percentage points, which stands at 5.25%. Central banks remain focused on meeting their targeted 2% inflation rates.

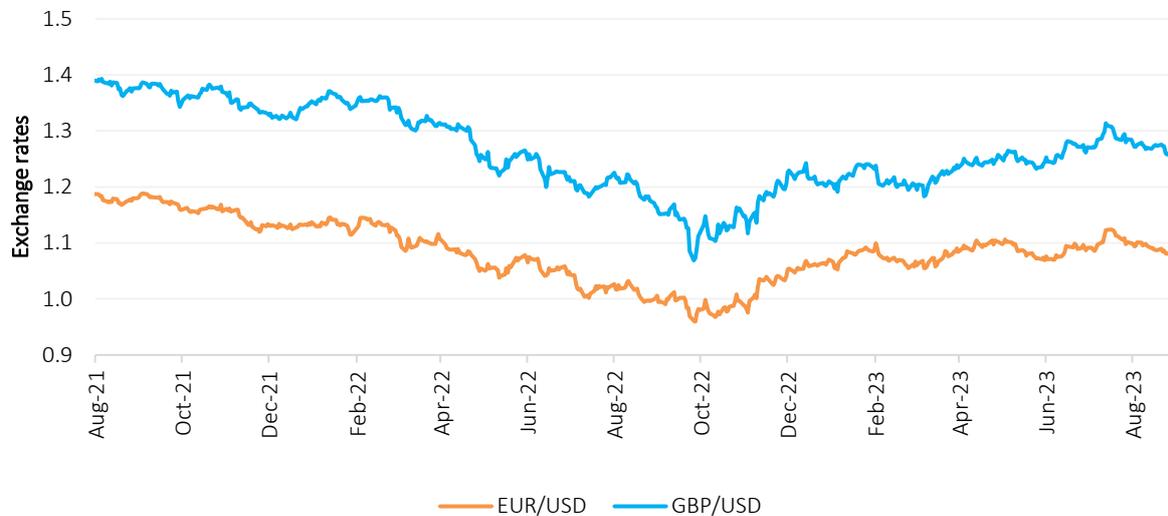
Figure 8: Interest rates in major central banks



Source: GECF Secretariat based on data from US Federal Reserve, European Central Bank and Bank of England

In August 2023, the euro depreciated against the US dollar, resulting in an average exchange rate of \$1.0908. This represented a 1% m-o-m decrease and an 8% y-o-y increase. Similarly, the British pound also lost value against the US dollar in August 2023, as the average exchange rate reached \$1.2707, reflecting a 1% decrease m-o-m and 6% increase y-o-y (Figure 9). Inflation in the Euro area remained relatively stable in August 2023, estimated at 5.3%.

Figure 9: Exchange rates



Source: GECF Secretariat based on data from Refinitiv Eikon

## 1.2 Other Developments

**G20 Summit:** The G20 Summit was held on September 9-10, 2023, in New Delhi, India under the theme of “*One Earth · One Family · One Future*”. Notably, the African Union, consisting of 55 member states, was granted permanent membership in the G20. Concerning the energy industry, G20 leaders emphasized the importance of “*exploring paths of enhanced energy security and market stability including through inclusive investments to meet the growing energy demand, in line with our sustainable development and climate goals,*” as outlined in the New Delhi Declaration. They also acknowledged the necessity of facilitating low-cost energy financing options for developing countries and supported the accelerated development of global hydrogen markets from zero- and low-emission technologies. Furthermore, the leaders recognized “*the importance to accelerate the development, deployment and dissemination of technologies, and the adoption of policies, to transition towards low-emission energy systems, including by rapidly scaling up the deployment of clean power generation, including renewable energy, as well as energy efficiency measures, including accelerating efforts towards phasedown of unabated coal power, in line with national circumstances and recognizing the need for support towards just transitions.*”

**BRICS Summit:** The 15<sup>th</sup> BRICS Summit took place on August 22-24, 2023, in Johannesburg, South Africa, with the theme “*BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development and Inclusive Multilateralism.*” A significant outcome of the Summit was the invitation extended to six countries namely Argentina, Egypt, Ethiopia, Iran, the UAE and Saudi Arabia, to join the group starting from January 1, 2024. The current five member countries collectively account for 23% of global GDP. With the inclusion of the new members,

the group is projected to account for 30% of global GDP in 2024. The leaders emphasized their shared perspective *“on the efficient use of all energy sources, namely: renewable energy, including biofuels, hydropower, fossil fuels, nuclear energy and hydrogen produced on the basis of zero and low emission technologies and processes, which are crucial for a just transition towards more flexible, resilient and sustainable energy systems.”* Furthermore, they recognised *“the role of fossil fuels in supporting energy security and energy transition”*, as highlighted in the Declaration. The summit also underscored the importance of integrated and holistic implementation of the United Nations Sustainable Development Goals (UN SDGs). The 16<sup>th</sup> BRICS Summit will be hosted by the Russian Federation in Kazan, Russia.

*APEC Energy Ministerial Meeting:* The 13<sup>th</sup> Asia-Pacific Economic Cooperation (APEC) Energy Ministerial Meeting was convened on August 15-16, 2023, in Seattle, United States, under the theme *“Creating a Resilient and Sustainable Future for All.”* APEC economies reaffirmed their commitment to collectively reduce methane emissions in the fossil energy sector by at least 50% from 2020 levels by 2030. This reduction will be achieved by minimizing flaring and venting, *conducting regular leak detection and repair in the oil and gas sector, and decreasing greenhouse gas emissions in the coal sector. Additionally, the Expert Group on Clean Fossil Energy was expanded to encompass issues related to methane abatement and efforts to convert wasteful methane emissions into valuable energy sources.*

*ASEAN Summit:* The 43<sup>rd</sup> Association of Southeast Asian Nations (ASEAN) Summit was held on September 4-7, 2023, in Jakarta, Indonesia. During the Summit, ASEAN members reaffirmed their commitment to further strengthen ASEAN as an organization that is robust, agile and equipped with strengthened capacity and institutional effectiveness. Several statements and declarations have been adopted at the Summit including the ASEAN Leaders’ Declaration on ASEAN as an Epicentrum of Growth. In the context of the gas industry, ASEAN energy ministers have confirmed their commitment to the *“full implementation of the ASEAN Power Grid and Trans-ASEAN Gas Pipeline, including the conduct of a study to assess the feasibility of cross-border electricity trade under the Brunei Darussalam–Indonesia–Malaysia–Philippines Power Integration Projects (BIMP-PIP),”* as stated in this declaration.

*Africa Climate Summit:* The inaugural Africa Climate Summit (ACS) was held on September 4-6, 2023, in Nairobi, Kenya, under the theme *“Driving Green Growth and Climate Finance Solutions for Africa and the World.”* The Summit was organized by the African Union Commission in collaboration with the Republic of Kenya, the host government. The leaders expressed their concerns about the disproportionate burdens and risks that many African countries face arising from climate change and called for ‘climate-positive investment.’ Furthermore, African leaders called for *“technical and financial resources directed toward Africa to promote sustainable utilization of Africa’s natural assets for the continent’s progression toward low carbon development, and contributing to global decarbonisation,”* as stated in the Nairobi Declaration on Climate Change and Call to Action. Moreover, this Declaration will serve as a basis for Africa’s common position in the global climate change process to COP28.

## 2 Gas Consumption

### 2.1 Europe

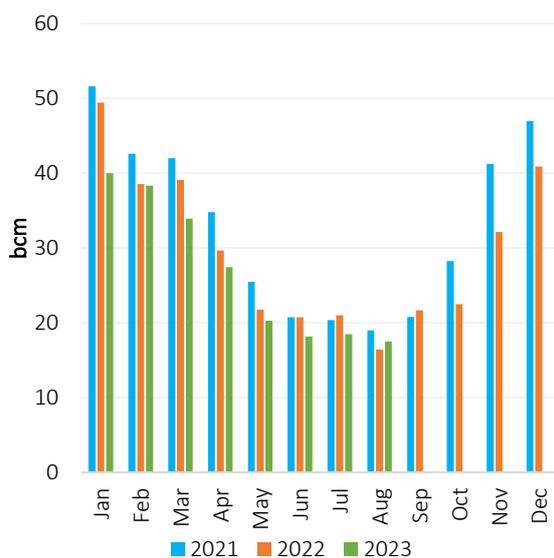
#### 2.1.1 European Union

In August 2023, following ten consecutive months of decline, gas consumption in the EU rose by 6.5% y-o-y, reaching a total of 17.5 bcm (Figure 10). This growth was largely driven by a resurgence in the industrial sectors of both Germany and Spain. Furthermore, as gas prices dropped throughout the month, the demand in the industrial sector in several EU countries returned to levels observed in previous years. It is worth noting that August 2022 marked the month when prices peaked historically, leading to the shutdown of industries across Europe, with 70% of fertilizer production in Europe coming to a halt during that period.

Gas-based electricity production within the EU fell by 21% y-o-y, while total electricity production decreased by 4% y-o-y, reaching 196 TWh. The decrease in gas-fired power generation was driven by the rising output from other renewable energy sources. Hydro, solar and wind power generation witnessed substantial growth of 21%, 12% and 32% y-o-y, respectively. Additionally, there was a significant decrease of 40% y-o-y (equivalent to 15 TWh) in electricity generation from coal. Electricity generation from nuclear power rose by 6% y-o-y (Figure 11). Renewables accounted for the largest share of the power mix at 34%, followed by nuclear (24%), gas (18%), hydro (12%) and coal (12%).

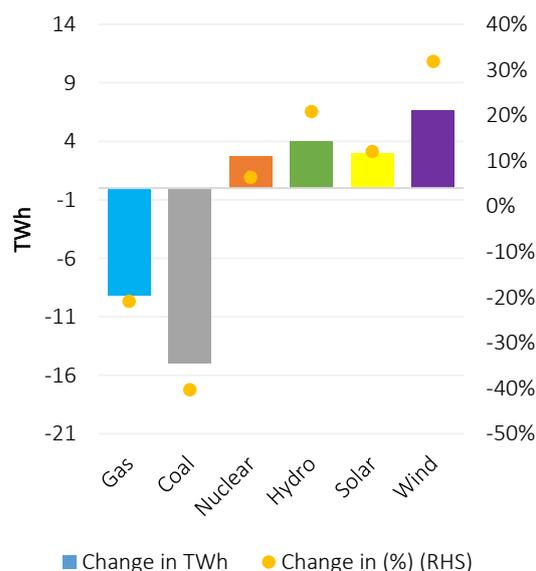
For the period from January to August 2023, EU's gas consumption fell by 9.5% y-o-y, reaching 214 bcm.

Figure 10: Gas consumption in the EU



Source: GECF Secretariat based on data from Entso-g and McKinsey

Figure 11: Trend in electricity production in the EU in August 2023 (y-o-y change)

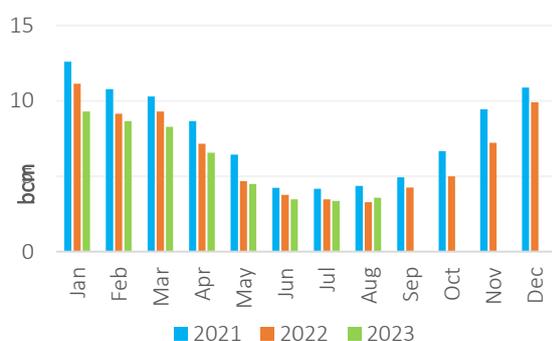


Source: GECF Secretariat based on data from Ember

### 2.1.1.1 Germany

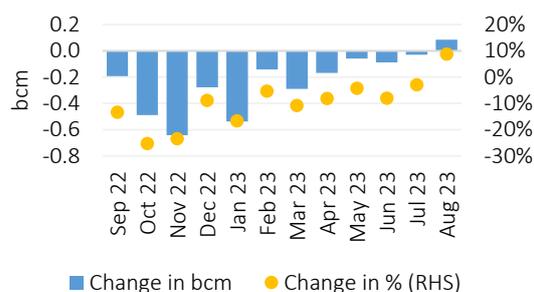
In August 2023, after more than a year and a half of declining gas consumption, Germany experienced an 8.8% y-o-y increase, reaching 3.6 bcm (Figure 12). This rise in gas consumption was observed across all sectors, with the power generation leading the way with a remarkable 24% y-o-y growth. Several factors contributed to this increase, including the competitiveness of natural gas, which promoted the shift from coal to gas; reduced solar output during the month; and the phase-out of nuclear energy, which favoured natural gas during this period. Similarly, the industrial sector recorded its first growth since November 2021, marking an 8% y-o-y increase (Figure 13).

Figure 12: Gas consumption in Germany



Source: GECF Secretariat based on data from Refinitiv

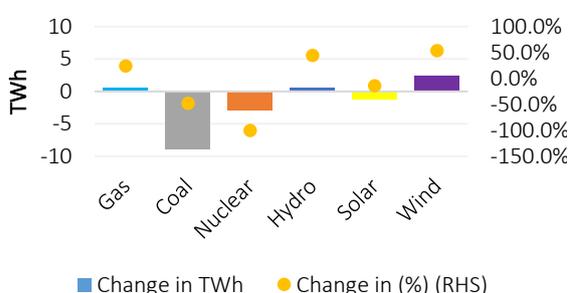
Figure 13: Trend in gas consumption in the industrial sector in Germany (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

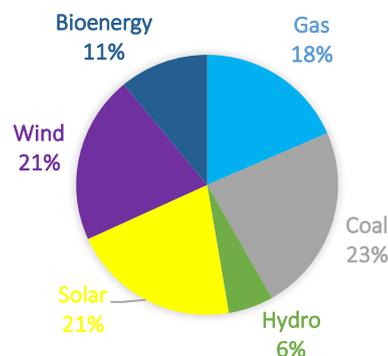
Electricity production from gas witnessed a sharp 24% y-o-y increase, while total electricity production fell by 22% y-o-y, amounting to 34 TWh. The same period witnessed a notable increase in energy generation from hydro (44% y-o-y) and wind (54%), as weather conditions were favourable for wind energy generation. Consequently, electricity production from coal witnessed a substantial decline of 48% compared to the previous year (Figure 14). Renewables held the dominant position in the energy mix, comprising 53% of the total, followed by coal (23%), gas (18%), and hydro (6%) (Figure 15).

Figure 14: Trend in electricity production in Germany in August 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 15: German electricity mix in August 2023



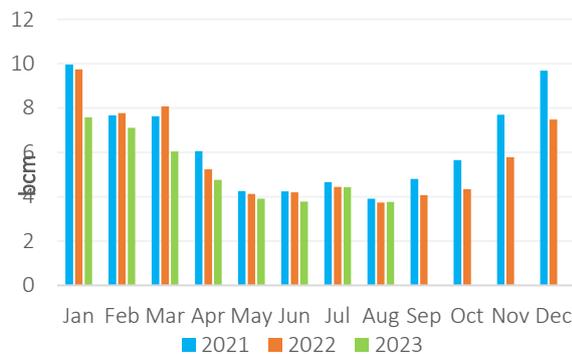
Source: GECF Secretariat based on data from Refinitiv and Ember

For the period from January to August 2023, Germany's gas consumption fell by 7% y-o-y, reaching 48 bcm.

### 2.1.1.2 Italy

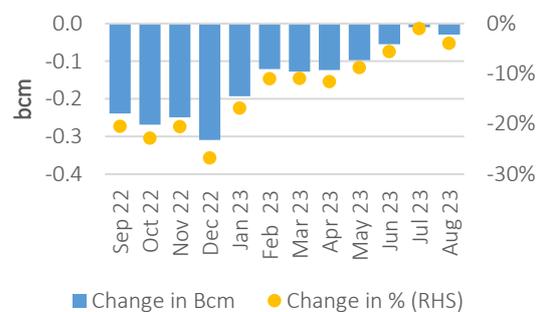
In August 2023, Italy's gas consumption dropped by 11% y-o-y to reach 3.2 bcm (Figure 16). The residential, power generation and industrial sectors all experienced reductions in consumption, with decreases of 2%, 16%, and 4%, respectively. This led to consumption levels of 0.8 bcm, 1.7 bcm, and 0.7 bcm, respectively. This drop in gas consumption can be primarily attributed to the high levels of hydro, solar and wind energy production recorded during the month. Remarkably, the industrial sector is now marking its 20<sup>th</sup> consecutive month of year-on-year declines in gas consumption (Figure 17).

Figure 16: Gas consumption in Italy



Source: GECF Secretariat based on data from Snam

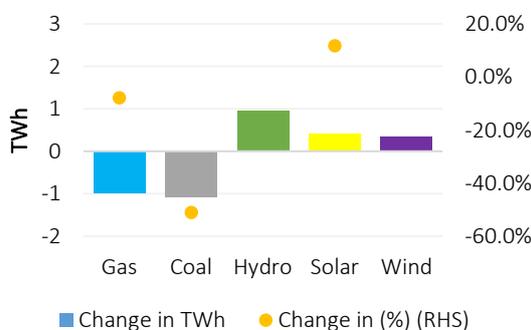
Figure 17: Trend in gas consumption in the industrial sector in Italy (y-o-y change)



Source: GECF Secretariat based on data from Snam

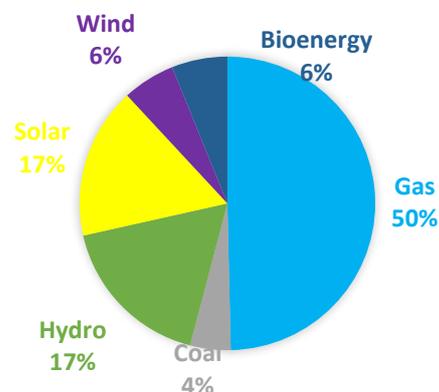
In August 2023, gas-based electricity production witnessed a notable decline of 24% y-o-y, resulting in a total decrease in electricity production of 5% y-o-y, reaching 20 TWh. In contrast, there was a significant y-o-y increase in energy generation from hydro (49%), solar (20%), and wind (45%) (Figure 18). Despite these changes, gas remained the dominant fuel in the power mix, accounting for 50% of the total, followed by renewables (29%), hydro (17%) and coal (4%) (Figure 19). It is worth noting that natural gas consumption did not benefit from the cooling demand recorded during the month following the heat wave that struck Italy during same period.

Figure 18: Trend in electricity production in Italy in August 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 19: Italian electricity mix in August 2023



Source: GECF Secretariat based on data from Refinitiv and Ember

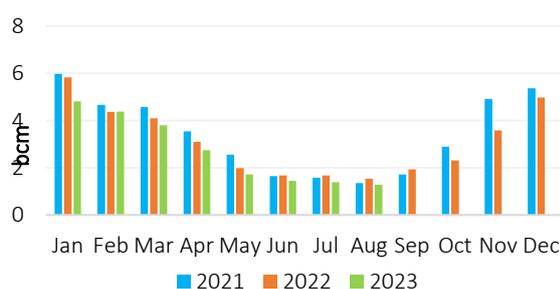
For the period from January to August 2023, Italy's gas consumption fell by 13% y-o-y, reaching 41 bcm.

### 2.1.1.3 France

In August 2023, France's gas consumption declined by 16% y-o-y to reach 1.3 bcm. This marked the sixth consecutive monthly decrease following a temporary rebound observed in February 2023 (Figure 20). The decline in gas consumption was mainly due to a sharp reduction in usage within the power generation sector (-43%), attributed to a recovery in nuclear output compared to the previous year. However, it is worth noting that high temperatures in the Rhone River caused nuclear power production to shut down on some days during the month. These elevated temperatures exceeded the limit of 20°C, triggering restrictions on nuclear power production.

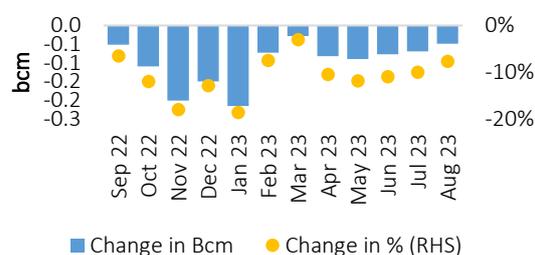
Despite falling gas prices, gas consumption in the industrial sector continued to decline, with a drop of 8% y-o-y (Figure 21). Similarly, the residential sector also experienced a decline of 1% y-o-y, due to the implementation of the EU regulation on a voluntary 15% reduction in gas demand.

Figure 20: Gas consumption in France



Source: GECF Secretariat based on data from GRTgaz

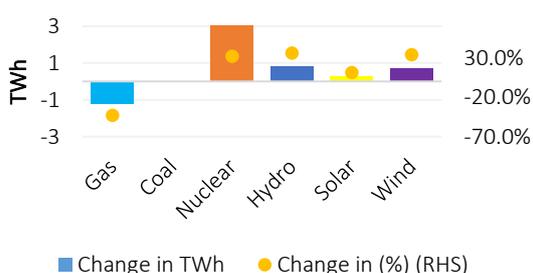
Figure 21: Trend in gas consumption in the industrial sector in France (y-o-y change)



Source: GECF Secretariat based on data from GRTgaz

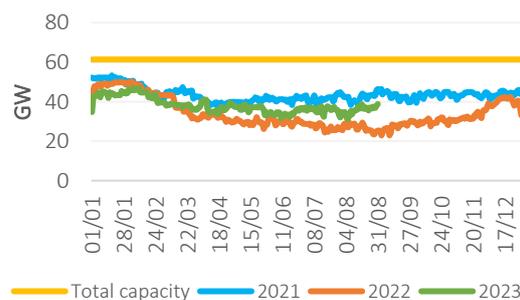
Electricity production from gas witnessed a decline of 43% y-o-y, whereas total electricity production increased by 23% y-o-y, reaching 34 TWh. The month also marked a recovery in electricity generation from nuclear power, increasing by 32% y-o-y. Nuclear capacity availability rose by 34% y-o-y, remaining at the same level as the previous month (Figure 23). Forecasts from the French EDF utility program suggest that the upcoming months are expected to see further increases in France's nuclear availability. Higher electricity production was recorded from hydro (36% y-o-y), wind (34%), and solar (11%). However, electricity production from coal remained unchanged (Figure 22). Nuclear power continued to hold the dominant position in the energy mix, comprising 70% of the total, followed by renewables (16%), hydro (9%), and gas (5%).

Figure 22: Trend in electricity production in France in August 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

Figure 23: French nuclear capacity availability



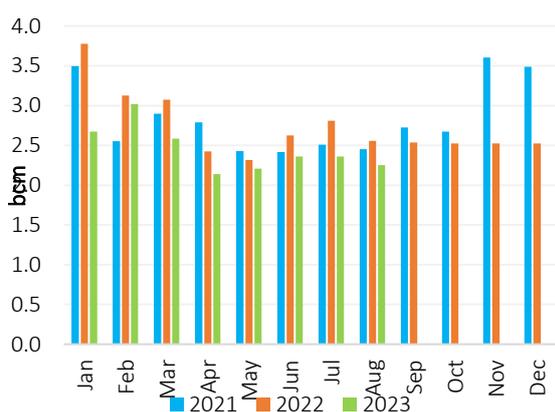
Source: GECF Secretariat based on data from Refinitiv and RTE

For the period from January to August 2023, France's gas consumption fell by 11% y-o-y, reaching 22 bcm.

### 2.1.1.4 Spain

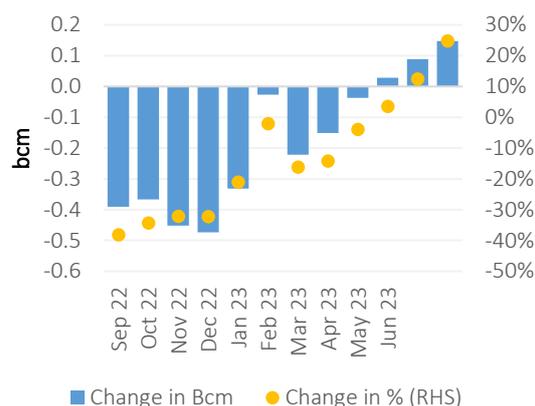
In August 2023, Spain witnessed a 12% y-o-y decline in gas consumption, reaching 2.3 bcm. The power generation sector drove the decline with a drop of 32% y-o-y. The decline was also attributed to increased renewable energy output (solar and hydro) and a reduction in electricity exports to France (Figure 24). However, in the industrial sector, gas consumption recorded its third consecutive growth in a row, with a y-o-y increase of 25% (Figure 25). This growth was driven by higher gas consumption in the refinery, textile, agri-food and pharma industries, with growth rates of 107%, 110%, 9%, and 34% y-o-y, respectively.

Figure 24: Gas consumption in Spain



Source: GECF Secretariat based on data from Enagas

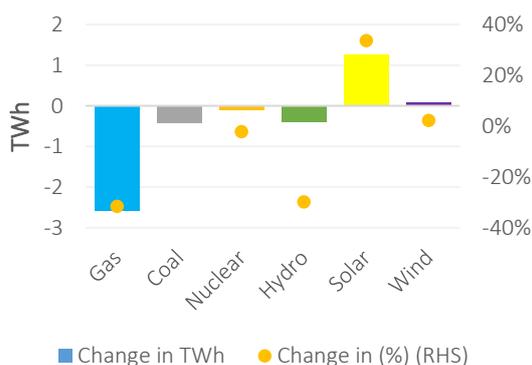
Figure 25: Trend in gas consumption in the industrial sector in Spain (y-o-y change)



Source: GECF Secretariat based on data from Enagas

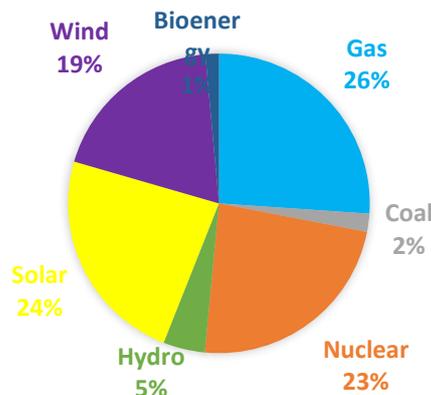
Electricity production from gas declined by 32% y-o-y, while total electricity production decreased by 9% y-o-y to reach 21 TWh. However, there were notable increases in electricity generation from solar (+34% y-o-y) and wind (2%). Conversely, electricity production from coal and hydro recorded declines of 50%, and 30%, respectively (Figure 26). Renewables held the dominant position in the power mix, accounting for 44% of the total, followed by gas (26%), nuclear (23%), hydro (5%), and coal (2%) (Figure 27).

Figure 26: Trend in electricity production in Spain in August 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember and Ree

Figure 27: Spanish electricity mix in August 2023



Source: GECF Secretariat based on data from Ember and Ree

For the period from January to August 2023, Spain's gas consumption fell by 14% y-o-y to 8 bcm.

