GECF

MONTHLY GAS MARKET REPORT

October 2023

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About GECF

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 8 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, Mauritania, 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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Contents

List of Figures

List of Tables

Highlights

Global economy: The global GDP growth forecast for 2023 remains steady at 2.5%, as reported by the latest forecast from Oxford Economics. However, the anticipated slowdown in economic growth in the fourth quarter of 2023 and in 2024 has led to a downward revision in the global GDP growth forecast for 2024, with a decrease of 0.1 percentage points to 1.9%. Meanwhile, the IMF is forecasting global GDP growth of 3% in 2023, which aligns with its previous forecast from July 2023, followed by a deceleration to 2.9% in 2024.

Gas consumption: In September 2023, gas consumption in the European Union (EU) resumed its declining trend after a surge in August 2023. Consumption decreased by 11% y-o-y, amounting to 19 bcm. Meanwhile, China's apparent gas demand, which includes pipeline imports, LNG imports and domestic production, grew by 11% compared to the previous year, reaching 33 bcm. This can be attributed to the resurgence of economic activities. For the third consecutive month, Japan experienced an uptick in gas consumption, totalling 8.1 bcm. This was primarily driven by increased gas usage in the power generation sector due to heightened cooling needs caused by a heatwave that affected the country.

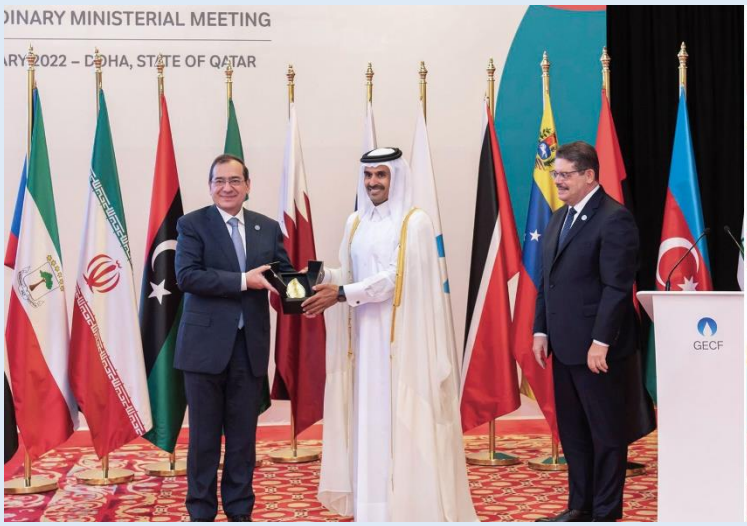
Gas production: In Europe, gas production in August 2023 experienced a 12% y-o-y decline to reach 14.4 bcm. This drop was largely due to lower production rates from the region's key players: Norway, the Netherlands, and the UK. Meanwhile, in September 2023, the major shale gas-producing regions in the US—Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara, and Permian—saw a 3% y-o-y increase in production, totalling 83.8 bcm. In the same month, the global count of gas drilling rigs, an indicator of upstream activities, decreased by 4 units m-o-m and 21 rigs y-o-y, bringing the count to 376 rigs. In August 2023, approximately 260 million boe of hydrocarbon volumes were discovered, with natural gas amounting to 29 bcm.

Gas trade: In September 2023, there was a substantial 19% m-o-m decline in the import of pipeline gas to the EU, to reach 10.8 bcm. In the same period, global LNG imports stood at 31.5 Mt, demonstrating a 2.1% y-o-y increase but marking the lowest level since September 2022. The primary impetus for this rise came from the Asia Pacific region, with additional contributions from LAC and the MENA regions, which helped compensate for declining imports in Europe. Specifically, the Asia Pacific region experienced substantial growth, with a noteworthy 11% y-o-y increase driven mainly by China, India, Japan and Thailand, offsetting the decline observed in South Korea. In contrast, Europe faced a significant 22% y-o-y decrease in LNG imports due to elevated gas storage levels, diminished demand and diverging prices between Asia Pacific and Europe.

Gas storage: The volume of gas in storage in the European Union continued to rise, approaching fully filled capacity. In September 2023, the average volume of gas in storage in the region rose to 99.3 bcm, which is 96% of the total storage capacity. In the United States, the rate of stockbuild has increased, with the quantity of gas in storage rising to 93.0 bcm, representing 69% of the country's capacity. In Asia, the estimated combined volume of LNG in storage in Japan and South Korea fell to 8.7 bcm.

Energy prices: Gas and LNG spot prices in Europe displayed a bullish trend, marking a consecutive increase for the second month in a row in September 2023. The surge in spot prices was mainly attributed to concerns surrounding global LNG supply. The catalyst for this uptick was the commencement of a strike action in early September at Chevron's Gorgon and Wheatstone LNG facilities in Australia. However, industrial strikes ended on September 22, 2023, and LNG exports appeared to be largely unaffected. Furthermore, Asian LNG prices traded at an average premium of nearly $2/MMBtu over TTF spot prices, thereby creating potential arbitrage opportunities. The average TTF spot price stood at $11.4/MMBtu, reflecting a 6% m-o-m increase. In addition, the average NEA spot LNG price experienced a substantial 12% m-o-m increase, reaching $13.1/MMBtu. Looking ahead to the upcoming months, prices are expected to receive support from increased LNG demand in Asia. Additionally, the ongoing Israel-Palestine conflict has put upward pressure on prices and may cause further upward price movement.

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
The GECF Award for Long-Term Commitment to Natural Gas.

For more information, including the criteria for the award categories, as well as the nomination form, please visit our website at:
https://www.gecf.org/events/the-2024-gecf-awards-call-for-nominations.

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

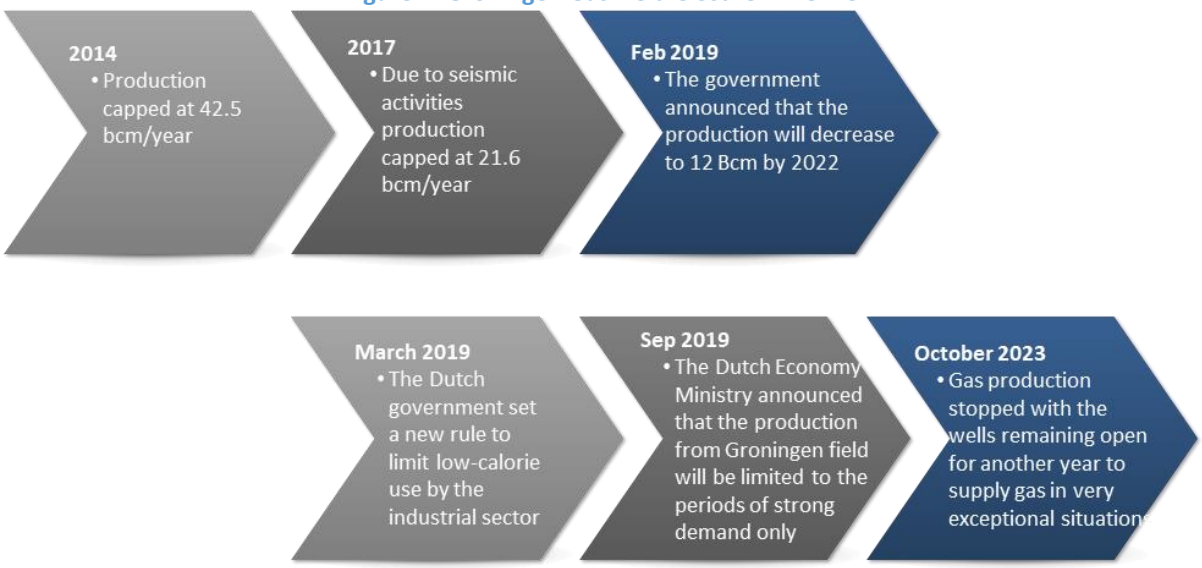
Feature Article: The Curtain Falls on the Groningen Gas Field in the Netherlands

The European energy landscape has undergone a monumental shift with the closure of the Groningen gas field, once celebrated as Europe's largest gas field. This significant decision not only marks the end of an era for a field that has been integral to Europe's energy framework for over six decades but also underscores the evolving dynamics of the North West Europe Gas Market.

In July 1959, the drilling by Nederlandse Aardolie Maatschappij [nl] (NAM), jointly owned by Shell and Esso, led to discovery of the Groningen gas field. Given its sheer size, it rapidly ascended to prominence, becoming a pivotal player in supplying natural gas to both the Dutch domestic market and the broader European region. Its vast reserves and crucial role in ensuring energy security for the continent made it indispensable. However, its reign had to come to an end.

By 2014, concerns surrounding subsidence and earthquakes caused by the field exploitation led to the introduction of a production cap, which was progressively tightened in the subsequent years. By 2022, the field's production was limited to only exceptionally cold winter days. While there were initial plans for a total shut down by 2026, a decision by the Dutch government in June 2023 expedited this timeline. The field has now set to close permanently on October 1, 2024. However, gas production ceased a year earlier on October 1, 2023, with the wells remaining open for another year to supply gas in "very exceptional situations," such as severe cold weather or gas shortages due to volatile geopolitical scenarios (Figure 1).

Figure 1: Groningen Gas Field Closure Timeline

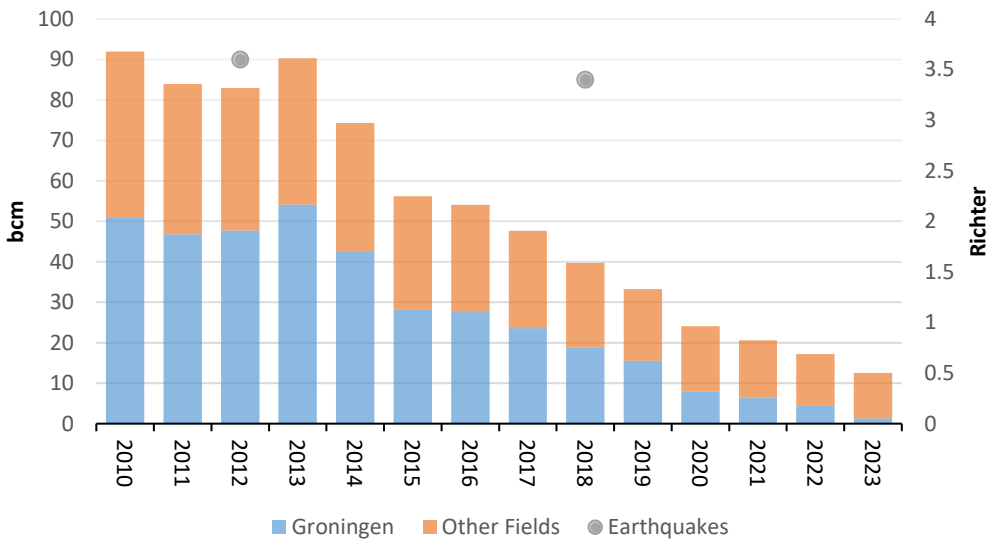


Source: GECF Secretariat

Over its operational lifespan, the Groningen field saw the production of approximately 2,300 bcm of gas. The imposition of the cap on its output in 2014 led to a significant decline in production. From producing 42 bcm in 2014, the output dropped to 15 Bcm in 2019 and further dwindled to 4.5 bcm in 2022 (Figure 2). This decline also affected the Netherlands'

total gas production, with the share of gas output from the Groningen field dropping from 57% in 2014 to 26% in 2022.

Figure 2: The Netherlands' natural gas production



Source: GECF Secretariat based on data from Refinitiv and Rystad Energy

However, the closure of the field came with a set of challenges. One of the primary challenges was the nature of the gas it produced. The Groningen field was known for its low-calorific gas, attributed to its high nitrogen content. This characteristic had led to adaptations in Northwestern Europe, where both household appliances and industrial users were modified to utilize this specific type of gas. Removing approximately 50 bcm of Groningen's low-calorific gas from the supply chain posed a significant disruption to the heating value balance of natural gas in the region.

To address this challenge, the Netherlands took proactive measures. They enhanced their capacity to convert high-calorific gas to low-calorific gas by adding nitrogen. This move ensured that the energy needs of the region could still be met despite the decline in low-calorific gas availability. Furthermore, in March 2019, the Dutch government introduced a regulation aimed at the industrial sector. This regulation mandated that industrial entities consuming over 100 million m^3 of low-calorific gas should shift to high-calorific gas.

In the intricate tapestry of the European energy landscape, the Groningen gas field has been a pivotal thread. Its closure underscores the evolving dynamics of the North West Europe Gas Market and the broader European energy matrix. Natural gas, with its versatility and historical significance, remains a cornerstone in Europe's energy consumption patterns. As Europe charts its energy future, the role of natural gas as a long-term energy solution remains undeniably central. Collaborative efforts, technological advancements and strategic partnerships will be instrumental in ensuring that Europe continues to harness the potential of natural gas in a sustainable and efficient manner.

1 Global Perspectives

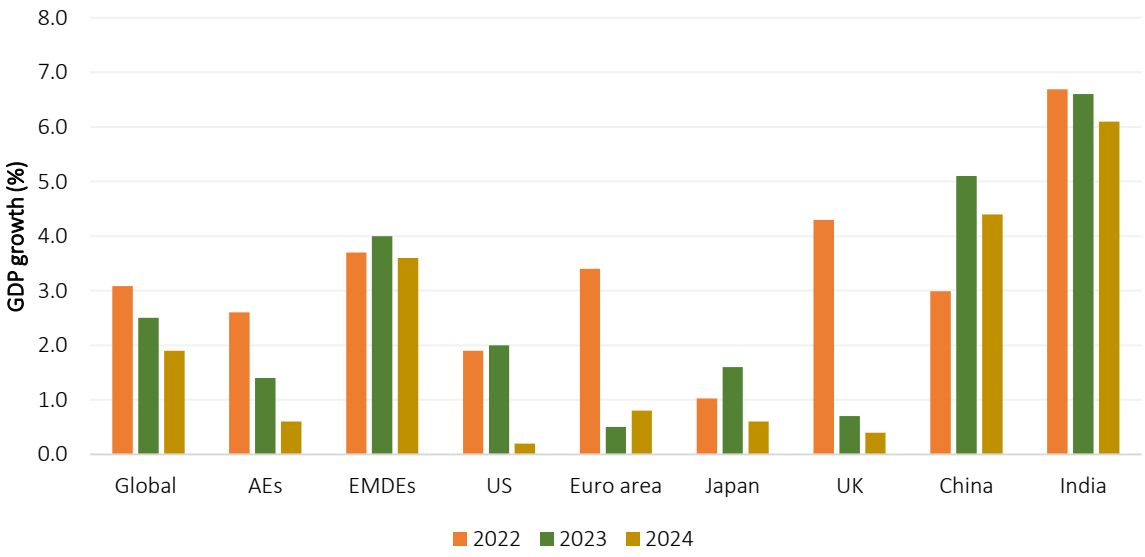
1.1 Global Economy

In its World Economic Prospects October 2023 report, Oxford Economics has affirmed its projection for global GDP growth in 2023, maintaining it at 2.5%. However, the anticipation of a slowdown in economic growth in the fourth quarter of 2023 and throughout 2024 has prompted a downward revision in the global GDP growth forecast for 2024, resulting in a decrease of 0.1 percentage points to 1.9% (Figure 3).

The outlook for GDP growth in Advanced Economies (AEs) remains unchanged, with a standing projection of 1.4% for 2023 and 0.6% for 2024. In the US, the GDP growth forecast for 2023 has been adjusted downward by 0.1 percentage points to 2%. Meanwhile, the GDP growth projection for 2024 remains at 0.2%. It is expected that robust consumer spending will persist in Q3 2023, followed by a slowdown in Q4 2023 and Q1 2024. This deceleration is attributed to the impact of high interest rates, tighter fiscal policies, and weakened household finances. In the Euro area, the GDP growth projection for 2023 remains at 0.5%. However, there was a downward revision by 0.1 percentage points to 0.8% in 2024. Economic growth is expected to experience a slight contraction in Q3 2023 and stagnation in Q4 2023, primarily due to persistent weakness in manufacturing and industrial activity. As for Japan, its GDP growth forecast for 2023 and 2024 stands at 1.6% and 0.6%, respectively, reflecting the ongoing challenges posed by a relatively weak external economic environment.

The GDP growth in Emerging Markets and Developing Economies (EMDEs) has been maintained, with a projected GDP growth rate of 4% in 2023. However, there has been a downward revision of 0.1 percentage points for the 2024 forecast, which now stands at 3.6%. In the case of China, the GDP growth projection remains at 5.1% for 2023, but it has been lowered by 0.2 percentage points to 4.4% for 2024. The real estate sector, constituting approximately 25% of the country's GDP, presents the most significant downside risk to the country's economic growth. Conversely, India's GDP growth forecasts for 2023 and 2024 have been revised downward by 0.1 percentage points to 6.6% and 6.1%, respectively.

Figure 3: GDP growth forecast



Source: GECF Secretariat based on data from Oxford Economics

The IMF's World Economic Outlook October 2023 and the OECD's Economic Outlook Interim Report September 2023 were recently released. Both reports provided valuable insights into the current global and regional economic prospects, as well as the critical factors that are set to influence the immediate path of the global economy.

The IMF forecasts global GDP growth of 3% in 2023, which remains consistent with its previous forecast in July 2023, primarily due to the resilience of the global economy earlier this year. It is important to note that this is below the historical average (2000-2019) of 3.8%. Furthermore, the IMF's forecast for global GDP growth in 2024 was revised downward by 0.1 percentage points to 2.9%. The report also highlighted that growth remains slow, with widening divergences between AEs and EMDEs. Additionally, there are potentially severe downside risks, including more volatile commodity prices due to geopolitical tensions, the further deepening of the real estate crisis in China, inflationary pressures and elevated debt levels in many countries.

The OECD predicts global GDP growth of 3% in 2023, representing an upward revision from its earlier forecast of 2.7% in June 2023. In addition, the OECD forecasts global GDP growth of 2.7% in 2024. Following a stronger-than-expected performance at the beginning of the year, the OECD anticipates a moderation in global economic growth as the effects of tightening monetary policy become more apparent. The report also underscored that risks continue to lean toward the downside, owing to sustained high inflation and uncertainties surrounding China's economic growth.

In most economies, inflation is expected to gradually subside, with the rate of decrease varying based on when monetary policy tightening occurs. Nevertheless, it is foreseen that headline inflation will persistently exceed targeted levels in major economies until at least 2024. According to the latest forecast from Oxford Economics, global inflation is projected to decrease from 8.2% in 2022 to 6.1% in 2023, followed by a further reduction to 4.4% in 2024. Specifically, in the US, inflation is projected to average 4.2% in 2023, with a decline to 2.8% in 2024. In the Euro area, inflation is anticipated to average 5.6% in 2023, followed by a subsequent decline to 2% in 2024. The UK is expected to experience inflation averaging 7.5% in 2023, before decreasing to 2.9% in 2024 (Figure 4).

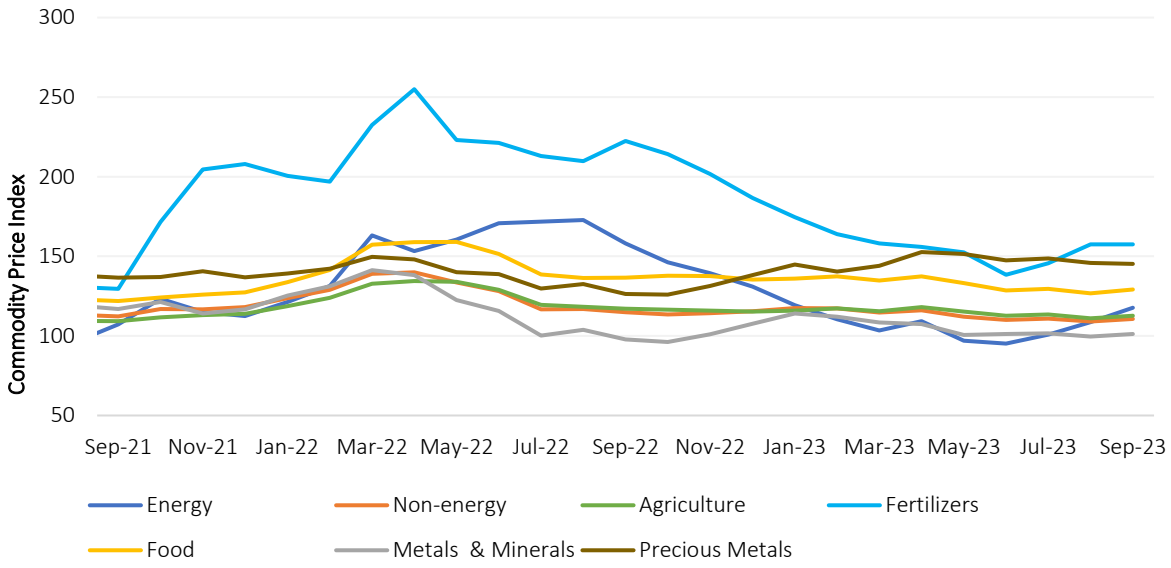
Figure 4: Inflation rates

Source: GECF Secretariat based on data from Oxford Economics

In September 2023, commodity prices in the energy sector experienced the third consecutive monthly increase. The energy price index increased by 8% m-o-m, but remained 26% lower y-o-y. This uptick was primarily driven by the upward movement in oil and gas prices. Additionally, coal prices in China also increased compared to the previous month.

On the other hand, prices in the non-energy sector rebounded from losses observed in the previous month. The non-energy price index experienced an increase of 1% m-o-m and was 4% lower y-o-y. Within the non-energy sectors, both the agriculture and precious metals price indices increased by 2% m-o-m. Additionally, the fertilizer price index was relatively stable after increasing for two consecutive months. However, it remained 29% lower y-o-y (Figure 5).

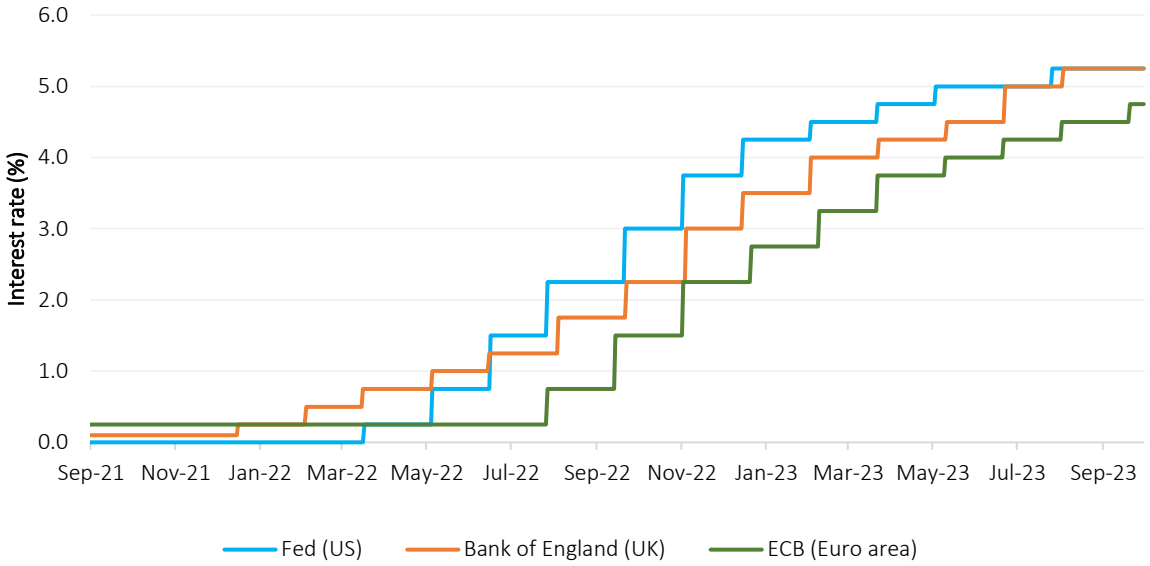
Figure 5: Monthly commodity price indices



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) held its benchmark interest rate steady within the range of 5.25% to 5.50% during its most recent meeting in September 2023. The latest rate hike occurred at the end of July 2023 (Figure 6). In a similar vein, the Bank of England (BOE) maintained its key interest rate at 5.25%, following the last increase on August 3, 2023. However, the European Central Bank (ECB) raised its key interest rates by 0.25 percentage points on September 20, 2023, which brought interest rates on the main refinancing operations, marginal lending facility and deposit facility to 4.5%, 4.75% and 4%, respectively. Major central banks are likely to have paused their rate hikes, but they will proceed with caution regarding any rate reductions, which may only commence after several months.

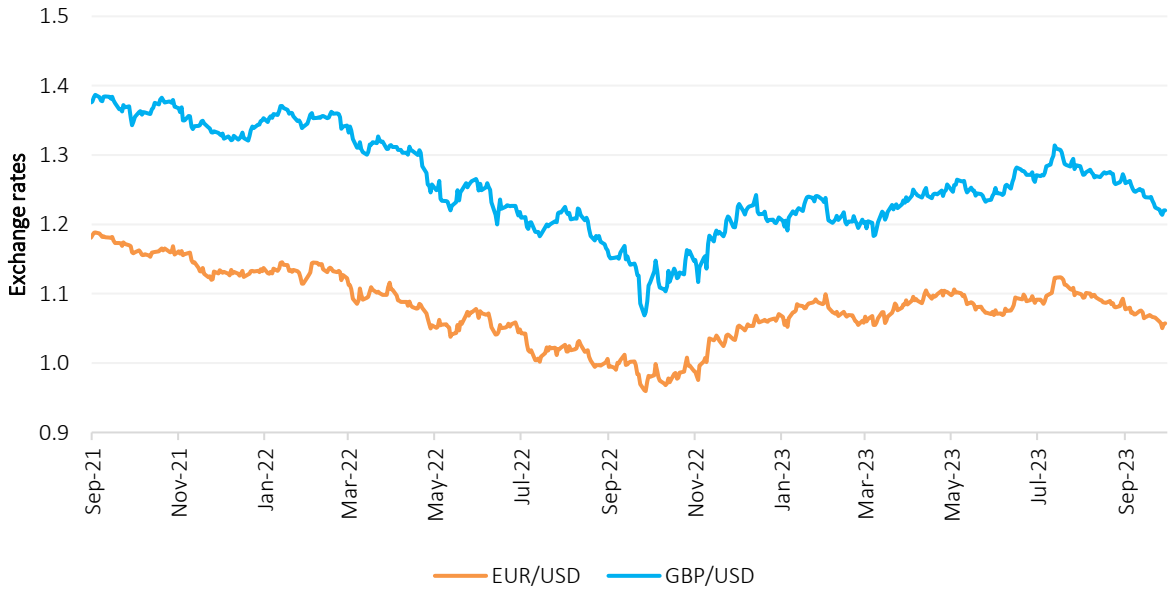
Figure 6: Interest rates in major central banks



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

In September 2023, the euro depreciated further against the US dollar, resulting in an average exchange rate of $1.0673. This represented a 2% m-o-m decrease and an 8% y-o-y increase. Similarly, the British pound also lost value against the US dollar in September 2023, as the average exchange rate reached $1.2386, reflecting a 3% decrease m-o-m and 9% increase y-o-y (Figure 7). Moreover, inflation in the Euro area was estimated at 4.3% in September 2023, decreasing from 5.2% in August 2023.

