



GECF

# MONTHLY GAS MARKET REPORT

November 2023

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The Gas Exporting Countries Forum (GECF or Forum) is an intergovernmental organisation gathering the world's leading gas producers and exporters, whose objective is to provide a framework for the exchange of views, experiences, information and data, and cooperation and collaboration amongst its Members in gas-related matters. The GECF comprises 12 Member Countries and 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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## Highlights

**Global economy:** The global GDP growth forecast for 2023 was revised upward by 0.1 percentage points to 2.6%, as reported by the latest forecast from Oxford Economics. This upgrade was mainly driven by robust economic activity in the US, as well as continued resilience of the global economy in Q3 2023. However, in Q4 2023, growth is still expected to be slow in the US and the other advanced economies.

**Gas consumption:** In October 2023, the European Union (EU) observed a resurgence in gas consumption, marking a notable 5.1% year-on-year (y-o-y) increase to reach 23.6 billion cubic meters (bcm). This uptick was largely fuelled by a revival in the industrial sector. Meanwhile, in the United States, gas consumption swelled by 6.7% y-o-y, predominantly driven by the power generation sector. This increase can be attributed to a shift away from coal-based power, amplified cooling demand, and a decline in natural gas prices. In September 2023, China's apparent gas demand escalated by 5% y-o-y to reach 32 bcm, driven by the economic rebound following the easing of the stringent COVID-19 lockdown restrictions.

**Gas production:** In Europe, gas production witnessed a substantial 27% y-o-y decline to reach 11 bcm in September 2023. This drop was mainly attributed to the lower production output from Norway because of extended planned maintenance in the giant Troll field. While in Asia, China continued leading the production growth with a remarkable 9% y-o-y surge, reaching 17.9 bcm. Meanwhile, in October 2023, the seven major shale gas-producing regions in the US recorded a 3% y-o-y growth in production, totalling 87 bcm. This was driven by an uptick in the Permian associated gas production. In October 2023, the global gas rigs increased by 6 units m-o-m, bringing the total count to 382 rigs. With regards to exploration, 82 million boe of hydrocarbon volumes were discovered in September 2023, with natural gas constituting 13 bcm (96%) of the total. This represented a record low for monthly discovered volumes.

**Gas trade:** Pipeline gas imports to the EU rebounded by 27% y-o-y in October 2023, reversing the previous month's decline, to reach 13.7 bcm. In the same month, there was a modest 1.9% y-o-y rise in global LNG imports, reaching a total of 32.1 Mt. The Asia Pacific region, particularly Bangladesh, China, India, Japan, Philippines, Singapore and Thailand, played a substantial role in driving this growth, expanding by 5.0% y-o-y to 21.0 Mt. Meanwhile, the LAC and MENA regions saw comparatively smaller increases in their imports. Conversely, Europe marked its fourth consecutive monthly y-o-y import decline predominantly due to high gas storage levels, reduced gas consumption and significant price premium of spot LNG prices in Asia Pacific over TTF month-ahead price.