### 2.1.2 United Kingdom

In August 2023, gas consumption in the UK fell by 2.7% y-o-y, reaching 3.5 bcm (Figure 28). This decline was largely attributed to decreases in gas consumption within the industrial and power generation sectors, which fell by 32% and 28% y-o-y, respectively. The reduction in gas consumption in the power generation sector was driven by higher wind output during the month. In contrast, the residential sector saw a significant increase of 0.5 bcm in gas consumption, representing a 30% y-o-y rise, reaching 2 bcm (Figure 29).

Figure 28: Gas consumption in the UK

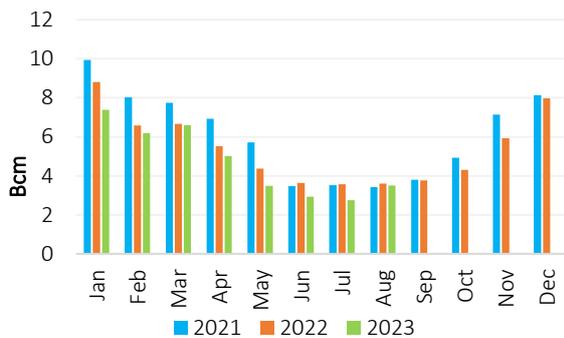
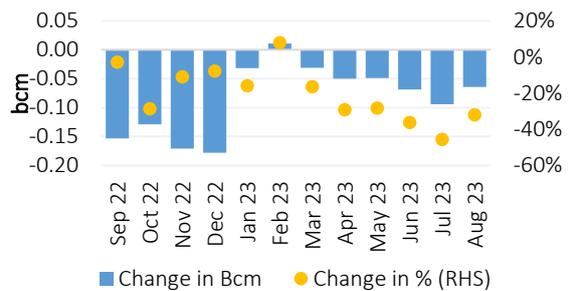


Figure 29: Trend in gas consumption in the industrial sector in the UK (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

The UK's electricity production from gas decreased by 37% y-o-y, while total electricity production fell by 15% y-o-y, reaching 23 TWh. Wind power generation increased by 36% y-o-y. However, electricity production from nuclear, hydro and solar declined by 12%, 13%, and 10% y-o-y, respectively (Figure 30). Gas emerged as the dominant energy source in the power mix accounting for 43% of the total, followed by renewables (37%), nuclear (18%), and hydro (1%) (Figure 31).

Figure 30: Trend in electricity production in UK in August 2023 (y-o-y change)

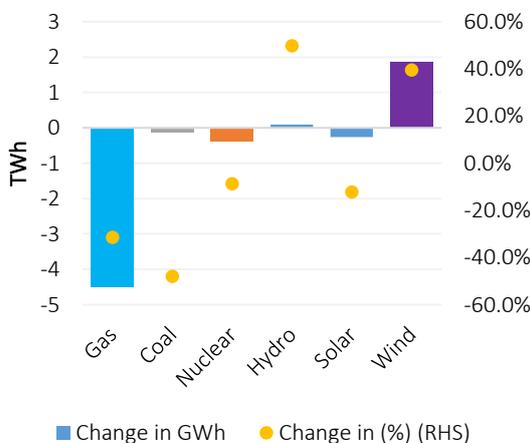
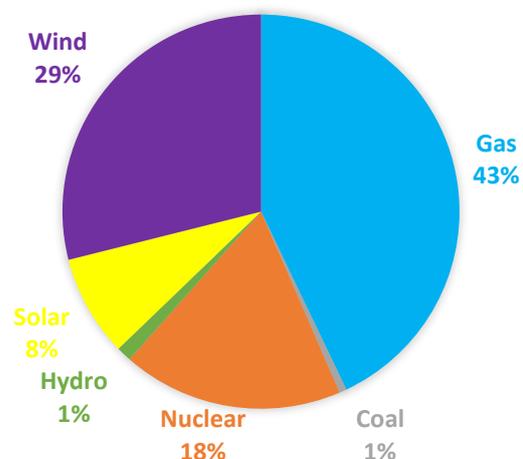


Figure 31: UK electricity mix in August 2023



Source: GECF Secretariat based on data from Refinitiv

For the period from January to August 2023, UK's gas consumption fell by 11% y-o-y to 38 bcm.

## 2.2 Asia

### 2.2.1 China

In July 2023, China's apparent gas demand, covering pipeline imports, LNG imports and domestic production, rose by 12% compared to the previous year, totalling 33 bcm. This uptick in natural gas usage can be attributed to the resurgence in economic activities after the strict COVID-19 lockdown measures of 2022 were relaxed.

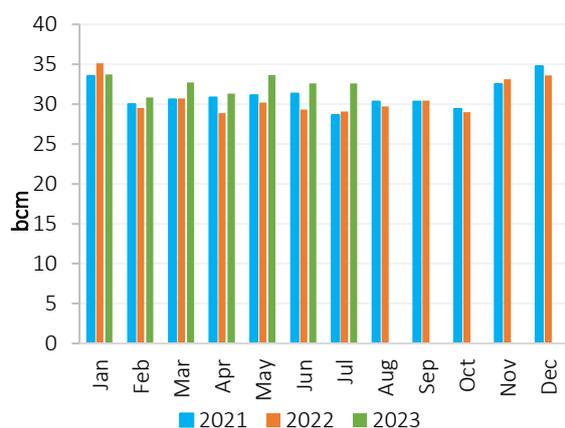
Moreover, a heatwave that swept through the eastern and southern regions in July led to a spike in cooling demand, resulting in a 6% increase in electricity production y-o-y. On 16 July, China recorded a new national temperature high of 52.2°C in Turpan city, located in Xinjiang province, as reported by the China Meteorological Administration. This heightened electricity demand coincided with a reduced hydro output of 17%, further amplifying the demand for natural gas in the power generation sector for that month (Figure 32).

According to China's National Energy Administration, the nation's natural gas consumption is forecast to reach 390 bcm in 2023. This indicates an increase of 7% compared to the prior year, largely attributed to the growth in the residential and power generation sectors.

Electricity production from gas increased by 15% y-o-y, while total electricity production rose by 5%, reaching 774 TWh. During the month, there was a surge in electricity generation from coal (+15%), nuclear (+14%), solar (+24%) and wind (+8%) (Figure 33). Coal remained the dominant fuel in the power mix, accounting for 63% of the total, followed by renewables (16%), hydro (13%), nuclear (5%) and gas (3%).

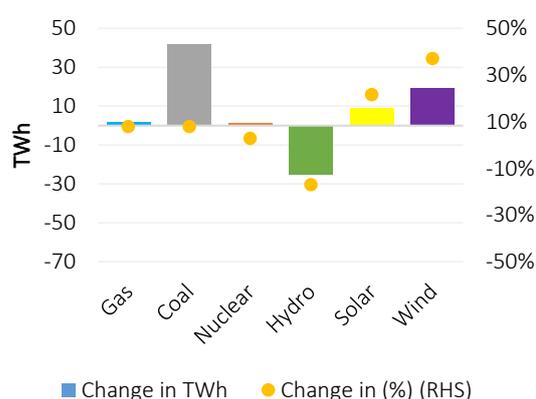
For the period from January to July 2023, China's gas consumption increased by 7% year-on-year to 227 bcm.

Figure 32: Gas consumption in China



Source: GECF Secretariat based on data from Refinitiv

Figure 33: Trend in electricity production in China in July 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

### 2.2.2 India

In July 2023, India's gas consumption marked its seventh consecutive month of growth, with a 9% y-o-y increase, reaching 5.6 bcm (Figure 34). The share of regasified LNG in India's gas supply fell to 45%. The fertilizer sector accounted for the largest share of gas consumption at 30%, followed by city gas (20%), power generation (13%), refining (9%) and the petrochemical sector (4%) (Figure 35).

The increase in gas consumption was driven by the power generation sector, which registered a growth of 12% y-o-y. The increase is linked to the higher-than-usual temperatures observed in India in July, leading to a surge in cooling demand.

India intends to raise its natural gas usage to 15% of its energy sources by 2030, a jump from 6% in 2022, India also plans to decrease its coal dependence and achieve net-zero CO2 emissions by 2070.

Figure 34: Gas consumption in India

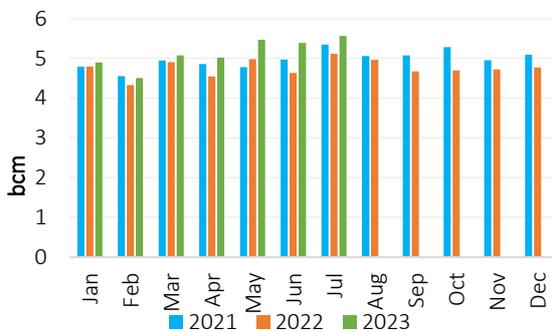
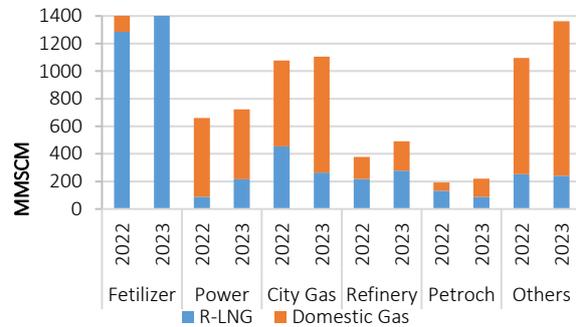


Figure 35: India's gas consumption by sector



Source: GECF Secretariat based on data from PPAC

From January to July 2023, India's total gas consumption increased by 8% y-o-y to 36 bcm.

### 2.2.3 Japan

In August 2023, for the second consecutive month, Japan experienced a 7.7% y-o-y increase in gas consumption, reaching a total of 8.8 bcm (Figure 36). This rise can be primarily attributed to heightened gas usage in the power generation sector due to increased cooling demand caused by a heatwave sweeping across the country. According to the Japan Meteorological Agency, the average temperature in Japan rose by 1°C in August compared to the previous year's record of 28°C in August 2022. Gas consumption in the power generation sector increased by 11% y-o-y. Additionally, the city gas sector saw a growth of 2.4% compared to the previous year. Furthermore, Japan's Heating Degree Days (HDD) averaged 9.3 during the month, indicating a 14% year-on-year growth (Figure 37).

For the period January to August 2023, Japan's gas consumption fell by 8% y-o-y to 64 bcm.

Figure 36: Gas consumption in Japan

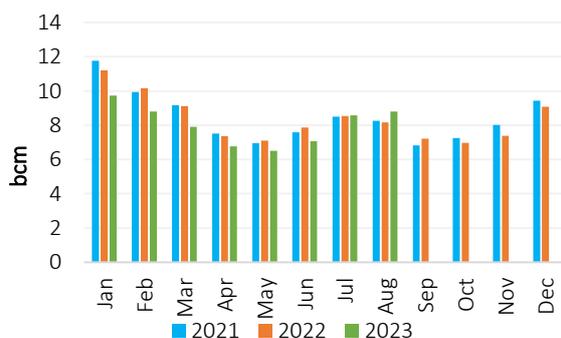
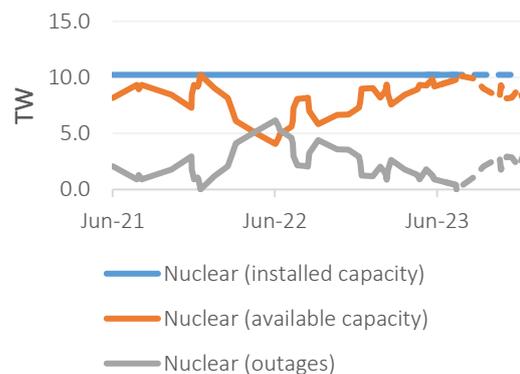


Figure 37: Nuclear availability in Japan



Source: GECF Secretariat based on data from Refinitiv

Source: GECF Secretariat based on data from Refinitiv

## 2.2.4 South Korea

In August 2023, South Korea experienced its first gas consumption growth after more than nine months of consecutive declines. It recorded an 8% y-o-y increase, totalling 4 bcm. This surge was primarily driven by a 10% upswing in gas consumption in the power generation sector, attributed to an unprecedented heatwave. The heatwave led to the issuance of the highest alert level for the first time in four years during this month. The highest alert is triggered when certain regions of the nation experience temperatures exceeding 38°C. In contrast, gas consumption in the city town sector decreased by 11% y-o-y, offsetting the growth in total natural gas consumption in the country during the month. (Figure 38). South Korea's Heating Degree Days (HDD) averaged 7 in August, representing a growth of 15% y-o-y (Figure 39).

For the period January to August 2023, gas consumption fell by 8% y-o-y to 36 bcm.

Figure 38: Gas consumption in South Korea

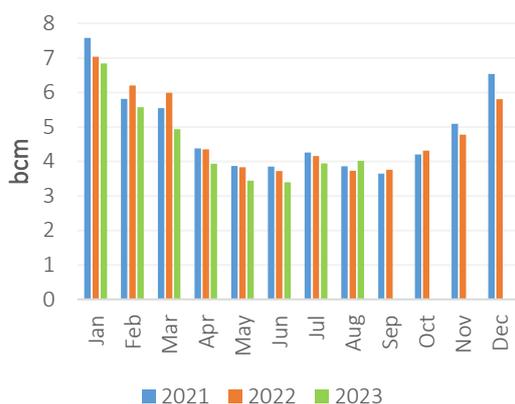
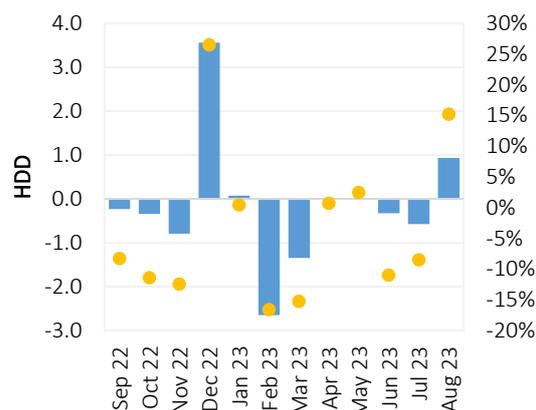


Figure 39: HDD in South Korea (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

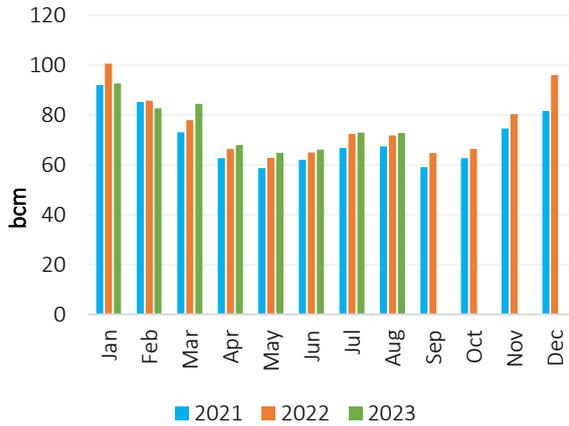
## 2.3 North America

### 2.3.1 US

In August 2023, US gas consumption increased by 0.7% y-o-y, reaching 73 bcm (Figure 40). The residential sector saw an 11% y-o-y increase, while the commercial sector experienced an 8% rise. Gas consumption in the power generation sector went up by 2%, reaching 39.3 bcm. This uptick can be attributed to the ongoing phase-out of coal power plants, heightened cooling demand due to a heatwave, and a drop in natural gas prices, which bolstered the appeal of gas-fired power plants. Meanwhile, the industrial sector's consumption remained consistent with the previous year, standing at 19 bcm.

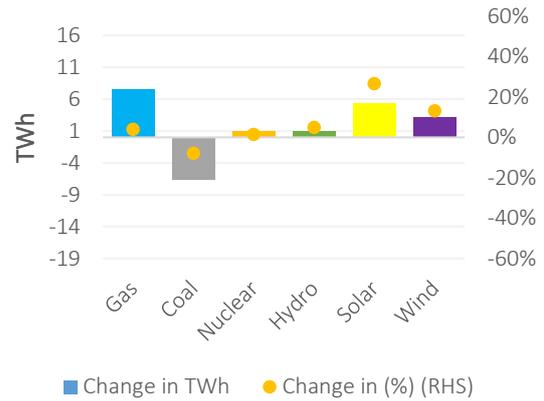
Electricity production from gas rose by 4% y-o-y, while total electricity production increased by 2.7%. The month recorded a decline of 8% in electricity generation from coal. However, there was an uptick in production from nuclear (1.4% year-on-year), hydro (5%), wind (13%), and solar (27%) (Figure 41). Gas continued to be the leading fuel in the power mix, holding a 47% share, followed by coal (18%), nuclear (16%), renewable energy sources (14%), and hydro (5%).

Figure 40: Gas consumption in the US



Source: GECF Secretariat based on data from EIA and Refinitiv

Figure 41: Electricity production in the US in August 2023 (y-o-y change)



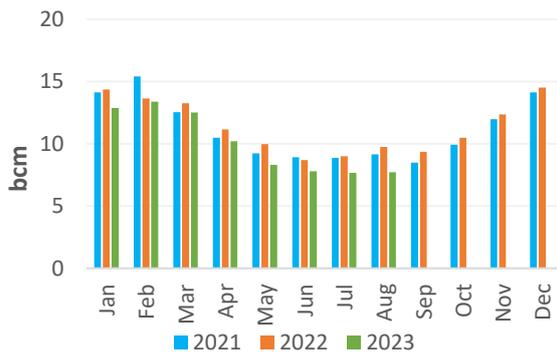
Source: GECF Secretariat based on data from Ember and Refinitiv

For the period January to August 2023, US gas consumption increased by 0.3% y-o-y to 604 bcm.

### 2.3.2 Canada

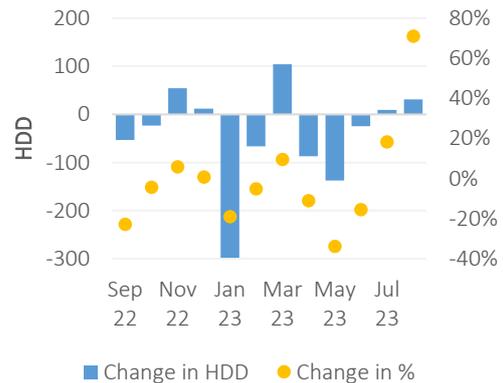
In August 2023, Canada's gas consumption declined by 20% y-o-y, reaching 7.7 bcm (Figure 42). This decline was attributed to reduced gas consumption in the industrial/power generation and commercial sectors, which fell by 22% and 30% y-o-y, respectively (Figure 43).

Figure 42: Gas consumption in Canada



Source: GECF Secretariat based on data from Refinitiv

Figure 43: HDD in Canada (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

For the period January to August 2023, Canada's gas consumption fell by 10% y-o-y to 81 bcm.

### 2.4 Weather Forecast

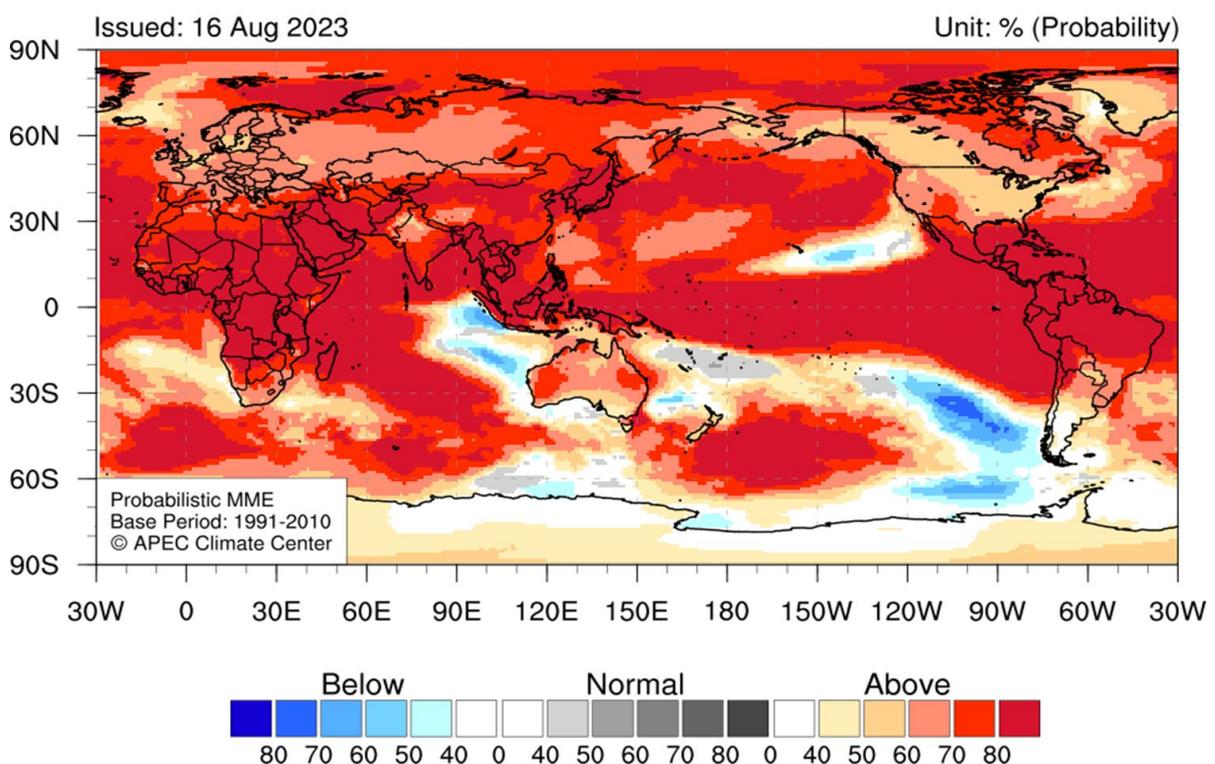
The weather and precipitation conditions have a significant impact on gas consumption. Below normal temperatures in winter and above normal temperatures in summer boost heating and cooling demand, respectively. Additionally, below normal precipitation levels result in lower hydro output, which can potentially increase gas demand in the power generation sector.

The APEC Climate Center reports the occurrence of the El Niño-Southern Oscillation (ENSO)<sup>1</sup> event. In July 2023, the equatorial Pacific recorded sea surface temperature anomalies that were higher than usual. From September 2023 to February 2024, the Niño3.4 index is expected to surpass 1.6°C. During this period, the probability of El Niño conditions is over 99%.

### 2.4.1 Temperature Forecast for September to November 2023

According to the Climate Outlook by the APEC Climate Center published on August 16, 2023 (Figure 44), a pronounced likelihood of experiencing above normal temperatures is predicted for most of the globe (excluding the eastern Indian Ocean, the eastern subtropical North Pacific, south-eastern South Pacific and the Antarctic) for the period September to November 2023.

Figure 44: Temperature forecast September to November 2023



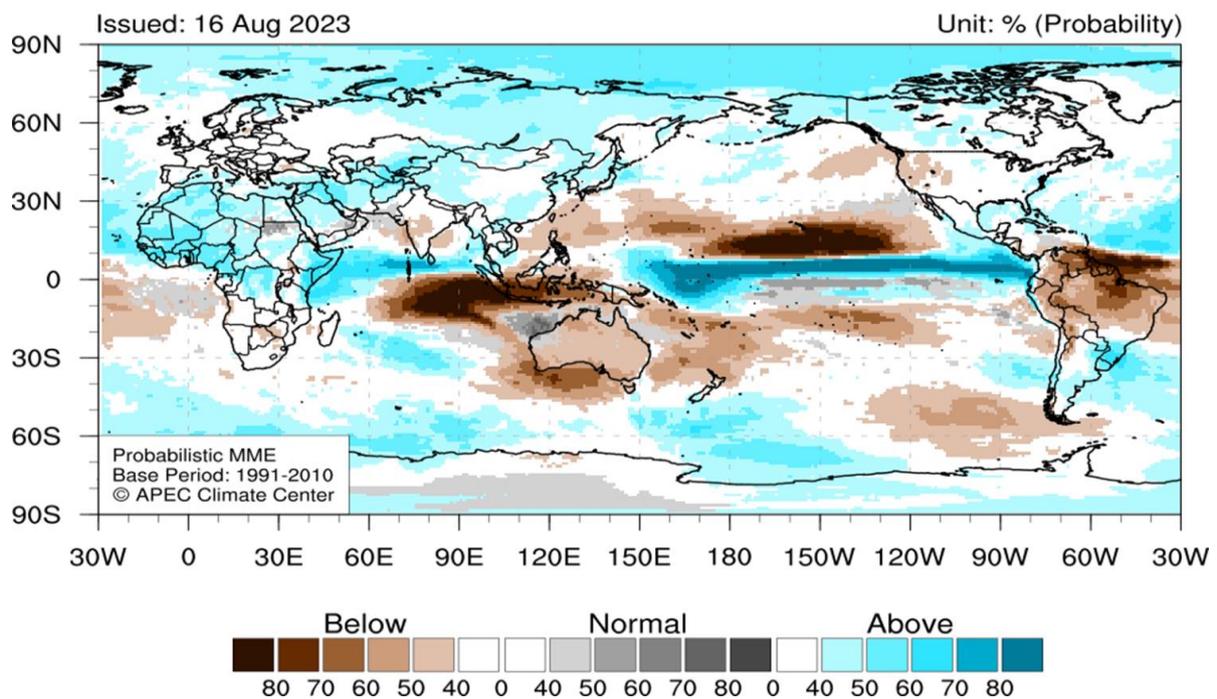
Source: APEC Climate Center

<sup>1</sup> ENSO, or El Niño-Southern Oscillation, is a recurring climate pattern involving changes in the temperature of waters in the central and eastern tropical Pacific Ocean. ENSO has two main phases: El Niño (associated with warmer than average sea surface temperatures) and La Niña (associated with cooler than average sea surface temperatures). These phases can significantly influence weather patterns around the world.

## 2.4.2 Precipitation Forecast for September to November 2023

According to the Climate Outlook by APEC Climate Center published on August 16, 2023 (Figure 45), above normal precipitation is expected for equatorial Pacific and western Indian Ocean, tropical North Atlantic, eastern Russia, northern and central Africa, the Middle East and the Arctic, while below normal precipitation is expected for central off-equatorial Pacific, tropical Atlantic near South America, eastern Indian Ocean, and northern South America and the Great Australian Bight for the period September November 2023.

Figure 45: Precipitation forecast September to November 2023



Source: APEC Climate Centre

### 3 Gas Production

#### 3.1 Global

The updated data reveals a modest 0.1% reduction in global gas production in 2022, resulting in a cumulative production volume of 4,029 bcm. This decline can be primarily attributed to decreased production levels in the CIS and African regions. Conversely, North America, the Middle East and Europe witnessed an uptick in their gas production quantities (Table 1). Updated information from the preceding month has resulted in a downward revision of the 2022 global gas production estimates.