Figure 7: Exchange rates



Source: GECF Secretariat based on data from Refinitiv Eikon

1.2 Other Developments

UN SDG Summit: The UN Sustainable Development Goals (SDG) Summit took place on September 18-19, 2023, in New York, US. This Summit served as a central focus of the UN General Assembly (UNGA) High-level Week. There were over 160 participants, including 57 heads of state/vice presidents, 30 heads of government, 58 deputy prime ministers and ministers and 18 representatives from intergovernmental organizations, the United Nations system, civil society and other stakeholders. The Summit marked the halfway point toward the deadline set for achieving the 2030 Agenda for Sustainable Development and the implementation of the 17 UN SDGs. Furthermore, the Summit achieved consensus on a negotiated political declaration as an official outcome, providing a roadmap for getting the world back on track to achieve the SDGs by 2030. The declaration emphasized their commitment to *"ensure universal access to affordable, reliable, sustainable and modern energy for all, including through enhanced international cooperation to assist developing countries and through sustained investments, advancing research and development, and promote investment in energy infrastructure and clean energy technology."*

UN Climate Ambition Summit: The UN Climate Ambition Summit was convened on September 20, 2023, in New York, US. This event held significant prominence during the UN General Assembly (UNGA) High-level Week. UN Secretary-General António Guterres presented the proposed Climate Action Acceleration Agenda, which included the goal of phasing out coal by 2030 for Organisation for Economic Co-operation and Development (OECD) countries and by 2040 for all other countries, along with the elimination of inefficient fossil fuel subsidies. Notably, Dr. Sultan Al Jaber, the President-Designate of COP28, urged the international community to transition from agreements to concrete actions in addressing global climate change. Dr. Al Jaber also underscored the imperative to "rapidly and comprehensively decarbonize the energies we use today," reiterating his previous calls for the oil and gas industry to eliminate methane emissions by 2030 and align with net zero by, or before, 2050.

2 Gas Consumption

2.1 Europe

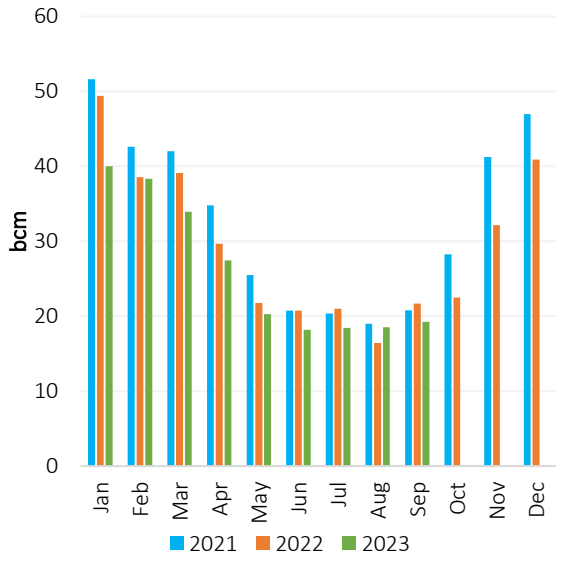
2.1.1 European Union

In September 2023, gas consumption in the European Union (EU) returned to a declining trend after experiencing an upsurge in the previous month. Gas consumption decreased by 11% year-on-year (y-o-y), totalling 19 bcm (Figure 8). This decline was attributed to the ongoing implementation of the EU regulation that encourages a voluntary 15% reduction in gas demand, effective from April 1, 2023, to March 31, 2024. Moreover, an increase in solar and nuclear output in the power generation sector reduced the reliance on gas within the EU's power generation mix. As gas prices fell throughout the year, demand in the industrial sector of several EU countries began to recover but did not reach the levels seen in previous years.

Gas-based electricity production in the EU decreased by 11% y-o-y, while total electricity production declined by 4% y-o-y, amounting to 184 TWh. The reduction in gas-fired power generation was influenced by the increased output from renewable and nuclear energy sources. Nuclear, hydro and solar power generation saw significant growths of 9%, 5%, and 38% y-o-y, respectively. There was also a notable decrease of 35% y-o-y (equivalent to 13 TWh) in electricity generation from coal. Electricity generation from wind witnessed a decline of 3% y-o-y (Figure 9). Renewables made up the largest portion of the power mix at 32%, followed by nuclear (25%), gas (19%), coal (13%) and hydro (11%).

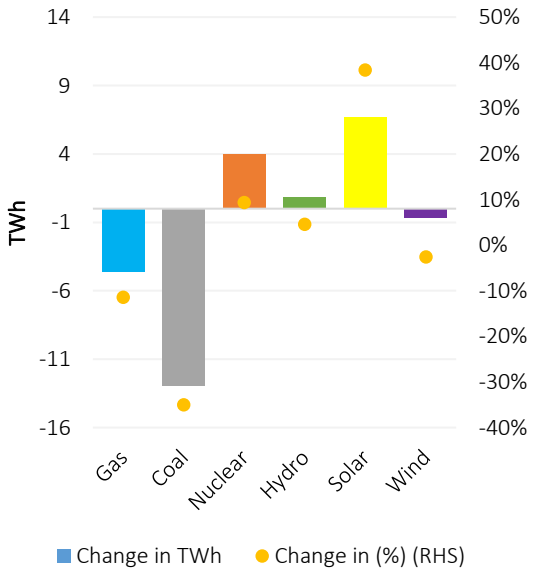
For the period from January to September 2023, EU's gas consumption fell by 9.3% y-o-y, reaching 234 bcm.

Figure 8: Gas consumption in the EU



Source: GECF Secretariat based on data from Entsog and McKinsey

Figure 9: Trend in electricity production in the EU in September 2023 (y-o-y change)

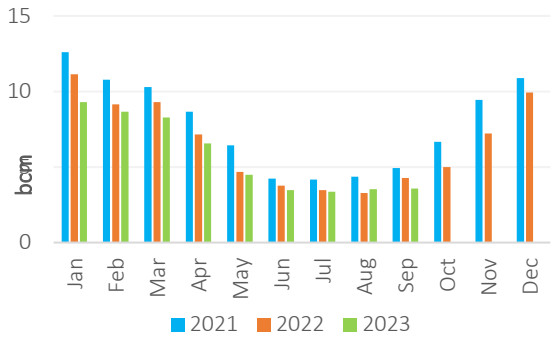


Source: GECF Secretariat based on data from Ember

2.1.1.1 Germany

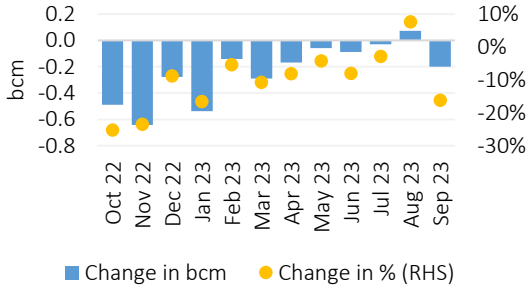
In September 2023, following a surge in gas consumption in the previous month, Germany witnessed a 16% y-o-y decrease, settling at 3.6 bcm (Figure 10). The decline in gas usage was notably observed in both the residential/industrial sectors, registering a 16% year-on-year (y-o-y) decrease. This reduction was influenced by both the stringent enforcement of the EU's gas consumption reduction regulation and a significant increase in solar output during the month. Conversely, the power generation sector witnessed a modest increase of 2%. This was driven by the phase-out of nuclear energy, which had supported natural gas consumption (Figure 11).

Figure 10: Gas consumption in Germany



Source: GECF Secretariat based on data from Refinitiv

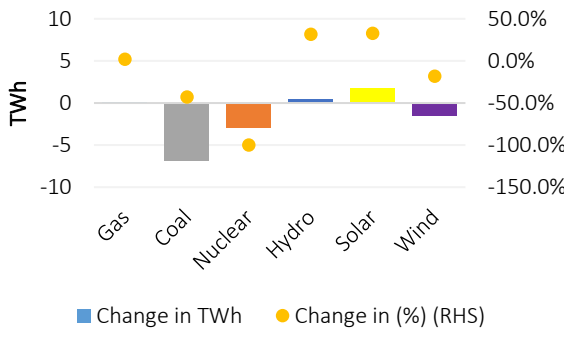
Figure 11: Trend in gas consumption in the industrial sector in Germany (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

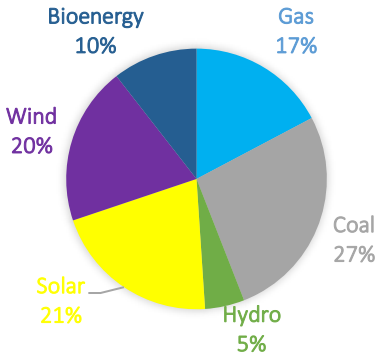
Electricity production from gas recorded a 2% y-o-y increase, even as overall electricity production declined by 21% y-o-y, totalling 34 TWh. During the same period, there was a significant rise in energy generation from solar (33% y-o-y) and hydro (32% y-o-y). Electricity production from coal and wind experienced decreases of 43% and 18%, respectively, compared to the previous year, largely due to unfavourable weather conditions for wind energy generation (Figure 12). Renewables held the dominant position in the energy mix, comprising 51% of the total, followed by coal (27%), gas (17%), and hydro (5%) (Figure 13).

Figure 12: Trend in electricity production in Germany in September 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 13: German electricity mix in September 2023



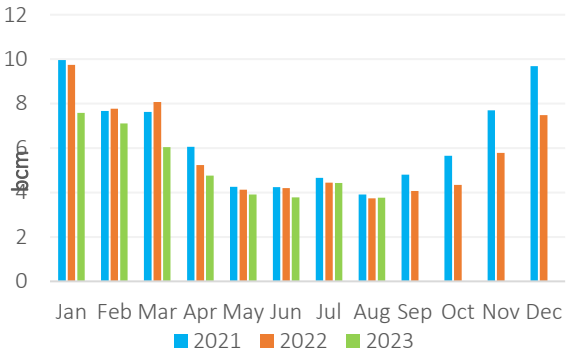
Source: GECF Secretariat based on data from Refinitiv and Ember

For the period from January to September 2023, Germany's gas consumption fell by 8.8% y-o-y, reaching 51 bcm.

2.1.1.2 Italy

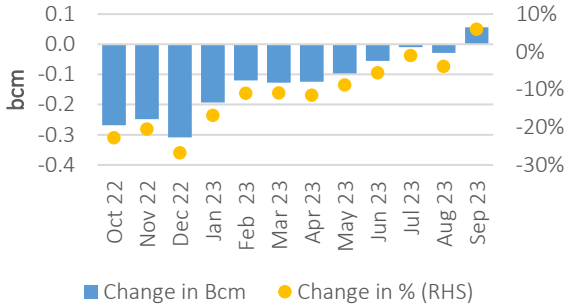
In September 2023, Italy's gas consumption experienced a slight decrease of 0.1% y-o-y, totalling 3.8 bcm (Figure 14). Both the residential and power generation sectors saw reductions in consumption of 4% (0.9 bcm) and 1% (1.8 bcm), respectively. The decline in gas consumption is largely attributed to the significant hydro and solar energy production observed during the month in the power generation mix. Notably, after 20 consecutive months of y-o-y declines, the industrial sector marked its first growth in gas consumption, reaching 1 bcm (Figure 15).

Figure 14: Gas consumption in Italy



Source: GECF Secretariat based on data from Snam

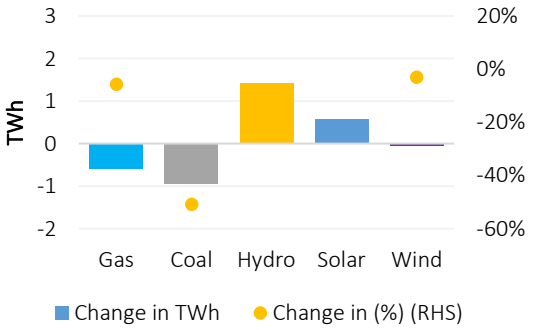
Figure 15: Trend in gas consumption in the industrial sector in Italy (y-o-y change)



Source: GECF Secretariat based on data from Snam

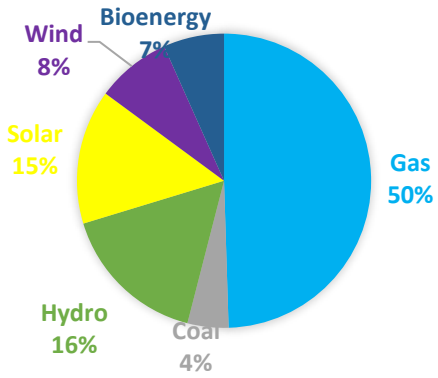
In September 2023, gas-based electricity production witnessed a decline of 5.6% y-o-y. However, total electricity production increase by 1.7% y-o-y, reaching 20 TWh. Furthermore, there was a significant y-o-y increase in energy generation from hydro (77%) and solar (24%) (Figure 16). Meanwhile, gas remained the dominant fuel in the power mix, accounting for 50% of the total, followed by renewables (30%), hydro (16%) and coal (4%) (Figure 17).

Figure 16: Trend in electricity production in Italy in September 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 17: Italian electricity mix in September 2023



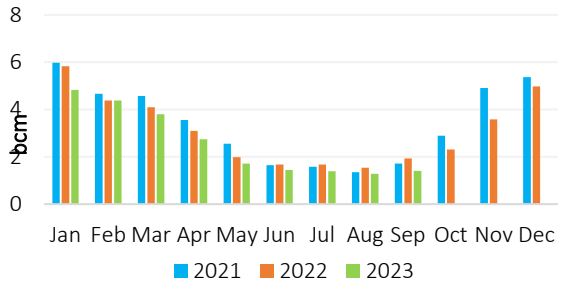
Source: GECF Secretariat based on data from Refinitiv and Ember

For the period from January to September 2023, Italy's gas consumption fell by 11% y-o-y, reaching 45 bcm.

2.1.1.3 France

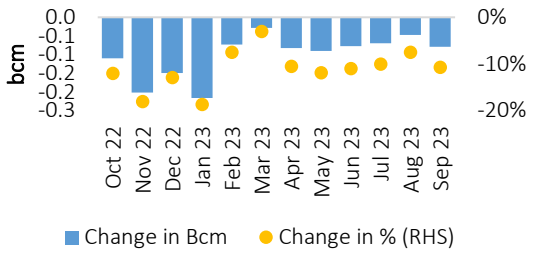
In September 2023, France's gas consumption decreased by 27% y-o-y, totalling 1.4 bcm. This represented the seventh consecutive monthly decline following a brief surge observed in February 2023 (Figure 18). The drop in gas consumption was primarily driven by a significant reduction in the power generation sector, which saw a 57% decrease. This was attributed to a resurgence in nuclear output compared to the previous year (+48%). Concurrently, both the residential and industrial sectors also reported declines in gas consumption from the previous year. Despite decreasing gas prices, the industrial sector's consumption persisted in its downward trend, showing an 11% y-o-y decline to 0.7 bcm (Figure 19). The residential sector also experienced a significant decline of 24% y-o-y, amounting to 0.5 bcm due to the implementation of the EU regulation on a voluntary 15% reduction in gas demand.

Figure 18: Gas consumption in France



Source: GECF Secretariat based on data from GRTgaz

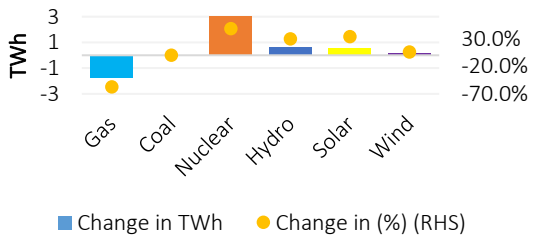
Figure 19: Trend in gas consumption in the industrial sector in France (y-o-y change)



Source: GECF Secretariat based on data from GRTgaz

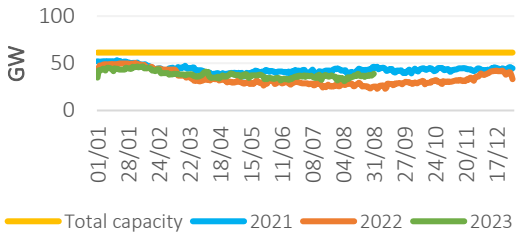
Electricity production from gas witnessed a decline of 57% y-o-y, whereas total electricity production increased by 30% y-o-y, reaching 36 TWh. The month also marked a recovery in electricity generation from nuclear power, increasing by 48% y-o-y. Nuclear capacity availability rose by 50% y-o-y and 11% m-o-m (Figure 21). 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 (30% y-o-y), solar (34%), and wind (6%). However, electricity production from coal remained unchanged (Figure 20). Nuclear power continued to hold the dominant position in the energy mix, comprising 75% of the total, followed by renewables (14%), hydro (7%), and gas (4%).

Figure 20: Trend in electricity production in France in September 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

Figure 21: French nuclear capacity availability



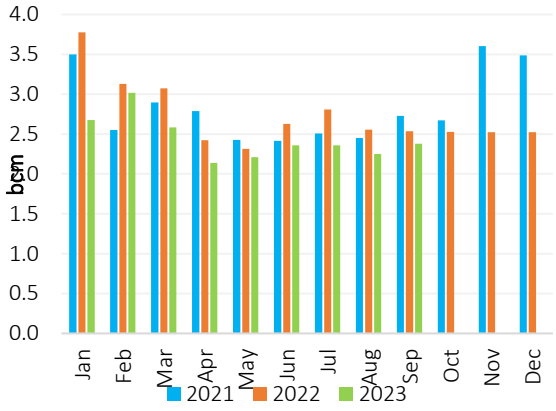
Source: GECF Secretariat based on data from Refinitiv and RTE

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

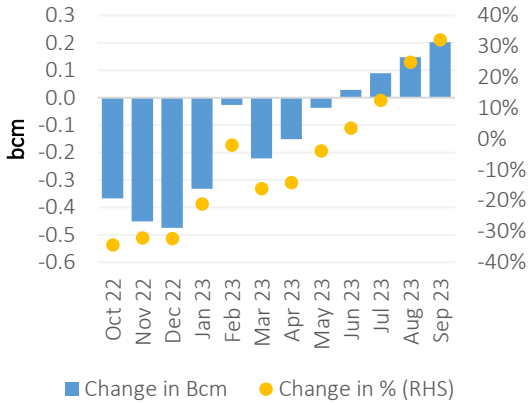
In September 2023, Spain witnessed a 6% y-o-y decline in gas consumption, reaching 2.4 bcm. The power generation sector drove the decline with a drop of 36% y-o-y. The decline was also attributed to increased solar energy output and a reduction in electricity exports to France (Figure 22). However, in the industrial sector, gas consumption recorded its fourth consecutive growth in a row, with a y-o-y increase of 32% (Figure 23). This growth was driven by higher gas consumption in the refinery, textile, agrifood and pharma industries, with growth rates of 129%, 43%, 13% and 44% y-o-y, respectively.

Figure 22: Gas consumption in Spain



Source: GECF Secretariat based on data from Enagas

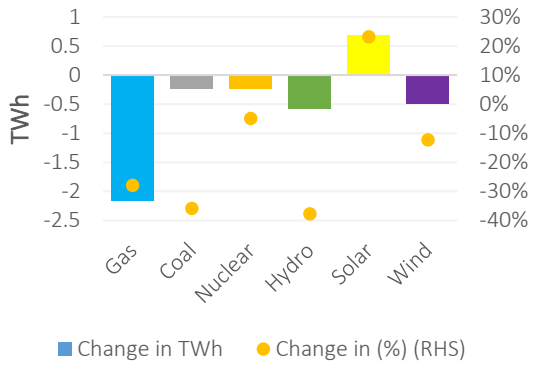
Figure 23: Trend in gas consumption in the industrial sector in Spain (y-o-y change)



Source: GECF Secretariat based on data from Enagas

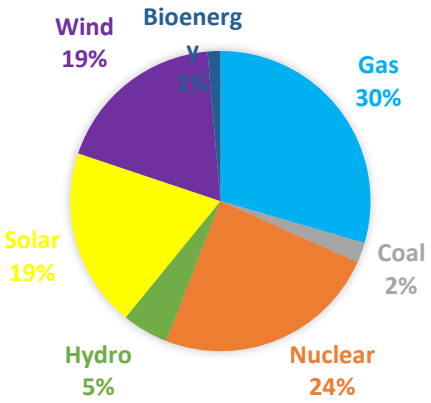
Electricity production from gas declined by 28% y-o-y, while total electricity production decreased by 14% y-o-y to reach 19 TWh. However, there were notable increases in electricity generation from solar (+23% y-o-y). Conversely, electricity production from coal, nuclear, hydro and wind recorded declines of 36%, 5%, 38% and 12%, respectively (Figure 24). Renewables held the dominant position in the power mix, accounting for 39% of the total, followed by gas (30%), nuclear (24%), hydro (5%), and coal (2%) (Figure 25).

Figure 24: Trend in electricity production in Spain in September 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember and Ree

Figure 25: Spanish electricity mix in September 2023



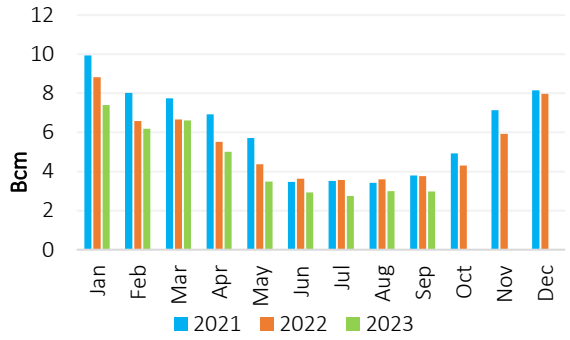
Source: GECF Secretariat based on data from Ember and Ree

For the period from January to September 2023, Spain's gas consumption fell by 13% y-o-y to 22 bcm.

2.1.2 United Kingdom

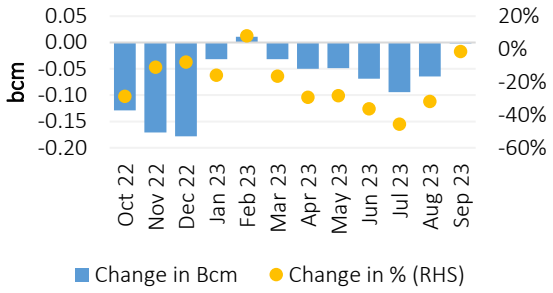
In September 2023, gas consumption in the UK fell by 21% y-o-y, reaching 3 bcm (Figure 26). This decline was largely attributed to decreases in gas consumption in the residential, industrial and power generation sectors, which fell by 15%, 1.5% and 29% y-o-y, respectively. The reduction in gas consumption in the power generation sector was driven by higher hydro and solar output during the month (Figure 27).

Figure 26: Gas consumption in the UK



Source: GECF Secretariat based on data from Refinitiv

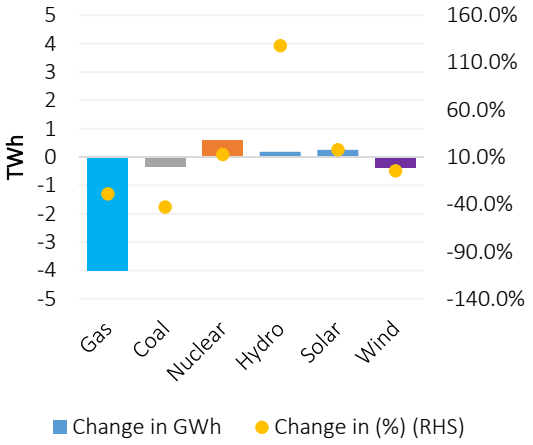
Figure 27: Trend in gas consumption in the industrial sector in the UK (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

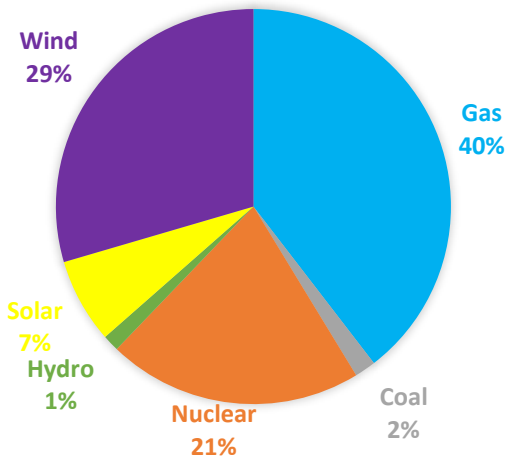
The UK's electricity production from gas decreased by 29% y-o-y, while total electricity production fell by 14% y-o-y, reaching 26 TWh. Hydro, nuclear and solar power generation increased by 128%, 13% and 17% y-o-y respectively. However, electricity production from wind and coal declined by 5% and 43% y-o-y, respectively (Figure 28). Gas emerged as the dominant energy source in the power mix accounting for 40% of the total, followed by renewables (36%), nuclear (21%), coal (2%) and hydro (1%) (Figure 29).

Figure 28: Trend in electricity production in UK in September 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

Figure 29: UK electricity mix in September 2023



Source: GECF Secretariat based on data from Refinitiv

For the period from January to September 2023, UK's gas consumption fell by 13% y-o-y to 40 bcm.

2.2 Asia

2.2.1 China

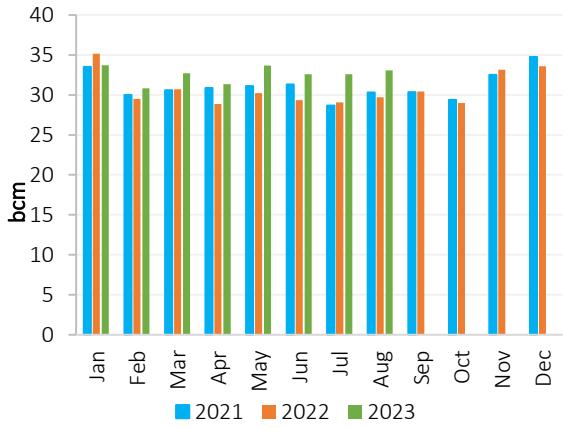
In August 2023, China's apparent gas demand, covering pipeline imports, LNG imports and domestic production, rose by 11% compared to the previous year, totalling 33 bcm. The increase in natural gas consumption is linked to the revival of economic activities following the easing of the stringent COVID-19 lockdown restrictions in 2022.

The resurgence in Chinese gas demand may be driven by industrial and residential sectors. It is worth noting that the official manufacturing Purchasing Managers' Index (PMI) showed signs of recovery, rising to 49.7% by the end of August from 48.8% in May, indicating a rebound in industrial activities (Figure 30). However, China's National Climate Centre forecasted that most of northern China will have slightly milder temperatures in October and November, which could reduce the overall gas demand.

Electricity production from gas declined by 1% y-o-y, while total electricity production rose by 3%, reaching 878 TWh. During the month, there was a surge in electricity generation from hydro (+19%), nuclear (+6%) and solar (+30%) (Figure 31). Coal remained the dominant fuel in the power mix, accounting for 63% of the total, followed by renewables (13%), hydro (17%), nuclear (4%) and gas (3%).

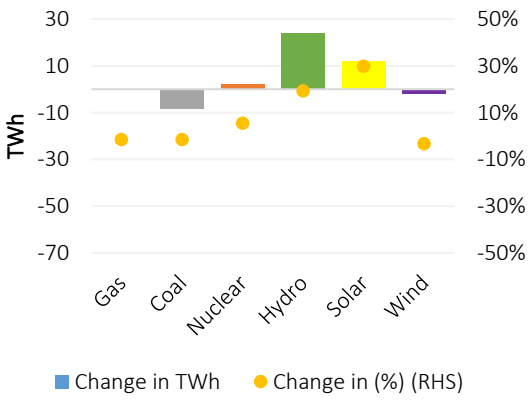
For the period from January to August 2023, China's gas consumption increased by 7.4% y-o-y to 260 bcm.

Figure 30: Gas consumption in China



Source: GECF Secretariat based on data from Refinitiv

Figure 31: Trend in electricity production in China in in August 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

2.2.2 India

In August 2023, India's gas consumption marked its eighth consecutive month of growth with a 6% y-o-y increase, reaching 6.1 bcm (Figure 32). The increase in gas consumption was driven by the power generation sector, which registered a growth of 84% y-o-y.

The share of regasified LNG in India's gas supply increased to 48%. The fertilizer sector accounted for the largest share of gas consumption at 29%, followed by city gas (18%), power generation (16%), refining (8.4%) and the petrochemical sector (4%) (Figure 33).

The rise is associated with the above-average temperatures recorded in India during August, which resulted in a heightened demand for cooling. The Ministry of Power has prolonged the duration of its previous instructions for gas-based utilities to function at maximum capacity.