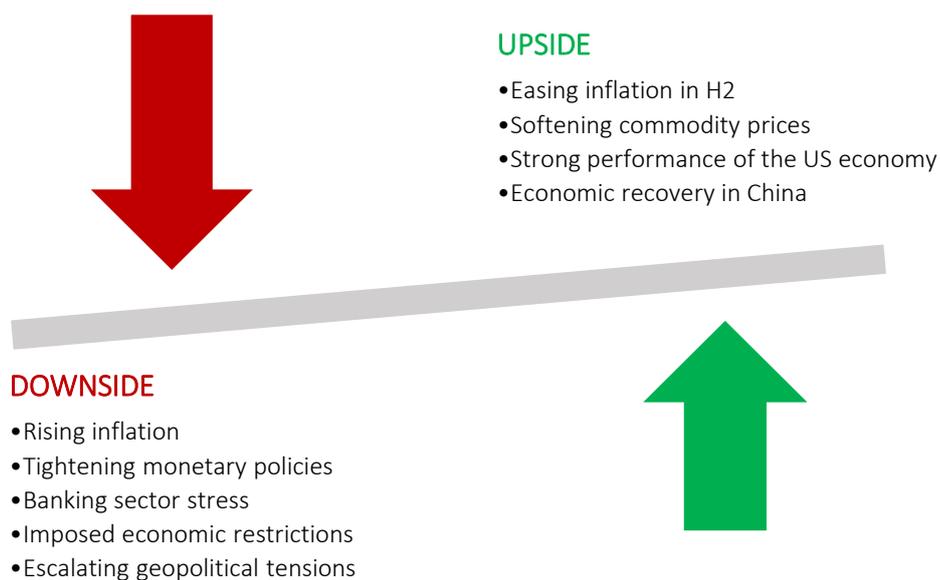
**Gas storage:** In the European Union, underground gas storage pushed closer toward fully filled capacity. The average volume of gas in storage reached 103.1 bcm in October 2023, representing 99% of the total storage capacity of the region. In the US, the rate of stockbuild has picked up as per the seasonal trend and storage levels now stood at 103.6 bcm, or 77% of the country's capacity. In Asia, the estimated combined volume of LNG in storage in Japan and South Korea rose to 12.0 bcm.

**Energy prices:** Gas and LNG spot prices in Europe and Asia increased for the third consecutive month in October 2023. Spot prices experienced greater volatility and were influenced by higher geopolitical risks in the Middle East and the resurgence of potential strikes at Australian LNG facilities. The average TTF spot price stood at \$13.4/MMBtu, reflecting a substantial 17% m-o-m increase. In addition, the average NEA spot LNG price also experienced a 17% m-o-m increase, reaching \$15.3/MMBtu. Looking ahead to the upcoming winter season, it is expected that spot prices will receive support from the anticipated increased demand for heating.

## Feature article: A resilient global economy, but challenges lie ahead

As we approach the end of 2023, we analyze the key factors that have shaped the global economy this year and look ahead to the projections for 2024. Notably, the global economy has faced significant challenges due to persistently high inflation, stringent monetary policies, banking sector instability, supply chain disruptions, imposed economic restrictions and rising geopolitical tensions. Despite these hurdles, the global economy has surpassed expectations, thanks in part to the gradual easing of inflationary pressures, declining commodity prices, the robust performance of the US economy and economic recovery in China (Figure 1).

Figure 1: Factors influencing the global economy in 2023



Source: GECF Secretariat

In October 2023, the International Monetary Fund (IMF) released its World Economic Outlook (WEO), forecasting a global GDP growth of 3% for 2023. This projection aligned with its previous estimate in July 2023, underscoring the global economy's resilience which was observed earlier in the year. It is noteworthy, however, that this figure is below the historical average of 3.8% from 2000 to 2019. Additionally, over 90% of advanced economies (AEs) are anticipated to witness slower growth in 2023. For emerging markets and developing economies (EMDEs), a modest decline in economic growth is expected. The report also draws attention to the increasing disparities between AEs and EMDEs.