The outlook for 2023 suggests a revival in worldwide gas production, with a projected rise of 1.6%. This upturn is set to be driven primarily by North America, the Middle East, Africa, and LAC, while other regions may either maintain their current production levels or potentially see a decline. Non-GECF producers are foreseen to augment their gas production by 3.3%, reaching an aggregate output of 2,412 bcm. In this growth narrative, the United States is anticipated to play a pivotal role, contributing a substantial increase of 48 bcm compared to the previous year.

**Table 1: Global gas production forecast by region (bcm)**

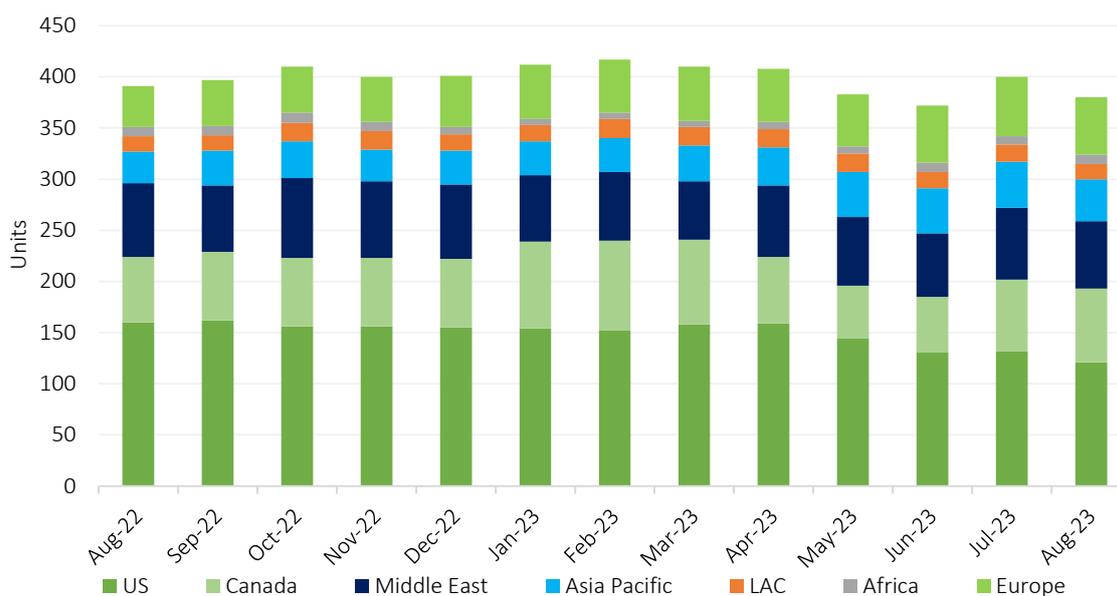
Region	2021	2022	2022 Revision*	2023	2023 Revision*
Africa	263	261	-0.2%	264	-0.6%
Asia Pacific	643	649	-1.5%	654	-0.5%
CIS	909	831	-0.1%	811	-0.4%
LAC	157	158	2.8%	164	2.2%
Europe	225	232	0.2%	222	-0.9%
Middle East	670	684	-0.1%	703	0.1%
North America	1165	1214	-0.1%	1277	-0.1%
<b>World</b>	4033	4029	-0.2%	4095	-0.2%
<b>GECF</b>	1764	1695	0.2%	1682	0.2%
<b>non-GECF</b>	2269	2335	-0.5%	2412	-0.5%

Source: GECF Secretariat based on Rystad Energy Ucube

\*Revision for 2022 and 2023 global gas production compared to previous estimate

In August 2023, the global number of gas drilling rigs—an indicator of upstream activity—experienced a m-o-m contraction of 20 units, as well as a y-o-y reduction of 11 units, culminating in a total of 380 rigs (Figure 46). While Canada and Africa saw an uptick in the number of operational gas rigs, contrasting trends were observed in other global regions. Specifically, the US, Middle East, Asia-Pacific, Europe and Latin America witnessed declines of 11, 4, 4, 2 and 2 units, respectively.

Figure 46: Trend in monthly global gas rig count



Source: GECF Secretariat based on data from Baker Hughes

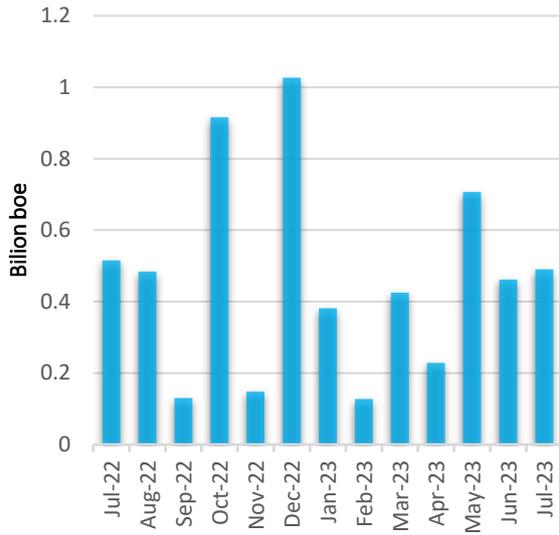
Note: Excludes data for Eurasia and Iran

In July 2023, the total volume of gas and liquids discovered amounted to 490 million barrels of oil equivalent (boe). Of this, gas accounted for 43% (36 bcm), while oil constituted the remaining 57% (280 million boe). This marked an increase in volumes compared to the 460 million boe discovered in June 2023, and a decrease compared to the 515 million boe discovered in July 2022. This resulted in an average monthly discovered volume of 451 million boe in the first seven months of 2023 (Figure 47). The cumulative volume of discoveries in the period January-July 2023 reached 3.1 billion boe, compared to discovered volumes of 4.5 billion boe for the same period in 2022. The decline in discovered volumes in 2023 reflects the challenges confronting global exploration activity, despite the anticipated rebound in global exploration investments for the year. There have been some signs of improvement in the past two months. It is noteworthy that approximately 93% of the total discoveries were made offshore.

In July 2023, 7 new discoveries were announced, only 1 of which was onshore. Europe, Africa and North America accounted for 51%, 21% and 19% of the discovered volumes, respectively. No significant discoveries were reported in Eurasia, LAC and the Middle East. (Figure 48).

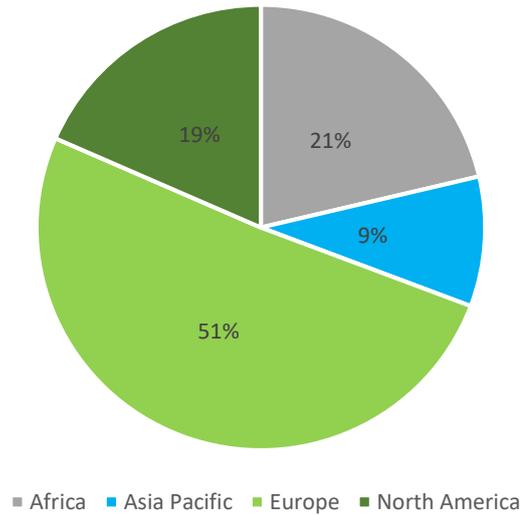
The Carmen offshore oil and gas discovery in Norway was the largest and most significant hydrocarbon discovery announced in July 2023. The discovery was made through the exploration well 35/10-10 S, drilled in Block PL 1148. The block lies within the Carmen prospect, 25km to the east of the prolific Troll field, which facilitates its development using nearby infrastructure. Rystad Energy estimated the discovery to hold 175 million boe of recoverable resources (24 bcm of gas and 35 million bbl of oil). This discovery is considered the largest find in Western Europe since the Wisting discovery in the Barents Sea, offshore Norway, in 2013.

Figure 47: Monthly gas and liquid discovered volumes



Source: GECF Secretariat based on Rystad Energy Ucube

Figure 48: Discovered volumes in July 2023 by region

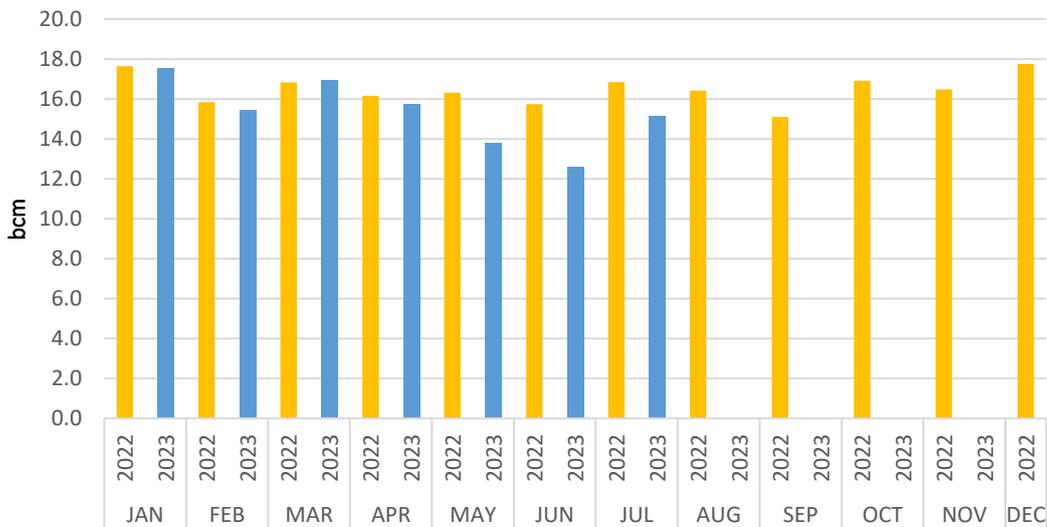


Source: GECF Secretariat based on Rystad Energy Ucube

### 3.2 Europe

In July 2023, European gas production witnessed a y-o-y decline of 10%, culminating in an aggregate output of 15.2 bcm (Figure 49). This contraction was largely ascribed to diminished production from the continent's main producers: Norway, the Netherlands and the United Kingdom. Consequently, the projected total production for 2023 is anticipated to contract by 10 bcm relative to the preceding year.

Figure 49: Europe’s monthly gas production



Source: GECF Secretariat based on data from Refinitiv, and Norwegian Petroleum Directorate

\*Europe’s production: UK, the Netherlands, Norway, Germany, Italy, Poland, Denmark, Austria and Romania

In a significant development in European gas production, Cyprus rejected the updated field development plan for Aphrodite submitted by Chevron Company in August. The plan included the construction of a subsea pipeline connecting the Aphrodite reservoir to the existing production and processing infrastructure in Egypt. The Aphrodite field was discovered in 2011 and located in Block 12 within the Cypriot Exclusive Economic Zone, approximately 30 km northwest of the Leviathan field. It is estimated to contain in the range of 124 bcm of gas potential. The Cypriot Minister of Energy stated that the parties would engage in discussion to reach an agreement within a period of 30 days.

In a related context, OMV announced in August the largest natural gas discovery in Austria in 40 years. This discovery was made through the exploration well Tief-2, drilled at a depth of 5000 m. Preliminary estimates indicate a discovery with potential recoverable resources of 4.8 bcm of natural gas. OMV expects that the full development of this new discovery has the potential to increase Austrian gas production by 50%.

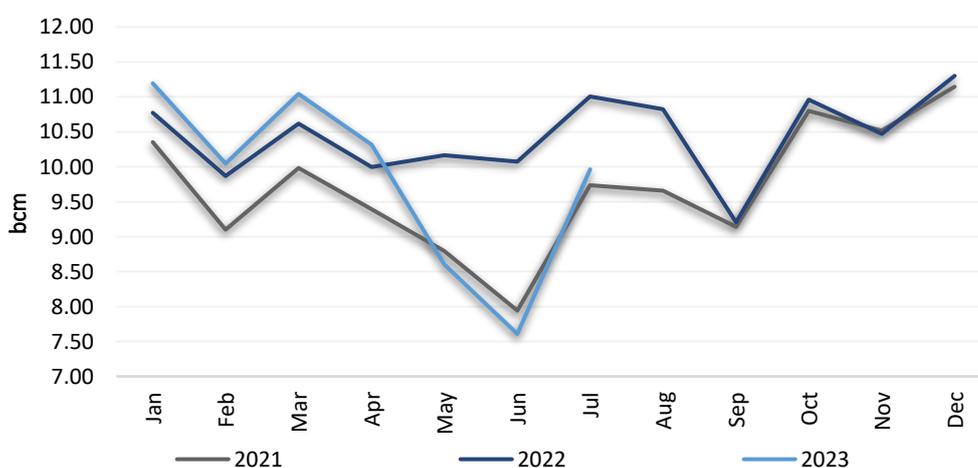
### 3.2.1 Norway

Based on initial data from the Norwegian Petroleum Directorate, Norway observed a 9% y-o-y contraction in its gas production for July 2023, amounting to 9.9 bcm (Figure 50). The aggregate gas production for the period spanning January through July stood at 68.8 bcm.

Furthermore, data from the network grid operator Gassco showed that the Dvalin gas field, in offshore Norway, was brought back into production at the beginning of August after years of shutdown due to technical issues. This development has provided a boost to Norwegian gas output. The field has an aggregated technical capacity of 9 mcm/d, which could potentially provide about 3.2 bcma of additional gas supply to Europe.

Regarding maintenance activities, the Troll gas field and Kollsnes gas processing plant underwent planned maintenance activities in August, resulting in a reduction of approximately 20 mcm/d, or 0.6 bcm, of Norwegian gas. These maintenance disruptions contributed to upward pressure on wholesale Dutch and British gas prices during the month, in addition to the impact of the Australian strikes. Furthermore, another round of planned maintenance activities is scheduled for September, affecting both the Troll field and Kollsnes plant.

Figure 50: Trend in gas production in Norway



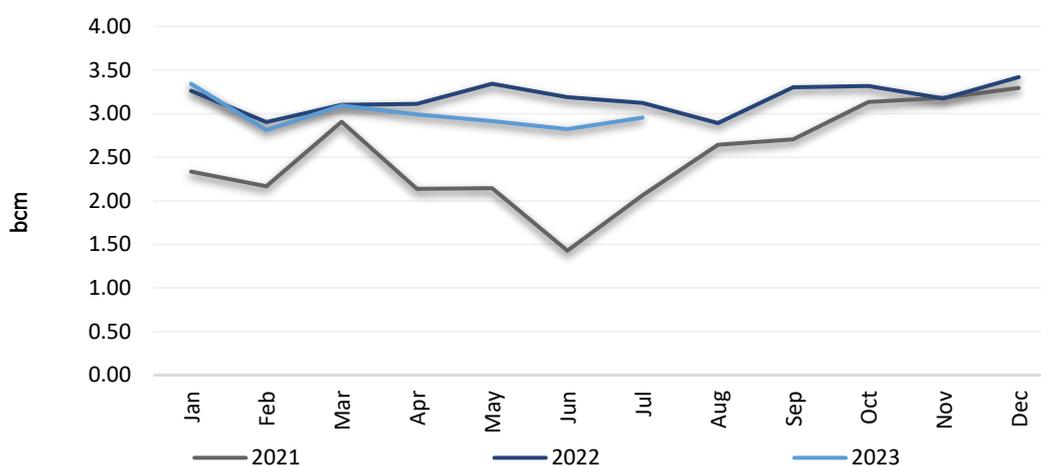
Source: GECF Secretariat based on data from Refinitiv and Norwegian Petroleum Directorate

### 3.2.2 UK

In June 2023, the UK experienced a 5% y-o-y decline in gas production, settling at 2.9 bcm (Figure 51). The cumulative gas output for January through July coalesced at 20.9 bcm, marking a 5% contraction relative to the same period last year.

Notably, the UK Prime Minister has announced that the government will grant more than a hundred new oil and gas exploration and production licences in the North Sea. This decision is aimed at ensuring the country’s energy security of supply, despite facing criticism from environmental activists. The North Sea Transition Authority (NSTA), the regulator overseeing this process, expects the first round of new licenses to be granted this autumn. Currently, the NSTA is evaluating the 115 bids submitted in the licensing round that closed last January.

Figure 51: Trend in gas production in the UK

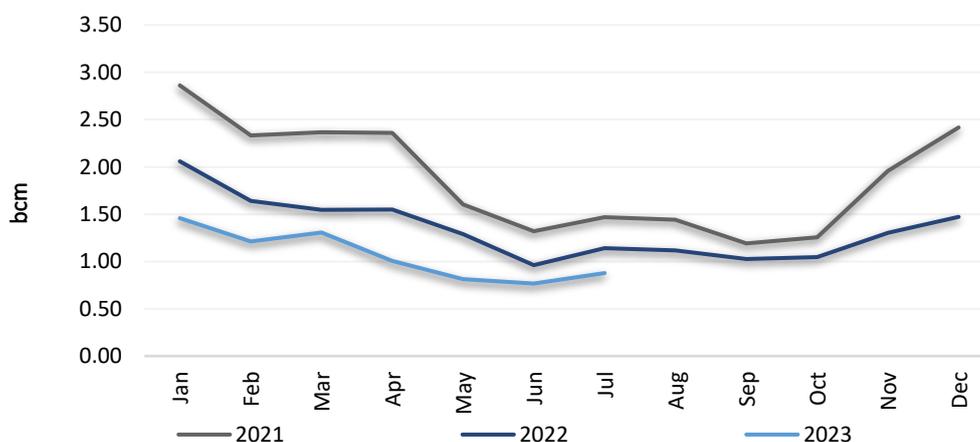


Source: GECF Secretariat based on data from Refinitiv

### 3.2.3 Netherlands

In July 2023, the Netherlands witnessed a 23% y-o-y decline in total gas production, culminating in an output of 0.88 bcm (Figure 52). Production from the Groningen field in June 2023 was further reduced, amounting to 0.06 bcm.

Figure 52: Trend in gas production in the Netherlands



Source: GECF Secretariat based on data from Refinitiv, Dutch Central Bureau of Statistics

### 3.3 Asia

Based on data released by the National Bureau of Statistics, China saw an 8% y-o-y increase in its gas production for July 2023, achieving a level of 18.4 bcm (Figure 53). Moreover, the aggregate gas production for the January-July period displayed a 6% expansion, amassing a total of 134.8 bcm. Additionally, the country realized a coal-bed methane (CBM) production of 1.1 bcm in the same month.

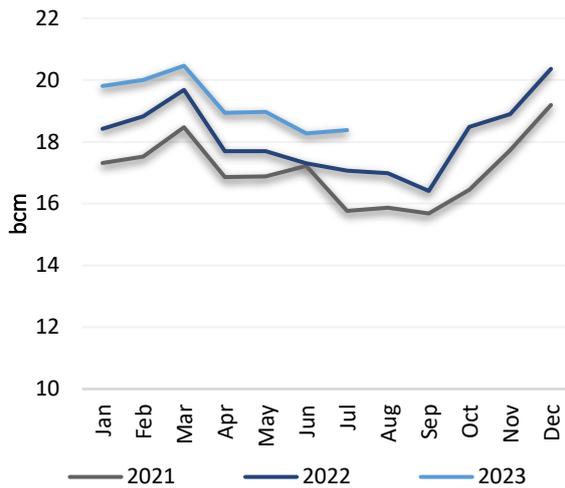
Furthermore, Sinopec Corporation has declared the proven reserve status of their deep tight gas reservoir in Bazhong field, located within Sichuan Basin. This reservoir holds approximately 30.5 bcm of gas. This development has increased the total proven gas reserves in the northeastern part of the Basin to 154.7 bcm, demonstrating the potential of deep tight gas exploration in the region, despite the technological challenges that deep tight gas production presents.

In the same context, the Chinese CNOOC subsidiary, Panhe, has announced the commencement of full-scale production from the thin coal-bed methane (CBM) project in Qingshui Basin. This project is considered the first of its kind in China, as it involved extracting methane from coal beds with a thickness of less than 1.5m, adding an extra layer of technological complexity to its production. Since production began in 2020, the cumulative output from the thin CBM in this block has reached 0.18 bcm. It is worth mentioning that CNOOC's total CBM reserves have exceeded 400 bcm.

In June 2023, India's gas production exhibited a 4% y-o-y increase, reaching a total output of 2.86 bcm (Figure 54). The cumulative gas production for the six-month period from January to June 2023 amounted to 16.75 bcm, representing a 2% increase relative to the same period in the prior year.

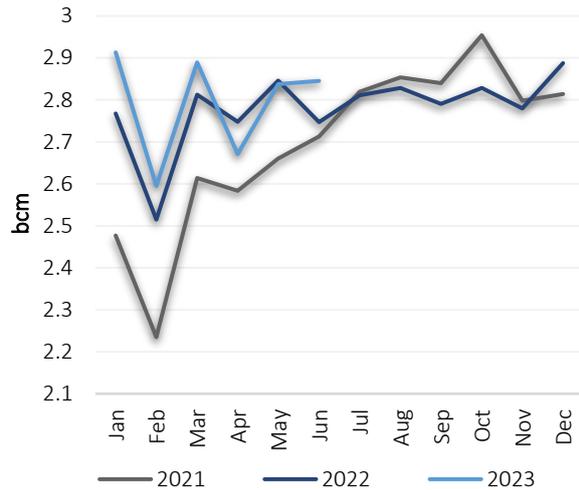
In August 2023, the India Oil and Natural Gas Corporation (ONGC) announced a new offshore gas discovery in the prolific Mumbai prospect. This discovery was made through the exploratory well ST-6, drilled in the Mid-South Tapti license within the Mumbai offshore region. Gas was found in the Mahuva and Daman formations, and this discovery extends beyond the established limits of the Mid Tapti and South Tapti fields, as stated in ONGC's release. However, the exact size of the discovery is still pending confirmation. Additionally, ONGC reported that in the previous financial quarter, the company made a total of four discoveries, with three of them being offshore and one onshore.

Figure 53: Trend in gas production in China



Source: GECF Secretariat based on data from the National Bureau of Statistics of China

Figure 54: Trend in gas production in India



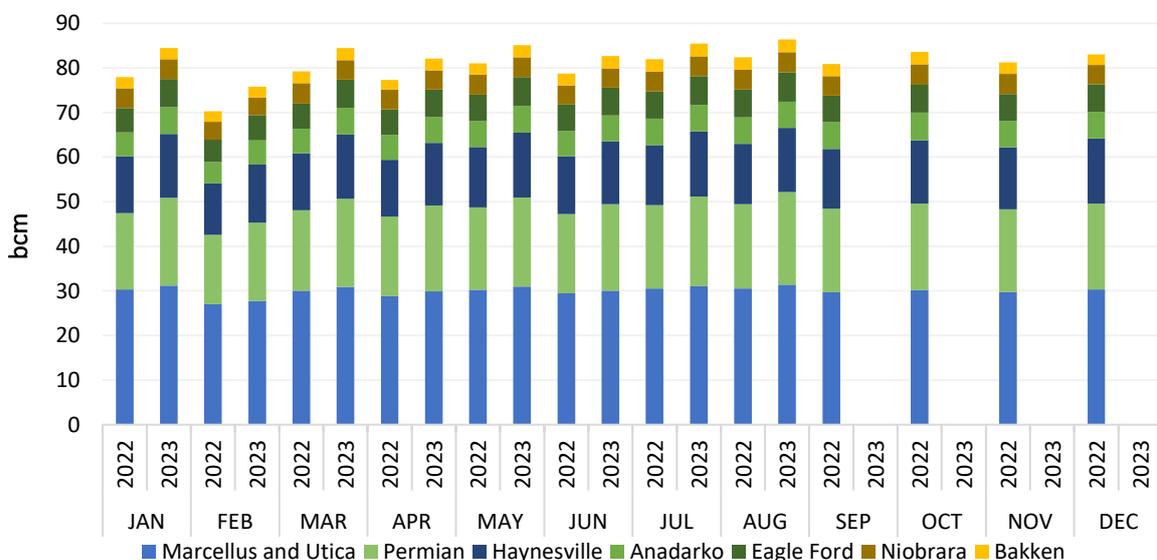
Source: GECF Secretariat based on data from Refinitiv, Ministry of Petroleum (India)

### 3.4 North America

#### 3.4.1 US

In August 2023, the seven key shale gas-producing regions in the US—Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara, and Permian—saw a y-o-y increase of 5% in production, totalling 86.34 bcm (Figure 55). Of these, the Appalachian region, which includes the Marcellus and Utica shale formations, accounted for 36% of the total output. Additionally, associated gas production in the Permian shale oil field experienced a 10% growth compared to the previous year, reaching 20.7 bcm, accounting for 24% of the overall shale gas production.

Figure 55: Trend in shale gas production in the US shale oil/gas producing regions



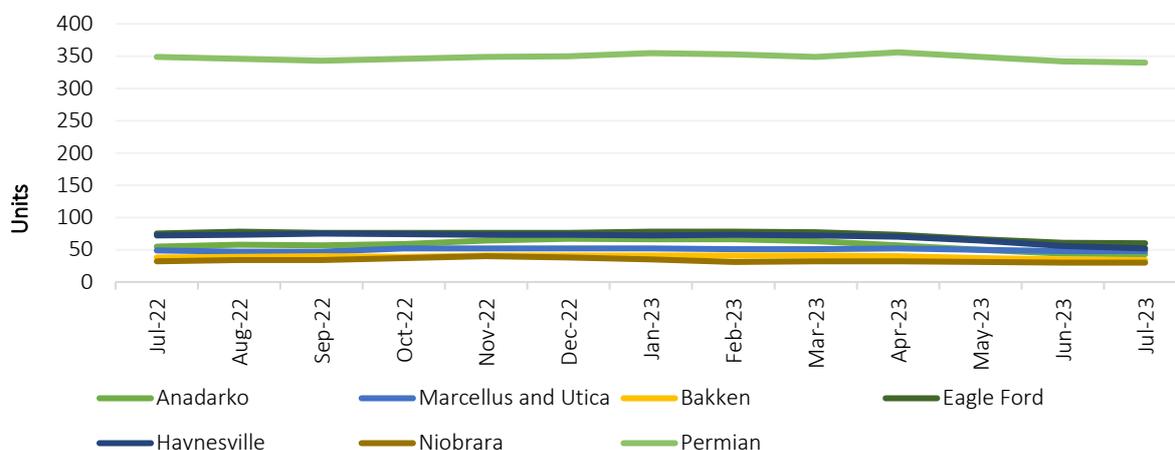
Source: GECF Secretariat based on data from Refinitiv, EIA

In July 2023, the combined count of oil and gas rigs in the seven major shale oil and gas producing regions in the US was 607. This marks a decline of 9 rigs compared to June 2023, and a reduction of 63 rigs relative to July 2022 (Figure 56).

Additionally, in July 2023, the seven regions had 4,787 drilled but uncompleted (DUC) wells, a drop of 5 wells from the count in June 2023 (Figure 57).