Figure 32: Gas consumption in India

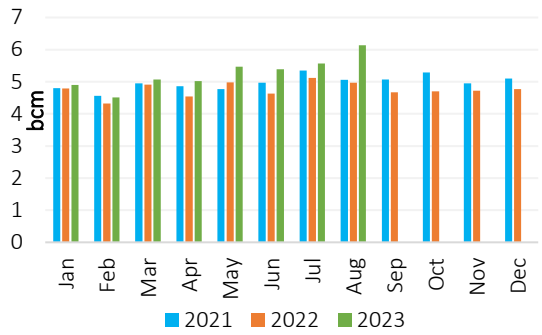
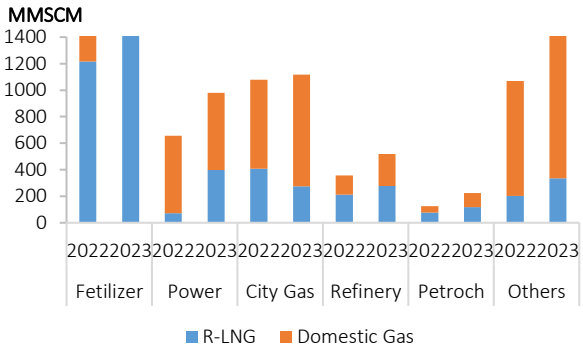


Figure 33: India's gas consumption by sector in Aug



Source: GECF Secretariat based on data from PPAC

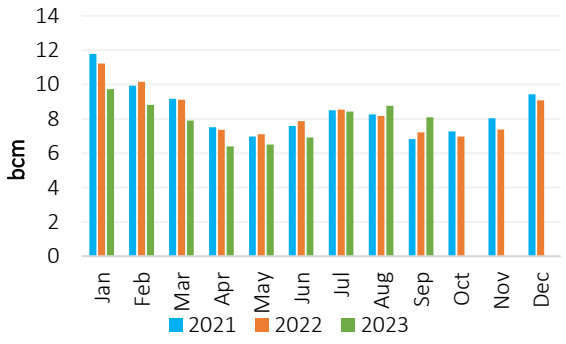
From January to August 2023, India's total gas consumption increased by 10% y-o-y to 42 bcm.

2.2.3 Japan

In September 2023 and for the third consecutive month, Japan experienced a 12% y-o-y increase in gas consumption, reaching 8.1 bcm (Figure 34). The rise can be 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 2.6°C in September 2023. Japan experienced its warmest September in the 125 years since records began. Gas consumption in the power generation sector increased by 24% y-o-y. By contrast, the city gas sector saw a decline of 2.1% compared to the previous year. Furthermore, Japan's Heating Degree Days (HDD) averaged 7.2 during the month, indicating a 33% y-o-y growth. Nuclear availability during the month was 29% higher compared to the same period last year (Figure 35).

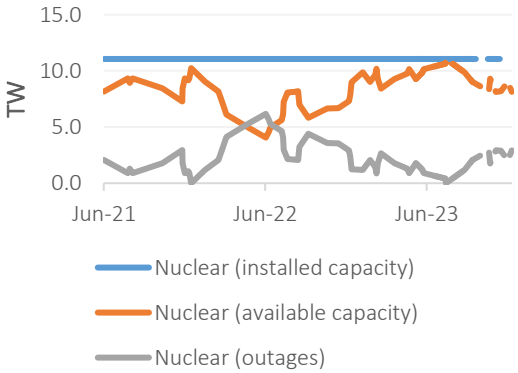
From January to September 2023, Japan's gas consumption fell by 6.8% y-o-y to 72 bcm.

Figure 34: Gas consumption in Japan



Source: GECF Secretariat based on data from Refinitiv

Figure 35: Nuclear availability in Japan



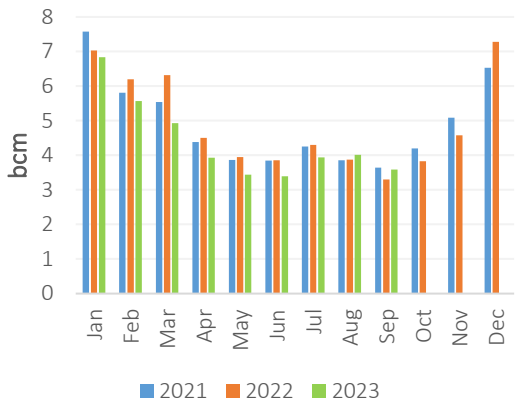
Source: GECF Secretariat based on data from Refinitiv

2.2.4 South Korea

In September 2023, South Korea experienced its second consecutive gas consumption growth (9% y-o-y) after more than nine months of successive declines, with consumption amounting to 3.6 bcm. This surge was primarily driven by a 10% upswing in gas consumption in the power generation sector, attributed to an unprecedented heatwave. In contrast, gas consumption in the city town sector decreased by 12% y-o-y, offsetting the growth in total natural gas consumption in the country during the month (Figure 36). South Korea's Heating Degree Days (HDD) averaged 4 in September, representing a growth of 50% y-o-y (Figure 37).

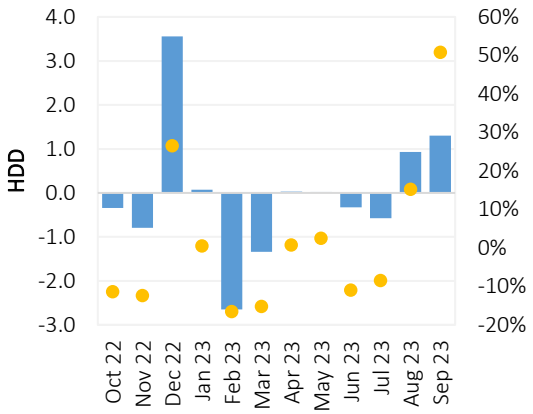
For the period January to September 2023, gas consumption fell by 9% y-o-y to 40 bcm.

Figure 36: Gas consumption in South Korea



Source: GECF Secretariat based on data from Refinitiv

Figure 37: HDD in South Korea (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

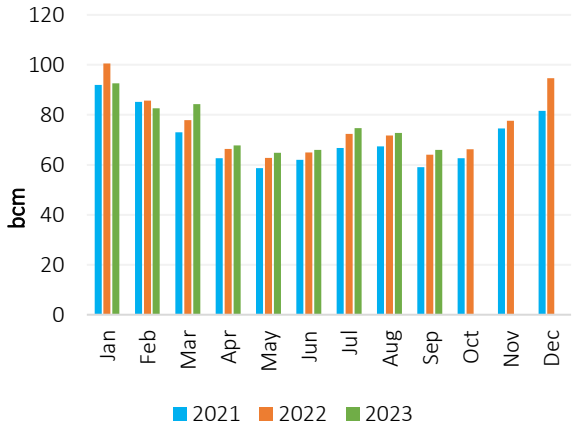
2.3 North America

2.3.1 US

In September 2023, US gas consumption increased by 3% y-o-y, reaching 66 bcm (Figure 38). The residential sector saw a 1% y-o-y increase, while the commercial sector experienced a 1.8% rise. Gas consumption in the power generation sector went up by 6.3%, reaching 33.4 bcm. The rise is a result of the continued reduction of coal power plants, increased cooling needs driven by a heatwave and the decreasing natural gas prices, enhancing the attractiveness of gas-powered plants. Concurrently, the industrial sector saw a 2.2% growth in consumption from the year before, reaching 18.5 bcm.

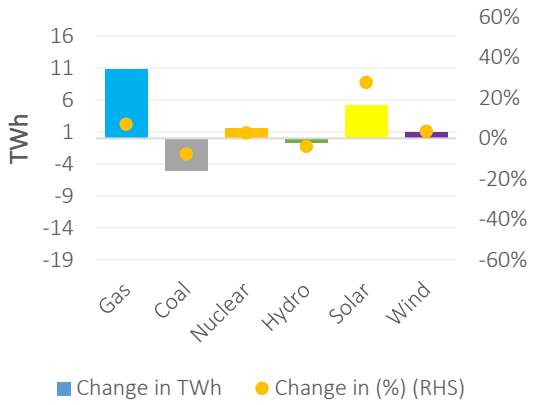
Electricity production from gas rose by 6% y-o-y, while total electricity production increased by 3.5%. The month recorded a decline of 8% and 4% in electricity generation from coal and hydro, respectively. However, there was an uptick in production from nuclear (2.6% y-o-y), wind (3%) and solar (28%) (Figure 39). Gas continued to be the leading fuel in the power mix, holding a 46% share, followed by nuclear (18%), coal (16%), renewable energy sources (15%) and hydro (5%).

Figure 38: Gas consumption in the US



Source: GECF Secretariat based on data from EIA and Refinitiv

Figure 39: Electricity production in the US in September 2023 (y-o-y change)



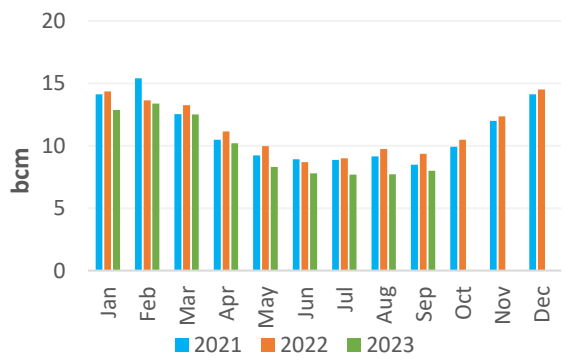
Source: GECF Secretariat based on data from Ember and Refinitiv

From January to September 2023, US gas consumption increased by 0.8% y-o-y to 671 bcm.

2.3.2 Canada

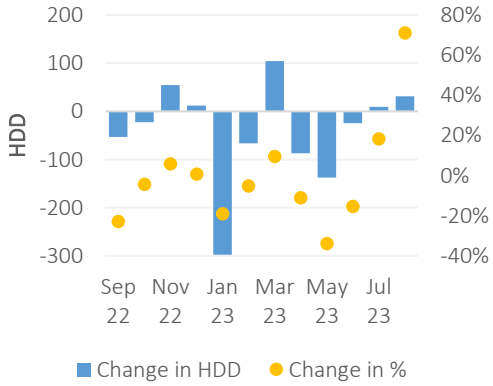
In September 2023, Canada's gas consumption declined by 14% y-o-y, reaching 8 bcm (Figure 40). This decline was attributed to reduced gas consumption in the industrial/power generation and commercial sectors, which fell by 16% and 25% y-o-y, respectively (Figure 41).

Figure 40: Gas consumption in Canada



Source: GECF Secretariat based on data from Refinitiv

Figure 41: HDD in Canada (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

From January to September 2023, Canada's gas consumption fell by 11% y-o-y to 88.4 bcm.

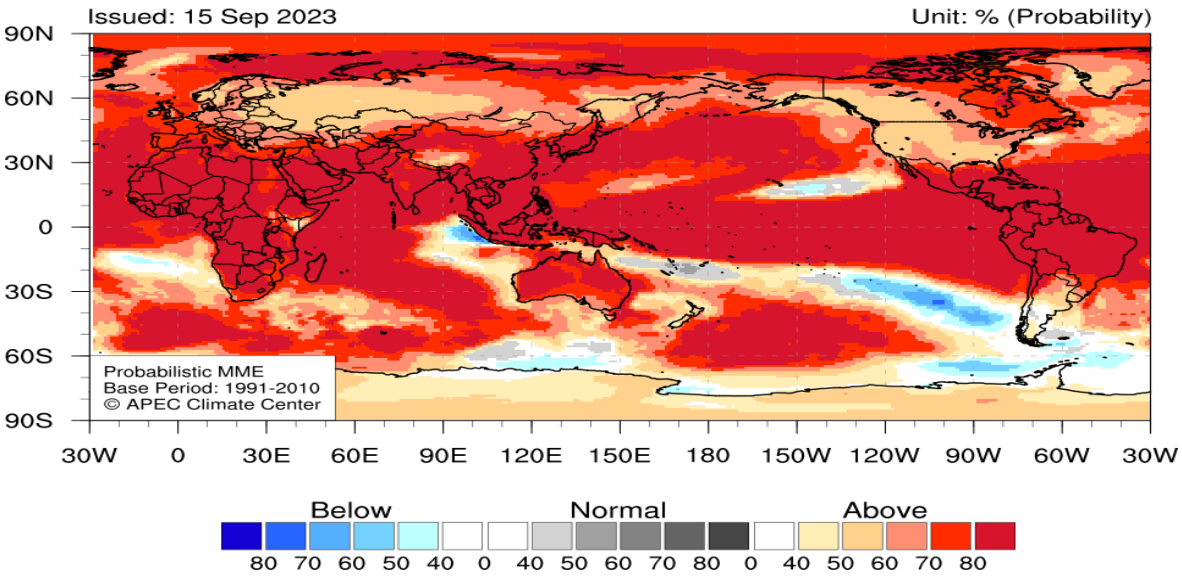
2.4 Weather Forecast

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 increase gas demand in the power generation sector.

2.4.1 Temperature Forecast for October to December 2023

According to the Climate Outlook by the APEC Climate Center published on September 15, 2023 (Figure 42), 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, southeastern South Pacific and the Antarctic) for the period October to December 2023.

Figure 42: Temperature forecast October to December 2023

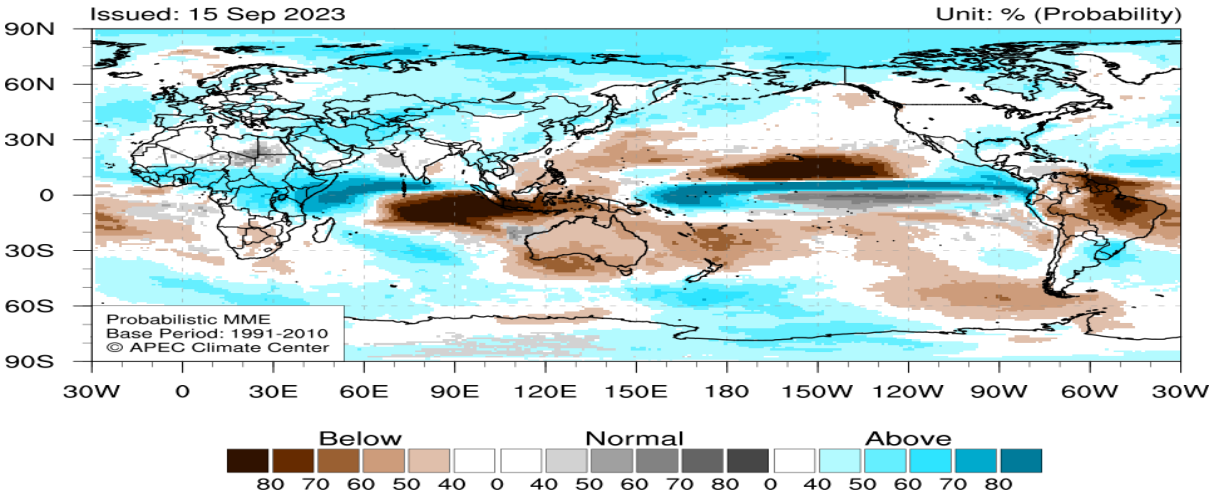


Source: APEC Climate Center

2.4.2 Precipitation Forecast for October to December 2023

According to the Climate Outlook by APEC Climate Center published on September 15, 2023 (Figure 43), above normal precipitation is expected for equatorial Pacific and western Indian Ocean, tropical North Atlantic, Eurasia, 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 October to December 2023.

Figure 43: Precipitation forecast October to December 2023



Source: APEC Climate Centre

3 Gas Production

3.1 Global

The latest data indicates a modest 0.12% decrease in global gas production for 2022, leading to a total production volume of 4,025 bcm. This reduction mainly stems from decreased production in the CIS and Africa. On the other hand, North America, the Middle East and Europe witnessed an increase in their gas production volumes (Table 1). Recent information has led to a downward revision for global gas production in 2022.

The forecast for 2023 indicates a resurgence in global gas production with an anticipated increase of 1.2%. This growth is largely expected to be fuelled by North America, the Middle East, Asia Pacific, Africa and LAC. Conversely, other regions may witness a decrease. Non-GECF producers are predicted to boost their gas output by 2.9%, achieving total production volumes of 2,411 bcm. Within this growth context, the United States is projected to be a key contributor with an anticipated surge of 37 bcm over the prior year's numbers.

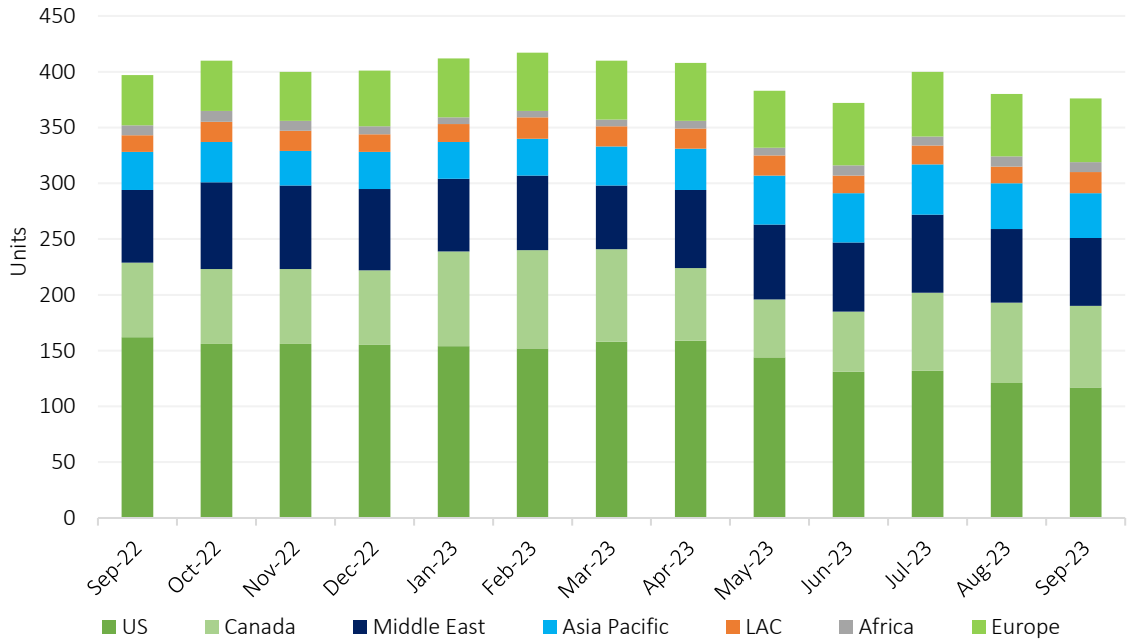
Table 1: Global gas production forecast by region (bcm)

Region	2021	2022	2022 Revision*	2022 Growth	2023	2023 Revision*	2023 Growth
Africa	258	254	-2.6%	-1.4%	255	-3.3%	0.5%
Asia Pacific	643	648	-0.2%	0.7%	657	0.5%	1.5%
CIS	911	818	-1.5%	-10.2%	794	-2.2%	-3.0%
LAC	157	158	0.0%	0.4%	159	-2.9%	0.8%
Europe	225	232	0.0%	3.4%	222	0.0%	-4.2%
Middle East	670	685	0.1%	2.1%	703	0.0%	2.6%
North America	1166	1229	1.2%	5.5%	1281	0.3%	4.2%
World	4030	4025	-0.12%	-0.1%	4071	-0.6%	1.2%
GECF	1759	1681	-0.8%	-4.4%	1660	-1.3%	-1.2%
non-GECF	2271	2344	0.4%	3.2%	2411	0.0%	2.9%

Source: GECF Secretariat based on Rystad Energy Ucube
**Revision for 2022 and 2023 gas production compared to previous estimate*

In September 2023, there was a m-o-m decrease of 4 units in the global count of gas drilling rigs, which serve as a measure of upstream activity. Additionally, there was a y-o-y decrease of 21 units, resulting in a total of 376 rigs (Figure 44). Although LAC, Europe and Canada observed an increase in operational gas rigs, opposing patterns were seen in other parts of the world. Notably, the Middle East, the US and Asia-Pacific experienced reductions of 5, 4 and 1 units respectively.

Figure 44: Trend in monthly global gas rig count



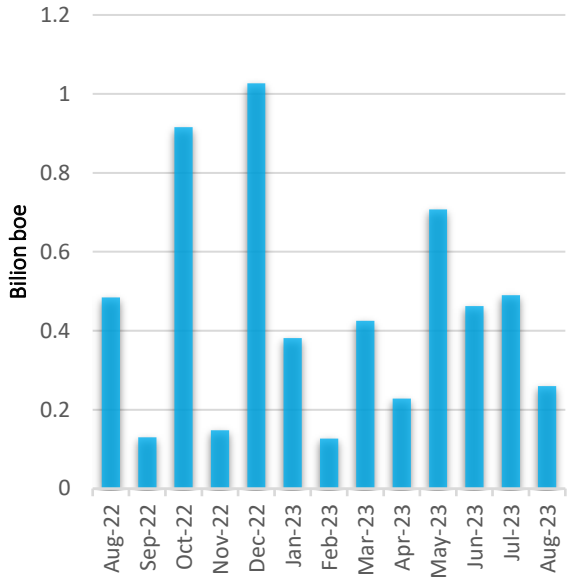
Source: GECF Secretariat based on data from Baker Hughes
Note: Excludes data for Eurasia and Iran

In August 2023, the total volume of gas and liquids discovered amounted to 260 million barrels of oil equivalent (boe). Of this, gas accounted for 65% (29 bcm) while oil constituted the remaining 35% (90 million boe). This marked a monthly decrease in volumes compared to the 490 million boe discovered in July 2023, and an annual decrease compared to the 485 million boe discovered in August 2022. This resulted in an average monthly discovered volume of 400 million boe in the first eight months of 2023 (Figure 45). The cumulative volume of discoveries in the period January to August 2023 reached 3.5 billion boe, compared to discovered volumes of 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 rebound in global exploration investments for the year. Approximately 67% of the total discoveries were made offshore.

In August 2023, 9 new discoveries were announced, 7 of which were offshore. LAC, Asia Pacific and Africa accounted for 55%, 18% and 11% of the discovered volumes, respectively. No significant discoveries were reported in Eurasia and the Middle East. (Figure 46).

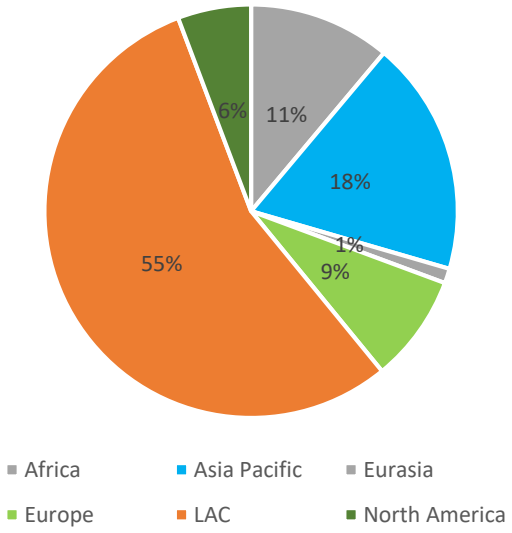
The Remanso onshore gas discovery in Bolivia was the largest and most significant hydrocarbon discovery announced in August 2023. The discovery was made through the re-entry for the exploration well Remasno-1X, after an updated interpretation for the seismic data. The new discovery lies within the Okinawa area, in the Warnes province of the Santa Cruz department. The estimated resources attributed to this new discovery reached approximately 28 bcm. According to the Bolivian Energy Company YBFP, the Remanso discovery opened a new development horizon in the short and medium term that would help to reduce fuel imports and generate revenue for the country.

Figure 45: Monthly gas and liquid discovered volumes



Source: GECF Secretariat based on Rystad Energy Ucube

Figure 46: Discovered volumes in August 2023 by region

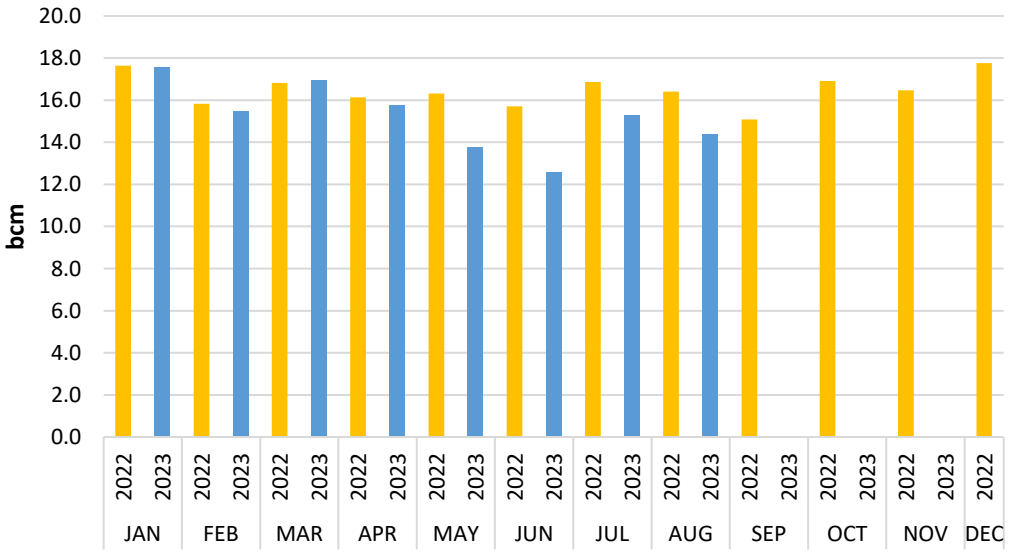


Source: GECF Secretariat based on Rystad Energy Ucube

3.2 Europe

In August 2023, gas production in Europe saw a y-o-y decrease of 12%, resulting in a total output of 14.4 bcm (Figure 47). This reduction was mainly attributed to decreased output from the major producers in the region: Norway, the Netherlands and the United Kingdom. As a result, the estimated overall production for 2023 is expected to decrease by 10 bcm compared to the previous year.

Figure 47: 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*

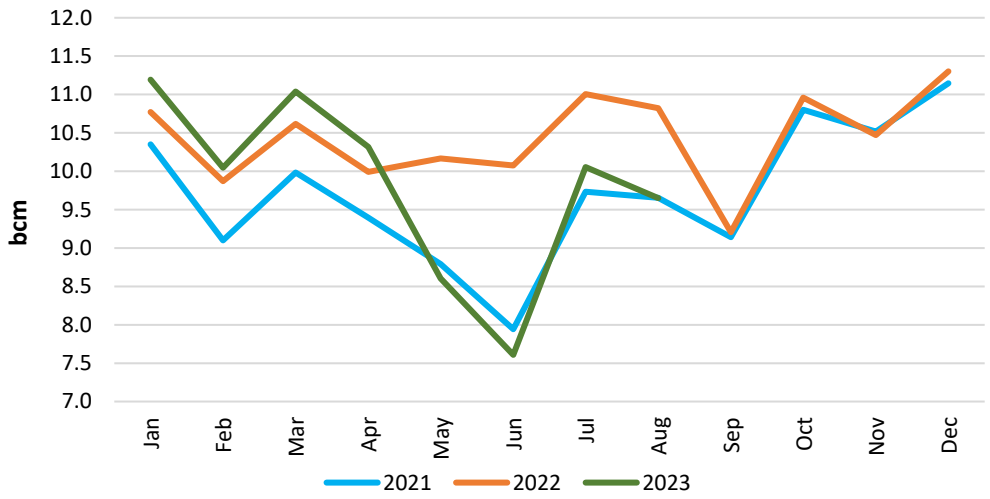
3.2.1 Norway

Preliminary data from the Norwegian Petroleum Directorate indicated that Norway experienced an 11% y-o-y decrease in its gas production in August 2023, reaching a total of 9.6 bcm (Figure 48). The cumulative gas production from January to August amounted to 78.5 bcm.

Furthermore, Equinor, along with its partner Kuwait Foreign Petroleum Exploration Company, announced the development plan for the Eirin gas field in the North Sea, with an estimated investment of about 0.37 billion USD. The field is believed to contain 4.2 bcm of recoverable gas reserves, with production start-up planned for the second half of 2025. This development would help Norway achieves its target for securing gas supply to Europe.