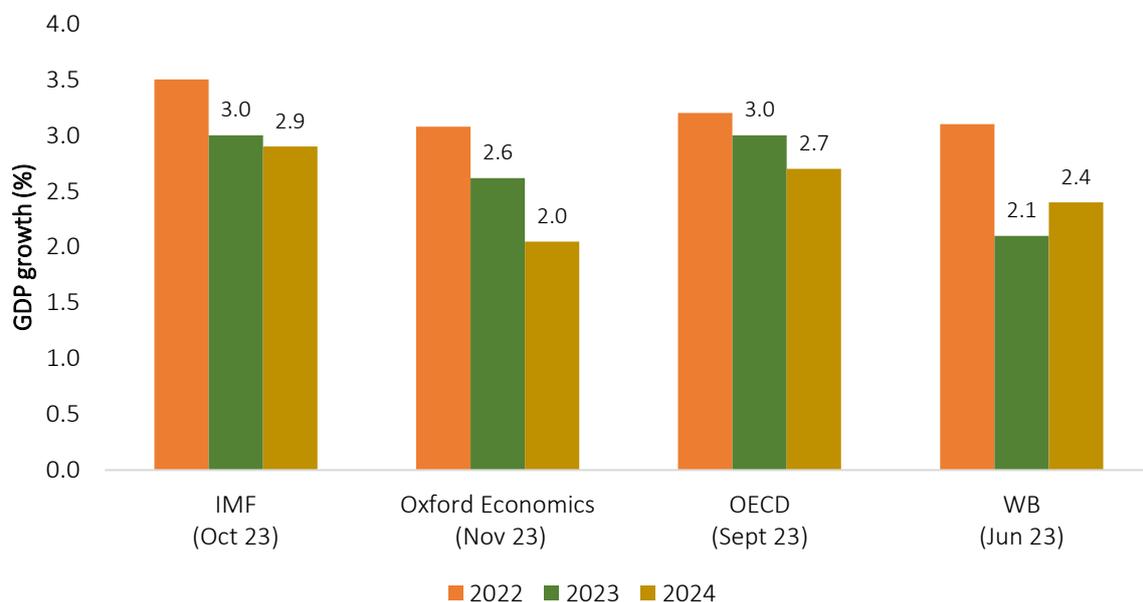
There was notable variation in growth among major economies. The US economy has been pivotal in driving global economic growth, contrary to initial expectations of a mild recession at the beginning of the year. This robust performance is mainly attributed to a strong labour market, significant business investment and vigorous consumer spending. Conversely, the Euro area experienced a slowdown, largely due to a persistent weakness of its manufacturing and industrial sectors. China's economy witnessed a recovery as a result of the relaxation of

COVID-19 restrictions and was bolstered by increased private consumption and supportive government policies. However, China’s real estate sector, which accounts for approximately 25% of the country’s GDP, continued to pose a significant risk to its economic growth. Similar to the US, China has played a crucial role in driving global economic growth in 2023.

The IMF has modestly lowered its forecast for global GDP growth in 2024 by 0.1 percentage points to 2.9%. The outlook for 2024 also encompasses significant potential risks, including heightened volatility in commodity prices due to geopolitical tensions, the intensification of China's real estate crisis, persistent inflationary pressures and high debt levels in numerous countries.

A comparative analysis of key economic projections suggests that global GDP growth for 2023 is likely to be between 2.1% – 3.0%. Looking ahead to 2024, global economic growth is projected to decelerate further, largely due to the delayed impacts of stringent monetary policies affecting various sectors. Consequently, the global economic forecast for 2024 is expected to range between 2.0% - 2.9% (Figure 2).