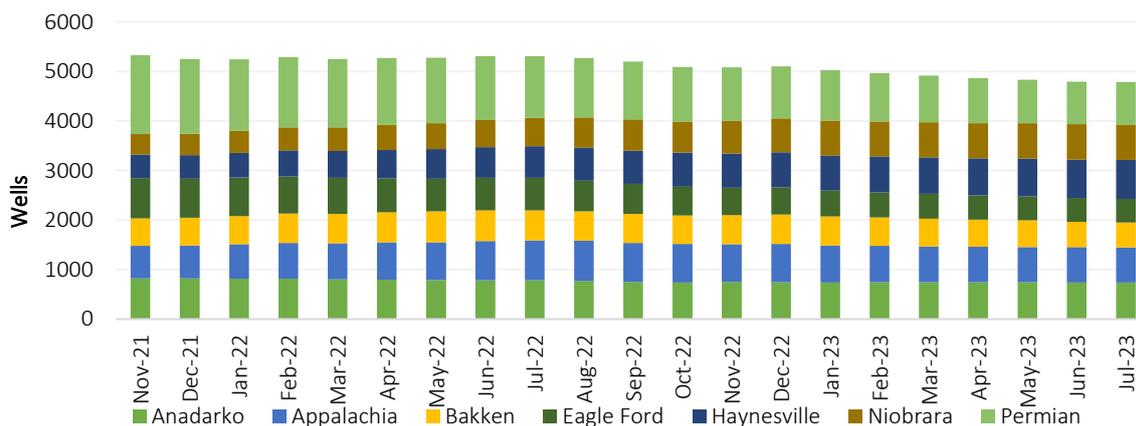
The Drilling Productivity Report from the EIA highlights a decline in gas production per rig for August 2023 in the seven regions. Gas production per newly drilled well reached 5,260 thousand cubic feet, marking a m-o-m reduction of 0.3% and a y-o-y decrease of 9.6% (Figure 58).

Figure 56: US shale region oil and gas rig count



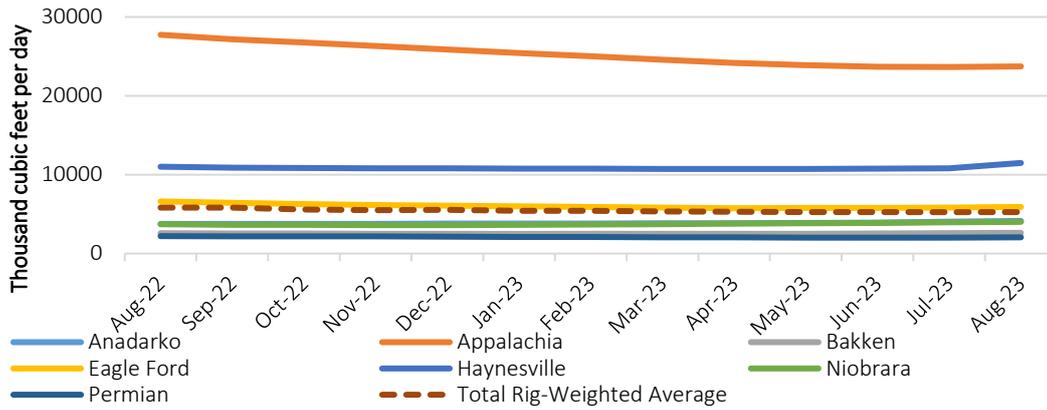
Source: GECF Secretariat based on data from Refinitiv

Figure 57: Drilled but uncompleted well (DUCs) counts in the US



Source: GECF Secretariat based on data from Refinitiv, US EIA

Figure 58: New-well gas production per rig

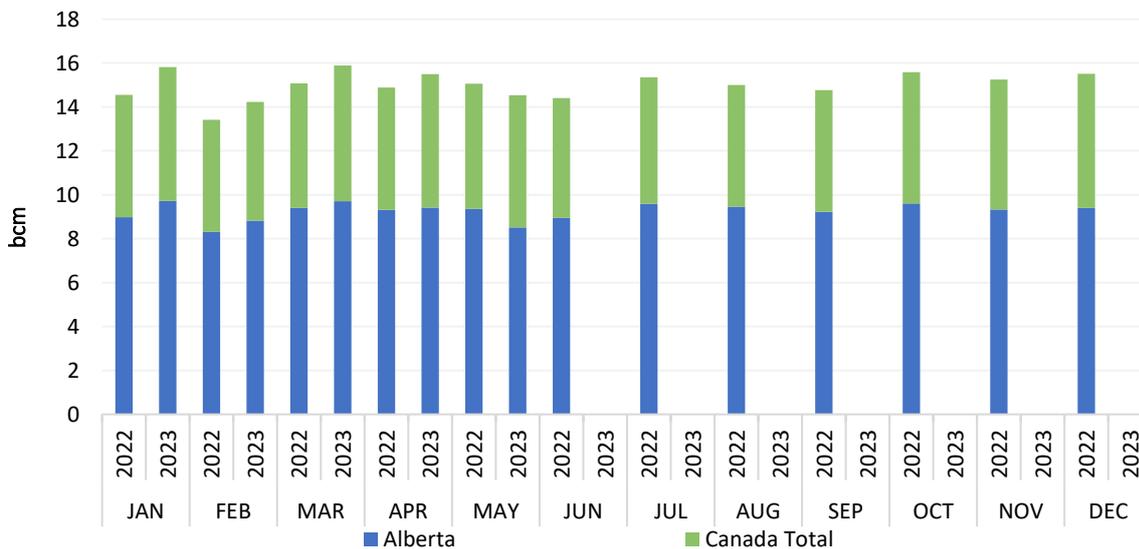


Source: GECF Secretariat based on data from Refinitiv, US EIA

### 3.4.2 Canada

Data from the Canada Energy Regulator (CER) shows that Canada's gas output in May 2023 underwent a y-o-y drop of 3%, totalling 14.5 bcm (Figure 59). For the period spanning January to May, however, the overall gas production saw a 4% y-o-y rise, hitting 76 bcm. On the other hand, Alberta's gas production in May 2023 decreased by 0.9 bcm, settling at 8.5 bcm.

Figure 59: Trend in gas production in Canada



Source: GECF Secretariat based on data from the Canada Energy Regulator (CER)

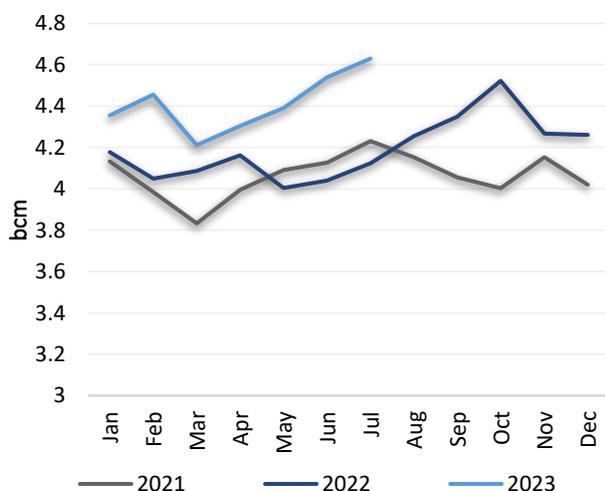
### 3.5 Latin America & the Caribbean (LAC)

Data from the Brazilian National Agency for Petroleum (ANP) revealed that Brazil's gross gas production achieved a record monthly high, surging to 4.68 bcm in July 2023. This represents a 1.2% m-o-m increase and a 13.6% y-o-y increase (Figure 60). Notably, this production level surpassed the record achieved in the previous month (June 2023) with approximately 4.63 bcm. Of the gross gas produced, 97.2% was made available to the market, with approximately 48% of the produced gas was reinjected into reservoirs. In terms of distribution, offshore gas fields

accounted for 85.8% of the gross monthly gas production, with the Tupi field in the Santos pre-salt basin emerging as the largest gas-producing field at 1.26 bcm, with 9% rise in production m-o-m. The FPSO facility in Guanabara in the shared Mero field was the highest gas producing facility with approximately 0.34 bcm, mirroring levels from the preceding month.

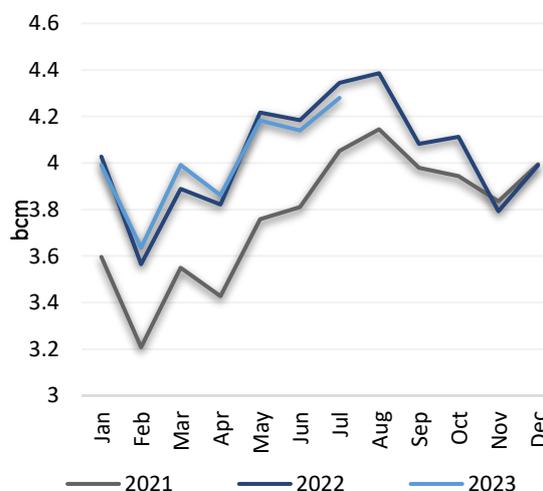
In Argentina, gross gas production reached 4.28 bcm in July 2023, based on data provided by the Argentinian Ministry of Economy. This represents a 1.5% decrease when compared to the production level recorded in July 2022 (4.34 bcm). However, it represents a 3.3% increase compared to June 2023 (4.14 bcm) (Figure 61). The cumulative gas production from January to June 2023 amounted to 28.1 bcm, aligning closely with the production levels for 2022. Shale gas production was 1.71 bcm in July 2023, representing 40% of the gross production while tight gas reservoir production was 0.54 bcm, accounting for 12.6% of the total gas production. The remaining portion of production stemmed from conventional fields.

Figure 60: Trend in gas production in Brazil



Source: GECF Secretariat based on data from the Brazilian National Agency of petroleum (ANP)

Figure 61: Trend in gas production in Argentina



Source: GECF Secretariat based on data from Argentinian Ministry of Economy

### 3.6 Other Regions

**Iran’s South Pars phase 11 produced its first gas:** The Iranian Ministry of Oil announced in August the production of first gas from phase 11 of the giant offshore South Pars field, marking an important milestone for the oil and gas sector in Iran. This project has been delayed multiple times, most recently due to the withdrawal of international companies Total Energies and CNPC. According to Argus, phase 11 began production at a rate of 12 mcm/d (4.3 bcma), with plans to increase production to 56 mcm/d (20.5 bcma) once the field is fully developed.

**Saudi ARAMCO plans to increase gas production by 50% by 2050:** In its latest quarterly financial report, Saudi ARAMCO announced its plan to increase gas production by 50 to 60% by 2030 to meet growing domestic demand in the industrial sector. ARAMCO also revealed updates on its current gas projects, including the massive Jafurah field development project, which is expected

to start production in 2025. Design and construction activities for the gas plant are on schedule. The field is expected to reach a production plateau of 20.5 bcma by 2030. In addition, construction of the Tanajib gas plant in the Marjan field development project is on track. The plant is expected to come online in 2025 and will add an additional 75 mcm/d (27 bcma) of processing capacity.

*Côte d'Ivoire achieved the first oil and gas production from Baleine field:* Oil and gas production from the prolific offshore Baleine field has started, according to Eni's press release. The start-up of production comes just two years after hydrocarbon discovery in September 2021 and less than a year and half after project FID, to be considered one of the fast-track development projects that is adopting the multi-phased development approach. The Baleine field is the most significant hydrocarbon discovery in the history of Côte d'Ivoire, with the initial development phase having a production capacity of 15,000 bpd of oil and 0.25 bcma of gas. This is being processed through the Baleine Floating Production, Storage and Offloading unit (FPSO). The second phase is planned to start at the end of 2024, and is expected to increase production to 150,000 bpd and 2 bcma of gas. Produced gas will be transported onshore through a newly constructed pipeline and will be used for domestic power generation.

*Azerbaijan officially inaugurated the Absheron gas field (co-owned by TotalEnergies and SOCAR):* The field currently produces 1.5 bcma from the first phase of development, with plans to increase production to 5.5 bcma as soon as the multi-phased development project is completed. Moreover, Shell announced first gas from its offshore Timi field under the SK318 production sharing contract (PSC). The field is planned to produce up to 3.1 bcma, with the gas transported to F23 production hub through a new 80 km pipeline.

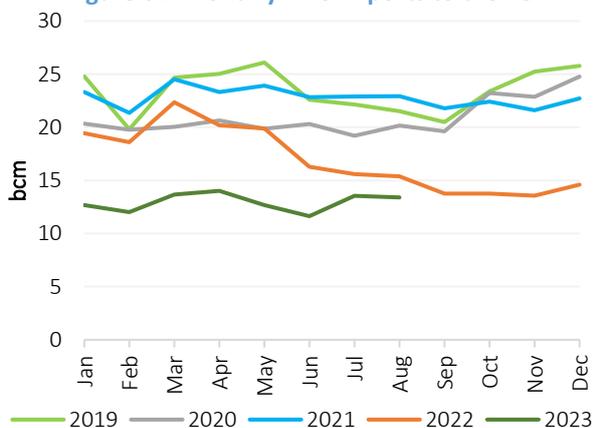
## 4 Gas Trade

### 4.1 Pipeline Natural Gas (PNG) Trade

#### 4.1.1 Europe

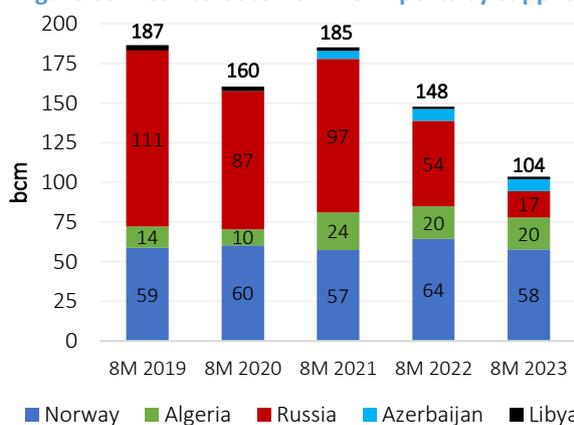
There were 13.4 bcm of PNG imports to the EU in August 2023, which marked just a 1% decrease from the previous month, but still 13% lower y-o-y (Figure 62). For the period January to August 2023, the total volume of PNG imported by the EU reached 104 bcm, a deficit of 30% compared with the same time a year ago (Figure 63). PNG supply has picked up since July 2023 because of increased flows from Russia and the completion of maintenance activities in some fields in Norway (Figure 64).

Figure 62: Monthly PNG imports to the EU



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 63: Year-to-date EU PNG imports by supplier

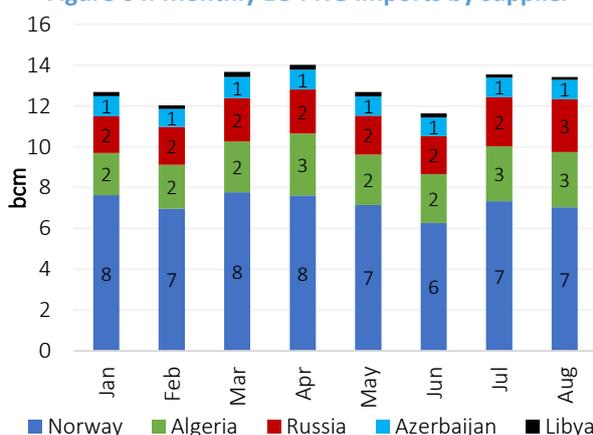


Source: GECF Secretariat based on data from McKinsey and Refinitiv

By August, the supply share of PNG to the EU for the year thus far remained at 56% from Norway, followed by 19% from Algeria and 16% from Russia. Compared to the same period last year, imports from Russia fell by 69% or 37.2 bcm, while imports from Norway fell by 10% or 6.6 bcm. The quantity imported from Algeria, Azerbaijan and Libya remained constant y-o-y.

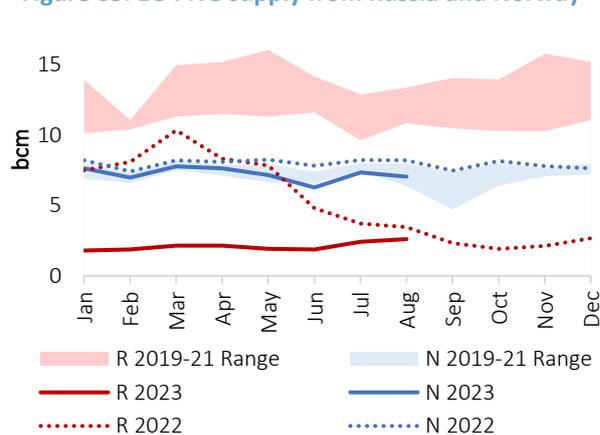
During the period January to August, the monthly PNG imports from Norway averaged 7.2 bcm in 2023, compared with 8.0 bcm in 2022, and 7.4 bcm in the years 2019 to 2021. On the other hand, during these same months, the average PNG imports from Russia crept up to 2.1 bcm per month in 2023, compared with 6.7 bcm in 2022, and 12.3 bcm in the years 2019 to 2021 (Figure 65).

Figure 64: Monthly EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 65: EU PNG supply from Russia and Norway



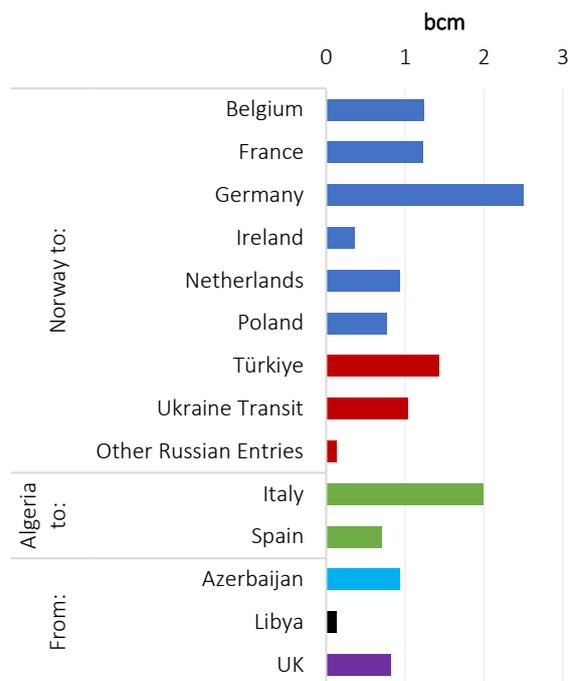
Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 66 illustrates the PNG imports to the region through the major supply routes in August 2023.

PNG volumes from Russia increased along all three routes during the month. Flows via the Turkstream pipeline rose by 10% m-o-m, accounting for 55% of Russian PNG imported by the EU. Algeria increased supply to Italy by 5% m-o-m, and Norway increased supply to the Netherlands by 7%. There continues to be net flow of gas via the interconnectors from the UK to EU. However, the August 2023 supply was just 0.8 bcm, which was 21% lower m-o-m and 60% lower y-o-y.

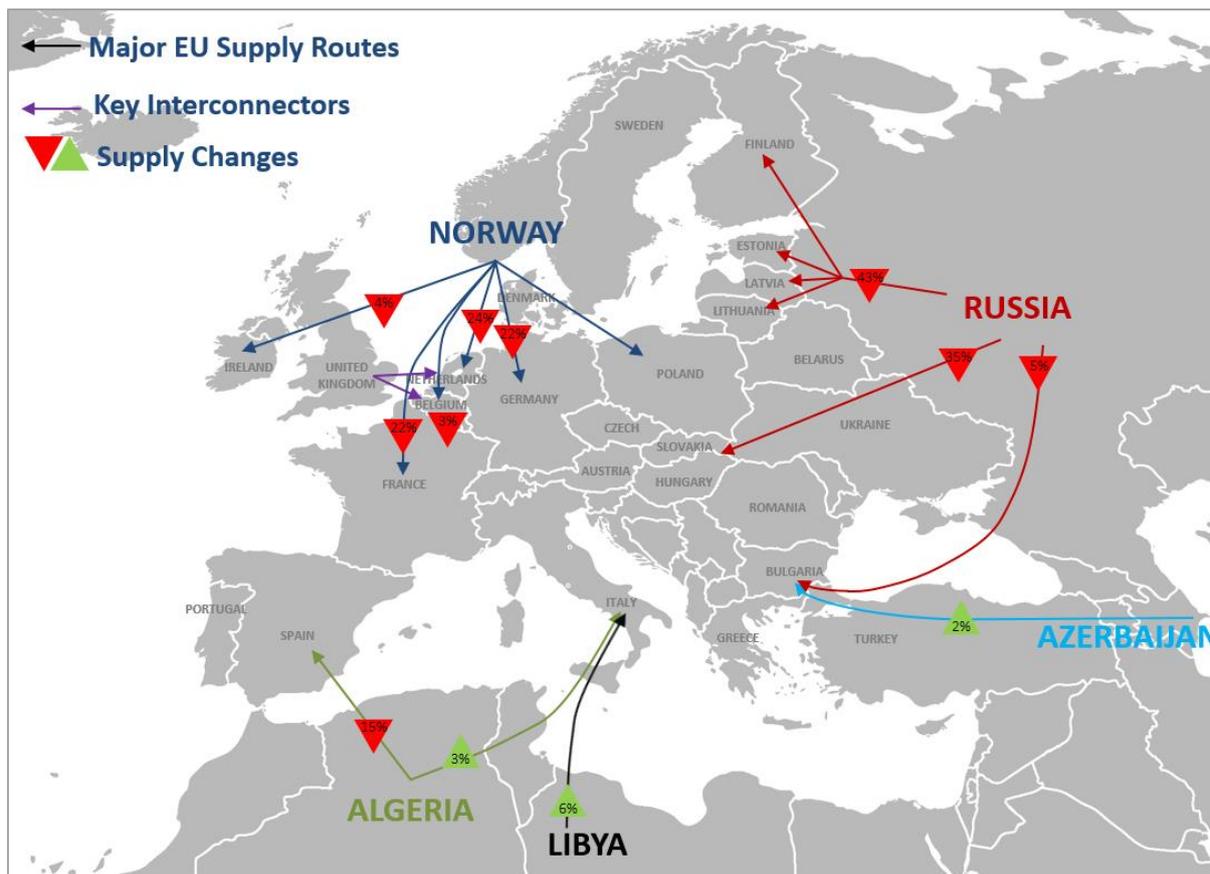
In Figure 67, the EU's PNG imports via major supply routes for the first eight months of 2023 are compared to the same period in 2022. Algerian PNG exports to Italy increased by 3%. Norway's supply to Germany declined by 22% in favour of exports to Poland. Supply from the UK has fallen by 20% over the period.

Figure 66: EU PNG imports by supply route, in August 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 67: PNG imports to the EU by supply route (8M 2023 v 8M 2022)

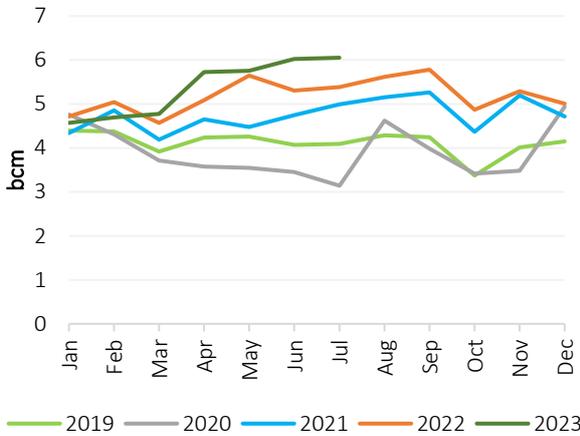


Source: GECF Secretariat based on data from McKinsey and Refinitiv

### 4.1.2 Asia

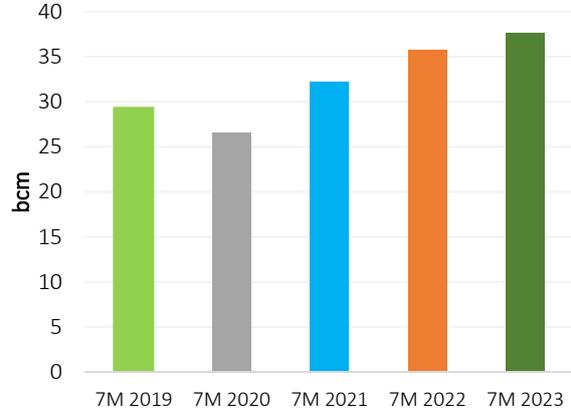
For the second consecutive month, China increased its record monthly quantity of PNG imports. In July 2023, PNG imports rose to 6.1 bcm, marking a 0.5% increase m-o-m, and 12% higher y-o-y (Figure 68). PNG accounted for an estimated 43% of China’s total gas imports during the month. From January to July 2023, 38 bcm of PNG were imported, representing a 5% increase compared with the same period one year ago (Figure 69). In this period, the average monthly import rate was 5.4 bcm in 2023, rising from 5.1 bcm in 2022.

Figure 68: Monthly PNG imports in China



Source: GECF Secretariat based on data from Refinitiv and General Administration of Customs China

Figure 69: Year-to-date PNG imports in China

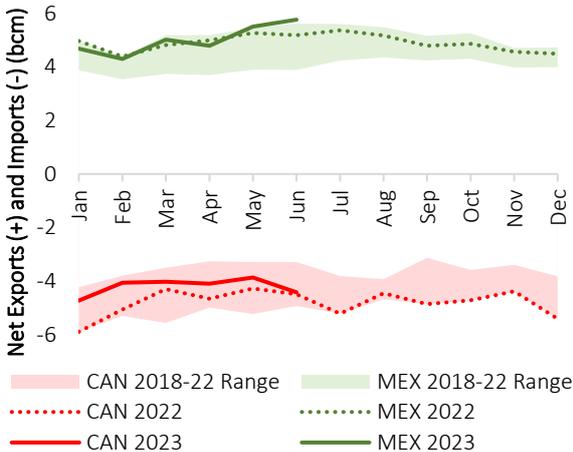


Source: GECF Secretariat based on data from Refinitiv and General Administration of Customs China

### 4.1.3 North America

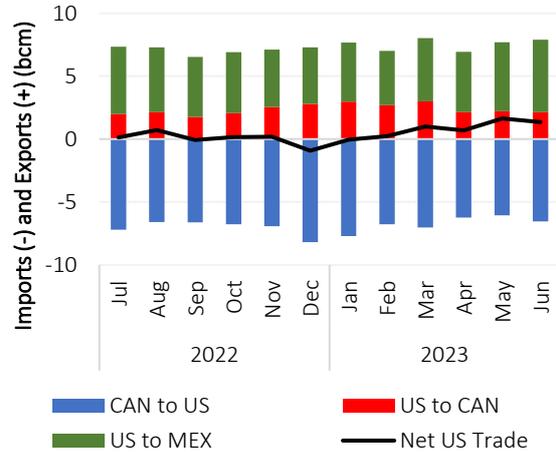
In June 2023, the US exported 5.8 bcm of PNG to Mexico, which is the largest monthly quantity on record (Figure 70). Flows for the month were 5% higher m-o-m and 11% higher y-o-y. At the same time, net PNG imports from Canada rose by 14% m-o-m to reach 4.4 bcm. The region has been observing the trend of net PNG exports from the US to the other countries throughout the year and recorded a net flow of 1.3 bcm in June 2023. Over the first half of the year, net PNG exports from Canada to the US decreased by 12% y-o-y, while imports to Mexico rose by 2%. The average monthly flows in the region in 2023 were 6.7 bcm from Canada to the US, 2.5 bcm from the US to Canada and 5.0 bcm from the US to Mexico.