Regarding maintenance activities, the Troll gas field and Kollsnes gas processing plant underwent planned maintenance activities in September, which was extended beyond the scheduled duration with another delay in the field ramp-up duration, resulting in a reduction of approximately 105 mcm/d of Norwegian gas. These maintenance disruptions contributed to upward pressure on wholesale Dutch and British gas prices during the month.

Figure 48: Trend in gas production in Norway



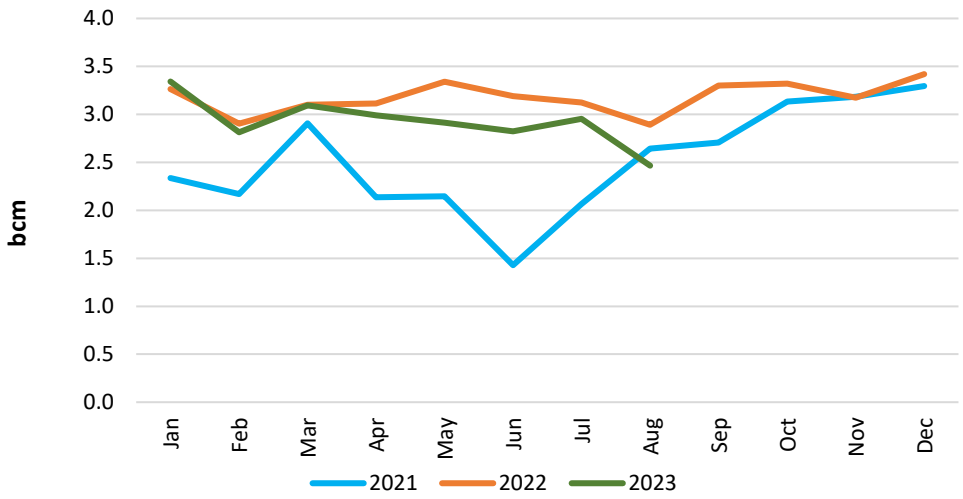
Source: GECF Secretariat based on data from Refinitiv and Norwegian Petroleum Directorate

3.2.2 UK

In August 2023, gas production in the UK saw a 15% drop y-o-y, totalling 2.47 bcm (Figure 49). The combined gas production from January to August was 23.4 bcm, representing a 6% decrease compared to the same timeframe in the previous year.

The North Sea Transition Authority (NSTA), the regulator overseeing the process of granting the new oil and gas exploration and production licences in the North Sea, approved the development plan of the Rosebank oil and gas project, despite public debate and opposition. Equinor can now proceed with phase 1 development, which project costs totalling approximately 3.8 billion USD. The Rosebank field is located 130 km north west of Shetland at water depth of 1100 m, with estimated total recoverable resources reaching approximately 300 million boe. The field will be developed using a Floating Production Storage and Offloading facility (FPSO), with production start-up expected in 2027.

Figure 49: Trend in gas production in the UK

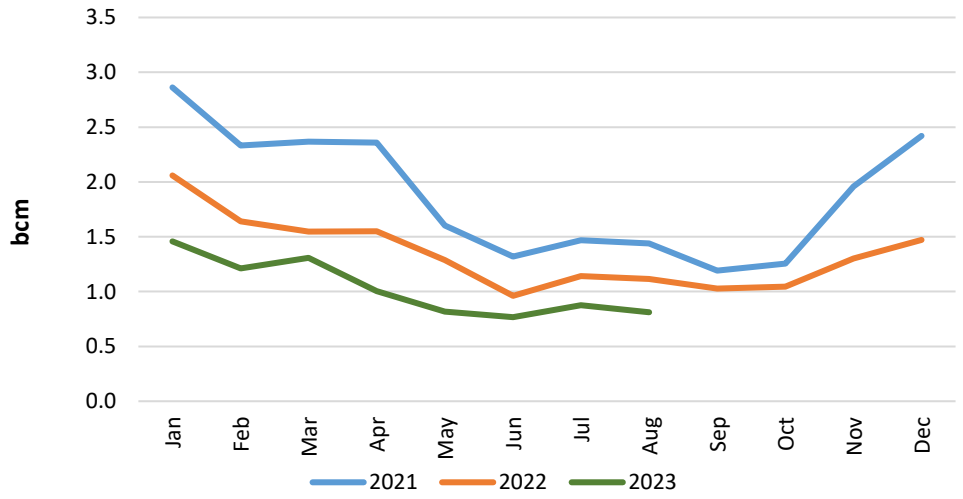


Source: GECF Secretariat based on data from Refinitiv

3.2.3 Netherlands

In August 2023, the Netherlands experienced a 27% drop in gas production compared to the previous year, resulting in an output of 0.81 bcm (Figure 50). October 2023 marked a historical event for Dutch gas production, with production from the Groningen gas field finally ceasing. The field has been producing since the 1960s.

Figure 50: Trend in gas production in the Netherlands



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

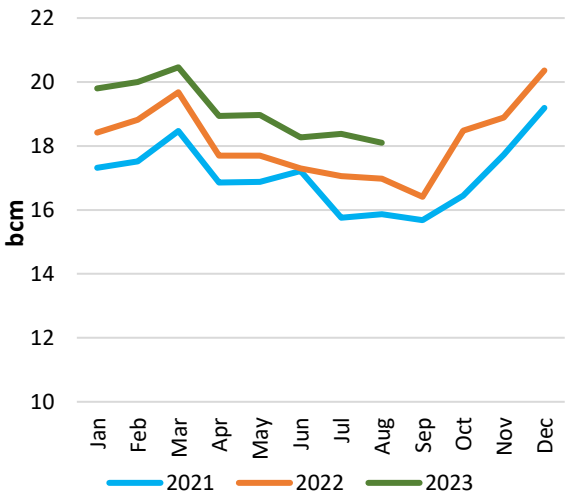
Moreover, in September 2023, the Dutch Central Bureau of Statistics revealed the status of the natural gas reserves in the Netherlands indicating that recoverable reserves volume amounted to 142 bcm (as of the end of 2022). Considering current volumes of production, the reserves are expected to be depleted in 9 years, unless new gas volumes are discovered. The remaining reserves in the Groningen field amounted to 2 bcm, while most of the remaining reserves are located in gas fields in the North Sea.

3.3 Asia

In August 2023, China witnessed a 7% y-o-y rise in gas production, reaching 18.1 bcm (Figure 51). Furthermore, the total gas output from January to August recorded a 6% y-o-y increase, totalling 152.9 bcm. The country also reported a coal-bed methane (CBM) output of 1.1 bcm for the month. Furthermore, in September 2023, the Chinese Ministry of Finance and State Taxation announced the extension of its shale gas resource tax policy until the end of 2027. This policy provides a fiscal incentive to encourage unconventional gas exploration and production by providing a 30% deduction on the 6% resource taxes. This is the second extension to this taxation policy, with the current extension originally planned to end in December 2023. It is worth noting that the shale gas reserves in the Sichuan province increased to the level of 561 bcm in 2022, with about 3% rise y-o-y.

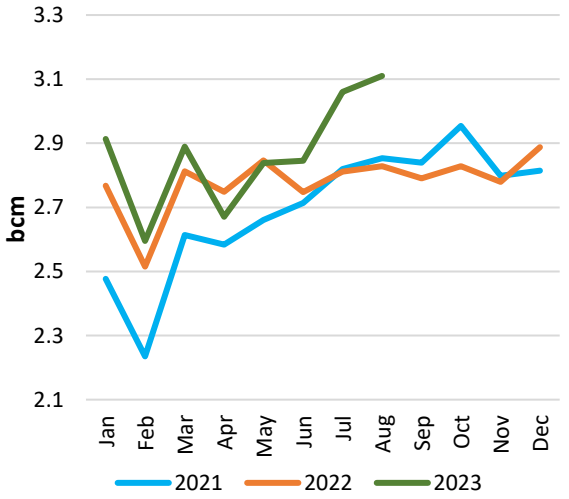
In August 2023, India witnessed a 10% y-o-y increase in gas production, attaining an output of 3.11 bcm (Figure 52). For the period from January to August 2023, the total gas production was 22.9 bcm, marking a 4% rise compared to the same period in the previous year.

Figure 51: Trend in gas production in China



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

Figure 52: Trend in gas production in India



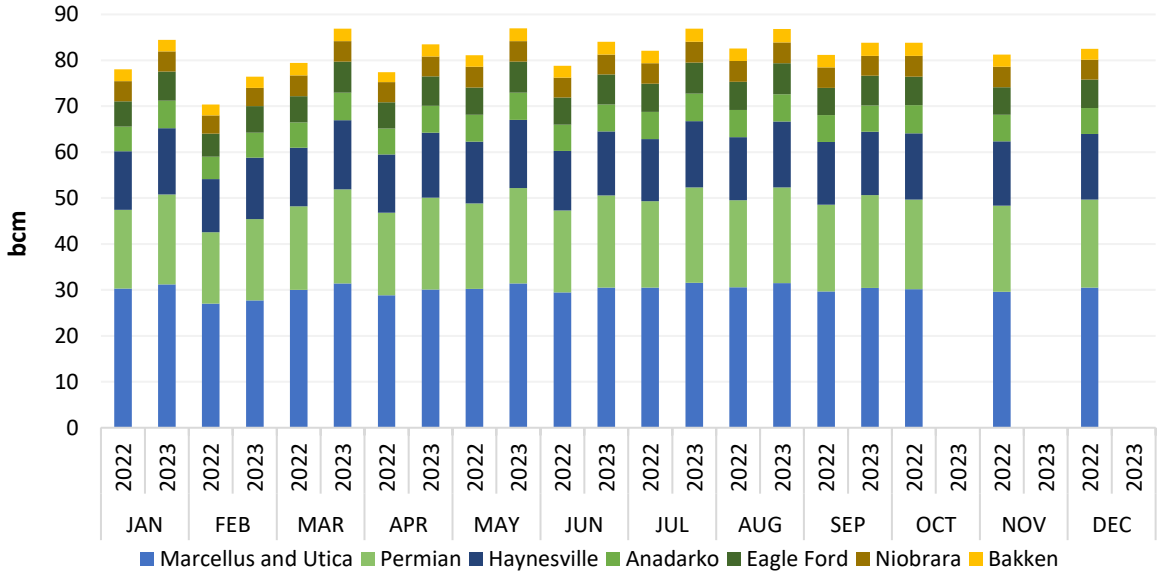
Source: GECF Secretariat based on data from Refinitiv, Ministry of Petroleum (India)

3.4 North America

3.4.1 US

In September 2023, the seven major shale gas-producing regions in the US—Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara, and Permian—recorded a 3% y-o-y growth in production, amassing 83.8 bcm (Figure 53). Among these, the Appalachian region, encompassing the Marcellus and Utica shale formations, contributed 36% to the aggregate production. Moreover, the Permian shale oil field saw a 7% y-o-y increase in associated gas production, totalling 20.1 bcm, representing 24% of the entire shale gas output.

Figure 53: Trend in shale gas production in the US shale oil/gas producing regions



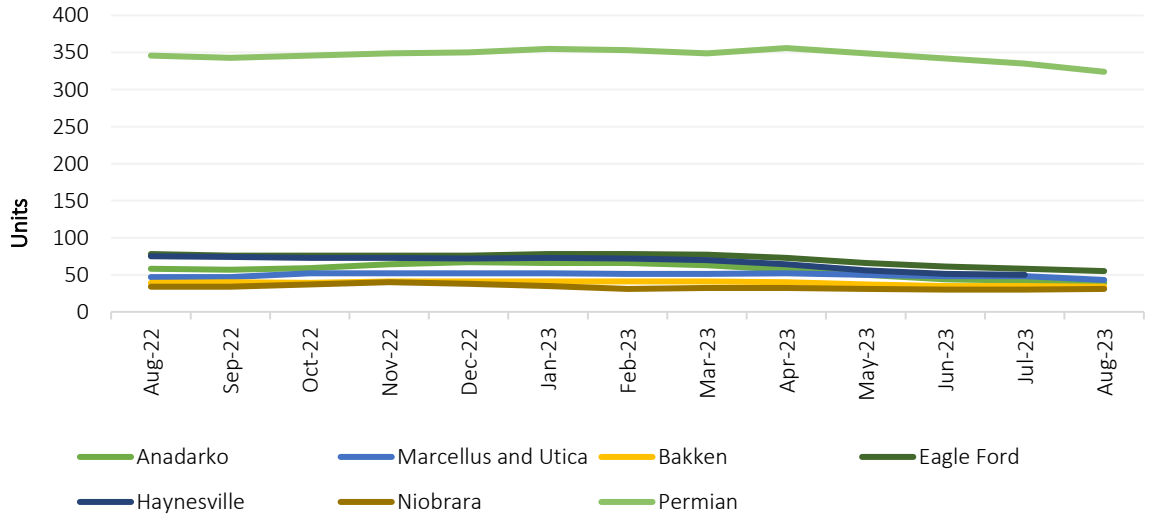
Source: GECF Secretariat based on data from Refinitiv, EIA

In August 2023, the total number of oil and gas rigs across the seven major shale oil and gas production regions in the US stood at 576. This indicates a decrease of 23 rigs from July 2023 and a drop of 99 rigs when compared to August 2022 (Figure 54).

Furthermore, in August 2023, the seven regions reported 4,749 drilled but uncompleted (DUC) wells, representing a decline of 38 wells compared to July 2023 (Figure 55).

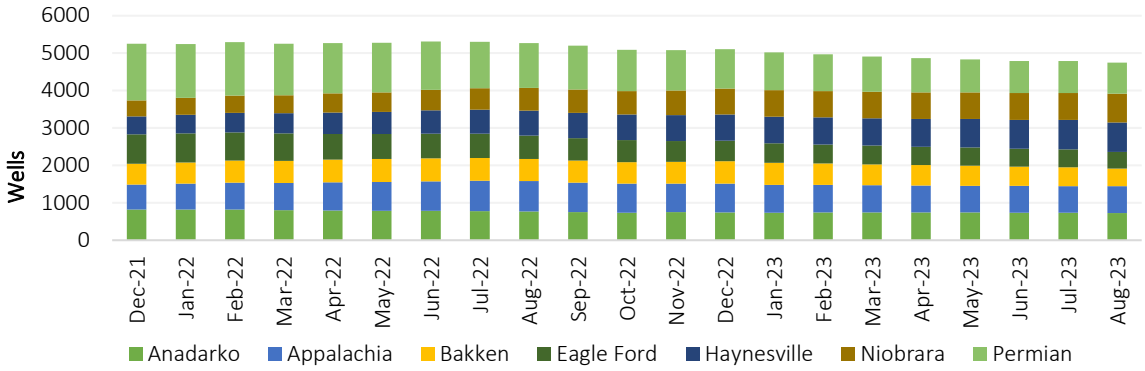
The EIA's Drilling Productivity Report underscores a m-o-m growth of 0.5% but a y-o-y reduction of 9.2% (Figure 56) in gas production per rig for September 2023. The average production across all regions reached 5,286 thousand cubic feet.

Figure 54: US shale region oil and gas rig count



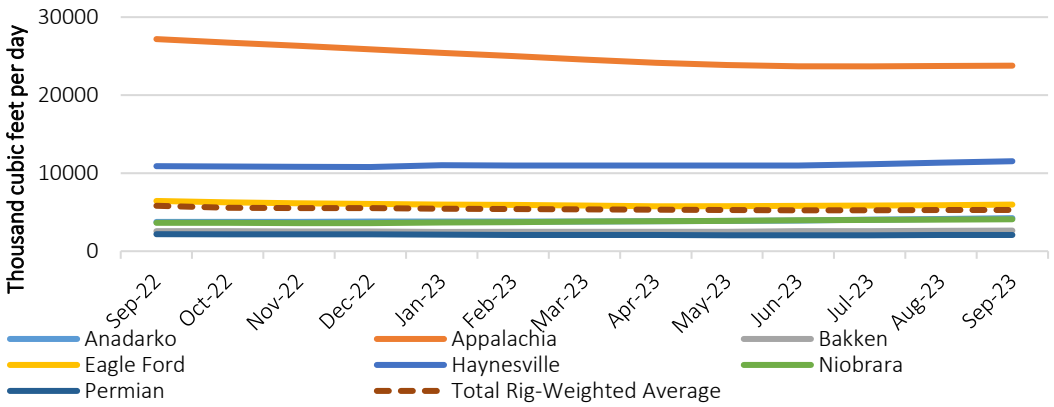
Source: GECF Secretariat based on data from Refinitiv

Figure 55: Drilled but uncompleted well (DUCs) counts in the US



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

Figure 56: New-well gas production per rig

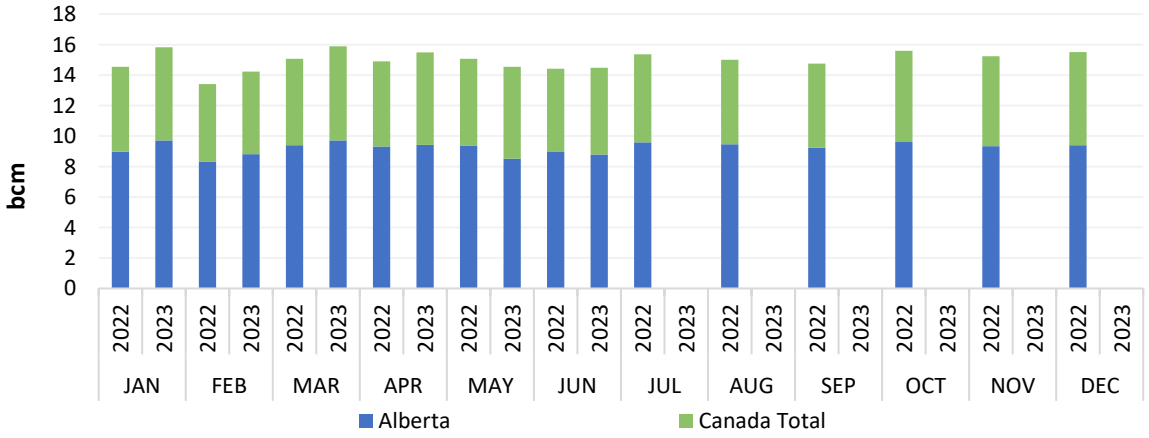


Source: GECF Secretariat based on data from Refinitiv, US EIA

3.4.2 Canada

According to the Canada Energy Regulator (CER), Canada's gas production in June 2023 was steady at 14.5 bcm, mirroring the figures from the prior month (Figure 57). From January to June, there was a 3% y-o-y growth in total gas production, reaching 90.6 bcm. Also, gas production in Alberta for June 2023 saw an increase of 0.3 bcm, reaching 8.8 bcm.

Figure 57: Trend in gas production in Canada



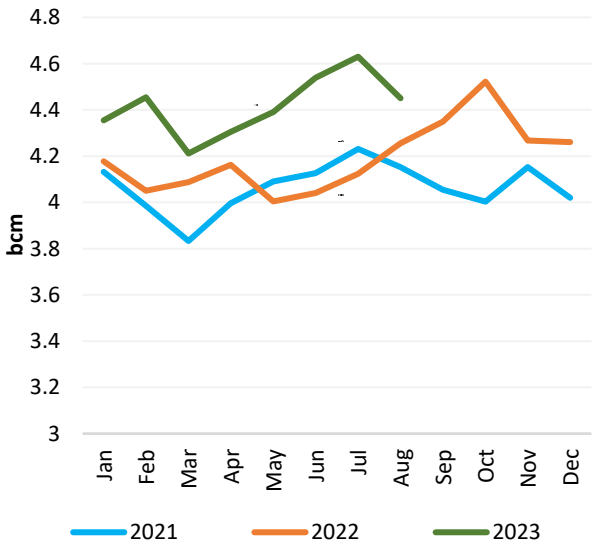
Source: GECF Secretariat based on data from the Canada Energy Regulator (CER)

3.5 Latin America & the Caribbean (LAC)

In Brazil, gross gas production reached 4.58 bcm in August 2023. This represented a 4% m-o-m decrease from the record high levels reached in July 2023, however, it represented a 5.6% y-o-y increase compared to August 2022 level (Figure 58). Approximately 51% of the produced gas was reinjected into reservoirs. In terms of distribution, offshore gas fields accounted for 86% of the gross monthly gas production, with the Tupi field in the Santos pre-salt basin emerging as the largest gas-producing field at 1.1 bcm, with 12% decrease in production m-o-m. The FPSO facility in Guanabara in the shared Mero field was the highest gas producing facility with approximately 0.36 bcm, a 5% increase compared to the previous month.

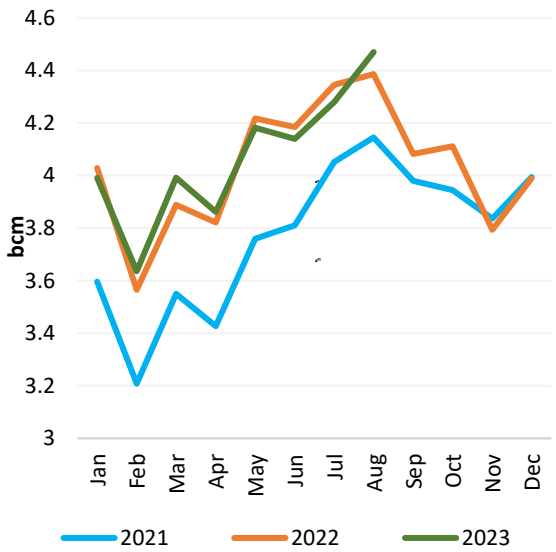
In Argentina, gross gas production reached a record high of 4.47 bcm in August 2023, based on data provided by the Argentinian Ministry of Economy. This represents a 4.4% increase when compared to the production levels recorded in July 2023 (4.28 bcm). In addition, it represents a 2% increase compared to August 2022 (4.38 bcm) (Figure 59). The cumulative gas production from January to August 2023 amounted to 32.5 bcm, aligning closely with the production levels for 2022. Shale gas production amounted to 2.1 bcm in August 2023, representing 47% of the gross production while tight gas reservoir production was 0.64 bcm, accounting for 14.3% of the total gas production. The remaining portion of production stemmed from conventional fields.

Figure 58: Trend in gas production in Brazil



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

Figure 59: Trend in gas production in Argentina



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

In September 2023, a significant milestone for LAC gas production was achieved when Venezuela and Trinidad and Tobago (2 GECF Member Countries) signed an agreement to develop the Dragon gas field, located in Venezuelan waters. The agreement included the development and production of Venezuelan natural gas for export and utilization in Trinidad and Tobago. The Dragon gas field is estimated to contain about 4.2 tcf (120 bcm) of recoverable gas reserves.

3.6 Other Regions

ADNOC awards 17 billion USD contracts for Hail and Ghasha gas projects: UAE's ADNOC company announced the award of 2 major Engineering, Procurement and Constructions (EPC) contracts to a consortium consisting of NPCC, Saipem and Tecnimont, with a total value of up to 17 billion USD. The Hail and Ghasha fields are located within the Ghasha concession and are estimated to produce about 1.5 bcf/d (15.5 bcma) by 2030. According to ADNOC, gas from the Ghasha concession is expected to contribute to the UAE's gas self-sufficiency and ADNOC's gas growth and export expansion plans. The two development projects are planned to operate with net-zero emissions and aim to capture about 1.5 Mtpa of CO_2.

Iraq inaugurated a new associated gas processing facility: A new associated gas processing facility was inaugurated in the Halfaya oil field, with a capacity of 300 million standard cubic feet. The facility would separate Hydrogen Sulphide H_2S from the associated feed gas and the produced gas would be transported to Amara and Maysan power plants. As a result of this project, five flaring sites would be closed, which would enhance and improve the environmental footprint of the Iraqi oil industry.

Indonesia offers 3 exploration blocks in its third auction of 2023: According to the release of the Ministry of Energy and Mineral Resources in Indonesia, 3 new oil and gas exploration blocks were offered in the third auction in 2023. These blocks included the Akimeugah 1 and Akimeugah 2 blocks, located onshore south Papua. Each block is estimated to contain about 15 billion boe of potential resources. The third exploration block is the Bobara block offshore west Papua and estimated to contain approximately 16 billion boe of potential resources.

The Islamic Republic of Mauritania to join the GECF: During the 25th Ministerial Meeting, the GECF has welcomed the Islamic Republic of Mauritania as its newest member and praised the significant moves which Mauritania has commenced to position itself as a LNG exporter. This step came in conjunction with the development of the Greater Tortue Ahmeyim gas project on Mauritania-Senegal maritime border, which is expected to start production from its phase 1 in Q1 of 2024. It is worth noting that expansion of the GECF membership represents an important milestone for the Forum's strategy of outreach, dialogue, and cooperation.

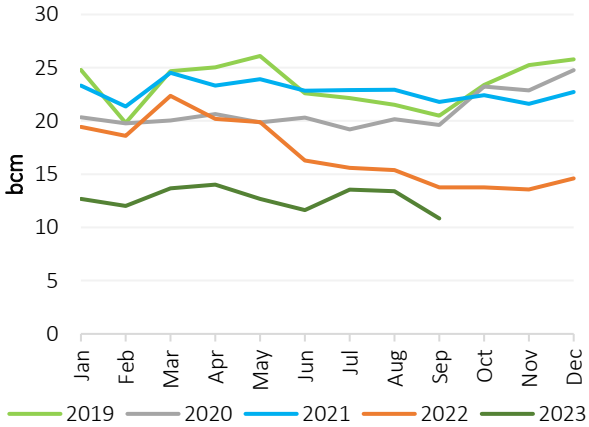
4 Gas Trade

4.1 Pipeline Natural Gas (PNG) Trade

4.1.1 Europe

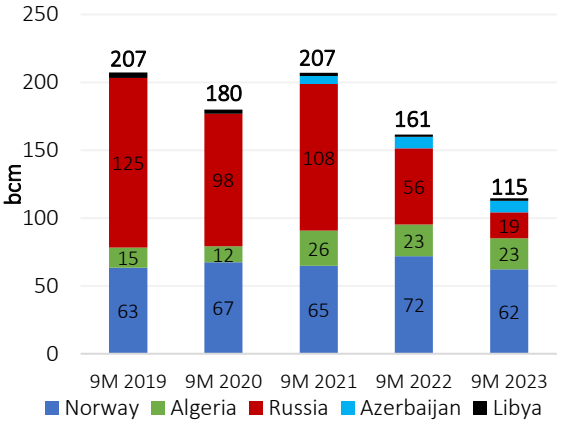
In September 2023, PNG imports to the EU plummeted to 10.8 bcm, a fall of 19% m-o-m, and 21% less than one year ago (Figure 60). For the three quarters of 2023, cumulative PNG volumes imported by the EU amounted to 115 bcm, which represents a 29% shortfall from the level imported at the same point last year (Figure 61). The supply of PNG to the region during the month has been especially hampered by scheduled and unplanned upstream outages in Norway to address maintenance activities (Figure 62).

Figure 60: Monthly PNG imports to the EU



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 61: Year-to-date EU PNG imports by supplier

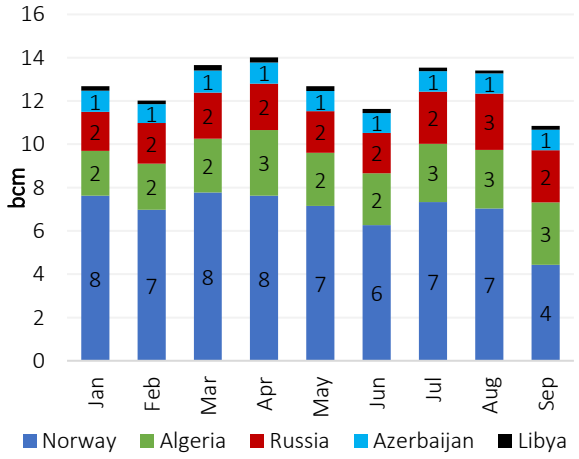


Source: GECF Secretariat based on data from McKinsey and Refinitiv

For the year thus far, Norway accounts for the largest supply share of PNG to the EU at 54%, followed by Algeria with 20% and then Russia with 17%. Compared to the same period last year, imports from Russia fell by 66% or 37 bcm, while imports from Norway fell by 13% or 9.6 bcm. The quantity imported from Algeria, Azerbaijan and Libya remained almost unchanged y-o-y.