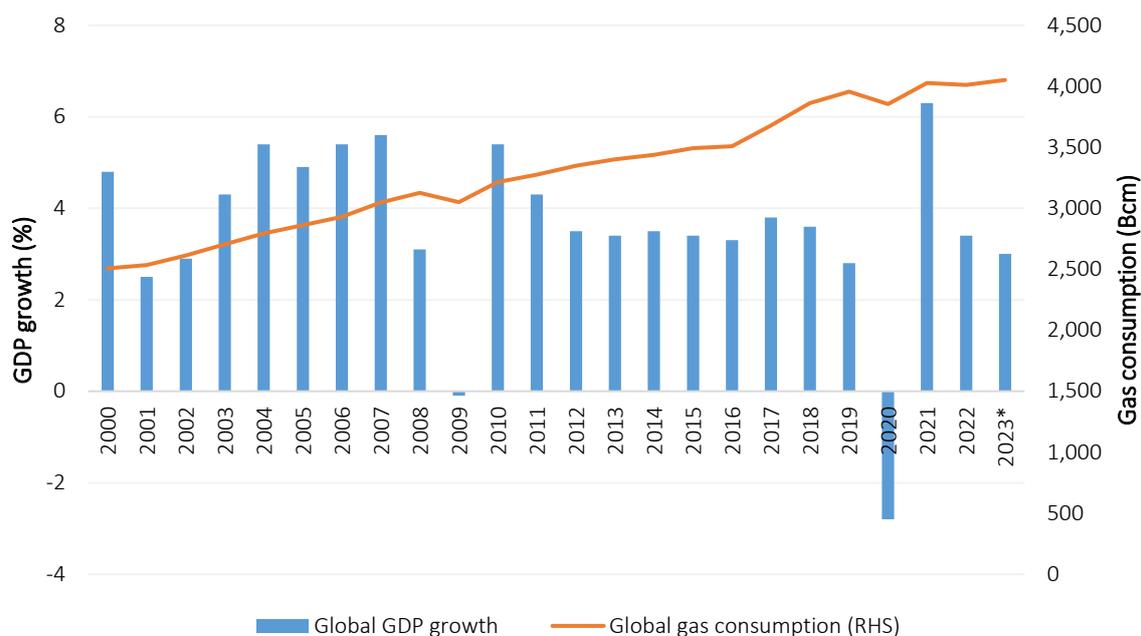
Figure 2: Global GDP growth forecast



Source: IMF World Economic Outlook October 2023, Oxford Economics, OECD Economic Outlook September 2023 and World Bank Global Economic Prospects June 2023

Global economic growth is a major factor influencing global gas consumption, particularly in the power and industrial sectors. Over the past two decades, there has been a steady increase in global gas consumption, with notable exceptions in 2009 and 2020. In 2009, a 2.5% year-over-year (y-o-y) decline in global gas consumption was observed, coinciding with a 0.1% contraction in global GDP growth due to the global financial crisis. Similarly, in 2020, a 2% y-o-y decline in global gas consumption corresponded with a 2.8% contraction in global GDP growth, largely attributed to the COVID-19 pandemic (Figure 3).

Figure 3: Global GDP growth and gas consumption (2000-2022)



Source: GECF Secretariat based on data from IMF, Cedigaz and Enerdata

Note: Global gas consumption for 2023 is based on GECF forecast

Inflation is another important factor impacting the gas markets. The elevated energy prices witnessed over the past two years have been a significant contributor to high inflation rates, which in turn trigger higher nominal energy prices. Cost inflation has also impacted the upstream energy sector, primarily driven by the increased prices of materials such as steel, aluminium, copper and nickel. To counteract inflationary pressures, major central banks, such as the US Federal Reserve, have implemented stringent monetary policies which potentially impact investment activities in the energy sector by making the financing of energy projects more costly. The underinvestment caused by tighter financial conditions may result in a negative impact on the security of gas supply in the medium to long term.

# 1 Global Perspectives

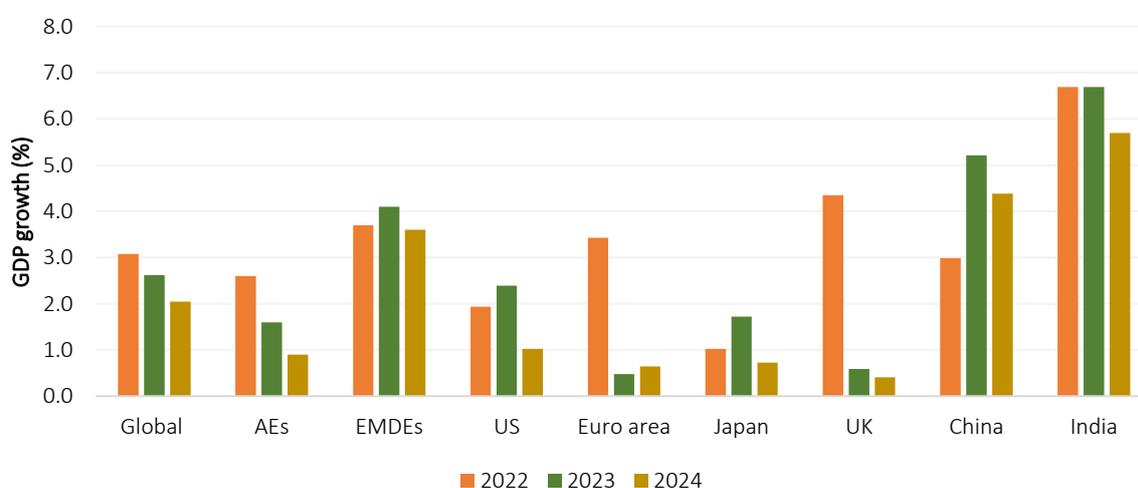
## 1.1 Global Economy

In its World Economic Prospects November 2023 report, Oxford Economics revised its global GDP growth projections upward by 0.1 percentage points to 2.6% for 2023 and 2% for 2024. This upgrade was mainly driven by robust economic activity in the US, as well as the continued resilience of the global economy in Q3 2023. However, in Q4 2023, growth is still expected to be slow in the US and the other advanced economies (Figure 4).