Figure 70: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 71: Monthly US PNG trade



Source: GECF Secretariat based on data from US EIA

#### 4.1.4 Other Developments

*Potential pipeline natural gas trade between Turkmenistan and Hungary:* High-level representatives from Turkmenistan and Hungary recently engaged in bilateral discussions, focusing on various sectors including energy trade. A key development arising from these discussions was the potential for Turkmenistan to provide pipeline gas supply to Europe via Hungary. According to Hungary's Minister of Foreign Affairs and Foreign Economic Relations, this would require the construction of a new 300 km pipeline and expansion of the current pipeline corridor in southern Europe. This new supply pipeline may have a capacity of 30 bcma. Turkmenistan is a major exporter of pipeline natural gas, accounting for around 55% of China's imports in 2022.

*Pakistan and Iran commit to pipeline gas trade:* Following a diplomatic visit by Iran's Foreign Minister to Islamabad, Pakistan, diplomats from both countries have reaffirmed their mutual commitment to the completion of a transnational gas pipeline project. The Iran-Pakistan pipeline is expected to supply 7.8 bcma across a distance of 2,800 km from the Pars energy economic zone in Iran to Nawabshah in Pakistan. Iran has already finalized the construction of its segment of the pipeline, and the entire infrastructure is expected to be fully operational by March 2024.

## 4.2 LNG Trade

### 4.2.1 LNG Imports

In August 2023, global LNG imports expanded by 4.3% (1.41 Mt) y-o-y, reaching a total of 33.88 Mt (Figure 72). The Asia Pacific and MENA regions were the driving forces behind this increase in LNG imports, which helped offset weaker import figures in Europe, Latin America and the Caribbean (LAC) (Figure 73). From January to August 2023, cumulative global LNG imports amounted to 272.35 Mt, representing a growth of 3.3% (8.64 Mt) y-o-y. Most of this expansion in global LNG imports during this period originated from Asia Pacific and Europe.

Figure 72: Trend in global monthly LNG imports

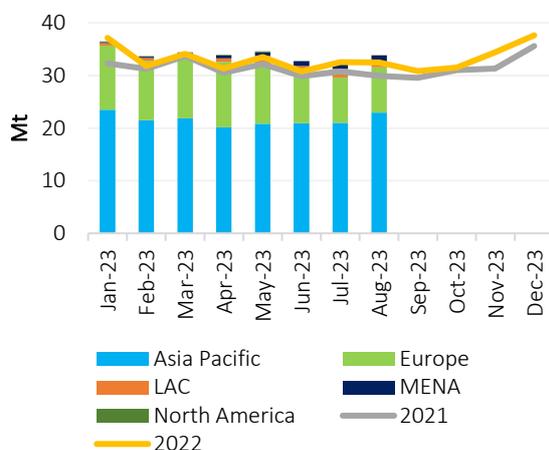
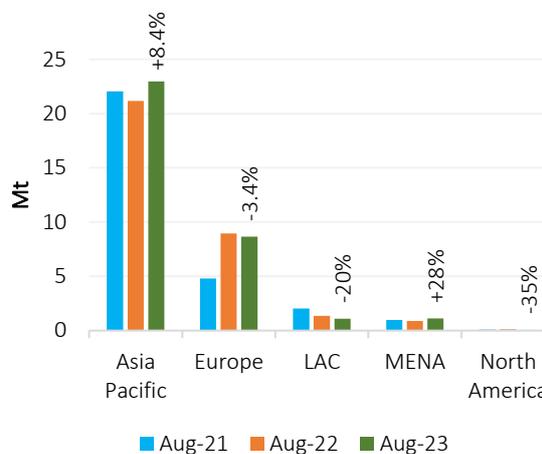


Figure 73: Trend in regional LNG imports in August



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.1.1 Europe

In August 2023, Europe experienced its second consecutive y-o-y decline in LNG imports with a decrease of 3.4% (0.30 Mt) y-o-y, reaching 8.65 Mt (Figure 74). The decline was primarily driven by a significant premium of the Asian spot LNG price over the TTF gas price in August, coupled with high gas storage levels in Europe. The weaker LNG imports were particularly pronounced in Belgium, France and the UK, partially offset by stronger imports in Germany, Italy and the Netherlands (Figure 75). Between January and August 2023, cumulative LNG imports in Europe showed a growth of 5.3% (4.29 Mt) y-o-y, totalling 85.02 Mt.

The drop in Belgium's LNG imports can be attributed to reduced gas consumption, a decline in pipeline gas exports to Germany and the Netherlands, and elevated gas storage levels. In parallel, diminished gas consumption, an uptick in pipeline gas imports from Belgium, and high storage levels contributed to the decline in French LNG imports. Additionally, the reduction in the UK's LNG imports was primarily driven by decreased gas consumption and weaker demand for pipeline gas exports to mainland Europe.

In contrast, Germany's LNG imports continue to expand, supported by the increase in LNG imports, higher gas consumption, reduced pipeline gas imports from Norway and Russia, and weaker domestic gas production. Likewise, the rise in LNG imports at the Eemshaven LNG terminal, increased gas consumption and pipeline gas exports to Germany, and a decline in domestic gas production have driven up the Netherlands' LNG exports. Finally, in Italy, a decrease in pipeline gas imports from Norway and Russia, along with an uptick in pipeline gas exports to neighbouring countries, in Central and Eastern Europe, boosted its LNG imports.

Figure 74: Trend in Europe’s monthly LNG imports

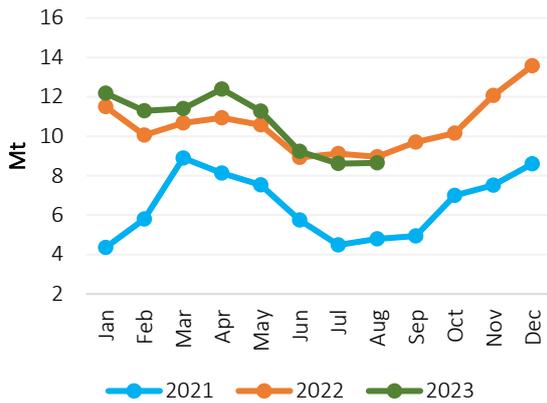
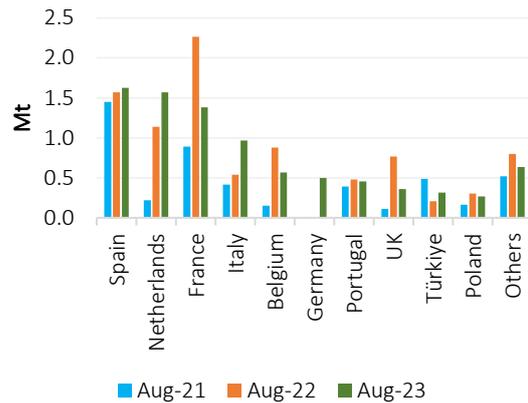


Figure 75: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.1.2 Asia

In August 2023, the Asia Pacific region witnessed a substantial 8.4% y-o-y increase in LNG imports, amounting to 1.78 Mt, reaching its highest monthly import volume of 22.95 Mt since January 2023 (Figure 76). This marked the first time in 2023 that monthly LNG imports exceeded the levels seen in 2021. The rise in LNG imports in Bangladesh, China, India, Pakistan and Thailand significantly contributed to the increase in Asia Pacific's LNG imports, effectively offsetting the declines observed in Japan, South Korea and Taiwan (Figure 77). Over the period from January to August 2023, cumulative LNG imports in the Asia Pacific region grew by 2.5% y-o-y, reaching 172.75 Mt, representing an increase of 4.14 Mt.

Chinese LNG imports reached their highest level since December 2022, driven by a recovery in gas demand and lower spot LNG prices. In Bangladesh, India and Pakistan, softer spot LNG prices compared to the previous year spurred increased demand for spot LNG in these countries. Furthermore, higher LNG imports from the US contributed to the overall rise in LNG imports in both China and India. In Thailand, the higher LNG imports were attributed to lower spot LNG prices and a decline in domestic gas production. Conversely, in Japan, increased nuclear availability and renewable energy output reduced gas consumption in the power sector. Similarly, in South Korea, an increase in nuclear availability and renewable energy output, along with high LNG storage inventory, led to a decrease in LNG imports.

Figure 76: Trend in Asia’s monthly LNG imports

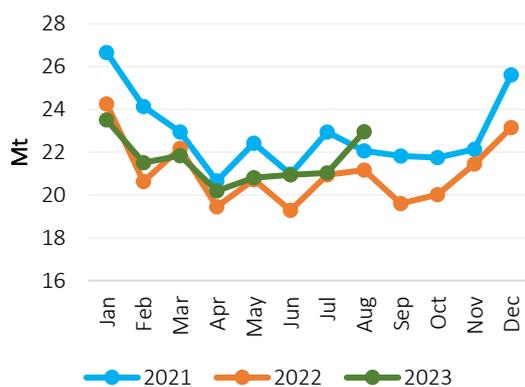
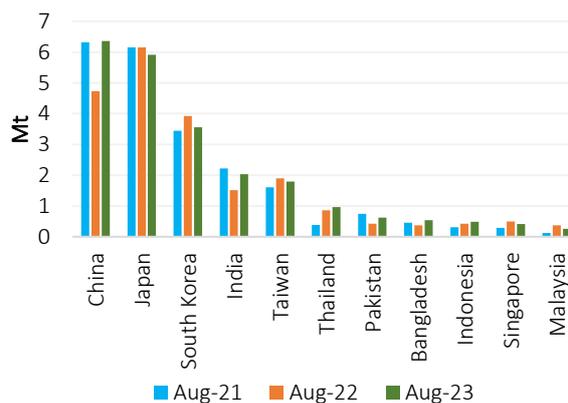


Figure 77: Top LNG importers in Asia



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.1.3 Latin America & the Caribbean (LAC)

In August 2023, LAC's LNG imports fell by 20% (0.27 Mt) y-o-y to reach 1.09 Mt (Figure 78). The weaker LNG imports came mainly from Argentina, Brazil, Dominican Republic and Jamaica, which offset higher imports in Chile, Colombia and Puerto Rico (Figure 79). From January to August 2023, cumulative LNG imports in LAC increased by 1.7% (0.14 Mt) y-o-y to 8.56 Mt.

The decline in Argentina's LNG imports was driven by a mild winter season and higher domestic gas availability. Meanwhile, higher hydro output in Brazil curbed gas consumption in the electricity sector. Conversely, Colombia has been purchasing more LNG in the past few months to safeguard against a potential drought brought about by the El Niño phenomenon.

Figure 78: Trend in LAC's monthly LNG imports

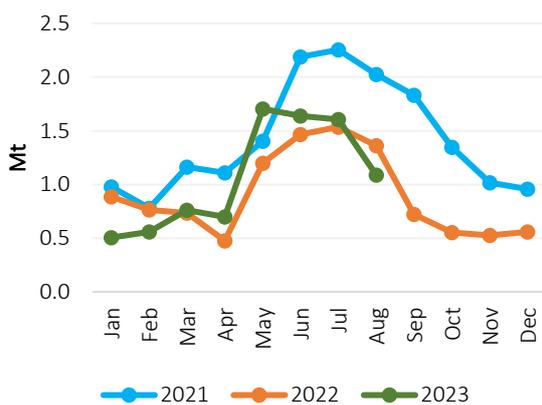
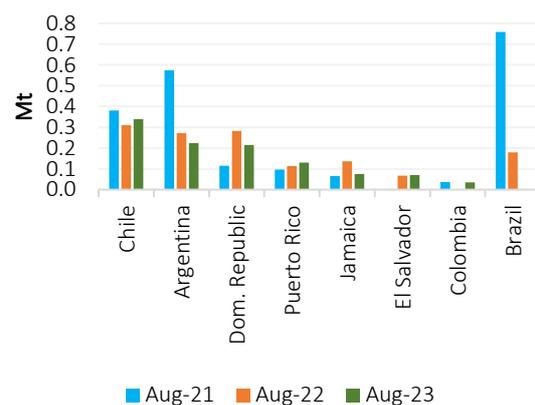


Figure 79: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.1.4 MENA

In August 2023, LNG imports in the MENA region expanded by 28% (0.24 Mt) y-o-y to reach 1.12 Mt (Figure 80). The higher LNG imports were driven mainly by Kuwait and the United Arab Emirates (Figure 81). Between January and August 2023, MENA's cumulative LNG imports were down slightly by 0.5% (0.03 Mt) y-o-y, reaching 5.06 Mt.

The hotter-than-usual weather in August 2023 increased Kuwait's electricity demand, requiring additional LNG imports.

Figure 80: Trend in MENA's monthly LNG imports

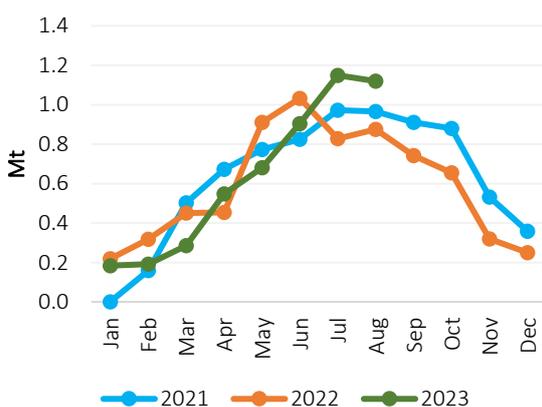
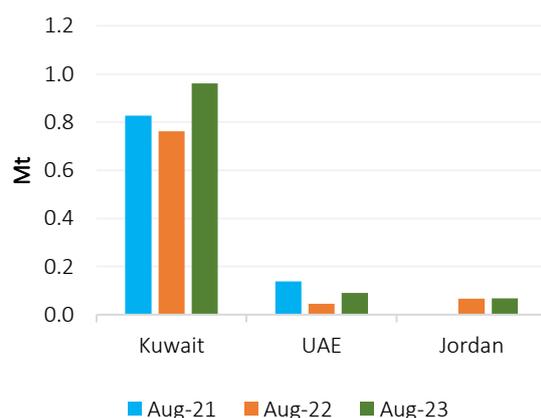


Figure 81: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

## 4.2.2 LNG Exports

In August 2023, global LNG exports jumped by 4.0% (1.29 Mt) y-o-y to reach 33.23 Mt, driven by increased shipments from both GECF and non-GECF countries, offsetting weaker LNG reloads (Figure 82). Non-GECF countries' share of global LNG exports grew from 50.2% in August 2022 to 51.7% in August 2023, while GECF member countries' share dropped from 48.1% to 47.0% during the same period, due to stronger growth in non-GECF exports. Additionally, LNG reloads' contribution to global exports decreased from 1.7% to 1.3%. From January to August 2023, cumulative global LNG exports grew by 3.9%, totalling 271.44 Mt. Notably, in August 2023, the top LNG exporting countries were the US, Australia and Qatar (Figure 83).

Figure 82: Trend in global monthly LNG exports

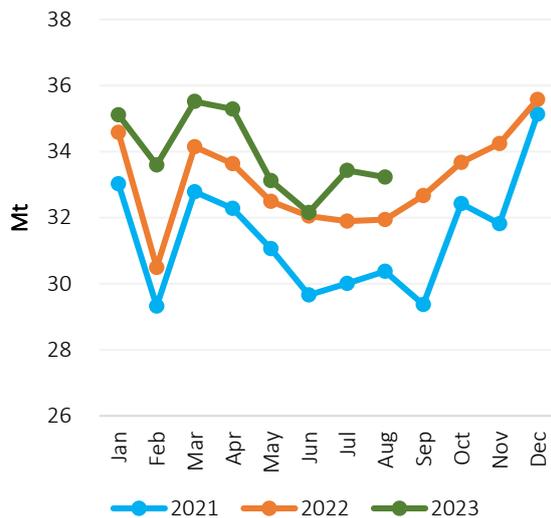
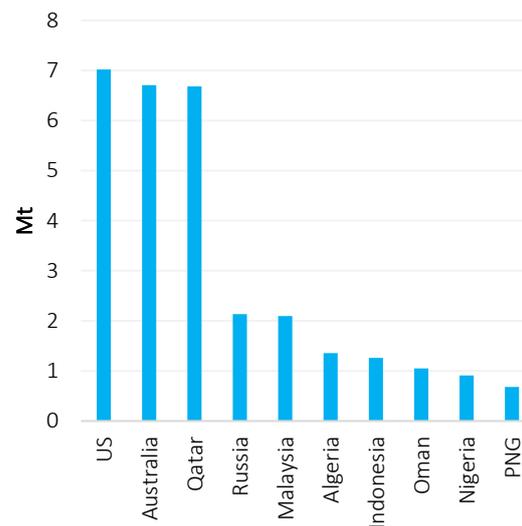


Figure 83: Top 10 LNG exporters in Aug 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.2.1 GECF

In August 2023, LNG exports from GECF member countries and observers reached 15.62 Mt, representing a y-o-y growth of 1.7%, equivalent to 0.26 Mt (Figure 84). This notable increase was primarily driven by Algeria, as well as Angola, Malaysia, and Mozambique. In contrast, LNG exports declined in Egypt, Equatorial Guinea, Nigeria, Norway, Peru, Qatar, Russia, Trinidad and Tobago and the United Arab Emirates (Figure 85). Between January and August 2023, the cumulative LNG exports from GECF member countries increased by 1.4% y-o-y, reaching a total of 131.10 Mt.

Reduced maintenance activity at the Arzew and Skikda LNG facilities propelled Algeria's LNG exports to a 70% y-o-y increase in August 2023. In Mozambique, the robust growth in LNG exports was due to the ongoing production ramp-up at the Coral South FLNG facility. Conversely, lower feedgas availability in Egypt and Nigeria led to a decline in LNG exports from both nations. Egypt did not export any LNG in August. In Russia, Trinidad and Tobago and the United Arab Emirates, increased maintenance activity contributed to the decrease in LNG exports, especially the elevated levels of planned maintenance activities at the Portovaya LNG and Sakhalin 2 LNG facilities in Russia, as well as at the Atlantic LNG facility in Trinidad and Tobago. The Das Island LNG facility in the United Arab Emirates faced disruptions due to an unplanned outage.

Figure 84: Trend in GECF monthly LNG exports

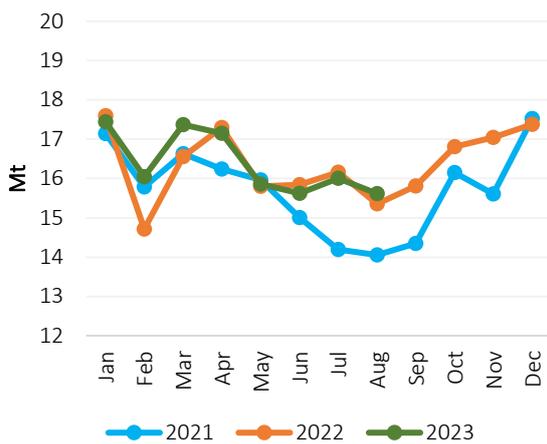
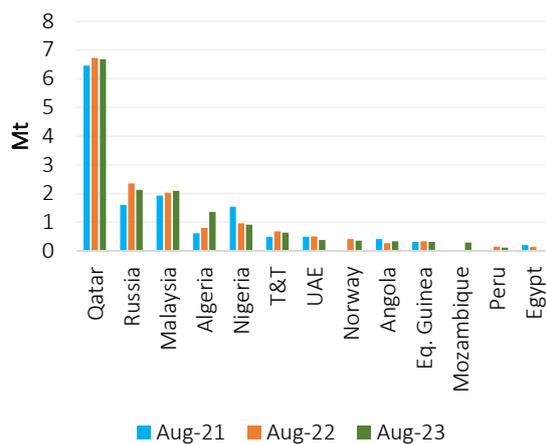


Figure 85: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.2.2 Non-GECF

In August 2023, LNG exports from non-GECF countries experienced a significant 7.3% (1.16 Mt) y-o-y increase, totalling 17.19 Mt (Figure 86). The primary driver of this growth was the US, with Australia, Cameroon and Oman also showing export increases, albeit to a lesser extent (Figure 87). From January to August 2023, cumulative LNG exports from non-GECF countries rose by 5.6%, equivalent to 7.26 Mt y-o-y, reaching 136.88 Mt.

The increase in LNG exports from Australia can be attributed to stronger performance from the APLNG, Ichthys, and Pluto LNG facilities. These facilities managed to compensate for the weaker export figures from the Darwin, GLNG, North West Shelf and QCLNG facilities. A decrease in maintenance activity positively impacted LNG exports from the APLNG and Ichthys LNG facilities, while the North West Shelf LNG facility experienced a decline in exports due to an uptick in maintenance. Simultaneously, robust LNG exports from the Calcasieu Pass and Freeport LNG facilities were responsible for the surge in US LNG exports, effectively offsetting lower exports from Sabine Pass. The boost in LNG exports from the Calcasieu Pass facility was underpinned by a continuous production ramp-up, while the restart of the Freeport LNG facility earlier this year significantly enhanced its export capabilities.

Figure 86: Trend in non-GECF monthly LNG exports

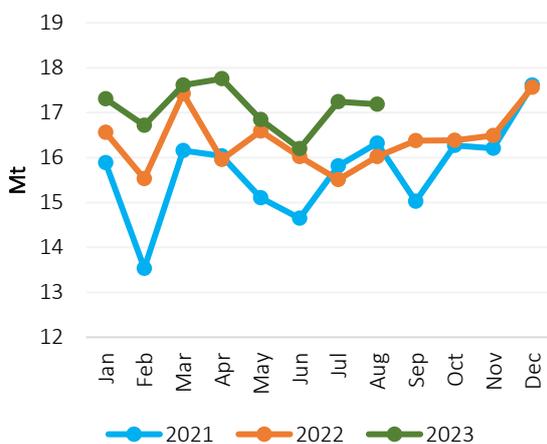
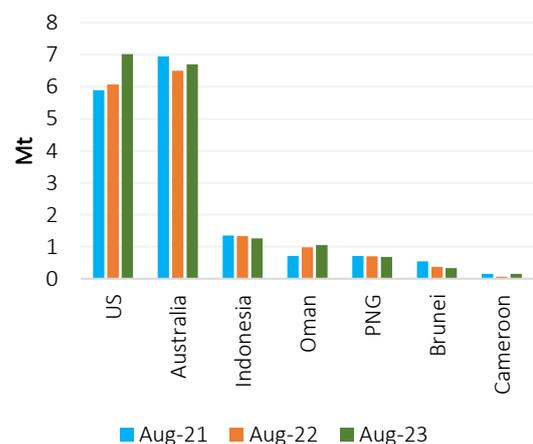


Figure 87: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.3 Global LNG Reloads

In August 2023, global LNG reloads decreased for the second consecutive month, with a y-o-y drop of 25% (0.14 Mt), bringing the total to 0.42 Mt (Figure 88). The decline in global LNG reloads was primarily driven by Spain, with lesser contributions from China, the Dominican Republic and France. Conversely, Belgium, Indonesia, Jamaica and Spain saw small increases in LNG reload activity (Figure 89). Between January and August 2023, cumulative global LNG reloads experienced a substantial y-o-y increase of 52% (1.18 Mt), reaching a total of 3.46 Mt.

In Spain, the decline in LNG reloading activity can be attributed to reduced LNG reloads and exports to Italy, the primary market for Spain. However, the decrease in Spain's LNG imports in recent months may have had a limiting effect on its LNG reloads. Conversely, the increase in LNG reloads from Indonesia was primarily driven by the Arun LNG facility, with portfolio players Shell and TotalEnergies exporting reloaded LNG cargoes to Japan. Additionally, New Fortress Energy has continued to bolster LNG reloads and exports from Jamaica to Puerto Rico.

Figure 88: Trend in global monthly LNG reloads

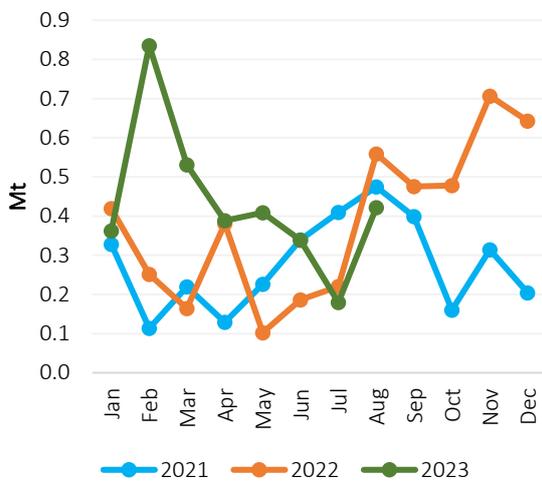
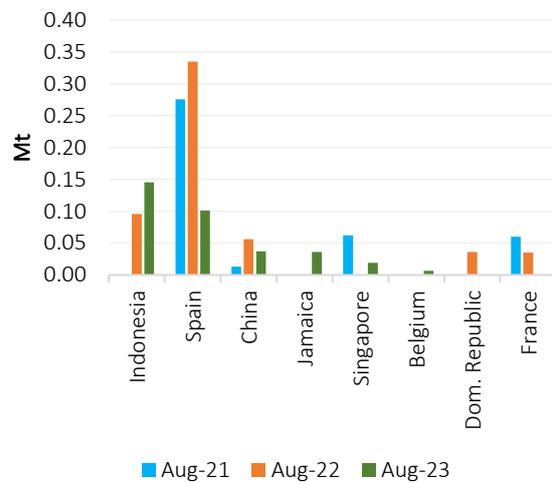


Figure 89: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.4 Arbitrage Opportunity

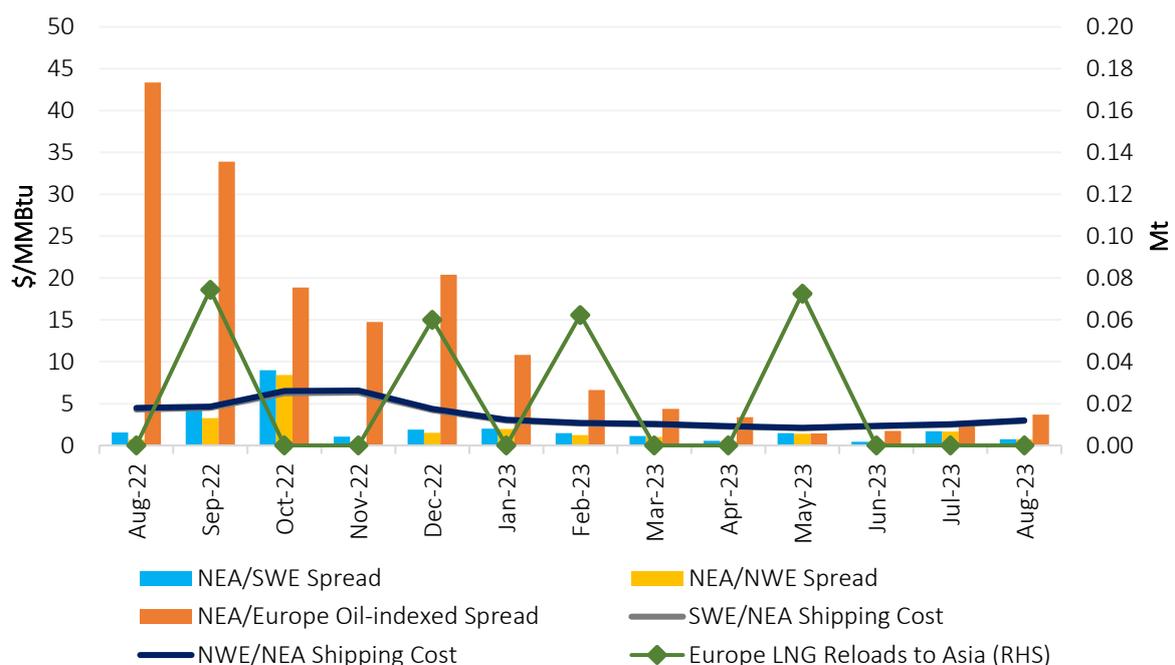
In August 2023, there was no arbitrage opportunity for LNG reloads from Europe to Asia Pacific. This was a result of a substantial decrease in the spot LNG price spreads between Asia Pacific and Europe, causing the price spreads to fall well below the spot shipping costs from Europe to the Asia Pacific (Figure 90). In contrast, the price spread between spot LNG prices in Asia Pacific and oil-indexed prices in Europe maintained a slight premium over the spot shipping cost from Europe to Asia Pacific.