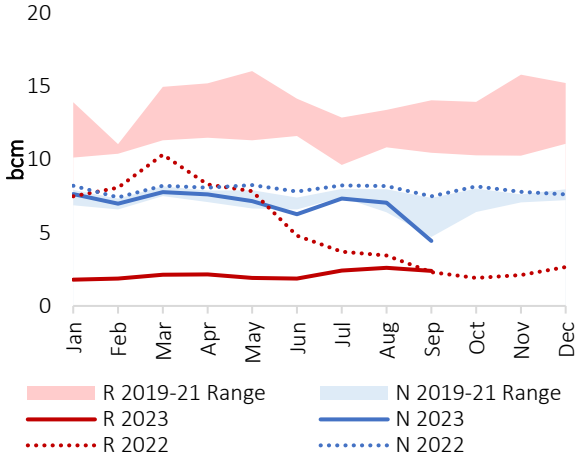
From January to September 2023, the monthly PNG imports from Norway fell to 6.9 bcm, compared with 8.0 bcm in 2022 and 7.2 bcm in the years 2019 to 2021. Conversely, during the same period, the average PNG imports from Russia averaged 2.1 bcm per month in 2023, compared with 6.3 bcm in 2022 and 12.2 bcm in the years 2019 to 2021 (Figure 63).

Figure 62: Monthly EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 63: EU PNG supply from Russia and Norway



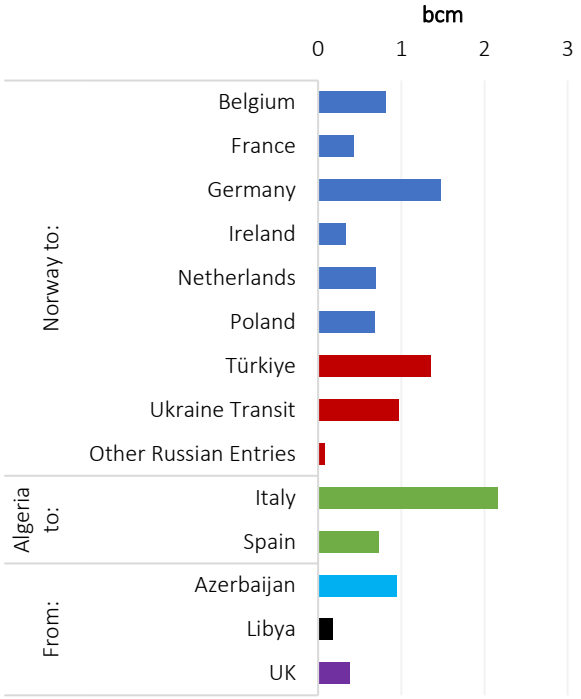
Source: GECF Secretariat based on data from McKinsey and Refinitiv

The PNG imports to the EU via the major supply routes in September 2023 is shown in Figure 64.

Norway's supply through all six routes fell during the month. Germany, with 1.5 bcm, accounted for one third of all Norwegian PNG exports to the region. Moreover, Russia's supply via its three routes also declined as well. On the other hand, Algeria increased exports to Italy by 8% m-o-m. Net PNG volumes continue to flow from the UK to Europe via the interconnectors. Nevertheless, supply from the UK declined by 54% m-o-m to just 0.4 bcm.

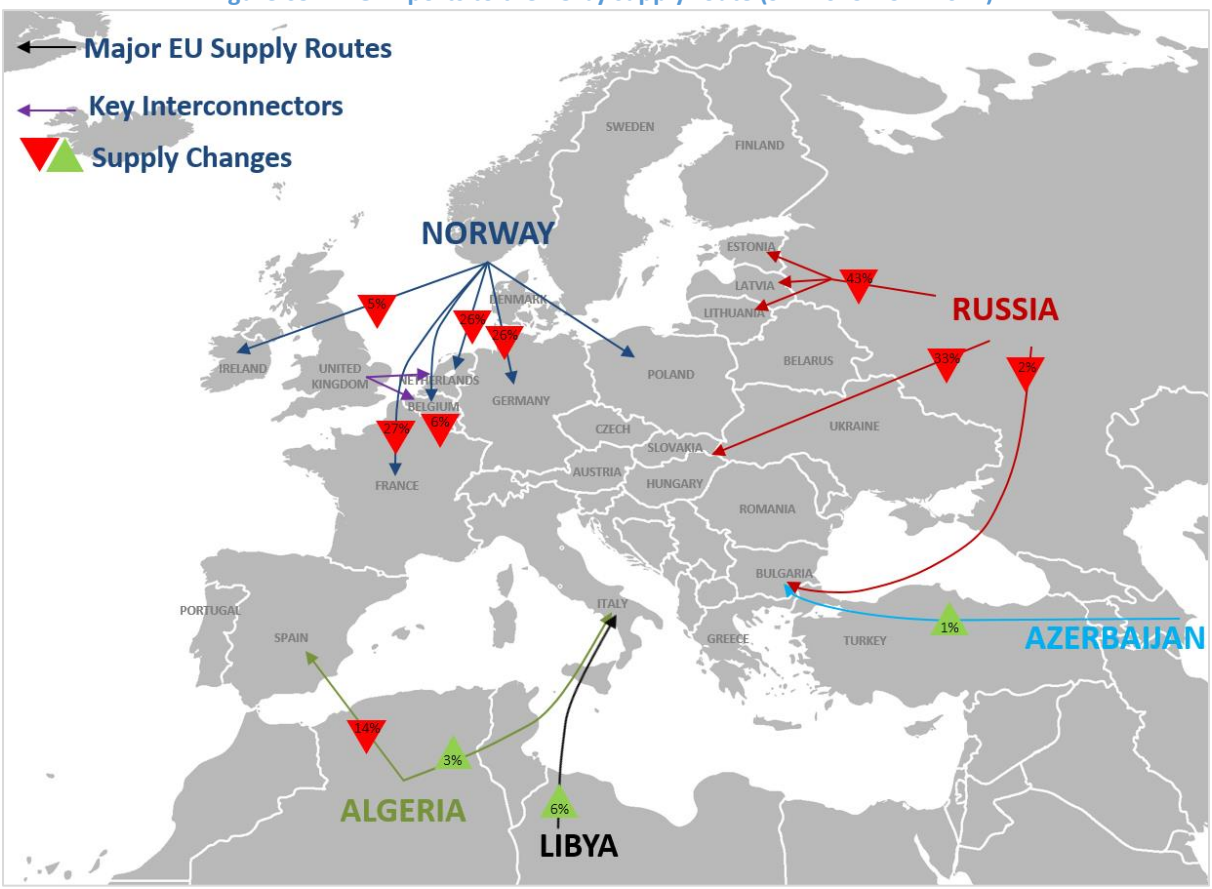
Figure 65 compares the PNG imports to the EU via major supply routes during the three quarters of 2023, with the same period in 2022. Algeria exported 3% more PNG to Italy during this period, while supply to Spain contracted by 14%. Norway's exports to France and the Netherlands declined by 27% and 26%, respectively.

Figure 64: EU PNG imports by supply route, in September 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 65: PNG imports to the EU by supply route (9M 2023 v 9M 2022)

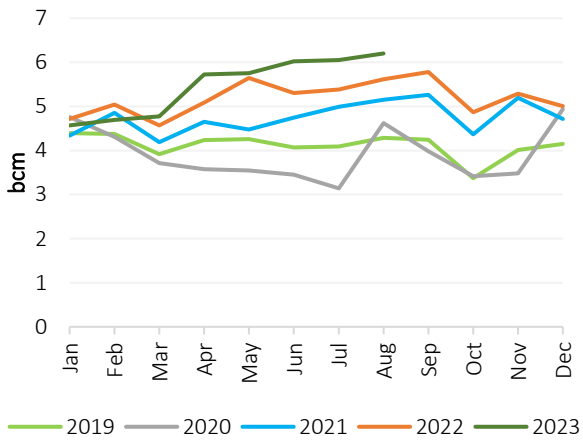


Source: GECF Secretariat based on data from McKinsey and Refinitiv

4.1.2 Asia

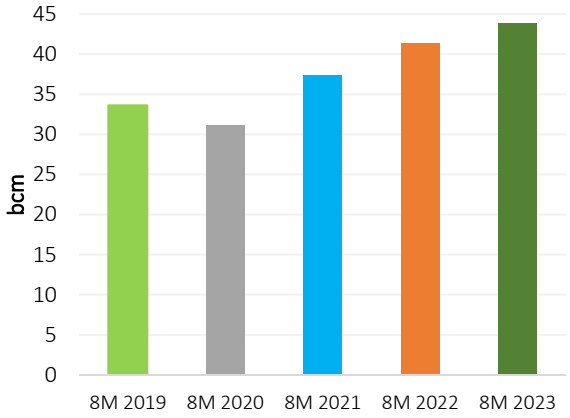
China increased its record monthly quantity of PNG imports for the third consecutive month. 6.2 bcm of PNG imports were recorded in August 2023, representing a 2% increase m-o-m and 10% increase y-o-y (Figure 66). China's total monthly gas exports also continued to rise, with PNG accounting for 42% in August. Over the period from January to August 2023, PNG imports totalled 44 bcm, increasing 6% compared with the same period in 2022 (Figure 67). The average monthly import rate was 5.5 bcm in 2023, rising from 5.2 bcm in 2022.

Figure 66: Monthly PNG imports in China



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

Figure 67: Year-to-date PNG imports in China

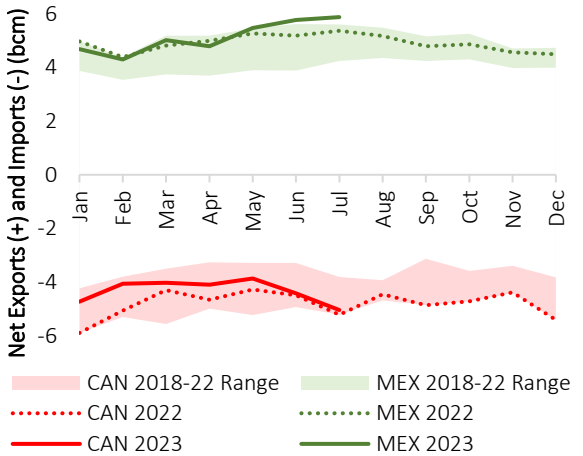


Source: GECF Secretariat based on data from Refinitiv and General Administration of Customs China

4.1.3 North America

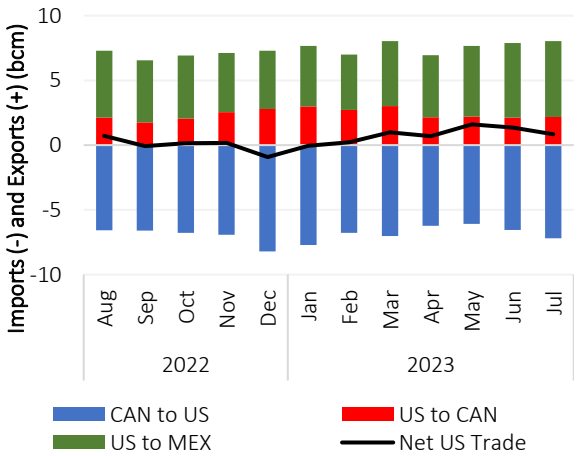
In July 2023, the US surpassed its record quantity of PNG exports to Mexico for the second consecutive month, supplying 5.9 bcm (Figure 68). This volume represented a 2% increase m-o-m and 9% increase y-o-y. Net PNG imports from Canada reached 5.0 bcm, having risen by 14% m-o-m, but 3% lower y-o-y. Over the first seven months, net PNG exports from Canada to the US decreased by 11% y-o-y, while imports to Mexico rose by 3%. As a result, net PNG exports continued in July from the US to the other countries at a net flow of 0.8 bcm.(Figure 69). The average monthly flows in the region in 2023 were 6.8 bcm from Canada to the US, 2.5 bcm from the US to Canada and 5.1 bcm from the US to Mexico.

Figure 68: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 69: Monthly US PNG trade



Source: GECF Secretariat based on data from US EIA

4.1.4 Other Developments

China expands gas pipeline connectivity: China is pushing forward in its ambitions to increase the interconnectivity between regions by constructing new gas pipelines between key supply and demand centres. This drive is a part of an overall vision established by the Government in the Five-Year Plans. To effect these expansions and operations of the country's pipeline infrastructure, the Government consolidated all the pipeline assets from state companies into the management of the China Oil & Gas Pipeline Network Corporation (PipeChina). In this latest project, PipeChina will construct a 20 bcma pipeline spanning 4,300 km from the gas producing fields in Sichuan towards the pipeline network on the country's east coast.

Argentina to increase gas exports to Chile: Argentine President Alberto Fernández has pledged to ensure a steady supply of natural gas to Chile until December 31, 2024. This decision comes amid Bolivia's decreasing production, causing South American countries to look towards the Vaca Muerta formation as an alternative gas source. From January to July 2023, Argentina's gas exports to Chile witnessed an 87% increase relative to the previous year, with a total value of $556 million. Moreover, Argentina plans to export up to 5 million cubic meters per day (mmcm/d) in the upcoming winter and up to 9 mmcm/d in Q4 2024. Emphasizing the environmental and economic benefits, Argentina's Foreign Ministry highlighted gas as a sustainable method to transition towards energy decarbonisation.

4.2 LNG Trade

4.2.1 LNG Imports

In September 2023, global LNG imports reached 31.47 Mt, recording a year-on-year increase of 2.1%, equivalent to 0.64 Mt (Figure 70). This marks the lowest level of LNG imports since September 2022. The rise in LNG imports was primarily fuelled by the Asia Pacific region, while Latin America and the Caribbean (LAC) and the Middle East and North Africa (MENA) regions contributed to a lesser extent, collectively compensating for reduced imports in Europe (Figure 71). From January to September 2023, the cumulative global LNG imports expanded by 3.0%, amounting to 8.81 Mt year-on-year, reaching a total of 303.36 Mt.

Figure 70: Trend in global monthly LNG imports

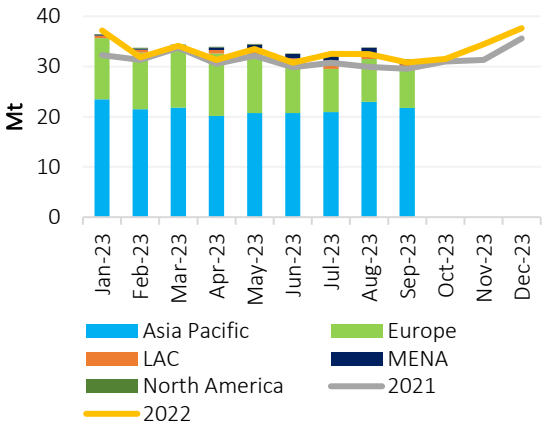
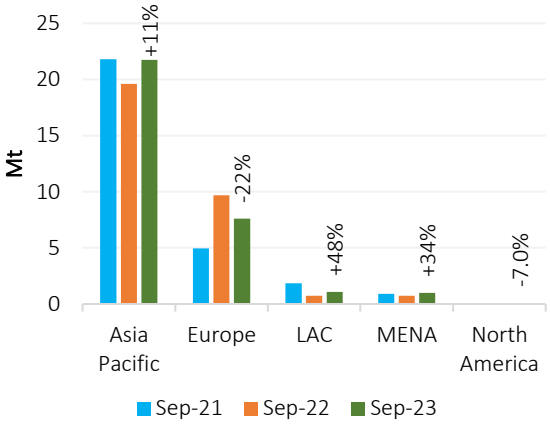


Figure 71: Trend in regional LNG imports



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.1 Europe

In September 2023, Europe experienced its third consecutive monthly decrease in LNG imports, reaching the lowest level since November 2021. Europe's LNG imports saw a substantial drop of 22% (2.10 Mt) compared to the previous year, settling at 7.59 Mt (Figure 72). This decline in Europe's LNG imports can be attributed to high underground gas storage levels, reduced gas demand in Europe and a widening price gap between spot LNG prices in Asia and the TTF price. Specifically, Belgium, France, Italy, the Netherlands, Spain and the UK recorded significant declines while Germany experienced a notable increase (Figure 73). From January to September 2023, Europe's cumulative LNG imports displayed a 2.4% year-on-year growth, amounting to 2.13 Mt and reaching a total of 92.55 Mt.

In Belgium, reduced LNG imports resulted from lower gas consumption, high gas inventory and reduced pipeline gas exports to Germany and the Netherlands. France's LNG imports declined due to more pipeline gas from Norway, lower gas consumption and increased maintenance at the Fos Cavaou LNG terminal. Italy's lower LNG imports were due to increased pipeline gas from Algeria and ample gas storage. In the Netherlands, despite higher gas usage, lower domestic gas production and a fall in pipeline gas imports from Norway, the country witnessed reduced LNG imports, which were mainly due to weaker gas exports to Germany and higher gas inventory.

Spain's LNG imports fell due to lower gas demand and elevated gas storage level. In the UK, reduced gas consumption and decreased pipeline gas exports to mainland Europe, driven by NBP and TTF gas price convergence, led to lower LNG imports. Conversely, Germany saw higher LNG imports due to the ramp-up in LNG imports at new terminals.

Figure 72: Trend in Europe's monthly LNG imports

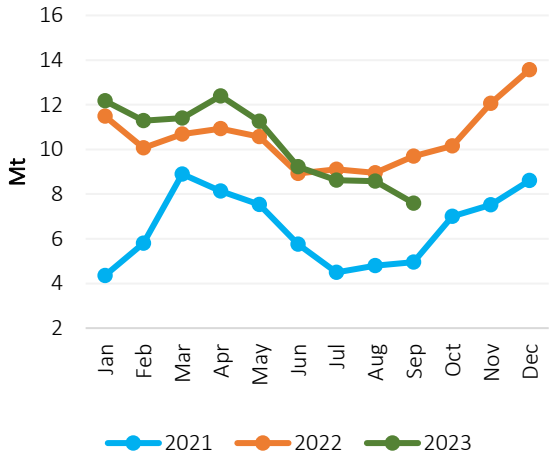
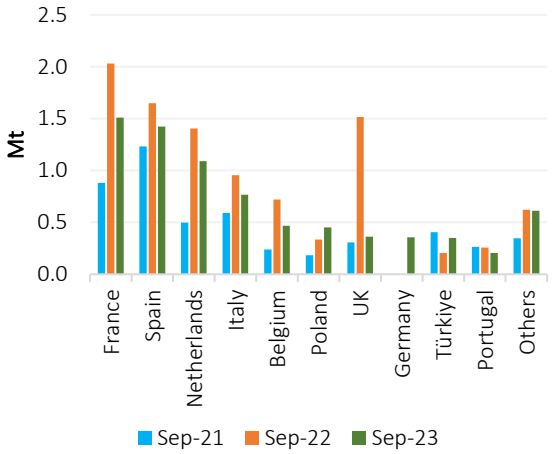


Figure 73: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.2 Asia

In September 2023, LNG imports in Asia Pacific jumped by 11% (2.15 Mt) y-o-y to 21.75 Mt, the strongest growth recorded in 2023 (Figure 74). However, LNG imports were still lower than the same month in 2021. China, India, Japan and Thailand drove the region's LNG imports higher and offset a sharp decline in South Korea's import volumes (Figure 75). From January to September 2023, Asia Pacific's cumulative LNG imports increased by 3.1% (5.92 Mt) y-o-y to reach 194.14 Mt.

China's surge in LNG imports was underpinned by a rebound in gas demand, pre-winter LNG stockpiling and lower spot LNG prices. Meanwhile, India experienced the most rapid growth in LNG imports among all Asian countries, thanks to attractive spot LNG prices that appealed to price-conscious buyers. Similarly, Thailand's increased LNG imports were linked to reduced spot LNG prices. In Japan, despite having higher nuclear capacity availability compared to 2022, lower LNG inventory supported pre-winter LNG stockpiling. On the other hand, South Korea's decline in LNG imports was influenced by greater nuclear availability and increased solar power generation, which led to reduced gas demand.

Figure 74: Trend in Asia's monthly LNG imports

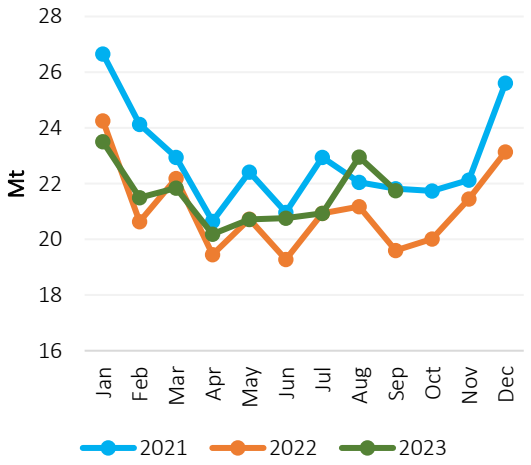
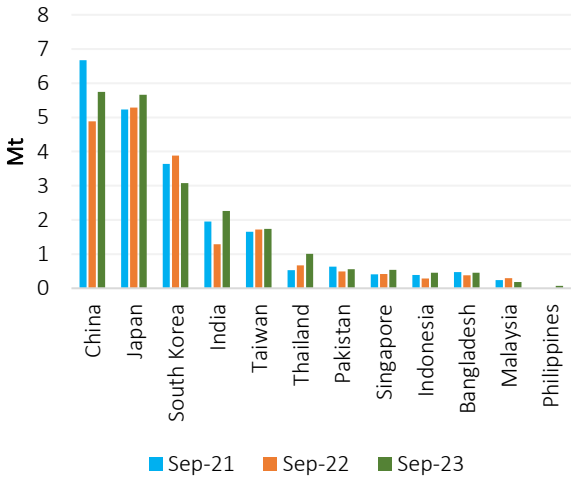


Figure 75: Top LNG importers in Asia Pacific



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.3 Latin America & the Caribbean (LAC)

In September 2023, LAC's LNG imports stood at 1.07 Mt, representing a surge of 48.1% (0.35 Mt) (Figure 76). Stronger LNG imports in Chile, Colombia, Panama and Puerto Rico drove LAC's LNG imports higher and offset weaker imports in Brazil and Jamaica (Figure 77). Between January and September 2023, LAC's cumulative LNG imports grew by 5.3% (0.49 Mt) y-o-y to 9.63 Mt.

Chile witnessed a significant increase in LNG imports, primarily driven by higher imports from Equatorial Guinea and the US. Meanwhile, Colombia experienced a rise in LNG imports due to increased gas demand for electricity generation and as a precautionary measure ahead of the El Nino phenomenon, which is expected to lead to drought conditions and reduced hydro output. Conversely, Brazil saw a decrease in LNG imports because of greater hydro output.

Figure 76: Trend in LAC's monthly LNG imports

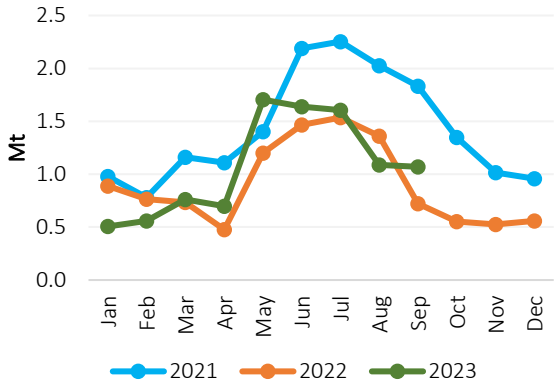
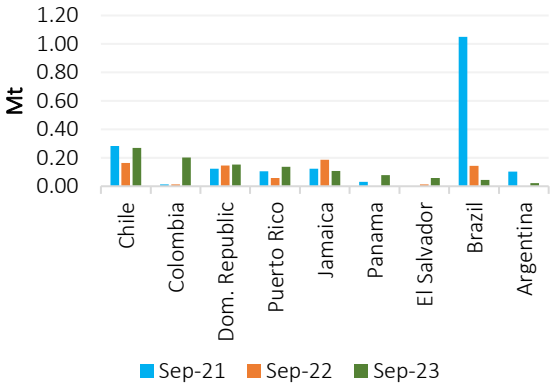


Figure 77: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.4 MENA

In September 2023, the MENA region's LNG imports increased sharply by 34% (0.25 Mt) y-o-y, reaching 0.99 Mt (Figure 78). Kuwait drove the higher LNG imports in the region (Figure 79). From January to September 2023, the region's cumulative LNG imports increased by 3.9% (0.23 Mt) y-o-y to 6.05 Mt.

Stronger gas demand in the electricity sector, amidst warmer-than-usual weather, boosted Kuwait's LNG imports.

Figure 78: Trend in MENA's monthly LNG imports

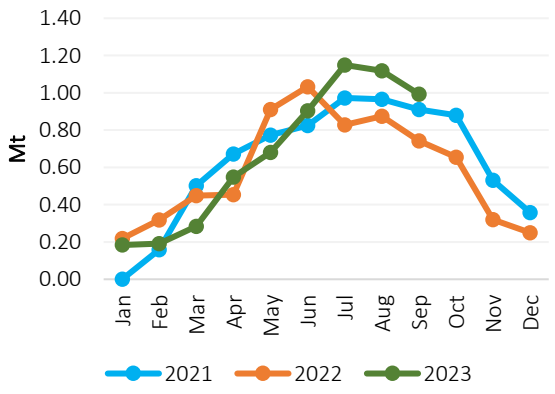
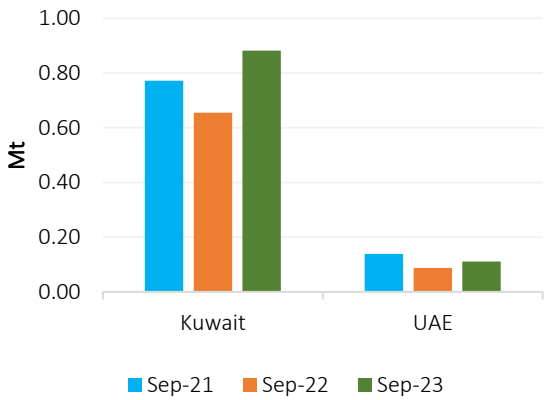


Figure 79: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2 LNG Exports

In September 2023, global LNG exports reached 33.58 Mt, marking a 2.8% (0.92 Mt) y-o-y growth (Figure 80). This increase in LNG exports was driven by both GECF and non-GECF countries, along with higher LNG reloads. Non-GECF countries remained the largest LNG exporters holding a market share of 49.7%, slightly down from 50.1% in September 2022. Conversely, the market shares of GECF member countries and LNG reloads in global LNG exports increased from 48.4% and 1.5% in the previous year to 48.6% and 1.7%, respectively. From January to September 2023, cumulative global LNG exports recorded a 3.7% (10.98 Mt) y-o-y growth, reaching 304.87 Mt. In September 2023, the leading LNG exporting countries were the US, Qatar and Australia (Figure 81).

Figure 80: Trend in global monthly LNG exports

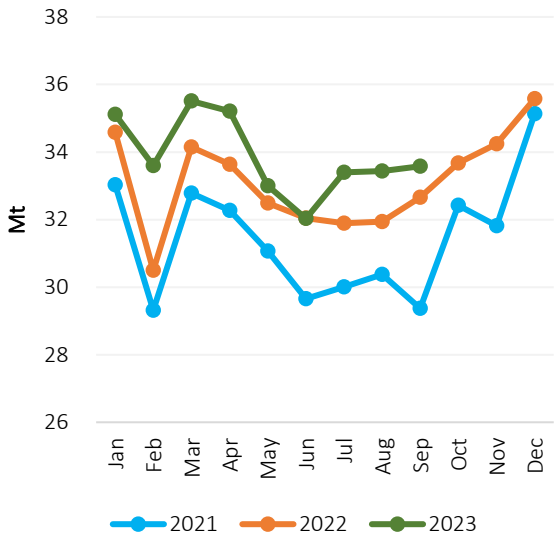
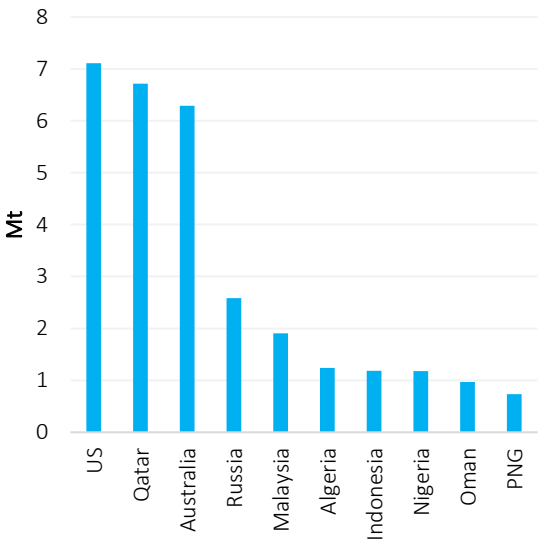


Figure 81: Top 10 LNG exporters in Sep 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.1 GECF

In September 2023, LNG exports from GECF member countries and observers increased by 3.2% (0.51 Mt) y-o-y to stand at 16.32 Mt (Figure 82). This represents the countries' highest monthly LNG exports since April 2023. Algeria, Mozambique, Peru and Qatar accounted for the bulk incremental increase and offset lower exports in Egypt, Malaysia and Trinidad and Tobago (Figure 83). From January to September 2023, GECF member countries' cumulative LNG exports expanded by 1.5% (2.13 Mt) y-o-y to 147.26 Mt.

Reduced maintenance activities at the Arzew LNG, Peru LNG and RasGas LNG facilities compared to the previous year contributed to increased LNG exports from Algeria, Peru, and Qatar, respectively. Additionally, Algeria's LNG exports received a boost from higher feedgas availability. Meanwhile, Mozambique saw a rise in LNG exports due to the ongoing production ramp-up at the Coral South FLNG facility.

Conversely, lower feedgas availability led to a decrease in Egypt's LNG exports, which remained absent for a second consecutive month in September. However, exports are expected to resume in October. Malaysia's decline in LNG exports was attributed to reduced LNG production at the Bintulu LNG facility. In Trinidad and Tobago, planned maintenance activity at the Atlantic LNG facility in September resulted in a decrease in LNG exports.

Figure 82: Trend in GECF monthly LNG exports

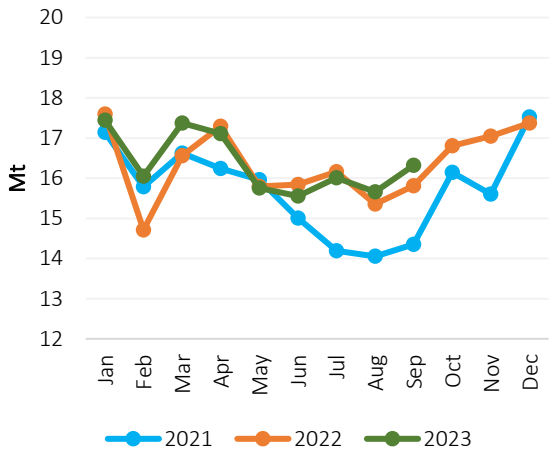
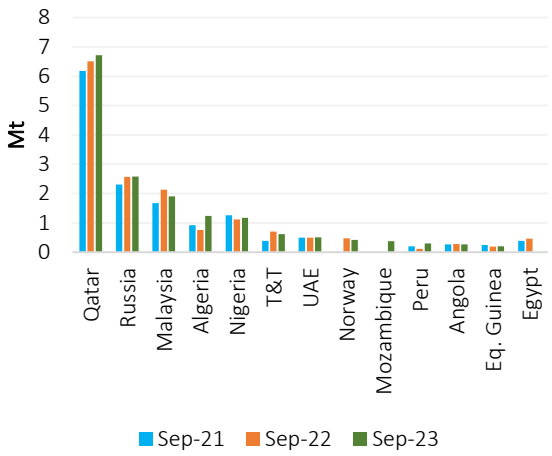


Figure 83: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.2 Non-GECF

In September 2023, non-GECF countries' LNG exports increased modestly by 1.9% (0.32 Mt) y-o-y, reaching 16.69 Mt (Figure 84). The US led the growth with Oman and Papua New Guinea contributing to a lesser extent. Conversely, Australia recorded a sharp decline in its LNG exports (Figure 85). Between January and September 2023, the countries' cumulative LNG exports increased by 5.2% (7.55 Mt) y-o-y to 153.54 Mt.

The increase in LNG exports from the US can be attributed to increased production levels at the Freeport and Sabine Pass LNG facilities. Specifically, the restart of operations at the Freeport LNG facility, which had been offline since June 2022, played a pivotal role in boosting production. On the other hand, Oman experienced higher exports due to reduced maintenance activities at the Qalhat LNG facility compared to the previous year.

In contrast, Australia witnessed a decline in exports due to lower output from the North West Shelf and Prelude LNG facilities as a result of planned maintenance activities. It is worth noting that strike actions at the Gorgon and Wheatstone LNG facilities did not impact Australia's LNG exports.

Figure 84: Trend in non-GECF monthly LNG exports

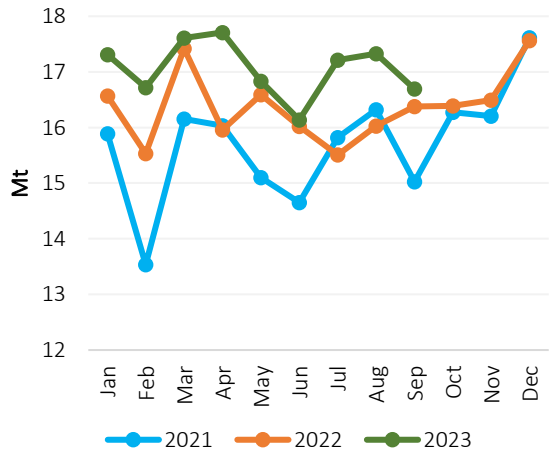
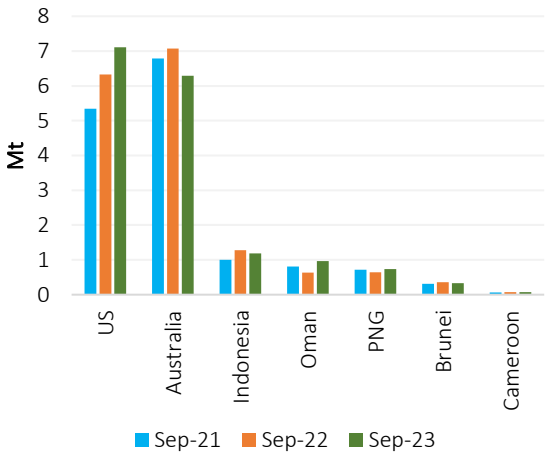


Figure 85: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.3 Global LNG Reloads

In September 2023, global LNG reloads rose by 19% (0.09 Mt) y-o-y to 0.56 Mt, reversing two consecutive months of decline (Figure 86). China, Indonesia and Singapore drove the higher LNG reloading activity and offsetting weaker LNG reloads from Chile and Spain (Figure 87). From January to September 2023, the cumulative global LNG reloads jumped by 47% (1.31 Mt) y-o-y to reach 4.12 Mt.

China's growth in LNG reloads was bolstered by an upswing in intra-regional LNG trade, particularly involving India, Japan and South Korea. In Indonesia, an expansion in domestic LNG trade and increased LNG reloads from the Arun LNG facility contributed to a rise in overall LNG reloads. In September, TotalEnergies carried out one LNG cargo reload from the Arun LNG terminal to China. Furthermore, an increase in LNG reloads destined for export to China and India propelled Singapore's LNG reloads higher. Conversely, both Chile and Spain experienced a decrease in LNG reloads, attributed to weaker LNG demand in Europe. In September 2022, Chile reloaded an LNG cargo intended for export to the UK.

Figure 86: Trend in global monthly LNG reloads

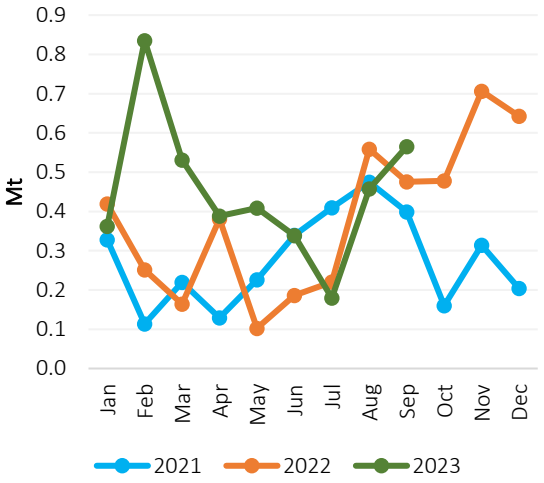
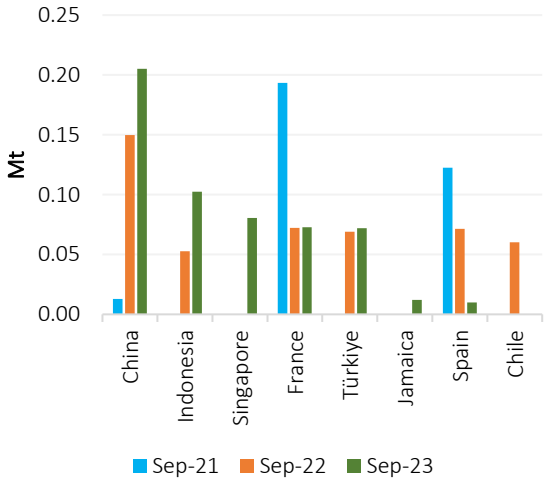


Figure 87: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.4 Arbitrage Opportunity

In September 2023, the arbitrage opportunity for LNG reloads from Europe to Asia Pacific continued to be absent. Although the price spreads between spot LNG prices in Asia Pacific and Europe significantly increased m-o-m, the spot shipping costs from Europe to Asia Pacific also expanded and remained above the price spreads (Figure 88). Conversely, the price spread between spot LNG prices in Asia Pacific and oil-indexed prices in Europe was at a significant premium over the spot shipping cost from Europe to Asia Pacific.

The price differentials between NEA/SWE and NEA/NWE each surged by 180% ($1.37/MMBtu) m-o-m to average $2.13/MMBtu. The stronger price differential was driven by a sharp increase in the spot Asian LNG price while the European spot LNG prices were relatively stable. Similarly, the price differential between spot LNG prices in Asia and oil-indexed prices in Europe increased by 39% ($1.44MMBtu) m-o-m to $5.14/MMBtu.

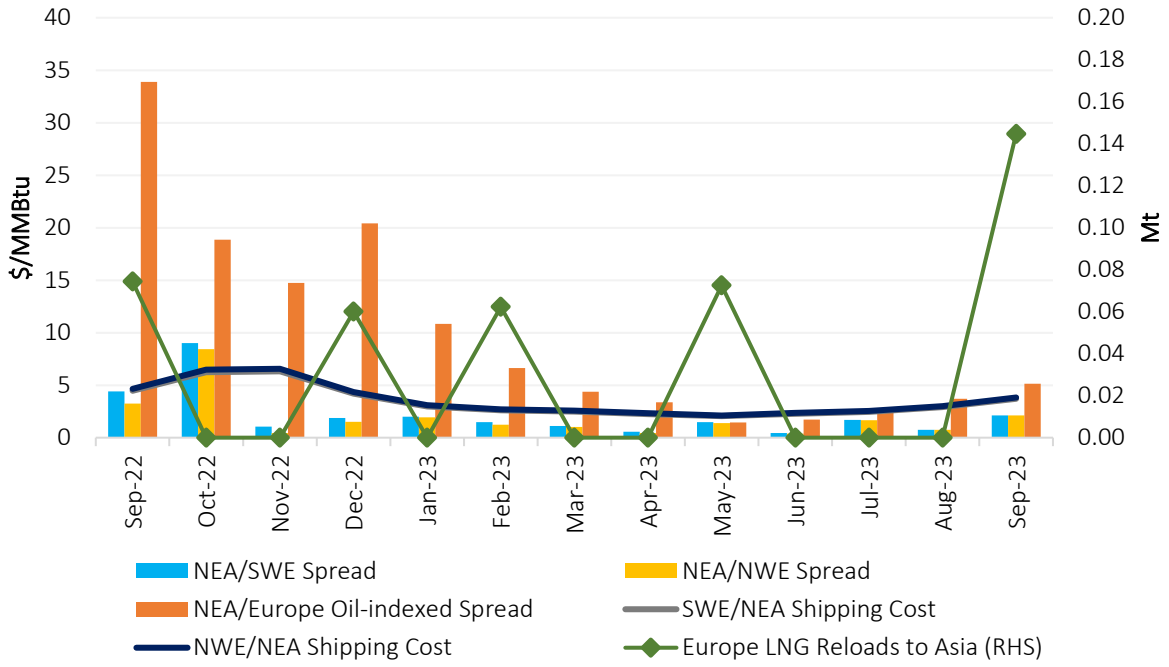
Meanwhile, the shipping costs for the NEA/SWE and NEA/NWE spot routes grew by 27% ($0.80/MMBtu) each to $3.69/MMBtu and $3.83/MMBtu, respectively. However, it is

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.

Despite the absence of an arbitrage opportunity for LNG reloads, there was a notable 0.14 Mt of LNG reloaded from Europe to the Asia Pacific region in September. This marks the highest level since December 2021. One LNG cargo was reloaded in France and subsequently exported to Taiwan, while another LNG cargo was reloaded in Türkiye and delivered to Japan. It is worth noting that TotalEnergies reloaded the LNG cargo in Türkiye for delivery under a long-term contract with JERA, while Shell reloaded the LNG cargo in France for delivery under a long-term contract with CPC.

Moreover, the NEA/SWE and NEA/NWE price differentials declined significantly by 52% ($2.27/MMBtu) and 35% ($1.12/MMBtu) y-o-y, respectively. Similarly, 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 decreased by 85% ($28.76/MMBtu), 17% ($0.78/MMBtu) and 18% ($0.81/MMBtu) y-o-y, respectively.

Figure 88: Price spreads & shipping costs between Asia & Europe spot LNG markets

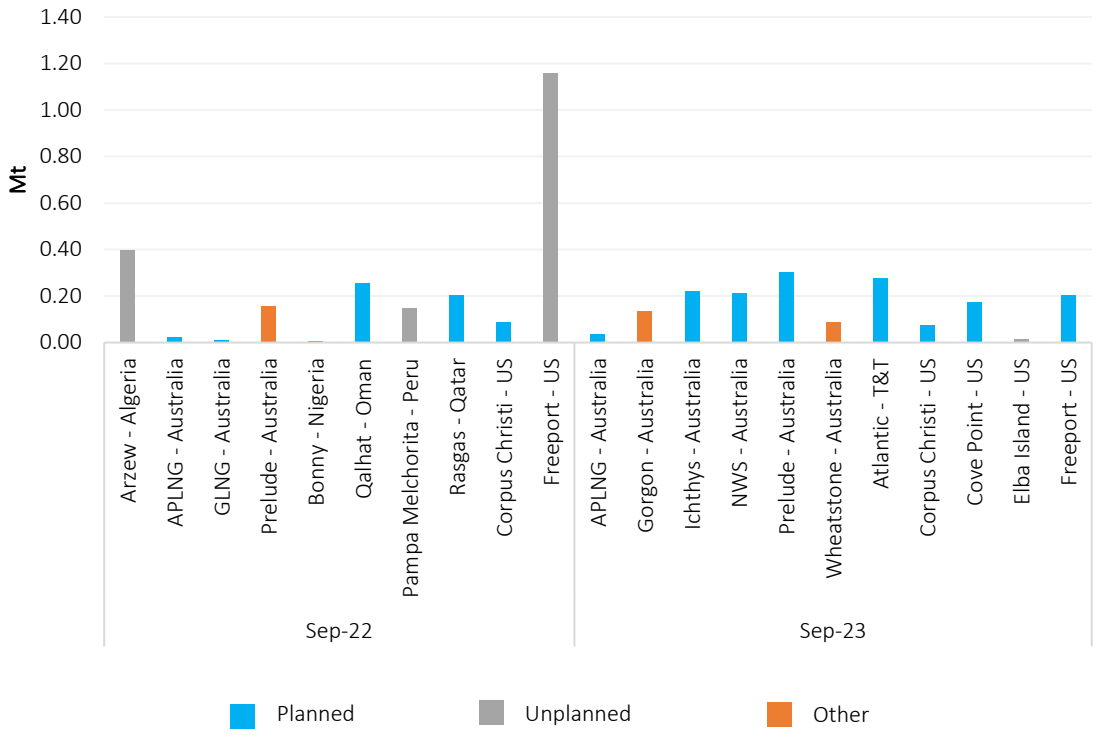


Source: GECF Secretariat based on data from GECF Shipping Model, Argus and ICIS LNG Edge

4.2.5 Maintenance Activity at LNG Liquefaction Facilities

In September 2023, the combined effects of scheduled maintenance, unplanned outages, and other factors at liquefaction facilities worldwide averaged 1.74 Mt. This figure marked a significant decrease compared to the 2.45 Mt recorded during the same period the previous year (Figure 89). Among the notable events, there were planned maintenance activities at various facilities, including APLNG, Ichthys, North West Shelf and Prelude LNG facilities in Australia, as well as the Atlantic LNG facility in Trinidad and Tobago. Similar maintenance activities took place at the Corpus Christi, Cove Point and Freeport LNG facilities in the US.

Figure 89: Maintenance activity at LNG liquefaction facilities during September (2022 and 2023)



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

4.2.6 Other Developments

Gazprom delivers first LNG cargo to China via the Arctic NSR – On September 14, 2023, Gazprom successfully completed its inaugural delivery of LNG to China using the Arctic Northern Sea Route, taking advantage of receding ice sheets, which have made this route more feasible. The LNG cargo was delivered aboard the Velikiy Novgorod vessel from the Portovaya LNG facility in Russia. This strategic move is intended to strengthen oil and gas shipments from Russia to Asia Pacific countries. Utilising the Arctic route significantly shortens delivery times to Asia Pacific countries, presenting a more efficient alternative to the conventional routes through the Suez Canal or around the Cape of Good Hope.

ConocoPhillips books regasification capacity at Gate LNG terminal – On September 14, 2023, ConocoPhillips secured a 1.5 Mtpa regasification capacity at the Gate LNG import terminal in the Netherlands. The 15-year agreement is set to commence in September 2031. Gate LNG, with a 14 Mtpa capacity and over a decade of operation, will facilitate ConocoPhillips' entry into the European LNG market.

Le Havre FSRU delivers first gas to grid – On September 28, 2023, the Le Havre Floating Storage and Regasification Unit (FSRU) successfully injected the first regasified LNG into the French gas grid. The FSRU, represented by the vessel Cape Ann, arrived in Le Havre, France, on September 18, 2023, following the loading of its LNG cargo through a ship-to-ship transfer in Gibraltar. This FSRU boasts a regasification capacity of 3.3 Mtpa and marks the fifth LNG import terminal to commence operations in France. Consequently, France's total regasification capacity has now reached 33 Mtpa.

Tianjin Nangang LNG import terminal receives first LNG cargo – On September 28, 2023, the Tianjin Nangang LNG import terminal welcomed its inaugural LNG shipment. This 5 Mtpa terminal, constructed by Beijing Gas, was completed in December 2022. The first LNG cargo, transported by Shell using the Maran Gas Pericles vessel, originated from the QCLNG facility in Australia. The vessel arrived at the terminal on September 15, 2023, but the cargo was not offloaded until the end of September.

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

Table 2: New LNG sale agreements signed in September 2023

Contract Type	Exporting Country	Project	Seller	Importing Country	Buyer	Volume (Mtpa)	Duration (Years)
SPA	Portfolio		Gunvor	Thailand	Hin Kong Power	0.5	5
HOA	US	Commonwealth LNG	Commonwealth LNG	Portfolio	MET Group	1	20
SPA	Canada	Woodfibre LNG	Woodfibre LNG	Portfolio	BP	0.45	15
SPA	UAE		ADNOC LNG	China	PetroChina	0.2	5
HOA	Australia	Pluto LNG Expansion	LNG Japan	Japan	Tokyo Gas	0.4	25
SPA	Congo	Marine XII JV	Congo LNG	Portfolio	Eni	2.4	20
SPA	Congo	Marine XII JV	Congo LNG	Portfolio	Eni	0.6	20
HOA	US	Commonwealth LNG	Commonwealth LNG	Portfolio	EQT Corporation	1	15
SPA	Portfolio		PetroChina	Thailand	EGAT	1.2	3

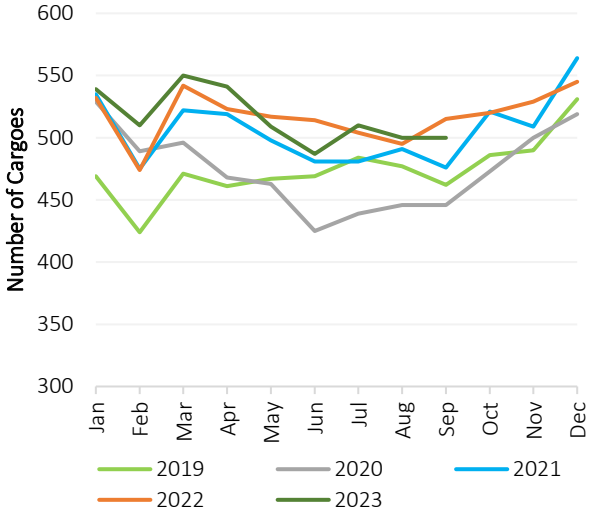
Source: GECF Secretariat based on Project Updates and News

4.2.7 LNG Shipping

There was no change in the total number of LNG export cargoes from August to September 2023, staying at 500 cargoes (Figure 90). After three quarters of the year, the total number of shipments reached 4,646. This represented a 1% increase, or 30 cargoes, compared with the same period in 2022 (Figure 91).

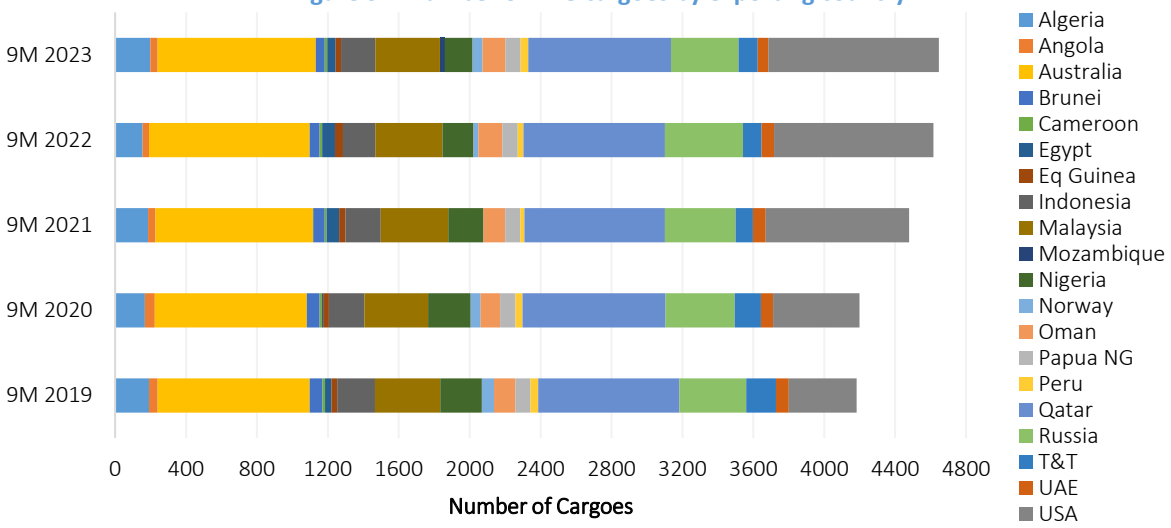
Over the first nine months of 2023, there have been notable increases in cargo shipments from the US (62), Algeria (43) and Norway (28), when compared with the same period in 2022 (Figure 92). Norway has doubled the number of cargo deliveries during this period. The next highest percentage increases were observed in Algeria (28%) and Peru (24%).

Figure 90: Number of LNG export cargoes



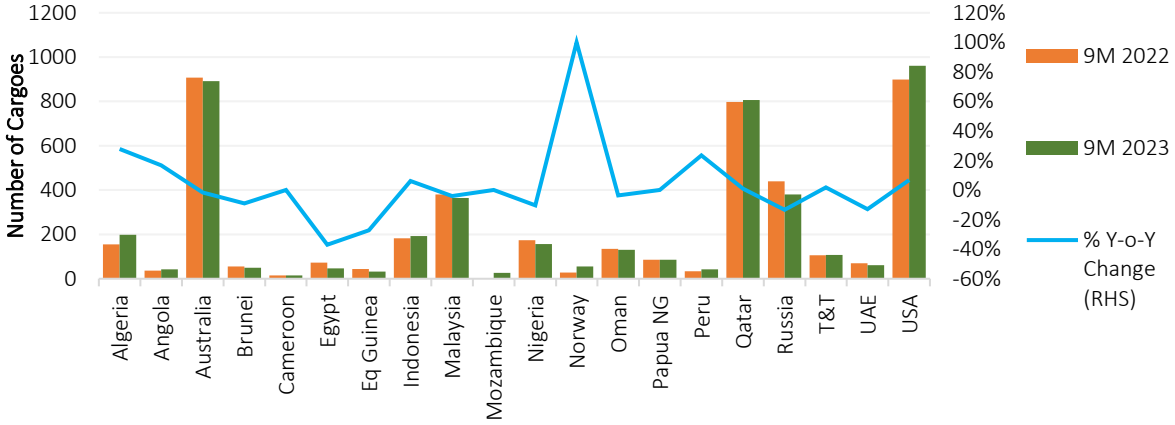
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 91: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 92: Changes in LNG cargo exports



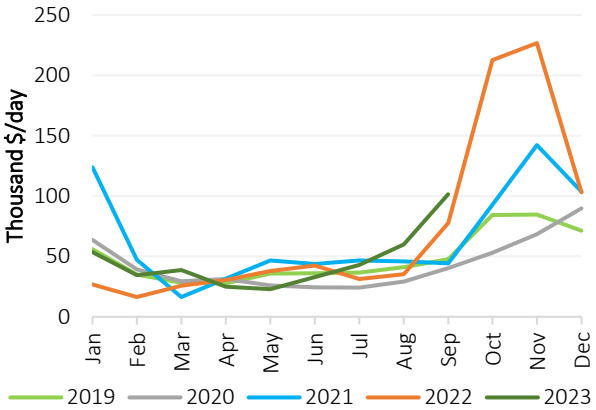
Source: GECF Secretariat based on data from ICIS LNG Edge

LNG charter rates shot upwards in September 2023. The spot charter rate for steam turbine LNG carriers surged by 69% m-o-m to reach an average of $101,500 per day (Figure 93). Moreover, this average rate was 31% higher y-o-y and was $48,900 per day greater than the five-year average price for September. Similarly, large increases in the average daily spot charter rate were observed for both TDFE and two-stroke LNG carriers as well. In the TDFE segment of the global LNG carrier fleet, the average spot charter rate grew by 78% m-o-m, reaching $168,400 per day. In addition, in the two-stroke segment, the average spot charter rate rose by 73% m-o-m, reaching $210,000 per day.

The tightening of the market which began in August gathered pace during September, fuelled by the seasonal drivers. For most of the month, charter rates kept creeping upwards. With European storage sites almost at capacity and the winter season approaching, the contango into Q4 2023 has been rising thus encouraging the use of LNG carriers as floating storage. Rates began to fall slightly during the last week of the month, as the contango softened and some of these floating cargoes were discharged. However, the market is expected to maintain its current state, and with the muted demand in Asia, vessels are not expected to undertake increased inter-basin deliveries.