The price spreads between NEA/SWE and NEA/NWE experienced a significant m-o-m decline of 55% (\$0.94/MMBtu) and 54% (\$0.90/MMBtu) respectively, reaching \$0.76/MMBtu each. This narrowing of price spreads can be attributed to the more substantial increase in European spot LNG prices in comparison to the NEA spot LNG prices. Conversely, the price differential between spot LNG prices in Asia and oil-indexed prices in Europe continued to grow for the third consecutive month, registering a m-o-m increase of 34% (\$0.93/MMBtu), reaching \$3.70/MMBtu.

In terms of the shipping costs for the NEA/SWE and NEA/NWE spot routes, they expanded by 18% (\$0.45/MMBtu) each to \$2.91/MMBtu and \$3.01/MMBtu, respectively. However, it is important to note that shipping costs can vary depending on the specific vessels used. Medium to long-term chartered vessels may have lower costs compared to spot shipping rates. The absence of the arbitrage opportunity prevented spot LNG reloads from Europe to Asia Pacific in August 2023.

Furthermore, the NEA/SWE price differential fell by 51% (0.78/MMBtu) y-o-y while the NEA/NWE price differential grew by 10% (\$0.07/MMBtu) y-o-y. The price spread between NEA spot LNG and European oil-indexed gas prices, as well as the NEA/SWE and NEA/NWE spot shipping costs recorded declines of 92% (\$39.65/MMBtu), 32% (\$1.40/MMBtu) and 33% (\$1.46/MMBtu) y-o-y, respectively.

Figure 90: Price spreads & shipping costs between Asia & Europe spot LNG markets

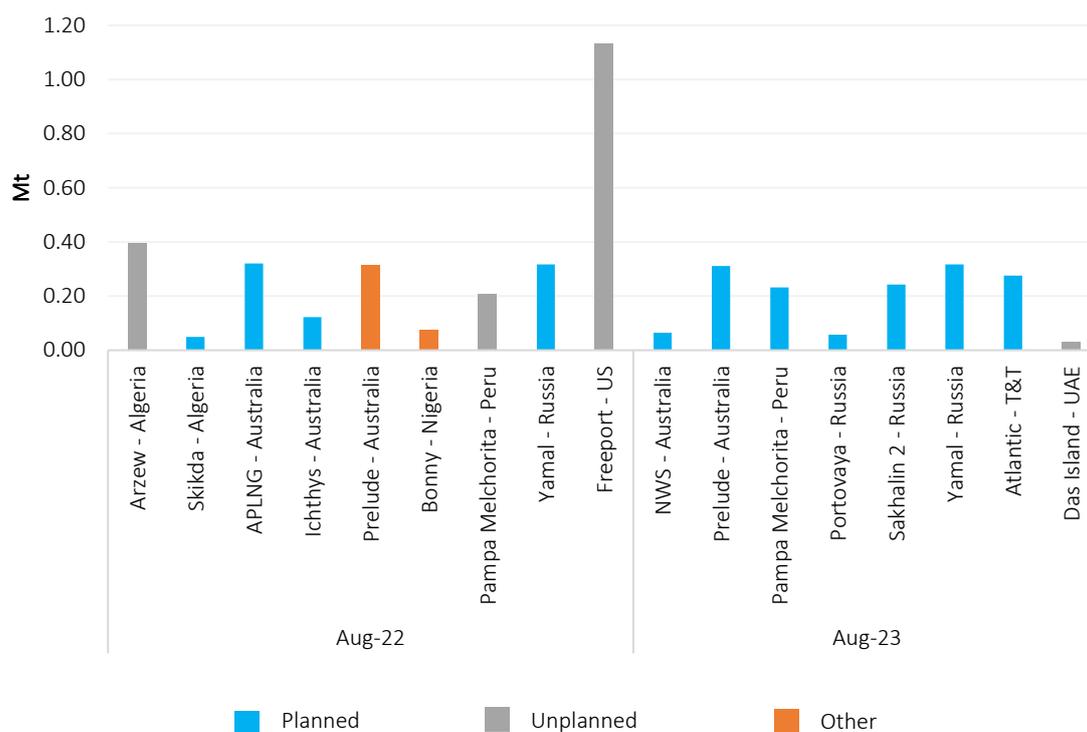


Source: GECF Secretariat based on data from GECF Shipping Model, Argus and ICIS LNG Edge

#### 4.2.5 Maintenance Activity at LNG Liquefaction Facilities

In August 2023, the total planned maintenance, unplanned outages, and other impacts at global liquefaction facilities reached 1.53 Mtpa, marking a significant decrease from the 2.94 Mt recorded in August 2022 (Figure 91). Planned maintenance activities took place at the North West Shelf and Prelude LNG facilities in Australia, the Pampa Melchorita LNG facility in Peru, the Portovaya, Sakhalin 2 and Yamal LNG facilities in Russia, and the Atlantic LNG facility in Trinidad. Conversely, the Das Island LNG facility in the United Arab Emirates experienced an unplanned outage, which occurred in July 2023.

Figure 91: Maintenance activity at LNG liquefaction facilities during August (2022 and 2023)



Source: GECF Secretariat based on information from Argus, ICIS LNG Edge and Refinitiv

#### 4.2.6 Other Developments

**BP delays start-up of the GTA Phase 1 FLNG to Q1 2024** – On August 1, 2023, BP announced a delay in the start-up of the Greater Tortue Ahmeyim (GTA) Phase 1 FLNG facility in Mauritania/Senegal from Q4 2023 to Q1 2024. The facility has already suffered from delays in 2022 due to the several factors, including COVID-related delays. The Tortue FLNG facility has a capacity of 2.5 Mtpa and will be supplied with gas from the Tortue field, which straddles both Mauritania and Senegal.

**Wenzhou LNG terminal receives its first LNG cargo** – On August 7, 2023, the Wenzhou LNG import terminal in China received its first LNG cargo. The terminal is owned by Zhejiang Energy and has a regasification capacity of 3 Mtpa and four 200,000 m<sup>3</sup> storage tanks. EEN Energy supplied the first LNG cargo to Zhejiang Energy from the Bontang LNG facility in Indonesia.

**First LNG train for Arctic LNG 2 arrives in the Gydan Peninsula**: On August 13, 2023, Novatek delivered the first train for Russia’s Arctic LNG 2 export facility in the Gydan Peninsula, West Siberia. The train is built on a concrete gravity-based structure (GBS) and was pre-commissioned in the Belokamenka yard. The train has a capacity of 6.6 Mtpa and is expected to start operations before the end of 2023. The second and third trains, which have a similar capacity, are expected to start operations before the end of 2026.

**Gate LNG terminal expansion takes FID** – On August 22, 2023, Gasunie and Vopak took a final investment decision to expand the Gate LNG terminal in the Netherlands. The expansion includes the construction of a 180,000m<sup>3</sup> LNG storage tank. The regasification capacity will also be increased by 3.1 Mtpa, raising the terminal’s regasification capacity to 16 Mtpa. The

expansion is estimated to cost €350 million (US\$380 million) and expected to be completed in the second half of 2026.

In terms of LNG agreements, six contracts were signed in August 2023, as shown in Table 2 below.

**Table 2: New LNG sale agreements signed in August 2023**

<b>Contract Type</b>	<b>Exporting Country</b>	<b>Project</b>	<b>Seller</b>	<b>Importing Country</b>	<b>Buyer</b>	<b>Volume (Mtpa)</b>	<b>Duration (Years)</b>
<b>SPA</b>	Mexico	Saguaro Energia LNG	Mexico Pacific LNG	Portfolio	Conoco Phillips	2.2	20
<b>SPA</b>	UAE		ADNOC	Japan	JAPEX	0.25	5
<b>SPA</b>	US	Sabine Pass Expansion	Cheniere	Portfolio	BASF	0.8	17
<b>Termsheet</b>	Oman	Qalhat LNG	Oman LNG	Portfolio	Shell	0.8	10
<b>Termsheet</b>	Oman	Qalhat LNG	Oman LNG	Portfolio	OQ Trading	0.75	4

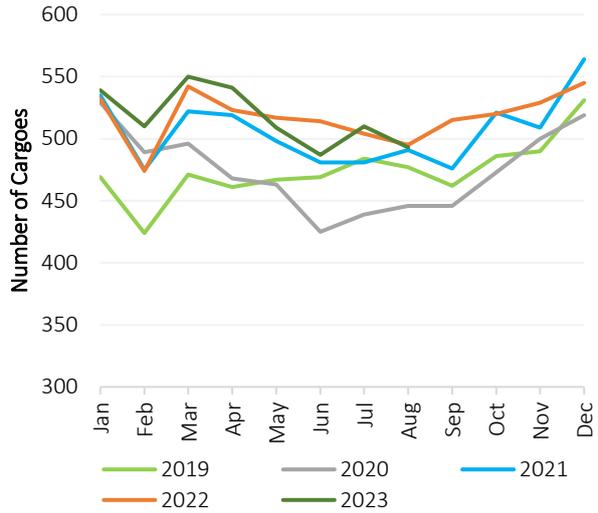
*Source: GECF Secretariat based on Project Updates and News*

### 4.2.7 LNG Shipping

The total number of LNG export cargoes fell by 3% m-o-m in August 2023, reaching 493 (Figure 92). After the first eight months of the year, the total number of shipments was 4,139. This represented a 1% increase, or 38 cargoes, compared with the same period in 2022 (Figure 93).

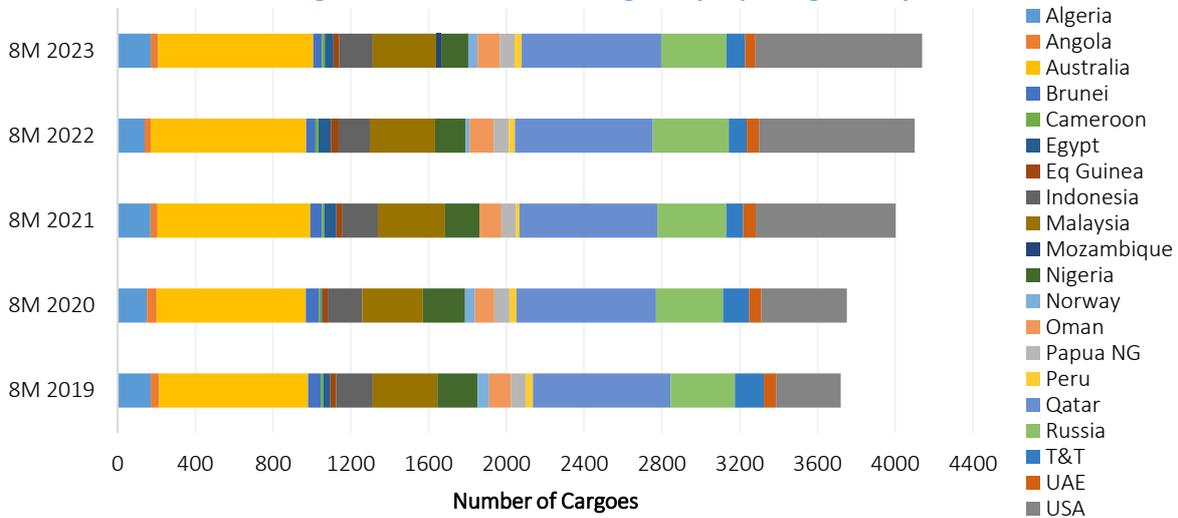
Over the eight months of 2023, there have been notable increases in cargo shipments from the US (55), Algeria (31) and Norway (28), when compared with the same period in 2022 (Figure 94). On a relative basis, Norway has recorded a 140% increase in cargo deliveries during the eight months of 2023, in contrast to the same period one year ago. The next highest percentage increases were observed in Algeria (22%) and Angola (19%).

Figure 92: Number of LNG export cargoes



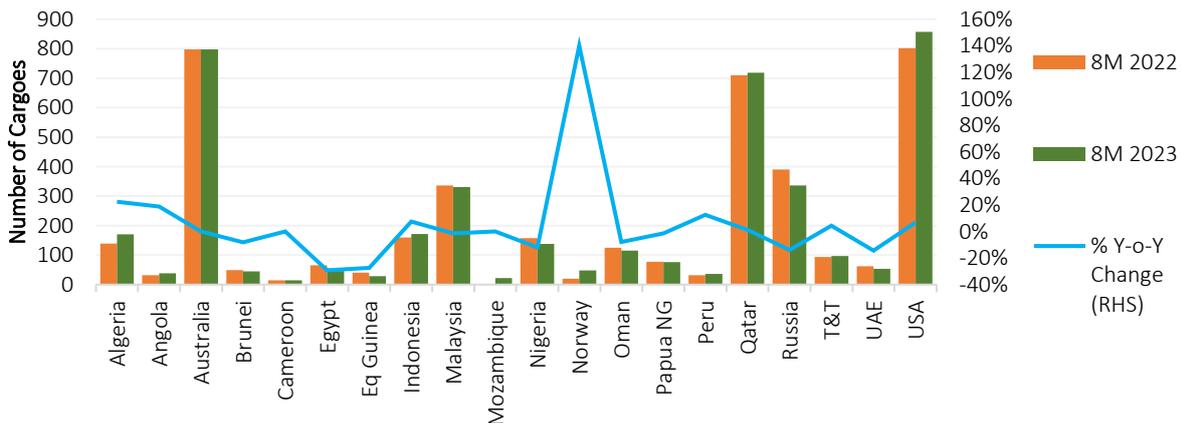
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 93: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 94: Changes in LNG cargo exports

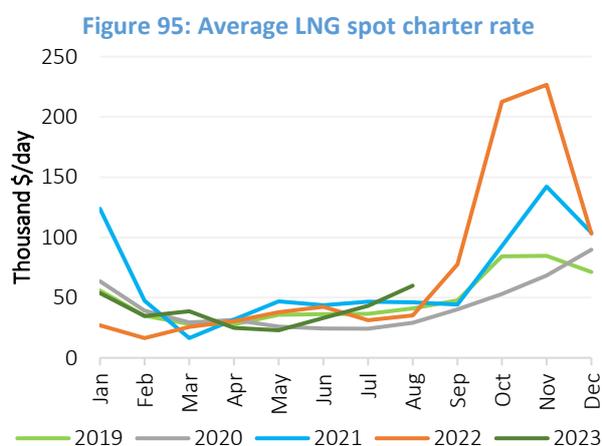


Source: GECF Secretariat based on data from ICIS LNG Edge

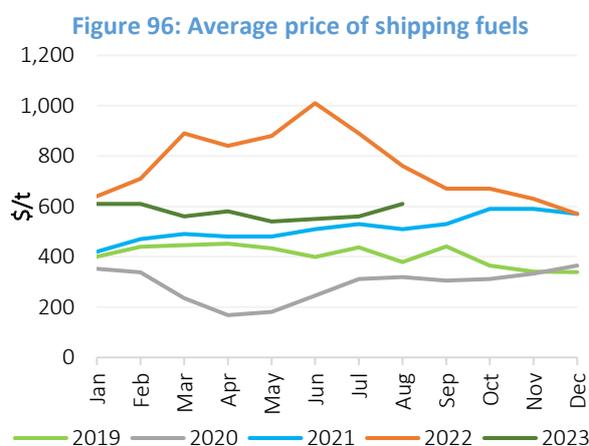
In August 2023, the spot charter rate for steam turbine LNG carriers gained 39% m-o-m, to reach an average of \$59,900 per day (Figure 95). This price was 70% greater than the August 2022 levels and is \$20,800 per day higher than the five-year historical average for this vessel class. Regarding the other segments of the LNG carrier fleet, both TDFE and two-stroke vessels observed increases in the spot charter rate as well. For TDFE carriers, the spot charter rate rose by 42% m-o-m to reach \$94,600 per day. Similarly, for two-stroke carriers, the spot charter rate rose by 33%, reaching \$121,500 per day.

The daily spot charter rate for steam turbine LNG carriers remained relatively unchanged in July indicating that the market is now tightening. As expected during this time of year, the number of vessels which are being taken out of rotation to be used as floating storage around Europe is increasing. In addition to this, the tensions surrounding potentially prolonged strikes at LNG facilities in Australia have been reflected in spikes in Asian LNG prices. This development, along with the high gas storage levels in Europe, has fuelled the arbitrage, leading to increased cross-basin flows from the Atlantic to the Pacific basin.

The average price of the leading shipping fuels increased by 9% m-o-m in August 2023, to reach \$610 per tonne (Figure 96). This price was 20% lower than one year ago.



Source: GECF Secretariat based on data from ICIS LNG Edge and Argus



Source: GECF Secretariat based on data from Bunker Ports News Worldwide and Argus

The GECF's assessment of LNG spot shipping costs for steam turbine carriers in August 2023 is shown in Table 3.

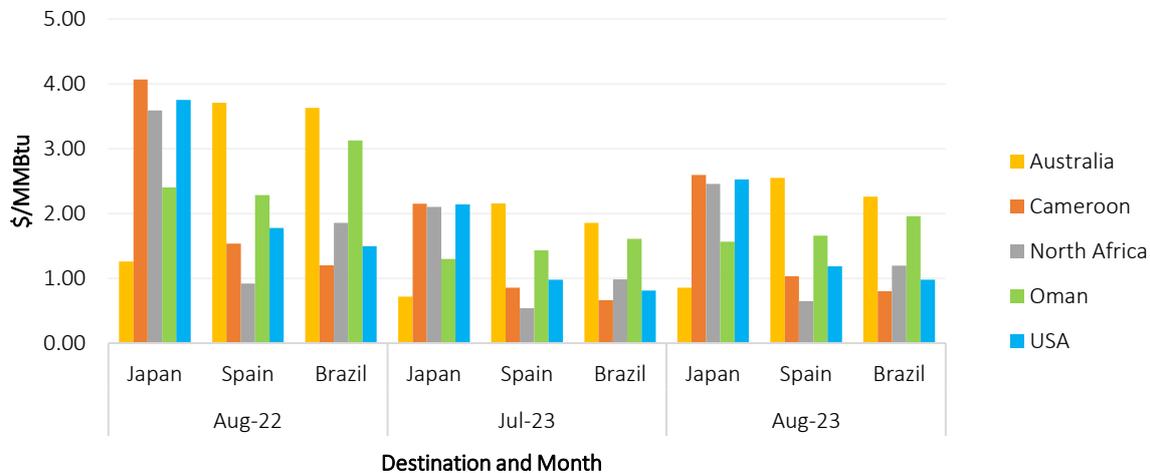
Table 3: Shipping costs for LNG spot cargoes from selected regions (\$/MMBtu) – August 2023

		Destination						
		To Japan	To China	To India	To UK	To Spain	To Argentina	To Brazil
LNG Supplier	From							
	Spot LNG delivered price	12.51	12.51	11.80	11.37	11.55	11.80	11.57
	Australia	0.86	0.91	1.03	2.63	2.55	2.06	2.26
	Cameroon	2.60	2.56	1.71	1.12	1.03	1.21	0.80
	North Africa	2.46	2.45	1.34	0.74	0.65	1.70	1.19
	Oman	1.56	1.46	0.33	1.75	1.66	1.98	1.96
	USA	2.53	2.79	2.67	1.22	1.19	1.63	0.98

Source: GECF Shipping Cost Model

In August 2023, there were monthly increases observed in the LNG carrier spot charter rate, the cost of LNG shipping fuels and the delivered spot LNG prices. Accordingly, the LNG spot shipping costs for steam turbine carriers increased by up to \$0.44/MMBtu on certain routes, relative to the previous month (Figure 97). When compared with the same month a year ago, the spot charter rates and the delivered spot LNG prices were much lower in August 2023, resulting in LNG shipping costs being up to \$1.47/MMBtu lower.

Figure 97: LNG spot shipping costs for steam turbine carriers



Source: GECF Shipping Cost Model

**Roundup of recent newbuild orders in South Korea:** The influx of orders for new LNG carriers continues at the most popular South Korean shipyards. Hyundai Heavy Industries has received an order for two carriers, each with a capacity of 174,000 m<sup>3</sup>. The order is valued at \$530 million, which places the \$265 million cost per vessel as the highest price for LNG carriers of such size. Market speculation is hinting that the buyer may be Evalend Shipping, which already owns a large fleet of more than 50 ships, including bulk carriers, tankers and LPG carriers, but is a newcomer on the LNG shipping scene. Both vessels are scheduled for delivery by November 2027. In addition, rival shipyard Hanwha Ocean received an order for one new carrier valued at \$260 million, with delivery planned for February 2027.

**Research into new technologies for LNG cargo tanks:** LNG ship owners and builders are constantly exploring new avenues for optimizing the voyages of their vessels. In this regard, South Korea’s shipyard Hanwha Ocean has been conducting a long-term research project in collaboration with steel manufacturer POSCO, to examine means of reducing the weight of the LNG cargo tanks. Currently, LNG cargo tanks are constructed of an alloy of nickel steel, stainless steel and aluminium. Hanwha’s research focuses on high-manganese steel, which the company claims is 30% cheaper.

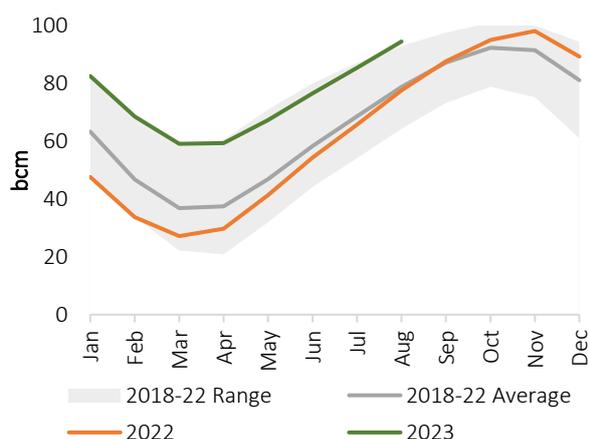
## 5 Gas Storage

### 5.1 Europe

Underground gas storage (UGS) sites in EU member states are now almost fully filled. In August 2023, the average daily volume of gas in storage increased to 94.5 bcm, up from 85.4 bcm recorded in the previous month (Figure 98). This level was 16.9 bcm higher than in the same month in 2022, and 15.7 bcm greater than the five-year historical average.

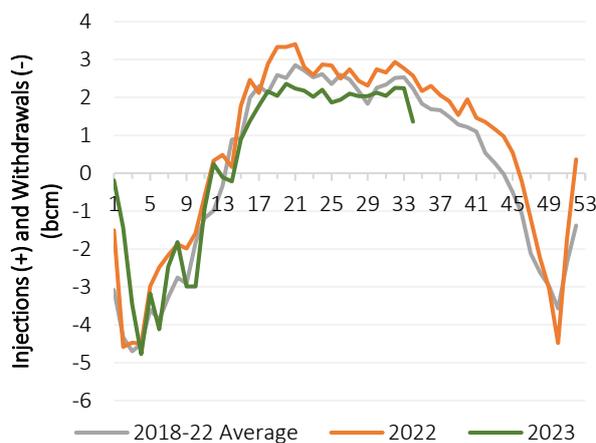
With the total working capacity for UGS sites in the EU currently at 104 bcm, the average UGS capacity utilization in the region increased to 91%. Over the course of August, there were 8.6 bcm of gas injected into UGS facilities, and 0.8 bcm of gas withdrawals.

Figure 98: Underground gas storage in the EU



Source: GECF Secretariat based on data from AGSI+

Figure 99: Weekly rate of EU UGS level changes



Source: GECF Secretariat based on data from AGSI+

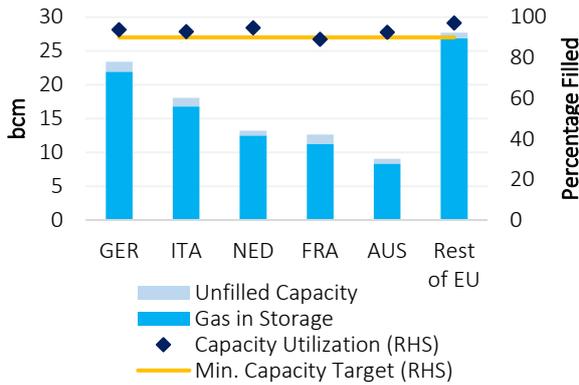
Net gas injections were observed during all the days of August 2023. With storage levels already high, stock build was observed at an average rate of just 2.0 bcm per week (Figure 99). In contrast, the average rate recorded in August 2022 was 2.7 bcm/week, while the five-year average rate was 2.4 bcm/week.

For the year 2023, EU member countries are obliged to fill UGS sites to a minimum level of 90% of capacity by November 1, 2023, with targets for the storage level set throughout the gas storage season. However, because of the mild weather conditions during the winter of 2022/23, along with the EU's gas consumption reduction measures, the region started the net gas injection season with elevated storage levels. The EU's 90% target was achieved ahead of schedule on August 12. Furthermore, by August 31, the storage target was surpassed by an additional 22 bcm.

By the end of August 2023, four out of the top five EU countries have surpassed the 90% mark (Figure 100). France is currently at 89%, following a surge in gas injections in recent months.

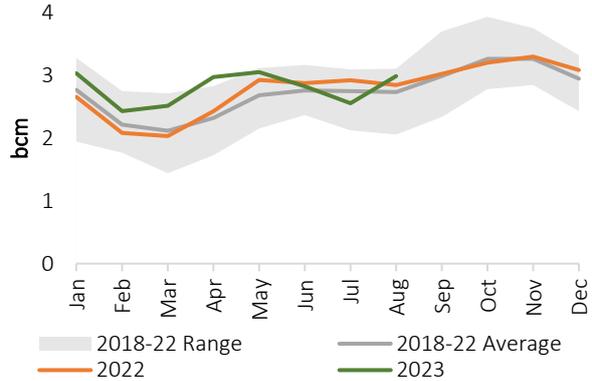
The EU has a total LNG storage capacity of 5.1 bcm, primarily concentrated in Spain (39%) and France (16%). In August 2023, the combined amount of LNG stored in EU countries picked up by 17% m-o-m, to reach 3.0 bcm (Figure 101). Moreover, the level of LNG in storage was 9% above the five-year average, in line with the seasonal trend of rising storage levels ahead of the winter.

**Figure 100: UGS in EU countries as of Aug 31, 2023**



Source: GECF Secretariat based on data from AGSI+

**Figure 101: Total LNG storage in the EU**

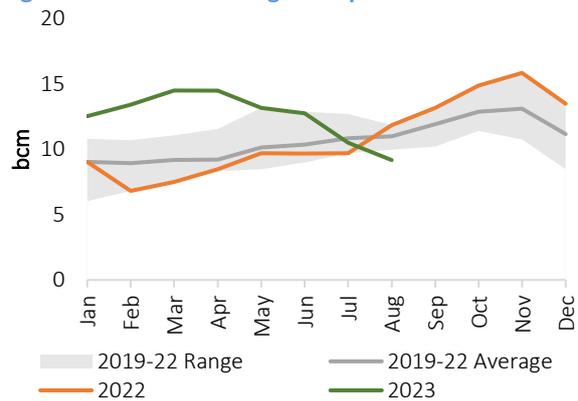


Source: GECF Secretariat based on data from ALSI

## 5.2 Asia

Japan and South Korea possess a combined capacity of 16.7 bcm of LNG storage. The combined level of LNG in storage reached an estimated 9.2 bcm in August 2023 (Figure 102), falling by 13% m-o-m. This quantity was 23% lower than at the same point one year ago and was also 1.8 bcm below the four-year average. Storage in Japan accounted for 4.4 bcm while there were 4.8 bcm in storage in South Korea. Sustained high temperature during the month, particularly in Japan, has maintained the demand for cooling.

**Figure 102: LNG in storage in Japan and South Korea**

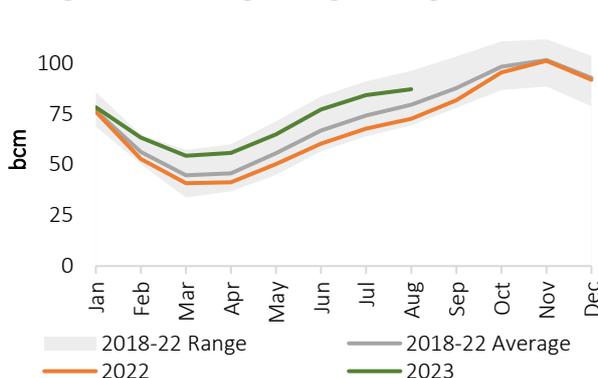


Source: GECF Secretariat based on data from Refinitiv

## 5.3 North America

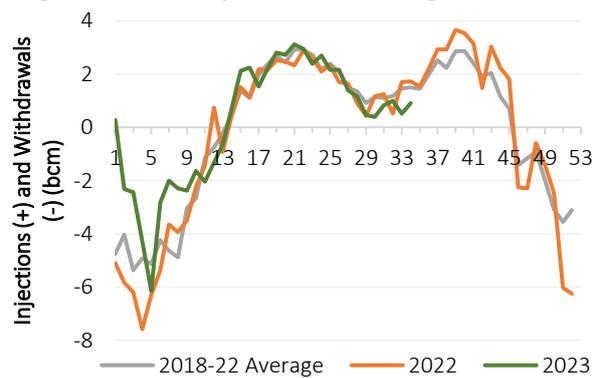
There are 134 bcm of working gas storage capacity in the US, and the country is currently restocking UGS sites in preparation for the winter season. In August 2023, the average daily volume of gas in storage rose to 87.0 bcm, up from 84.2 bcm one month ago (Figure 103). This quantity was 14.5 bcm higher than in August 2022, and 7.5 bcm greater than the five-year historical average. Capacity utilization for the month reached 65%. The rate of stock build plummeted during the month, averaging just 0.8 bcm/week, compared with 1.3 bcm/week in 2022 as well as for the five-year average (Figure 104).

**Figure 103: Underground gas storage in the US**



Source: GECF Secretariat based on data from US EIA

**Figure 104: Weekly rate of UGS changes in the US**



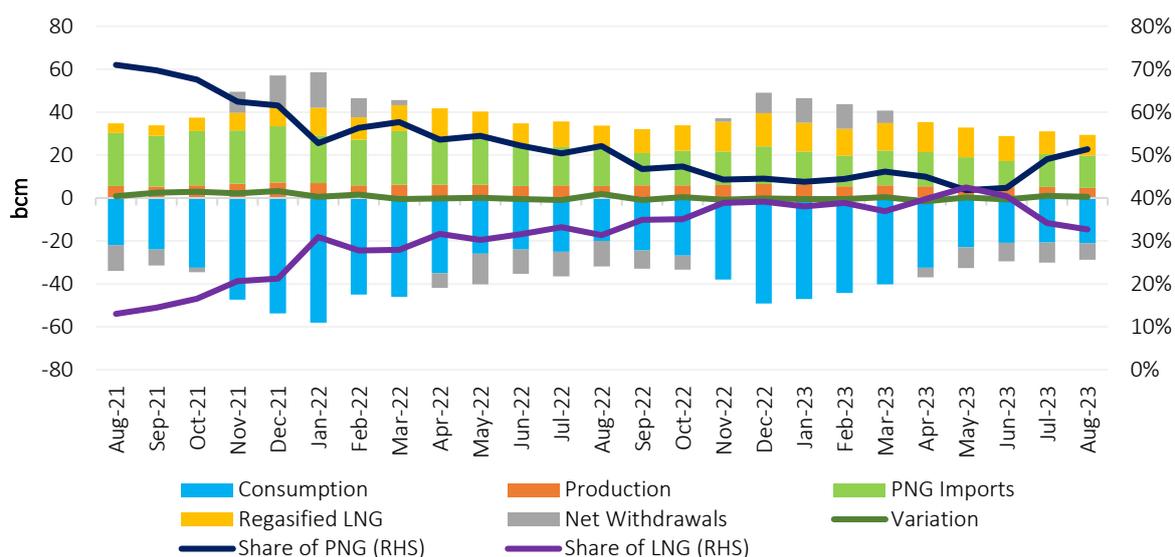
Source: GECF Secretariat based on data from US EIA

## 6 Gas Balance

### 6.1 EU + UK

In August 2023, the share of pipeline gas imports in the EU + UK's gas supply continued to increase m-o-m and exceeded 50% for the first time since August 2022. Compared to a year earlier, the share of pipeline gas imports was down slightly by 1%. Conversely, the share of regasified LNG declined by 1% m-o-m to 33% but rose by 2% y-o-y (Figure 105). The sharper m-o-m decline in the share of regasified LNG sendout compared to pipeline gas imports into the EU + UK's gas market led to the lower share of regasified LNG sendout. Since 2022, there has been a shift from the reliance on PNG imports to LNG imports in the EU + UK, driven by the EU's targeted reduction in gas imports from Russia.

Figure 105: EU + UK monthly gas balance



Note: Variation refers to losses and statistical differences

Source: GECF Secretariat based on data from AGSI+, ICIS LNG Edge, JODI Gas, McKinsey and Refinitiv

Table 4 below provides data on the gas supply and demand balance for the EU + UK for the month of August 2023.

Table 4: EU + UK gas supply/demand balance for August 2023 (bcm)

	2022	Aug-22	Aug-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) Gas Consumption	417.40	20.00	21.00	279.00	249.60	5%	-11%
(b) Gas Production	72.73	5.59	4.70	48.44	43.15	-16%	-11%
Difference (a) - (b)	344.67	14.41	16.30	230.56	206.45	13%	-10%
PNG Imports	230.46	17.54	15.09	166.25	117.88	-14%	-29%
Regasified LNG	146.57	10.57	9.60	94.32	98.56	-9%	4%
Net Withdrawals	-31.79	-11.82	-7.79	-27.96	-11.11	-34%	-60%
Variation	-0.57	-1.87	-0.60	-2.05	1.14		

Source: GECF Secretariat based on data from AGSI+, JODI Gas, McKinsey and Refinitiv

Note: variation refers to statistical differences and losses

(\*): y-o-y change for Aug 2023 compared to Aug 2022

(\*\*): y-o-y change for YTD 2023 compared to YTD 2022

## 6.2 OECD

Table 5 below provides data on the gas supply and demand balance for all OECD countries, including OECD Americas, OECD Asia Oceania and OECD Europe for the month of May 2023.

Table 5: OECD's gas supply/demand balance for May 2023 (bcm)

	2022	May-22	May-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) OECD Gas Consumption	1803.1	123.0	121.3	821.2	785.7	-1.4%	-4.3%
(b) OECD Gas Production	1651.0	140.2	140.8	675.5	703.4	0.5%	4.1%
Difference (a) - (b)	152.1	-17.2	-19.5	145.7	82.3	13.4%	-43.5%
OECD LNG Imports	346.9	27.0	26.6	147.9	150.7	-1.7%	1.9%
LNG Imports from GECF	161.8	13.1	11.6	66.7	65.4	-11.3%	-1.9%
LNG Imports from Non-GECF	185.1	13.9	15.0	81.2	85.3	7.4%	5.0%
OECD LNG Exports	223.2	18.6	19.4	92.1	99.2	4.4%	7.7%
Intra-OECD LNG Trade	152.7	11.6	12.8	65.4	69.0	10.4%	5.5%
OECD Pipeline Gas Imports	630.3	59.7	44.2	297.2	221.8	-25.9%	-25.4%
OECD Pipeline Gas Exports	562.7	53.4	43.3	253.0	213.5	-19.0%	-15.6%
Stock Changes and losses	39.2	32.0	27.7	-45.7	-22.6		

Source: GECF Secretariat based on data from ICIS LNG Edge and IEA Monthly Gas Statistics

(\*): y-o-y change for May 2023 compared to May 2022

(\*\*): y-o-y change for YTD 2023 compared to YTD 2022

## 6.3 India

Table 6 below provides data on the gas supply and demand balance for India for the month of July 2023.

Table 6: India's gas supply/demand balance for July 2023 (bcm)

	2022	Jul-22	Jul-23	YTD-2022	YTD-2023	Change* y-o-y	Change** 2023/2022
(a) India Gas Consumption	60.96	5.31	5.30	35.88	35.47	-0.3%	-1.2%
(b) India Gas Production	33.46	2.81	3.06	19.34	19.81	9.0%	2.4%
Difference (a) - (b)	27.50	2.50	2.23	16.54	15.65	-10.6%	-5.4%
India LNG Imports	28.07	2.52	2.52	17.11	16.78	-0.4%	-1.9%
LNG Imports from GECF	22.15	1.78	1.62	13.97	13.15	-8.6%	-5.9%
LNG Imports from Non-GECF	5.92	0.75	0.89	3.15	3.64	19.1%	15.5%
Stock Changes and losses	0.57	0.02	0.28	0.57	1.13		

Source: GECF Secretariat based on data from ICIS LNG Edge and India's PPAC

(\*): y-o-y change for Jul 2023 compared to Jul 2022

(\*\*): y-o-y change for YTD 2023 compared to YTD 2022

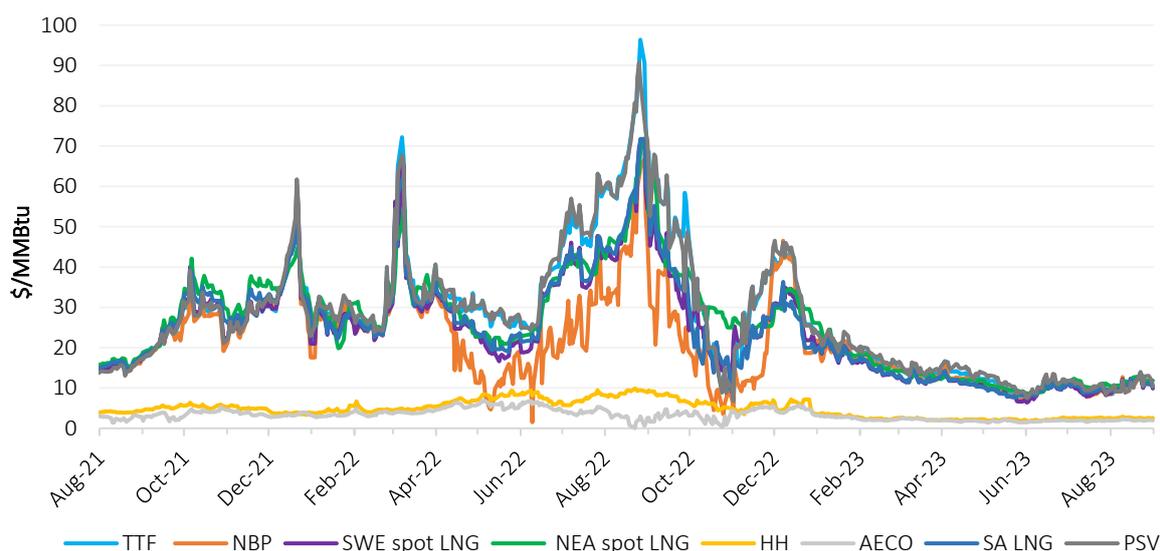
## 7 Energy Prices

### 7.1 Gas Prices

#### 7.1.1 Gas & LNG Spot Prices

In August 2023, gas and LNG spot prices in Europe and Asia experienced some bullish movement, despite the overall weakness in global gas market fundamentals. Additionally, spot price volatility was more prominent compared to the previous month but remained relatively low (Figure 106 and Figure 107). The possibility of disruption in Australian LNG exports contributed to the upward movement in spot prices. In the coming months, it is expected that the rising buying activity from price-sensitive Asian LNG importers will continue to provide support for prices.

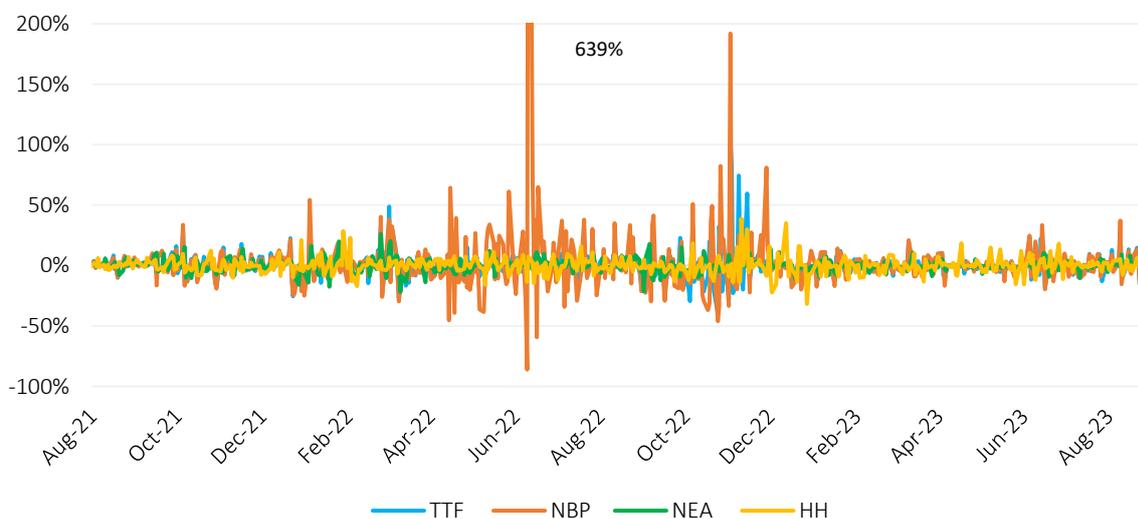
Figure 106: Daily gas & LNG spot prices



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

Note: SA LNG price is an average of the LNG delivered prices for Argentina, Brazil and Chile based on Argus assessment.

Figure 107: Daily variation of spot prices



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

### 7.1.1.1 European Spot Gas and LNG Prices

In August 2023, average TTF and NBP spot gas prices were \$10.74/MMBtu (12% increase m-o-m) and \$10.65/MMBtu (16% increase m-o-m), respectively, as shown in Figure 108. In addition, these spot prices were lower by 85% y-o-y for TTF and 76% y-o-y for NBP. The SWE spot LNG prices averaged \$10.95/MMBtu in August 2023, marking a 19% increase m-o-m and a 79% decrease y-o-y. As for the PSV spot price, it averaged \$10.95/MMBtu in August 2023, a 5% increase m-o-m and an 84% decline y-o-y.

European gas and LNG spot prices witnessed an increase, primarily attributed to the uncertainty stemming from industrial actions in Australia and a more constrained gas balance in northwest Europe caused by extensive maintenance activities in Norway. Europe itself does not directly import LNG from Australia, but the response in spot prices was likely influenced by the concurrent rise in Asian LNG spot prices. However, these price gains were tempered by subdued demand in the region and the fact that EU gas storage levels had already reached their target of 90% for November 1. Notably, daily TTF spot prices surged above \$13/MMBtu during the month.

From January to August 2023, TTF and NBP averaged \$13.11/MMBtu and \$12.49/MMBtu, respectively, representing substantial declines of 66% and 54% y-o-y, respectively.

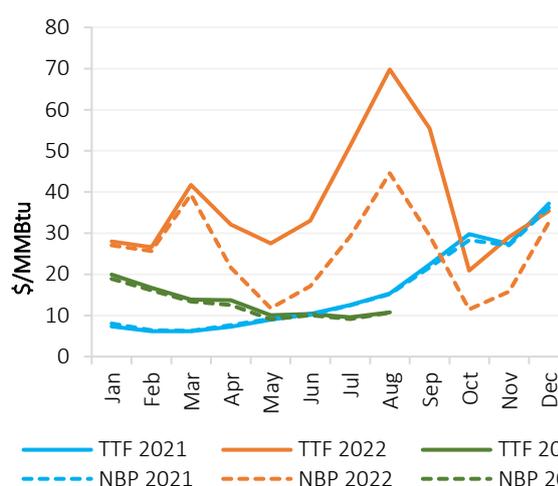
### 7.1.1.2 Asian Spot LNG Prices

In August 2023, the average North East Asia (NEA) spot LNG price experienced an increase of 8% m-o-m, reaching an average of \$11.71/MMBtu. This represents a 78% decrease compared to the same period last year (Figure 109).

The upward movement in Asian LNG prices was fuelled by several factors, including the possibility of disruption in Australian LNG exports and heightened gas demand for cooling purposes as Japan and South Korea faced heatwaves during the month. Daily NEA spot LNG prices surpassed \$13/MMBtu.

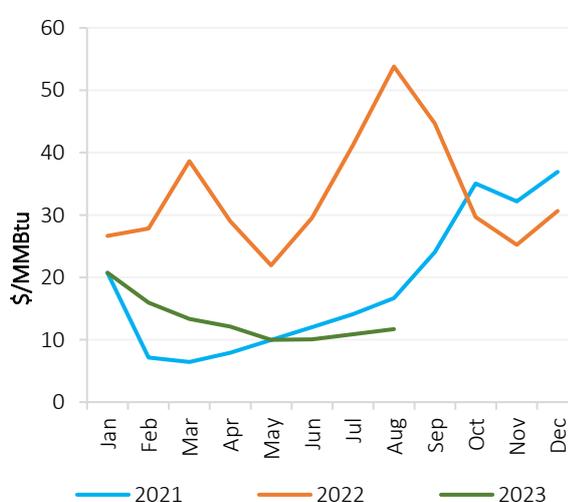
From January to August 2023, the average NEA spot LNG price stood at \$13.10/MMBtu, representing a 61% y-o-y decrease.

Figure 108: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Figure 109: Monthly Asian spot LNG prices



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

### 7.1.1.3 North American Spot Gas Prices

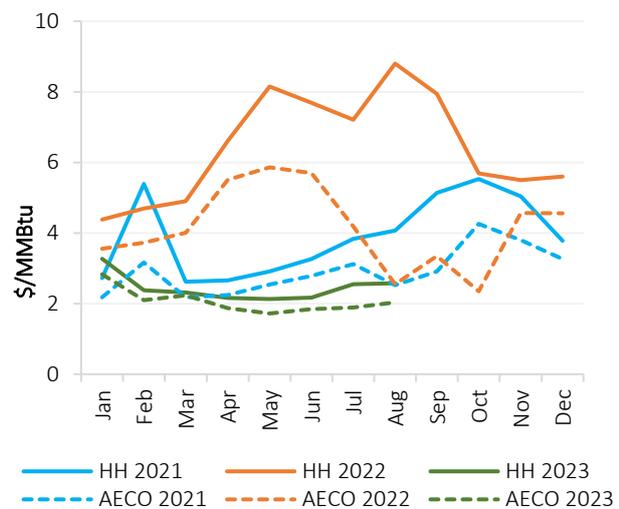
In August 2023, the HH spot gas price averaged \$2.58/MMBtu, reflecting a slight increase of 1% m-o-m. However, it was significantly lower y-o-y, dropping by 71%, compared to the average price of \$8.80/MMBtu observed in August 2022. (Figure 110).

Henry Hub prices rose due to warmer-than-expected temperatures, leading to increased gas demand for cooling. However, gas storage levels remained above the five-year average. Moreover, daily HH spot prices reached a peak of \$2.92/MMBtu.

Similarly, in Canada, the AECO spot price increased by 7% m-o-m, averaging \$2.03/MMBtu in August 2023, however it was 20% lower y-o-y.

From January to August 2023, the HH spot price averaged \$2.44/MMBtu, representing a significant 63% y-o-y decrease. The AECO spot price averaged \$2.06/MMBtu, marking a substantial 56% y-o-y decrease.

Figure 110: Monthly North American gas spot prices



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

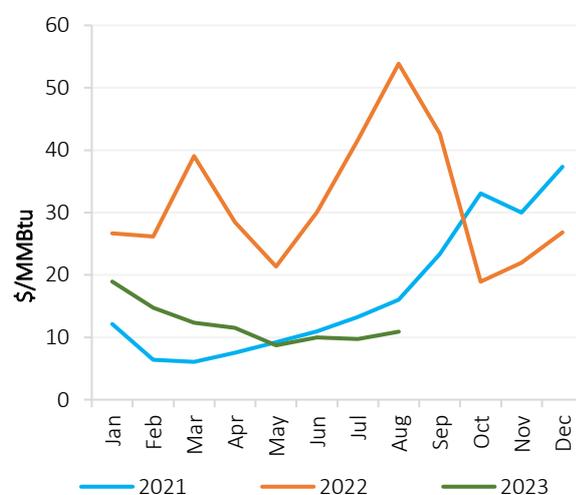
### 7.1.1.4 South American Spot LNG Prices

In August 2023, the South American (SA) LNG price experienced a 12% m-o-m increase, averaging \$10.88/MMBtu. However, this price was 80% lower compared to the average price of \$53.86/MMBtu observed in August 2022 (Figure 111).

LNG spot prices in South America continued to align with the trends observed in European and Asian spot prices. The average delivered prices for LNG in Argentina, Brazil and Chile averaged \$11.14/MMBtu, \$10.43/MMBtu and \$11.06/MMBtu, respectively.

From January to August 2023, the SA LNG spot price averaged \$12.09/MMBtu, marking a substantial 64% y-o-y decrease.

Figure 111: Monthly South American LNG spot prices



Source: GECF Secretariat based on data from Argus  
Note: SA LNG price is an average of the LNG delivered prices for Argentina, Brazil and Chile based on Argus assessment

### 7.1.2 Spot and Oil-indexed Long-Term LNG Price Spreads

In August 2023, the average Oil-indexed I LNG price was \$12.30/MMBtu, remaining relatively stable m-o-m and representing a decrease of 26% y-o-y. Similarly, the Oil-indexed II LNG price averaged \$9.21/MMBtu, showing a 2% m-o-m increase and a 28% y-o-y decrease (Figure 112). Furthermore, the Oil-indexed I prices held an average premium of \$1/MMBtu over NEA spot LNG prices. Meanwhile, the Oil-indexed II prices held an average discount of \$3/MMBtu compared to the NEA spot LNG prices.

In Europe, the Oil-indexed III price averaged \$8.01/MMBtu in August 2023, reflecting a 3% m-o-m decrease and an 18% y-o-y decrease (Figure 113). Moreover, the Oil-indexed III price held a discount of \$3/MMBtu over the average SWE LNG.

From January to August 2023, the Oil-indexed I LNG price exhibited a 9% y-o-y decrease, while the Oil-indexed II LNG price demonstrated a 16% y-o-y decrease. Additionally, the Oil-indexed III LNG price for the same period was relatively stable.