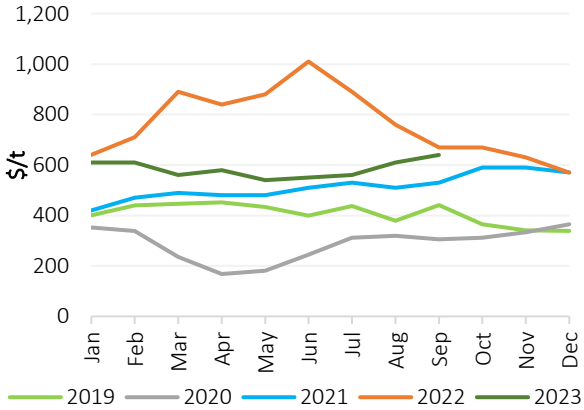
In September 2023, the average price of the leading shipping fuels increased by 5% m-o-m to reach $640 per tonne (Figure 94) which is just 4% lower than one year ago.

Figure 93: Average LNG spot charter rate



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

Figure 94: Average price of shipping fuels



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 September 2023 is shown in Table 3.

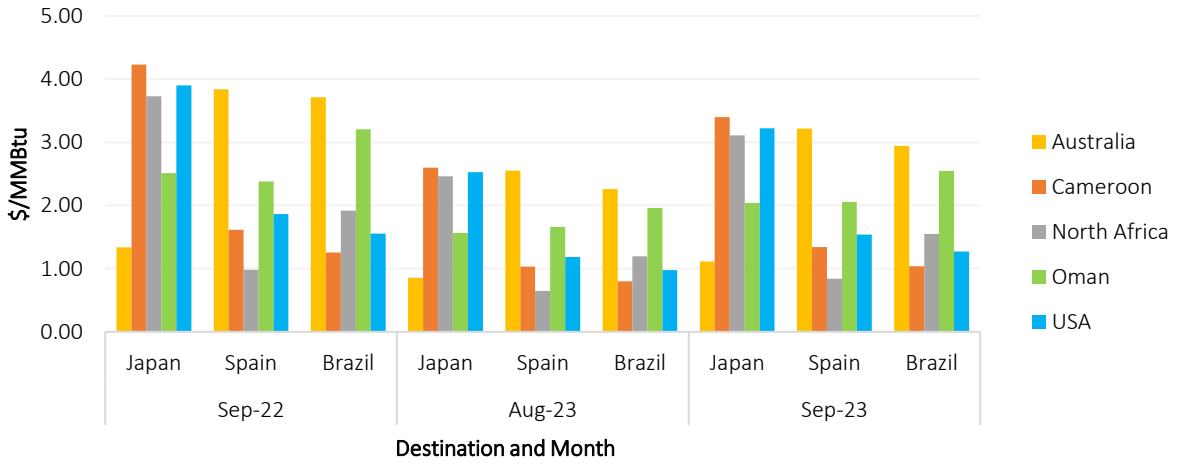
Table 3: Shipping costs for LNG spot cargoes from selected regions ($/MMBtu) – September 2023

LNG Supplier / From \ To	Japan	China	India	UK	Spain	Argentina	Brazil
	Destination						
Spot LNG delivered price	13.14	13.14	12.64	11.29	11.46	11.76	11.58
Australia	1.12	1.18	1.35	3.32	3.21	2.68	2.94
Cameroon	3.40	3.35	2.24	1.46	1.34	1.57	1.04
North Africa	3.11	3.09	1.65	0.95	0.84	2.21	1.55
Oman	2.04	1.90	0.42	2.17	2.05	2.57	2.55
USA	3.22	3.56	3.40	1.58	1.54	2.12	1.27

Source: GECF Shipping Cost Model

The LNG carrier spot charter rate, the cost of LNG shipping fuels and the delivered spot LNG prices all increased in September 2023 relative to the previous month. As such, there was an increase in the LNG spot shipping costs for steam turbine carriers by up to $0.80/MMBtu on certain routes when compared with the previous month (Figure 95). The fuel oil prices and the delivered spot LNG prices were much lower in September 2023 when compared with the same month a year ago, resulting in LNG shipping costs of up to $0.83/MMBtu lower.

Figure 95: LNG spot shipping costs for steam turbine carriers



Source: GECF Shipping Cost Model

"Approval in Principle" awarded to the design of the world's largest LNG carrier: At the recently concluded Gastech 2023, Chinese shipbuilding firm Hudong-Zhonghua Shipbuilding announced the development of a new size class of LNG carrier, the "Global Max", which will be the largest on the market. The vessel will have a capacity of 271,000 m^3, surpassing the current record held by the Q-Max class carriers, which have a capacity of 266,000 m^3. Moreover, the ship will contain five cargo tanks, utilising the GTT NO 96 Membrane containment system. The firm also noted that the design will entail flexible dual-fuel propulsion and an air lubrication system, which, they claim, will reduce the vessel's IMO Carbon Intensity Indicator by 23% compared with current 174,000 m^3 LNG carriers. At the event, the "Approval in Principle" was awarded to Hudong-Zhonghua from several reputable

maritime industry classification societies, including DNV, Lloyd's Register, American Bureau of Shipping and Bureau Veritas.

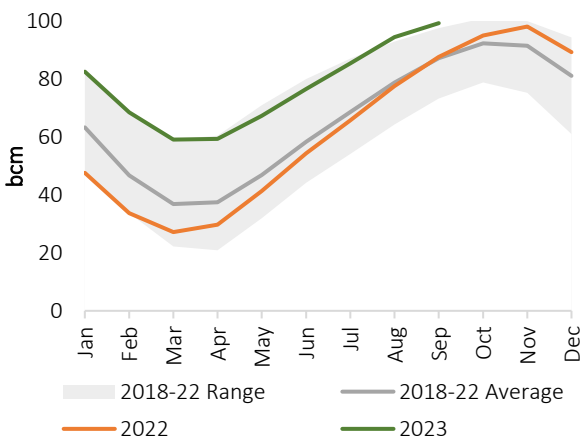
Launch of a new hybrid electric design for LNG carriers: At Gastech 2023 in Singapore, Shell Shipping and Maritime, CSSC Hudong-Zhonghua Shipbuilding, and Wärtsilä Marine unveiled a new hybrid electric LNG carrier design. This design, while maintaining standard dimensions, boasts a larger cargo capacity of 185,000 m^3 within a frame typically designed for 174,000 m^3. Addressing the sub-optimal operation speeds of current LNG carriers, which consequently produce higher emissions, the innovative hybrid electric model promises reductions of around 10% in fuel consumption, 15% in greenhouse gas emissions and over 20% in methane slip. The modular, electrified and hybridised power system provides enhanced efficiency, decreased emissions and versatile operational capabilities, which can potentially integrate upcoming decarbonisation technologies. Electric propulsion, a well-established solution in various shipping sectors, has been gaining traction in the LNG carrier segment, reflecting a wider trend towards adopting hybrid electric propulsion for its adaptability and future-proofing benefits.

5 Gas Storage

5.1 Europe

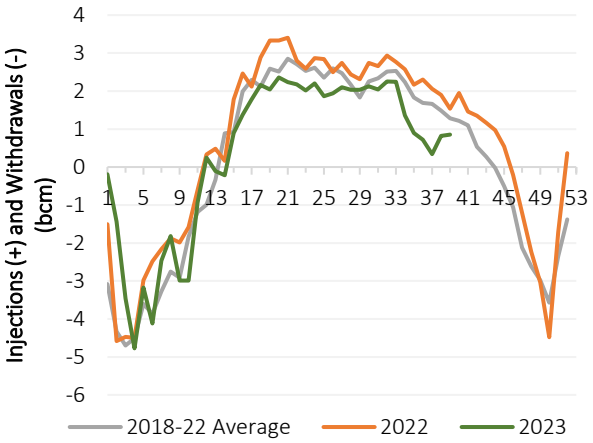
In the EU, underground gas storage (UGS) sites are edging closer towards being fully filled. In September 2023, the average daily volume of gas in storage crept up to 99.3 bcm from 94.5 bcm in the previous month (Figure 96). This quantity of gas was 11.6 bcm more than in September 2022, as well as being 12.1 bcm higher than the five-year historical average. With the total working capacity for UGS sites in the EU is currently at 104 bcm, the average UGS capacity utilization in the region now stands at 96%. During the month of September, 4.8 bcm of gas was injected into UGS facilities and 1.5 bcm of gas withdrawals.

Figure 96: Underground gas storage in the EU



Source: GECF Secretariat based on data from AGSI+

Figure 97: Weekly rate of EU UGS level changes



Source: GECF Secretariat based on data from AGSI+

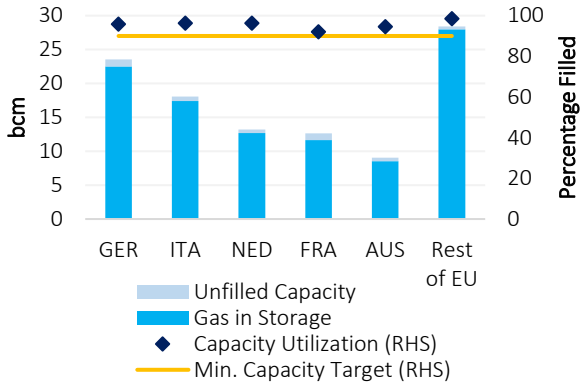
Net gas injections were observed during the month, however, since the end of August, the rate of stockbuild has been gradually declining. In September, with storage levels extremely elevated, the rate of stockbuild continued to plummet even further. A mere 0.7 bcm per week was recorded in September 2023, compared with the 2.0 bcm/week observed in September 2022, and the five-year average rate of 1.6 bcm/week (Figure 97).

Starting in 2023, the EU mandated that member states must fill their UGS sites to a minimum level of 90% of capacity by November 1, while setting key checkpoints throughout the year. As a result of this, and milder-than-expected temperatures, member states did not have a large drawdown of their gas stocks. Hence, EU countries started the net gas injection season with elevated storage levels, and less gas was required to be injected during the summer of 2023. Accordingly, the EU's 90% target was achieved by mid-August, way ahead of schedule. At the end of September, there was 14.6 bcm more gas in storage than what was originally planned.

The top EU countries for UGS capacity are Germany, Italy, Netherlands, France and Austria. By the end of September 2023, all had attained at least 95% filled capacity, except for France, which is currently at 92% (Figure 98). In addition, Nafotgaz has reported that EU traders stored around 1.8 bcm of gas in Ukrainian UGS sites by mid-September.

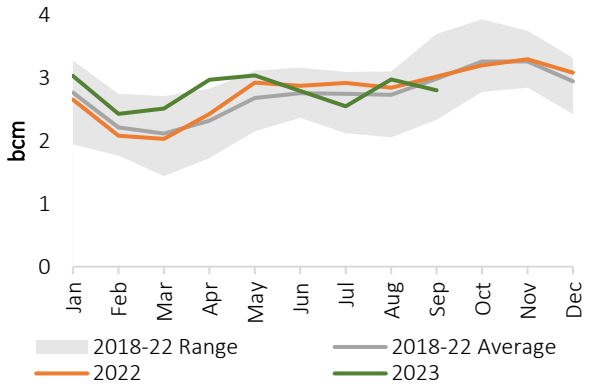
The combined amount of LNG stored in the EU countries in September 2023 was 2.8 bcm (Figure 99). This represented a 6% decline m-o-m, while also being 6% lower than the five-year historical average. The EU has a total LNG storage capacity of 5.1 bcm, primarily concentrated in Spain (39%) and France (16%).

Figure 98: UGS in EU countries as of Sep 30, 2023



Source: GECF Secretariat based on data from AGSI+

Figure 99: Total LNG storage in the EU

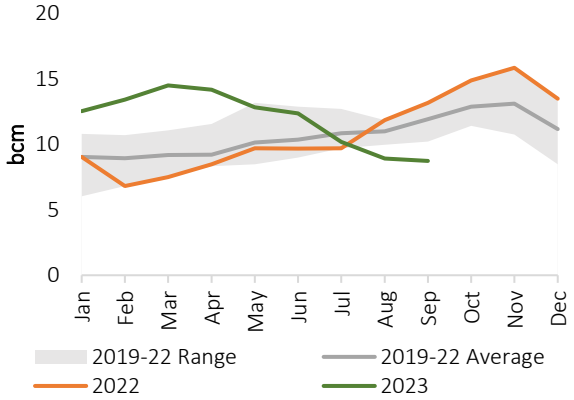


Source: GECF Secretariat based on data from ALSI

5.2 Asia

Japan and South Korea possess a combined capacity of 17 bcm of LNG storage. In September 2023, the combined level of LNG in storage fell by 2% m-o-m to an estimated 8.7 bcm in (Figure 100). This quantity was 34% lower than at the same point one year ago and 3.2 bcm below the four-year average. Storage in Japan and South Korea accounted for 4.0 bcm and 4.7 bcm respectively. High LNG drawdown has been observed in recent months due to continued demand for cooling amidst high temperatures in the region.

Figure 100: LNG in storage in Japan and South Korea

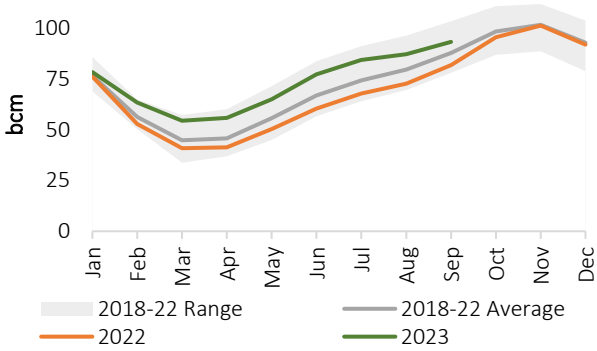


Source: GECF Secretariat based on data from Refinitiv

5.3 North America

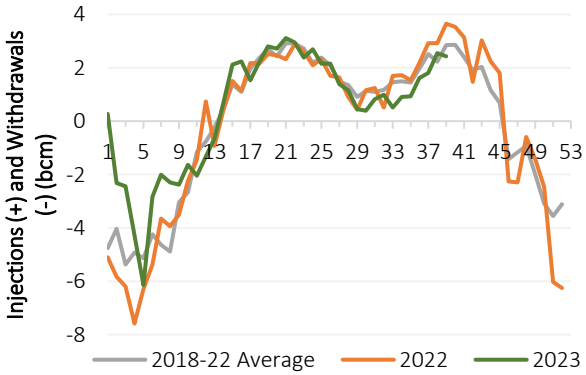
The average daily volume of gas in storage in the US rose to 93.0 bcm in September 2023, up from 87.0 bcm in the previous month (Figure 101). This quantity was 11.3 bcm higher than one year ago, and 5.3 bcm more than the five-year historical average. With a total of 134 bcm of working gas storage capacity in the US, this meant that the capacity utilization for the month climbed to 69%. In September, the rate of stock build crept back upwards, averaging 1.9 bcm per week, which was still slower than the 2.6 bcm/week in 2022, and the five-year average rate of 2.2 bcm/week (Figure 102).

Figure 101: Underground gas storage in the US



Source: GECF Secretariat based on data from US EIA

Figure 102: Weekly rate of UGS changes in the US



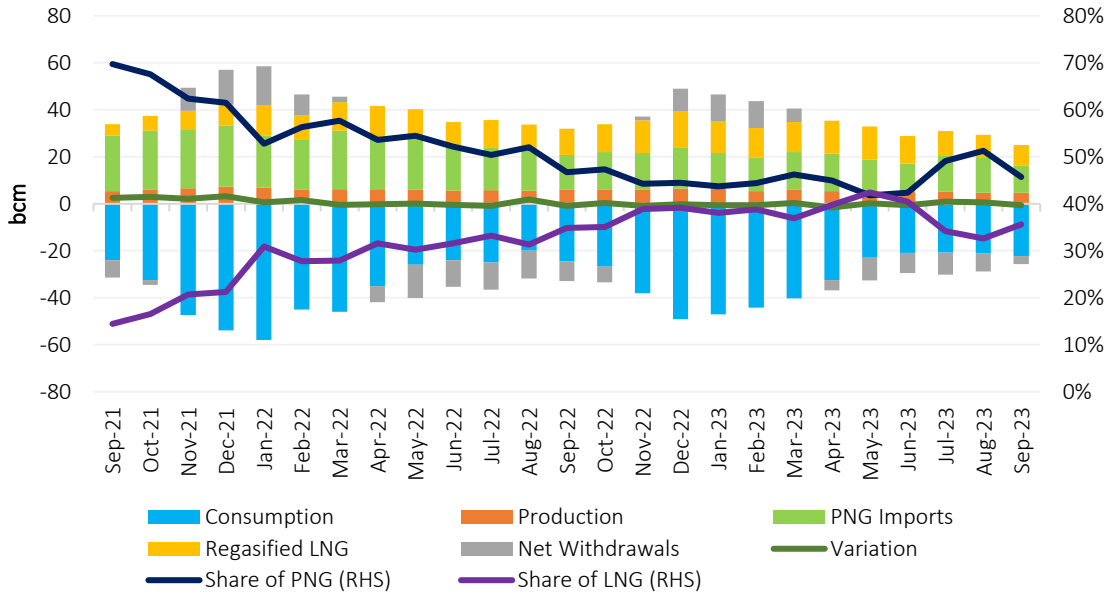
Source: GECF Secretariat based on data from US EIA

6 Gas Balance

6.1 EU + UK

In September 2023, the proportion of regasified LNG in the gas supply of the EU and UK rose by 3% compared to the previous month, reaching 36%. This marked a minor 1% increase when compared to the same month in 2022. In contrast, the share of gas imports via pipelines dropped by 5% compared to the previous month and by 1%year-on-year, settling at 46% (Figure 103). The monthly increase in regasified LNG's share relative to pipeline gas imports in the EU and UK was due to a steeper decline in pipeline gas imports compared to regasified LNG. 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 103: EU + UK monthly gas balance



Note: Variation refers to losses and statistical differences
Source: GECF Secretariat based on data from AGSI+, 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 September 2023.

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

	2022	Sep-22	Sep-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) Gas Consumption	417.40	24.50	22.24	303.50	271.84	-9%	-10%
(b) Gas Production	72.73	5.89	4.68	54.33	47.82	-21%	-12%
Difference (a) - (b)	344.67	18.61	17.56	249.17	224.02	-6%	-10%
PNG Imports	230.46	14.96	11.47	181.21	129.34	-23%	-29%
Regasified LNG	146.57	11.17	8.93	105.49	107.49	-20%	2%
Net Withdrawals	-31.79	-8.44	-3.37	-36.40	-14.54	-60%	-60%
Variation	-0.57	0.92	0.54	-1.13	1.74		

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 Sep 2023 compared to Sep 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 June 2023.

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

	2022	Jun-22	Jun-23	H1 2022	H1 2023	Change* y-o-y	Change** 2023/2022
(a) OECD Gas Consumption	1803.0	122.5	119.8	943.7	906.7	-2.1%	-3.9%
(b) OECD Gas Production	1656.2	136.2	136.2	811.7	839.6	0.0%	3.4%
Difference (a) - (b)	146.8	-13.7	-16.3	132.0	67.1	19.4%	-49.2%
OECD LNG Imports	346.9	24.6	24.0	172.5	174.7	-2.4%	1.2%
LNG Imports from GECF	161.8	10.6	11.2	78.6	78.8	5.4%	0.3%
LNG Imports from Non-GECF	185.1	14.0	12.8	94.0	95.9	-8.3%	2.1%
OECD LNG Exports	223.2	17.2	18.9	128.1	118.0	9.9%	-7.8%
Intra-OECD LNG Trade	152.7	11.5	11.1	76.9	80.1	-3.8%	4.0%
OECD Pipeline Gas Imports	630.9	51.8	34.9	349.3	256.9	-32.6%	-26.5%
OECD Pipeline Gas Exports	567.0	48.1	36.2	282.7	250.1	-24.7%	-11.5%
Stock Changes and losses	40.9	24.9	20.2	-20.8	-3.7		

Source: GECF Secretariat based on data from ICIS LNG Edge and IEA Monthly Gas Statistics
(*): y-o-y change for Jun 2023 compared to Jun 2022
(**): y-o-y change for H1 2023 compared to H1 2022

6.3 India

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

Table 6: India's 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) India Gas Consumption	60.96	4.86	5.35	40.74	40.81	10.0%	0.2%
(b) India Gas Production	33.46	2.83	3.11	22.17	22.93	10.0%	3.4%
Difference (a) - (b)	27.50	2.03	2.23	18.57	17.89	10.1%	-3.7%
India LNG Imports	28.07	2.07	2.71	19.18	19.48	31.2%	1.6%
LNG Imports from GECF	22.15	1.71	1.88	15.67	15.03	10.2%	-4.1%
LNG Imports from Non-GECF	5.92	0.36	0.83	3.50	4.45	131.6%	27.0%
Stock Changes and losses	0.57	0.04	0.47	0.61	1.59		

Source: GECF Secretariat based on data from ICIS LNG Edge and India's PPAC
(*): y-o-y change for Aug 2023 compared to Aug 2022
(**): y-o-y change for YTD 2023 compared to YTD 2022

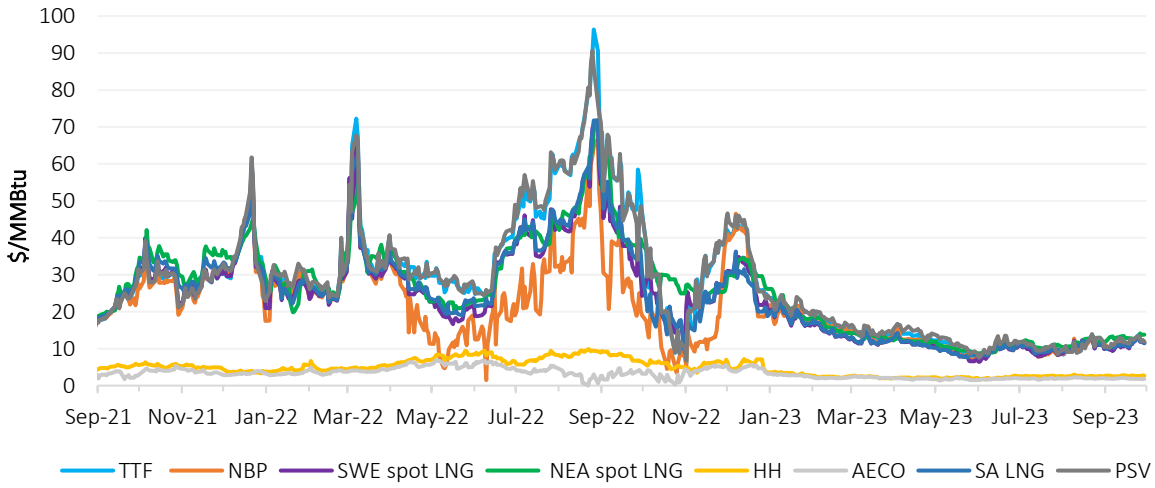
7 Energy Prices

7.1 Gas Prices

7.1.1 Gas & LNG Spot Prices

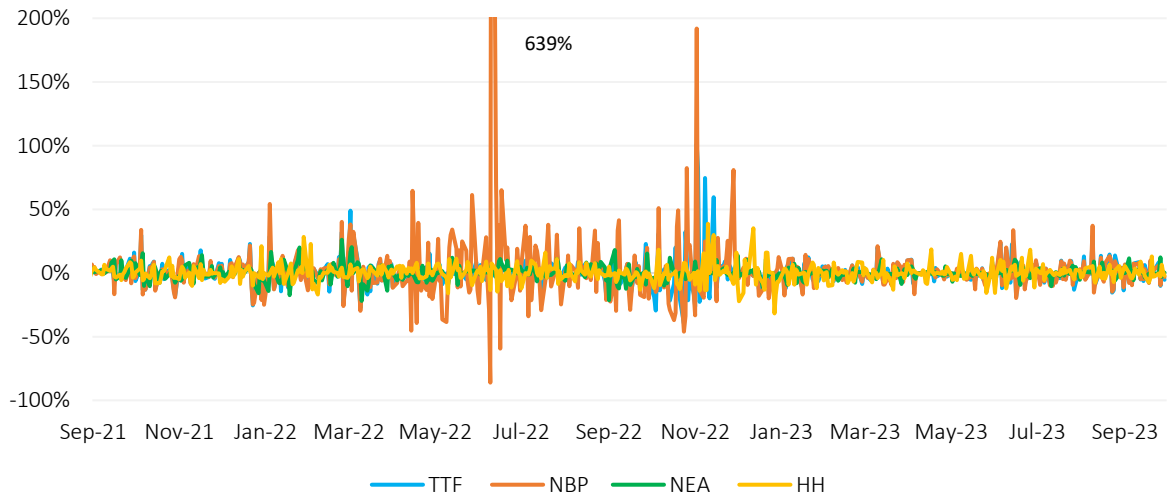
In September 2023, gas and LNG spot prices in Europe and Asia showed moderate bullish movement, increasing for the second consecutive month. Additionally, spot price volatility remained relatively low (Figure 104 and Figure 105). The increase in spot prices was primarily attributed to global LNG supply concerns, triggered by September's strike action at Chevron's Gorgon and Wheatstone LNG facilities in Australia. However, industrial strikes ended on September 22, 2023, and LNG exports appeared to be largely unaffected. Additionally, the ongoing Israel-Palestine conflict has put upward pressure on prices and may cause further upward price movement. In the coming months, prices will also be supported by the anticipated increase in LNG demand from Asia.

Figure 104: 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 105: Daily variation of spot prices



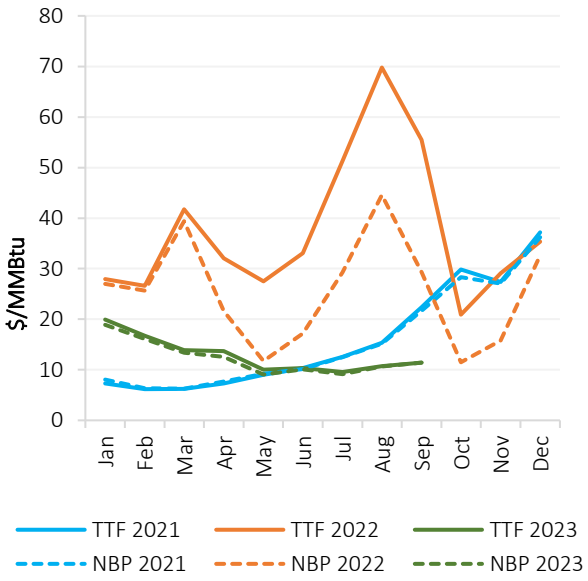
Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

7.1.1.1 European Spot Gas and LNG Prices

In September 2023, average TTF and NBP spot gas prices were $11.42/MMBtu (6% increase m-o-m) and $11.40/MMBtu (7% increase m-o-m), respectively, as shown in Figure 106. In addition, these spot prices were lower by 79% y-o-y for TTF and 61% y-o-y for NBP. The SWE spot LNG prices averaged $10.96/MMBtu in September 2023, relatively stable m-o-m and a 73% decrease y-o-y. As for the PSV spot price, it averaged $11.94/MMBtu in September 2023, a 9% increase m-o-m and a 78% decline y-o-y.

European gas and LNG spot prices displayed bullish movement, fuelled by supply concerns arising from strike action in Australia and extended maintenance activities at several Norwegian gas fields. Notably, daily TTF spot prices surged above $13/MMBtu during the month.

Figure 106: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

From January to September 2023, TTF and NBP averaged $12.92/MMBtu and $12.37/MMBtu, respectively, representing substantial declines of 68% and 55% y-o-y, respectively.