Figure 112: Asia: Spot and oil-indexed price spread

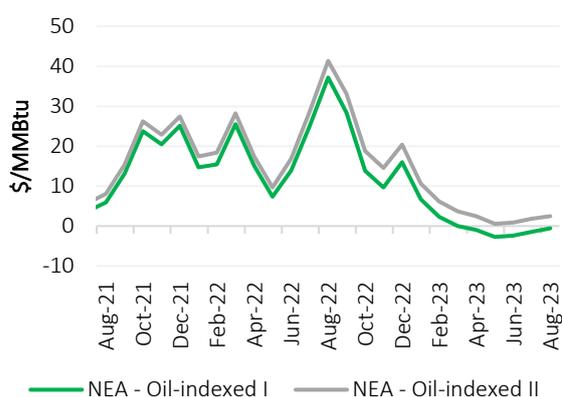
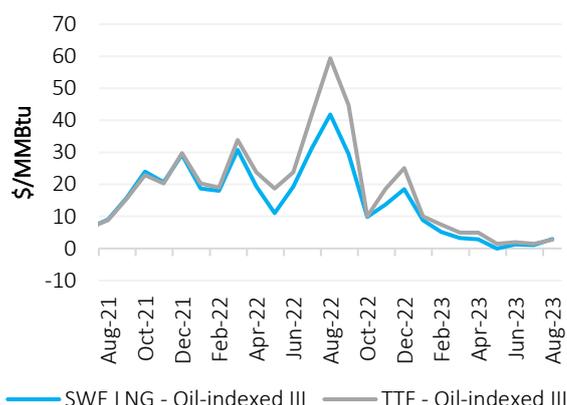


Figure 113: Europe: Spot and oil-indexed price spread



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

Note: Oil-indexed I LNG prices are calculated using the traditional LTC slope (14.9%) and 6-month historical average of Brent. Oil-indexed II LNG prices are calculated using the 5-year historical average LTC slope (11.1% for 2023) and 3-month historical average of Brent. Oil-indexed III LNG prices are based on Argus' assessment for European oil-indexed long-term LNG prices.

### 7.1.3 Regional Spot Gas & LNG Price Spreads

In August 2023, the average NEA-TTF price spread remained positive, with the average NEA LNG spot price gaining a premium of \$0.97/MMBtu over the average TTF spot price (Figure 114). Both prices experienced upward momentum during the month.

NBP traded at a discount of \$0.09/MMBtu compared to TTF, which was lower than the average discount of \$0.40/MMBtu in the previous month (Figure 115). The NBP-TTF spread narrowed as the average NBP spot price experienced a larger increase than the TTF spot price.

Furthermore, the NWE LNG-TTF spread turned slightly positive, with the NWE LNG spot price trading at a premium of \$0.21/MMBtu compared to TTF (Figure 116). This was likely due to concerns about LNG supply to the sub-region. The NWE LNG-SA LNG price spread turned positive, averaging \$0.07/MMBtu (Figure 117). The NEA-HH spread widened to \$9.13/MMBtu, while the TTF-HH spread narrowed to \$8.16/MMBtu (Figure 118 and Figure 119). Thus, Asian spot prices held a higher premium over North American spot prices during the month.

Figure 114: NEA-TTF price spread

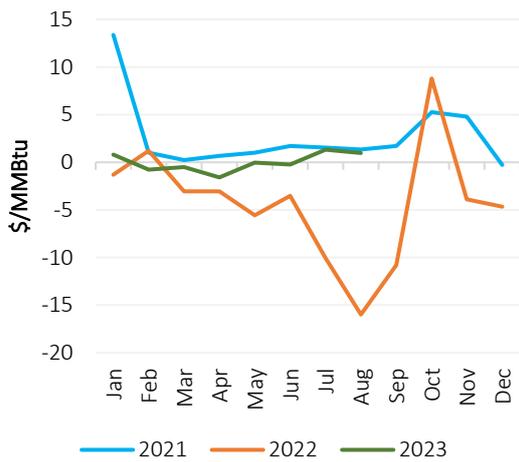


Figure 115: NBP-TTF price spread

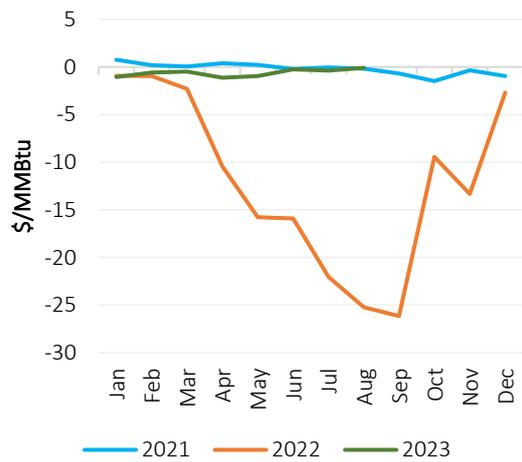


Figure 116: NWE LNG-TTF price spread

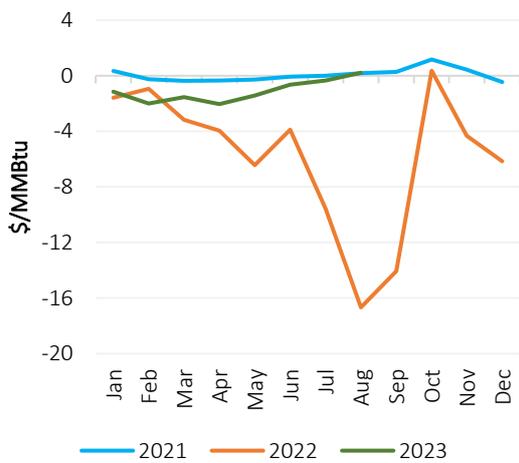


Figure 117: NWE LNG – SA LNG price spread

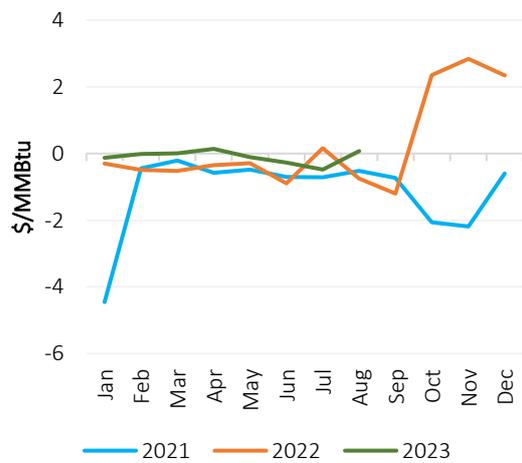


Figure 118: NEA-HH price spread

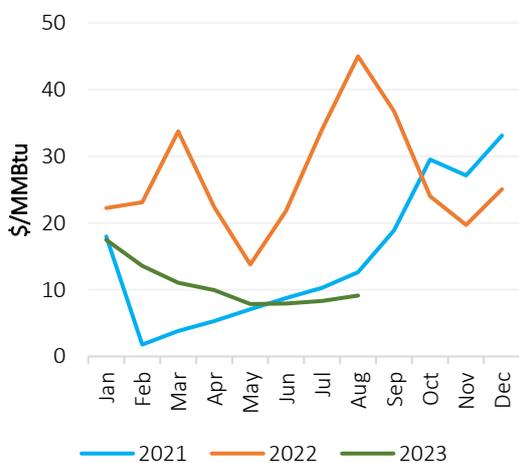
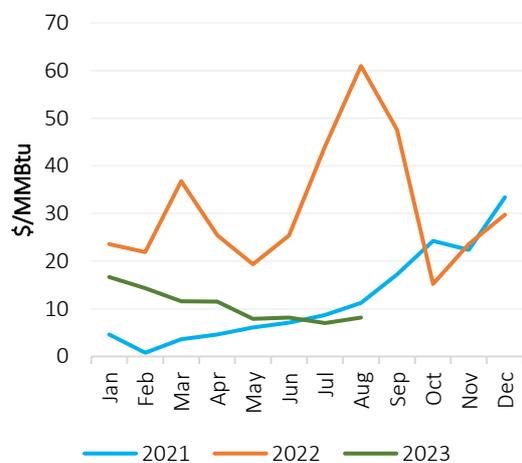


Figure 119: TTF-HH price spread



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

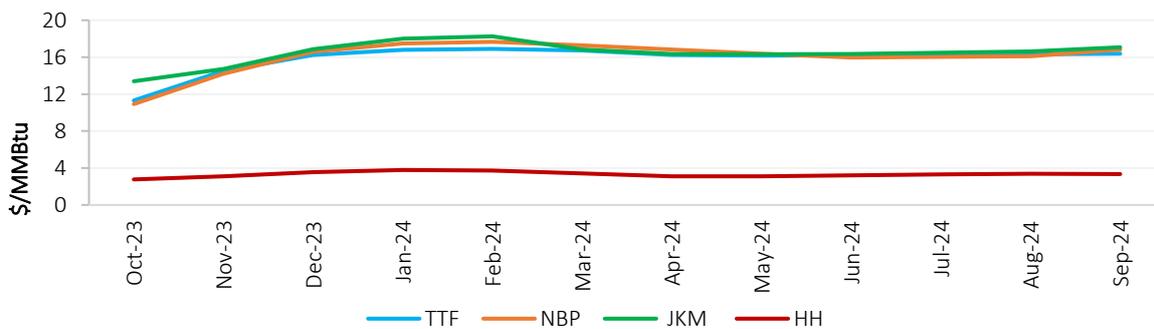
### 7.1.4 Gas & LNG Futures Prices

For the 6-month period spanning from October 2023 to March 2024, it is anticipated that the JKM-TTF futures price spread will remain positive. This suggests that Asian LNG prices may have a slight premium over European spot prices during this timeframe. Specifically, in October 2023, JKM is expected to trade at an average premium of \$2.1/MMBtu compared to TTF. Subsequently, in November 2023, the JKM-TTF spread is projected to significantly narrow to \$0.2/MMBtu, followed by a potential widening to \$0.6/MMBtu in December 2023. However, in January and February 2024, the spread is anticipated to widen once more, reaching approximately \$1.3/MMBtu. (Figure 120).

Regarding the difference between the TTF and NBP spot prices, NBP is expected to persistently trade at a minor discount to TTF of -\$0.4/MMBtu, in October and November 2023. In December 2023, the spread is expected to shift slightly to the positive side, with NBP potentially gaining a slight premium of around \$0.3/MMBtu.

For the 6-month period from October 2023 to March 2024, gas and LNG futures prices for TTF, NBP and JKM (as of September 3, 2023) were all higher than the futures prices expectations considered on August 8, 2023 (as reported in the GECF MGMR August 2023). Moreover, as of August 8, 2023, the average futures prices for TTF, NBP and JKM during the same 6-month period were \$15.42/MMBtu, \$15.69/MMBtu and \$16.34/MMBtu, respectively. Meanwhile, the average HH futures price was \$3.39/MMBtu, which was higher than previous expectations (Figure 121).

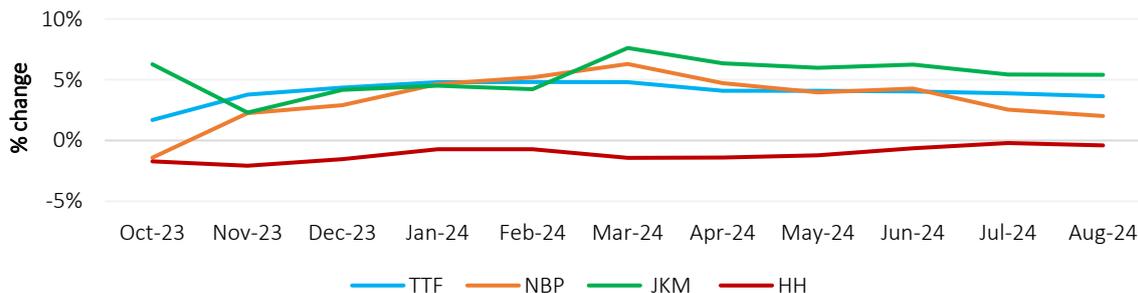
Figure 120: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Note: Futures prices as of September 3, 2023.

Figure 121: Variation in gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Note: Comparison with the futures prices as of August 8, 2023, as reported in GECF MGMR August 2023.

## 7.2 Cross Commodity Prices

### 7.2.1 Oil Prices

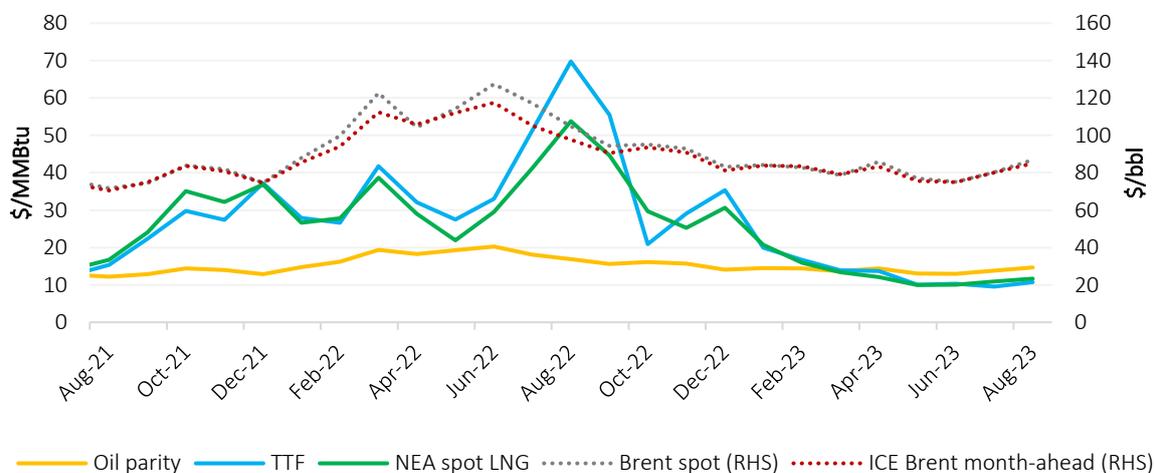
In August 2023, the average Brent spot price was \$86.90/bbl, reflecting an increase of 8% m-o-m, but a decrease of 17% y-o-y (Figure 122). The Brent month-ahead price averaged \$85.10/bbl, marking a 6% increase m-o-m and a 13% decrease y-o-y.

Oil prices experienced their second consecutive monthly increase in August, reaching a nine-month high. This increase was due to several factors, including the one-month extension of supply reductions by OPEC+ through to September 2023 and a rebound in China's PMI, which rose from 49.2 in the previous month to 51 in August. In addition, Saudi Arabia extended its voluntary supply cut of 1 million bpd, while Russia reduced its crude exports by 300,000 bpd, down from the 500,000 bpd reduction in August.

Furthermore, in August 2023, both TTF and NEA LNG spot prices continued to trade at a discount to the oil parity price of \$3.9/MMBtu and \$3/MMBtu, respectively.

From January to August 2023, the average Brent spot price was \$81.34/bbl, representing a 26% decrease y-o-y. Similarly, the average Brent month-ahead price was \$80.75/bbl, representing a 22% decrease y-o-y.

Figure 122: Monthly crude oil prices



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

Note: Conversion factor of 5.8 was used to calculate the oil parity price in \$/MMBtu based on the ICE Brent month-ahead price.

### 7.2.2 Coal Prices

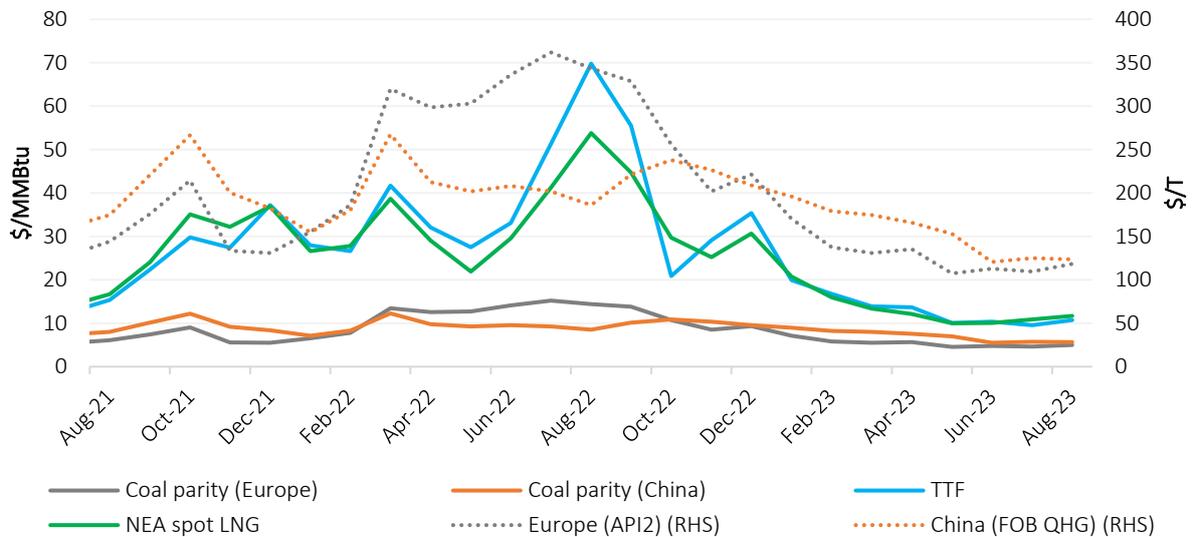
In August 2023, the European coal price (API2) experienced an 8% m-o-m increase (averaging \$118.38/T) and a 66% y-o-y decrease. Meanwhile, in China, the QHG coal price averaged \$123.44/T, decreasing by 1% m-o-m and 34% y-o-y (Figure 123).

European coal prices followed the upward trend in TTF, largely due to increased concerns regarding LNG supply from Australia. It is worth noting that fuel-switching dynamics continue to be a significant driver of coal prices.

The premium of TTF spot price over the API2 parity price increased by 16% m-o-m to \$5.8/MMBtu in August 2023. Additionally, the premium of NEA spot LNG price over the QHG parity price increased by 17% m-o-m to \$6.1/MMBtu.

From January to August 2023, the European API2 averaged \$127.78/T, representing a 56% decrease y-o-y. Meanwhile, the Chinese QHG price averaged \$154.61/T, which was 23% lower y-o-y.

Figure 123: Monthly coal parity prices



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

Note: Conversion factors of 23.79 and 21.81 were used to calculate the coal prices in \$/MMBtu for Europe (API2) and China (QHG) respectively.

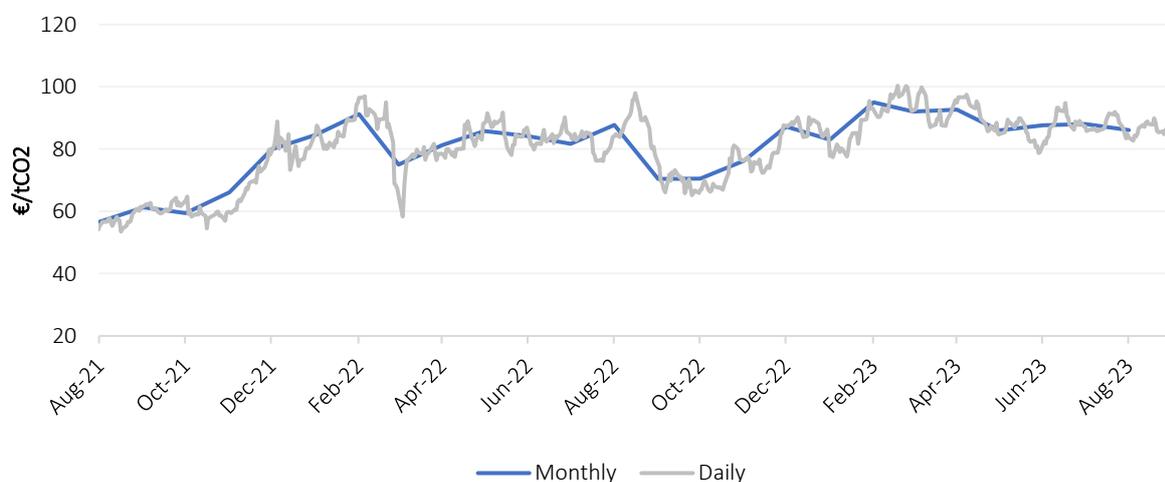
### 7.2.3 Carbon Prices

In August 2023, EU carbon prices averaged €86.06/tCO<sub>2</sub>, decreasing by 2% m-o-m and 2% y-o-y (Figure 124).

The drop in prices was attributed to cooler temperatures and robust renewable energy output, which decreased the demand for hydrocarbons in the power generation sector.

From January to August 2023, EU carbon prices averaged €88.82/tCO<sub>2</sub>, representing a 6% increase y-o-y.

Figure 124: EU carbon prices



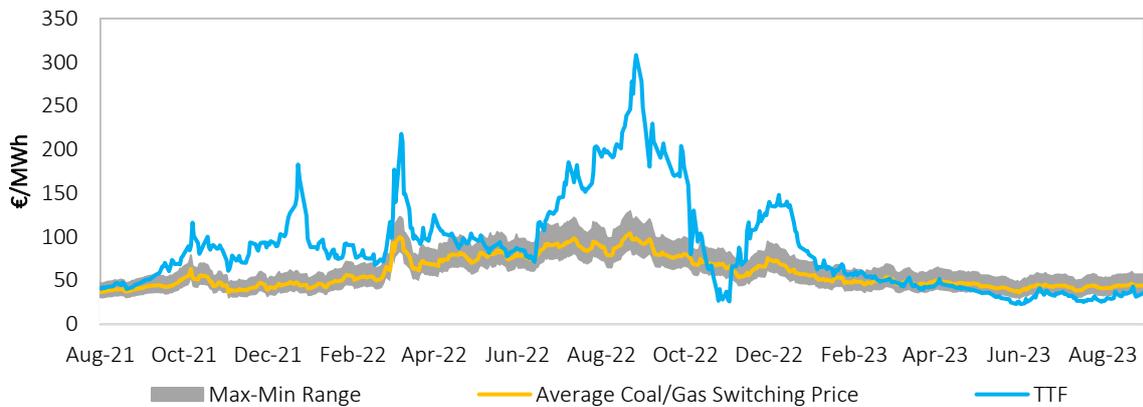
Source: GECF Secretariat based on data from Refinitiv Eikon

## 7.2.4 Fuel Switching

In August 2023, daily TTF spot prices remained below the range suitable for coal-to-gas switching, with an average coal-to-gas switching price of €43.40/MWh, marking a 4% m-o-m increase. The average monthly spread between the TTF spot price and the coal-to-gas switching price remained negative and narrowed to approximately -€10/MWh (Figure 125).

Looking ahead to October 2023, the TTF spot price is expected to remain slightly below the coal-to-gas switching range, indicating the continued competitiveness of gas-fired generation. This will continue to support coal-to-gas switching in the region.

Figure 125: Daily TTF vs coal-to-gas switching prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Note: Coal-to-gas switching price is the price of gas at which generating electricity with coal or gas is equal. The estimate takes into consideration coal prices, CO<sub>2</sub> emissions prices, operation costs and power plant efficiencies. The efficiencies considered for gas plants are max: 56%, min: 46%, avg: 49.13%. The efficiencies considered for coal plants are max: 40%, min: 34%, avg: 36%.

## 7.3 Other Developments

**Australia:** Potential strike action at Australian LNG facilities was the major driver for gas and LNG spot prices increase in August 2023. Toward the end of August, a resolution was reached between the Offshore Alliance union and Woodside Energy. However, the union was unable to reach a similar agreement with Chevron, resulting in industrial strikes commencing on September 8, 2023, at Chevron's Gorgon and Wheatstone LNG facilities. The union has planned intermittent industrial actions until September 14, after which a full work ban may be in effect until September 29. A sustained disruption in LNG supply may induce an uptick in spot prices in the next month.

**China:** On August 22, 2023, China's CNOOC and Singapore-based Pavilion Energy concluded an LNG deal on the Shanghai Petroleum and Gas Exchange (SHPGX), with settlement in Chinese yuan. This transaction marked the third LNG trade settled in yuan on SHPGX and represented the first instance of a Chinese firm being a seller rather than a buyer. The first transaction settled in yuan was between TotalEnergies and CNOOC in late March 2023. The second deal was in April 2023 between CNPC and ADNOC. China's active promotion of yuan serves, in part, to protect its financial system from potential US dollar risks and sanctions.

## 8 Abbreviations

Abbreviation	Explanation
AE	Advanced Economies
AECO	Alberta Energy Company
bcm	Billion cubic metres
bcma	Billion cubic metres per annum
bcm/yr	Billion cubic metres per year
CBAM	Carbon Border Adjustment Mechanism
CBM	Coal bed methane
CCS	Carbon, Capture and Storage
CCUS	Carbon Capture, Utilization and Storage
CDD	Cooling Degree Days
CNG	Compressed Natural Gas
CO <sub>2</sub>	Carbon dioxide
CO <sub>2e</sub>	Carbon dioxide equivalent
CPI	Consumer Price Index
DOE	Department of Energy
EC	European Commission
ECB	European Central Bank
EEXI	Energy Efficiency Existing Ship Index
EMDE	Emerging Markets and Developing Economies
EU	European Union
EU ETS	European Union Emissions Trading Scheme
EUA	European Union Allowance
Fed	Federal Reserve
FID	Final Investment Decision
FSU	Floating Storage Unit
FSRU	Floating Storage Regasification Unit
G7	Group of Seven

<b>GDP</b>	Gross Domestic Product
<b>GECF</b>	Gas Exporting Countries Forum
<b>GHG</b>	Greenhouse Gas
<b>HDD</b>	Heating Degree Days
<b>HH</b>	Henry Hub
<b>IEA</b>	International Energy Agency
<b>IMF</b>	International Monetary Fund
<b>IMO</b>	International Maritime Organization
<b>JKM</b>	Japan Korea Marker
<b>LNG</b>	Liquefied Natural Gas
<b>LAC</b>	Latin America and the Caribbean
<b>LT</b>	Long term
<b>MMBtu</b>	Million British thermal units
<b>mmcm</b>	Million cubic metres
<b>MENA</b>	Middle East and North Africa
<b>METI</b>	Ministry of Trade and Industry in Japan
<b>m-o-m</b>	month-on-month
<b>Mt</b>	Million tonnes
<b>Mtpa</b>	Million tonnes per annum
<b>MWh</b>	Megawatt hour
<b>NEA</b>	North East Asia
<b>NBP</b>	National Balancing Point
<b>NDC</b>	Nationally Determined Contribution
<b>NGV</b>	Natural Gas Vehicle
<b>NZBA</b>	Net-Zero Banking Alliance
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>PNG</b>	Pipeline Natural Gas
<b>PPAC</b>	Petroleum Planning & Analysis Cell
<b>QHG</b>	Qinhuangdao

<b>R-LNG</b>	Regasified LNG
<b>SA</b>	South America
<b>SPA</b>	Sales and Purchase Agreement
<b>SWE</b>	South West Europe
<b>T&amp;T</b>	Trinidad and Tobago
<b>TANAP</b>	Trans-Anatolian Natural Gas Pipeline
<b>TCFD</b>	Task Force on Climate-Related Financial Disclosure
<b>Tcm</b>	Trillion cubic metres
<b>tCO2</b>	Tonne of carbon dioxide
<b>TTF</b>	Title Transfer Facility
<b>TWh</b>	Terawatt hour
<b>UGS</b>	Underground Gas Storage
<b>UAE</b>	United Arab Emirates
<b>UK</b>	United Kingdom
<b>UQT</b>	Upward Quantity Tolerance
<b>US</b>	United States
<b>y-o-y</b>	year-on-year

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