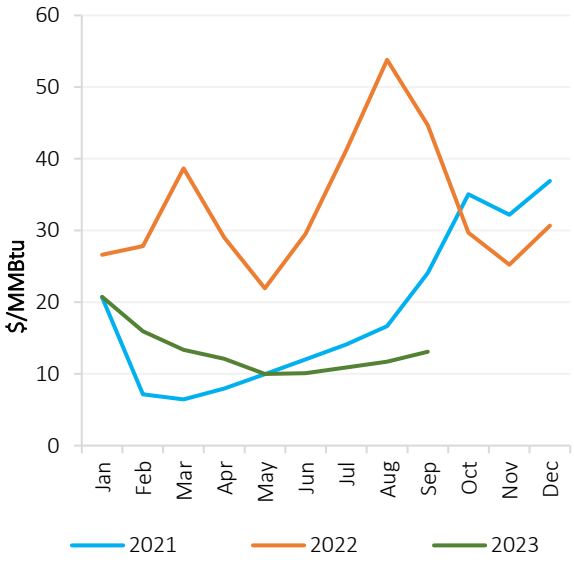
7.1.1.2 Asian Spot LNG Prices

In September 2023, the average North East Asia (NEA) spot LNG price experienced an increase of 12% m-o-m, reaching an average of $13.09/MMBtu. This represents a 71% decrease compared to the same period last year (Figure 107).

Asian LNG prices increased substantially due to the strike action in Australia, as well as rising gas demand from China, South and Southeast Asia. Additionally, emerging buying interest from Japan and South Korea ahead of the winter season provided support to prices. Daily NEA spot LNG prices surpassed $14/MMBtu.

From January to September 2023, the average NEA spot LNG price stood at $13.10/MMBtu, representing a 62% y-o-y decrease.

Figure 107: Monthly Asian spot LNG prices



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

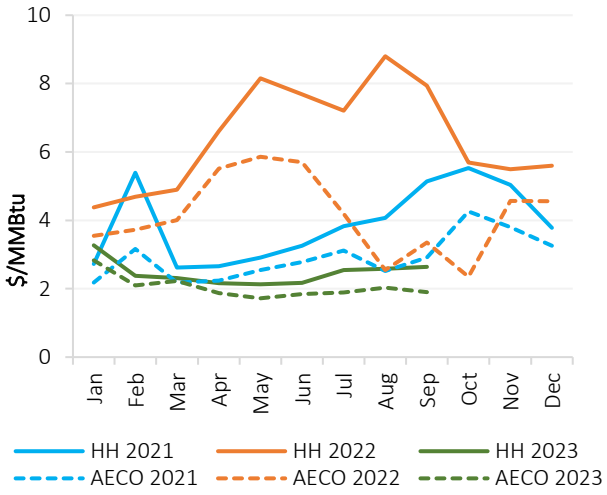
7.1.1.3 North American Spot Gas Prices

In September 2023, the HH spot gas price averaged $2.64/MMBtu, reflecting an increase of 2% m-o-m. However, it was significantly lower y-o-y, dropping by 67%, compared to the average price of $7.94/MMBtu observed in September 2022. (Figure 108).

Henry Hub prices experienced some upward movement primarily attributed to increased gas demand for power generation and stronger LNG exports. However, gas storage levels remained above the five-year average. Moreover, daily HH spot prices reached a peak of $2.81/MMBtu.

Similarly, in Canada, the AECO spot price decreased by 6% m-o-m and 43% y-o-y, averaging $1.90/MMBtu in September 2023.

Figure 108: Monthly North American gas spot prices



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

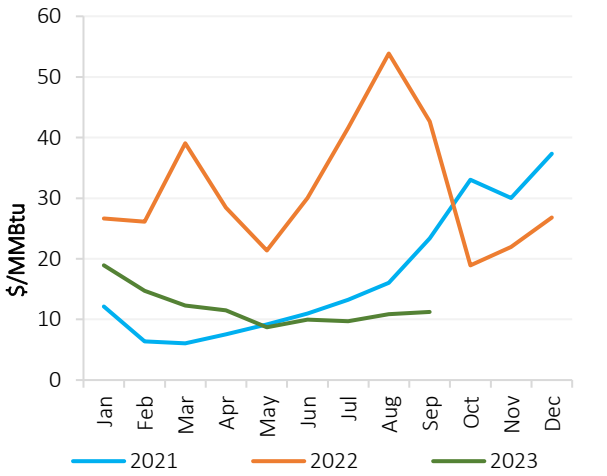
From January to September 2023, the HH spot price averaged $2.47/MMBtu, representing a decline of 63% y-o-y. The AECO spot price averaged $2.05/MMBtu, marking a 52% y-o-y decrease.

7.1.1.4 South American Spot LNG Prices

In September 2023, the South American (SA) LNG price experienced a 3% m-o-m increase, averaging $11.23/MMBtu. However, this price was 74% lower compared to the average price of $42.63/MMBtu observed in September 2022 (Figure 109).

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 $11.60/MMBtu, $10.53/MMBtu and $11.55/MMBtu, respectively.

Figure 109: 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

From January to September 2023, the SA LNG spot price averaged $12.00/MMBtu, marking a substantial 65% y-o-y decrease.

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

In September 2023, the average Oil-indexed I LNG price was $12.46/MMBtu, reflecting an increase of 1% m-o-m and a decrease of 24% y-o-y. Similarly, the Oil-indexed II LNG price averaged $9.69/MMBtu, showing an increase of 5% m-o-m and a decrease of 22% y-o-y (Figure 110). Furthermore, the Oil-indexed I prices held an average discount of $1/MMBtu over NEA spot LNG prices after maintaining a premium for the previous five months. 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 $7.95/MMBtu in September 2023, reflecting a 1% m-o-m decrease and a 24% y-o-y decrease (Figure 111). Moreover, the Oil-indexed III price held a discount of $3/MMBtu over the average SWE LNG.

From January to September 2023, the Oil-indexed I LNG price exhibited an 11% y-o-y decrease, while the Oil-indexed II LNG price showed a 16% y-o-y decrease. Additionally, the Oil-indexed III LNG price for the same period was 3% lower y-o-y.

Figure 110: Asia: Spot and oil-indexed price spread

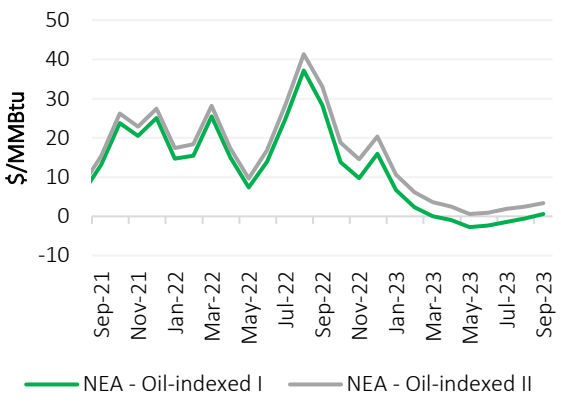
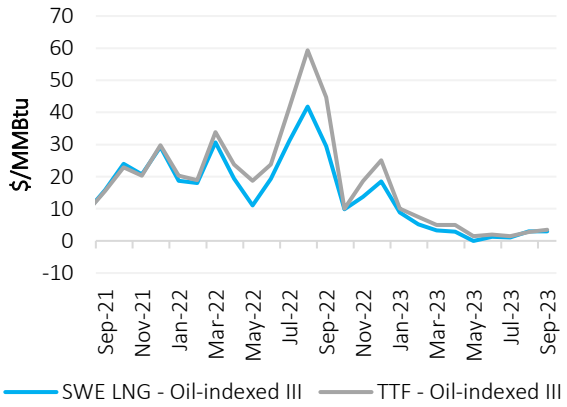


Figure 111: Europe: Spot and oil-indexed price spread



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 September 2023, the average NEA-TTF price spread remained positive. The average premium of NEA LNG spot price increasing to $1.67/MMBtu over the average TTF spot price, signalling that Asia may be regaining its position as the premium LNG market (Figure 112).

NBP traded at a discount of $0.02/MMBtu compared to TTF, which was lower than the average discount of $0.09/MMBtu in the previous month (Figure 113). The NBP-TTF spread narrowed due to an overall looser UK gas balance.

Furthermore, the NWE LNG-TTF spread turned slightly negative, with the NWE LNG spot price trading at a discount of $0.46/MMBtu compared to TTF, indicating a well-supplied market (Figure 114). The NWE LNG-SA LNG price spread turned negative, averaging $0.27/MMBtu (Figure 115). The NEA-HH and TTF-HH spreads both widened to $10.45/MMBtu and $8.78/MMBtu, respectively (Figure 116 and Figure 117). Thus, Asian spot prices held a higher premium over North American spot prices during the month.

Figure 112: NEA-TTF price spread

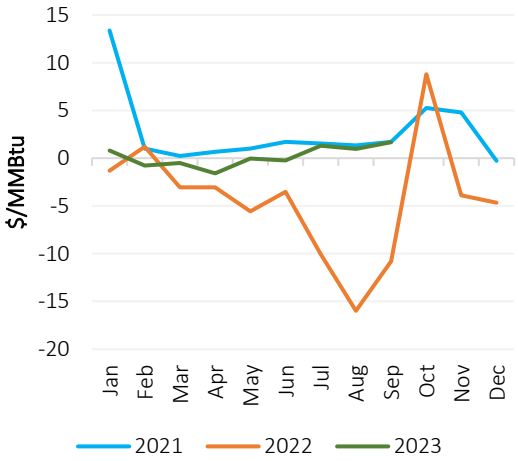


Figure 113: NBP-TTF price spread

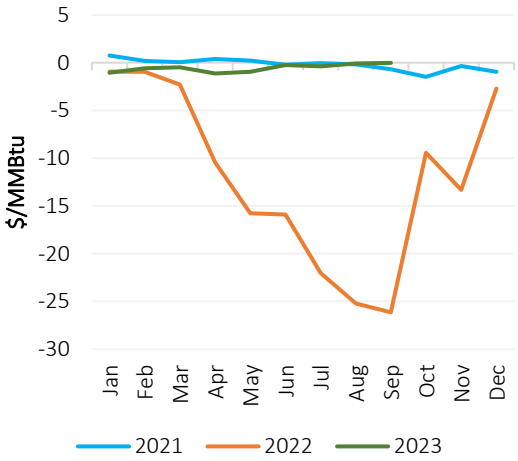


Figure 114: NWE LNG-TTF price spread

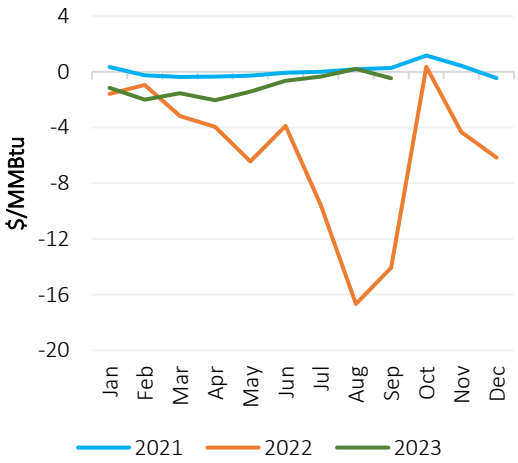


Figure 115: NWE LNG – SA LNG price spread

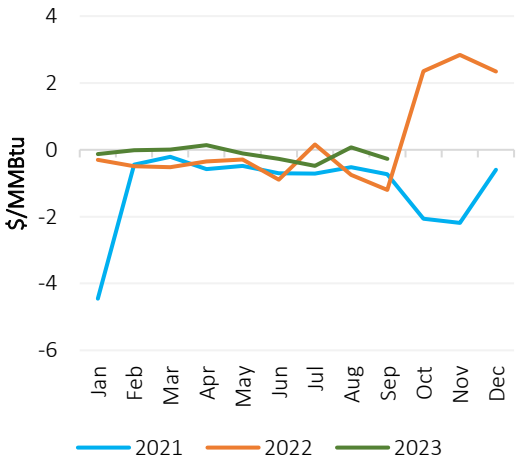


Figure 116: NEA-HH price spread

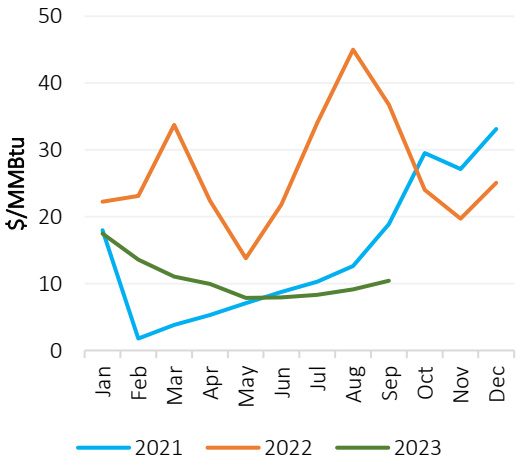
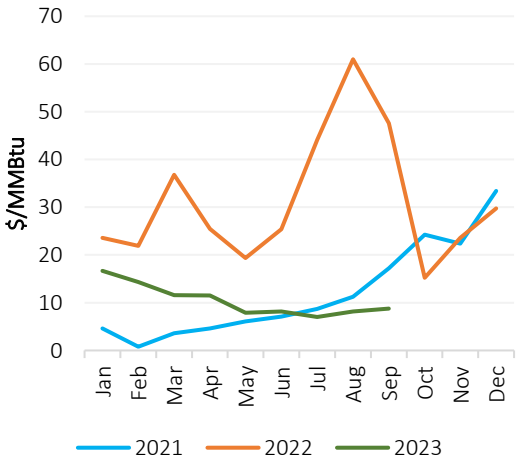


Figure 117: TTF-HH price spread



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

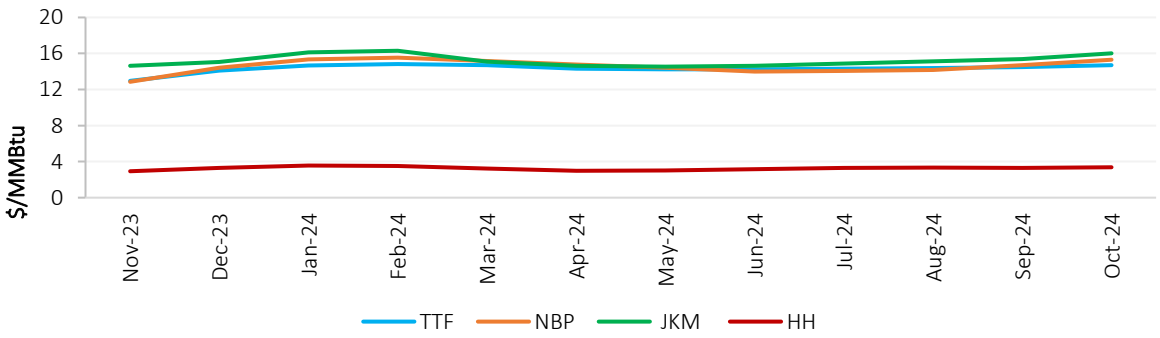
7.1.4 Gas & LNG Futures Prices

For the 6-month period spanning from November 2023 to April 2024, the JKM-TTF futures price spread is expected to remain positive, suggesting that Asian LNG prices may maintain a slight premium over European spot prices. Moreover, from November 2023 to February 2024, JKM is expected to trade at a premium above $1/MMBtu compared to TTF. Subsequently, in March 2024, the JKM-TTF spread is projected to significantly narrow to $0.4/MMBtu (Figure 118).

In November 2023, NBP is expected to trade at a minor discount to TTF of $0.1/MMBtu. Subsequently, 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. Thereafter, in Q1 2024, this NBP-TTF spread is expected to remain positive, averaging $0.6/MMBtu.

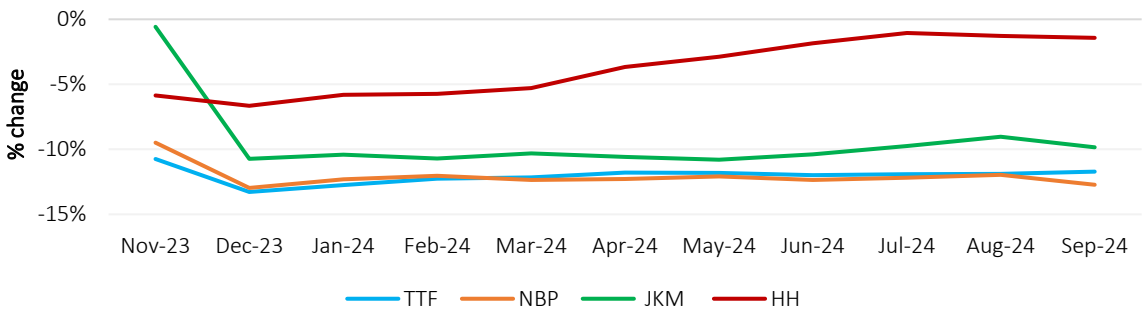
For the 6-month period from November 2023 to April 2024, gas and LNG futures prices for TTF, NBP and JKM (as of October 1, 2023) are all lower than the futures prices expectations considered in September 3, 2023 (as reported in the GECF MGMR September 2023). Moreover, as of October 1, 2023, the average futures prices for TTF, NBP and JKM during the same 6-month period are $14.26/MMBtu, $14.68/MMBtu and $15.30/MMBtu, respectively. Meanwhile, the average HH futures price is $3.25/MMBtu, which is also lower than previous expectations (Figure 119).

Figure 118: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Futures prices as of October 1, 2023.

Figure 119: Variation in gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Comparison with the futures prices as of September 3, 2023, as reported in GECF MGMR September 2023.

7.2 Cross Commodity Prices

7.2.1 Oil Prices

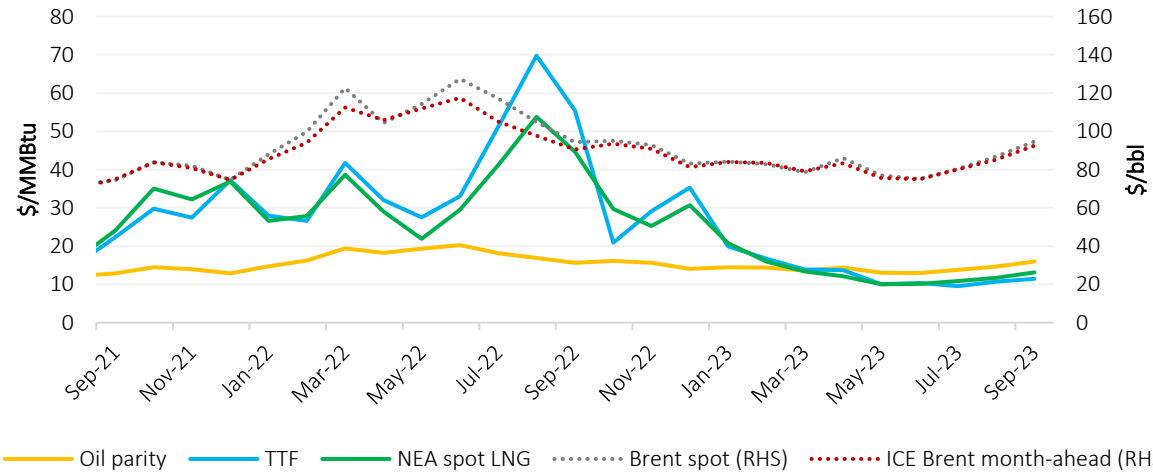
In September 2023, the average Brent spot price was $94.64/bbl, reflecting an increase of 9% m-o-m and similar to last year's price (Figure 120). The Brent month-ahead price averaged $92.59/bbl, marking a 9% increase m-o-m and a 2% increase y-o-y.

Oil prices increased for the third consecutive month, reaching their highest level since November 2022. This was influenced by the extension of voluntary supply cuts by Russia and Saudi Arabia until the end of the year. The cuts were previously expected to conclude in October 2023. On the demand side, prospects for global oil demand growth were optimistic, particularly in China, where manufacturing activity expanded in September 2023 for the first time in six months, registering a PMI of 50.2.

Furthermore, in September 2023, both TTF and NEA LNG spot prices continued to trade at a discount to the oil parity price of $4.5/MMBtu and $2.9/MMBtu, respectively.

From January to September 2023, the average Brent spot price was $82.82/bbl, representing a 20% decrease y-o-y. Similarly, the average Brent month-ahead price was $82.06/bbl, representing an 18% decrease y-o-y.

Figure 120: 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

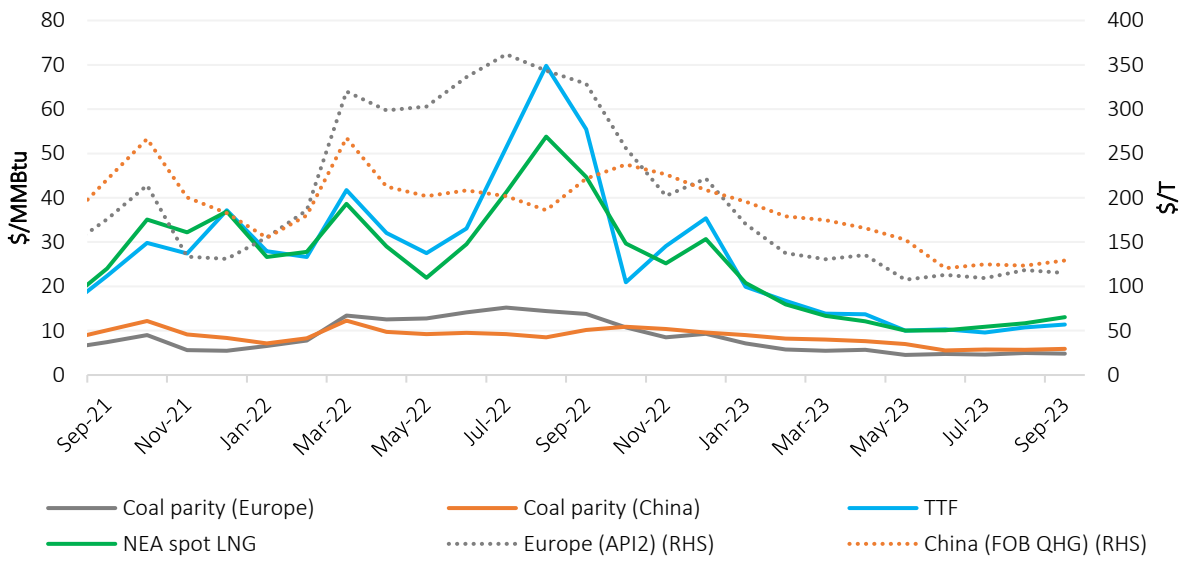
In September 2023, the European coal price (API2) averaged $115.25/T, experiencing a 3% m-o-m decrease and a 65% y-o-y decrease. Meanwhile, in China, the QHG coal price averaged $129.10/T, reflecting an increase of 5% m-o-m, but was 42% lower y-o-y (Figure 121).

European coal prices declined during the month, as demand for coal in the power sector declined with an increasing impetus for coal-to-gas switching. In Germany, for instance, coal-fired generation decreased by more than 60% y-o-y.

The premium of TTF spot price over the API2 parity price increased by 14% m-o-m to $6.6/MMBtu in September 2023. Additionally, the premium of NEA spot LNG price over the QHG parity price increased by 19% m-o-m to $7.2/MMBtu.

From January to September 2023, the European API2 averaged $126.39/T, representing a 57% decrease y-o-y. Meanwhile, the Chinese QHG price averaged $151.78/T, which was 26% lower y-o-y.

Figure 121: 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.

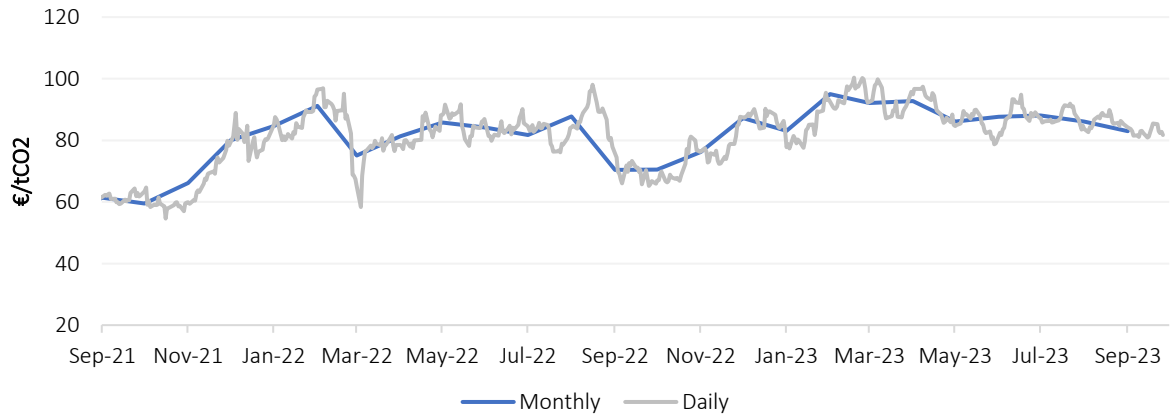
7.2.3 Carbon Prices

In September 2023, EU carbon prices averaged €82.95/tCO_2, reflecting a 4% decline m-o-m but an18% increase y-o-y (Figure 122).

EU carbon prices softened during the month, driven by relatively weak demand from power and industry combined with strong renewable energy output.

From January to September 2023, EU carbon prices averaged €88.17/tCO_2, representing an increase of 7% y-o-y.

Figure 122: EU carbon prices



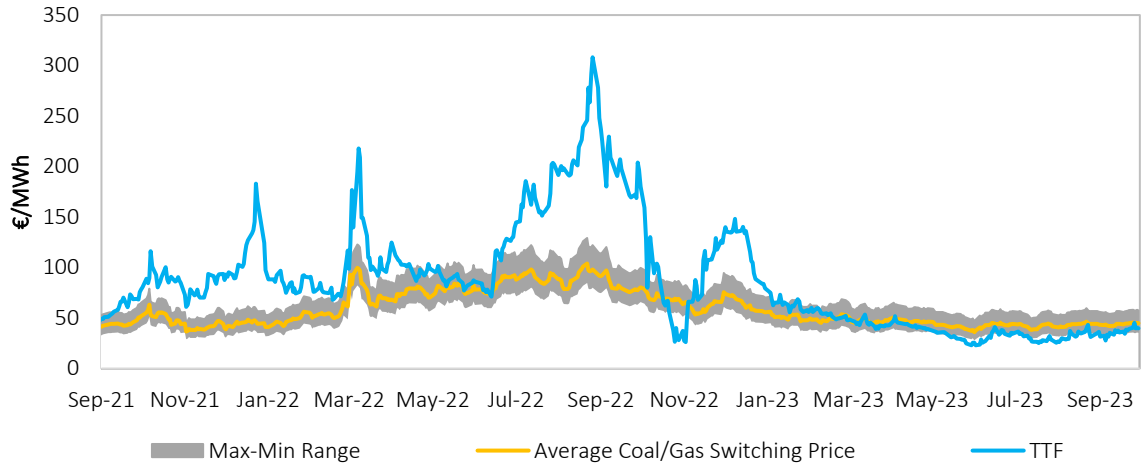
Source: GECF Secretariat based on data from Refinitiv Eikon

7.2.4 Fuel Switching

In September 2023, daily TTF spot prices remained below the range suitable for coal-to-gas switching, with an average coal-to-gas switching price of €43.87/MWh, marking a 1% 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 -€8/MWh (Figure 123).

Looking ahead to November 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 Europe.

Figure 123: 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, CO2 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: Strike action was initiated at Chevron's Gorgon and Wheatstone LNG facilities on September 8, 2023, following unsuccessful negotiations between Chevron and the Australian union group, Offshore Alliance (OA). The industrial strikes continued until September 22, 2023, when both parties accepted the terms and conditions negotiated by Australia's Fair Work Commission (FWC). Despite approximately 500 staff members participating in daily strikes, exports from the Wheatstone LNG and Gorgon LNG plants remained unaffected. While the markets have since stabilized, labour relations in the country continue to be contentious.

European Union: The initial phase of the EU's Carbon Border Adjustment Mechanism (CBAM) was launched on October 1, 2023. This is the world's first system to impose CO_2 emissions tariffs on imported steel, cement and other goods. In this phase, EU importers will have to report the greenhouse gas emissions embedded in imported volumes of iron and steel, aluminium, cement, electricity, fertilisers and hydrogen. Subsequently, from 2026, importers will need to purchase certificates to cover these CO_2 emissions.

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_2	Carbon dioxide
CO_{2e}	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

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

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

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