The outlook for GDP growth in Advanced Economies (AEs) has been revised upward by 0.2 percentage points to 1.6% for 2023, and by 0.3 percentage points to 0.9% for 2024. In the US, the GDP growth forecast for 2023 has been revised upward by 0.4 percentage points to 2.4%, mainly driven by strong consumer spending. Additionally, the GDP growth projection for 2024 has been revised upward by 0.8 percentage points to 1%. While the US is likely to avoid recession, growth is expected to stagnate in 2024 due to the impacts of restrictive monetary policies, tight fiscal policies and weakened household finances. In the Euro area, the GDP growth projection for 2023 remained at 0.5%. However, there has been a downward revision by 0.2 percentage points to 0.6% in 2024. Preliminary estimates showed that growth contracted marginally in Q3 2023. As for Japan, its GDP growth forecast for 2023 and 2024 has been revised upward by 0.1 percentage points to 1.7% and 0.7%, respectively, reflecting near-term improvements in the external economic environment.

The GDP growth in Emerging Markets and Developing Economies (EMDEs) has also been revised upward, with a projected GDP growth rate of 4.1% in 2023. Meanwhile, the forecast for 2024 remained at 3.6%. In the case of China, the GDP growth projection for 2023 has been revised upward by 0.1 percentage points to 5.2% and remained the same for 2024 at 4.4%. Economic growth continued to be supported by private consumption, however, the property sector remained weak. Similarly, India's GDP growth forecast for 2023 was revised upward by 0.1 percentage points to 6.7% for 2023. However, GDP growth for 2024 has been revised downward by 0.4 percentage points to 5.7%.

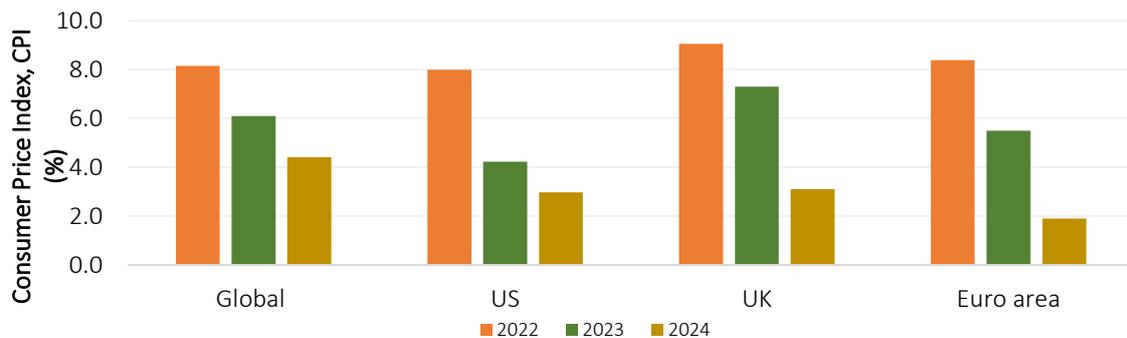
Figure 4: GDP growth forecast



Source: GECF Secretariat based on data from Oxford Economics

Inflation rates have started to ease in several economies, but there is still a long way to go before rates fall to within the targeted range. In October 2023, inflation in the Euro area fell sharply to 2.9%, decreasing from 4.3% in September 2023. This marked its lowest in two years. According to the latest forecast from Oxford Economics, global inflation is projected to decrease from 8.1% 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 3% in 2024. In the Euro area, inflation is anticipated to average 5.5% in 2023, followed by a subsequent decline to 1.9% in 2024. The UK is expected to experience inflation averaging 7.3% in 2023, before decreasing to 3.1% in 2024 (Figure 5).

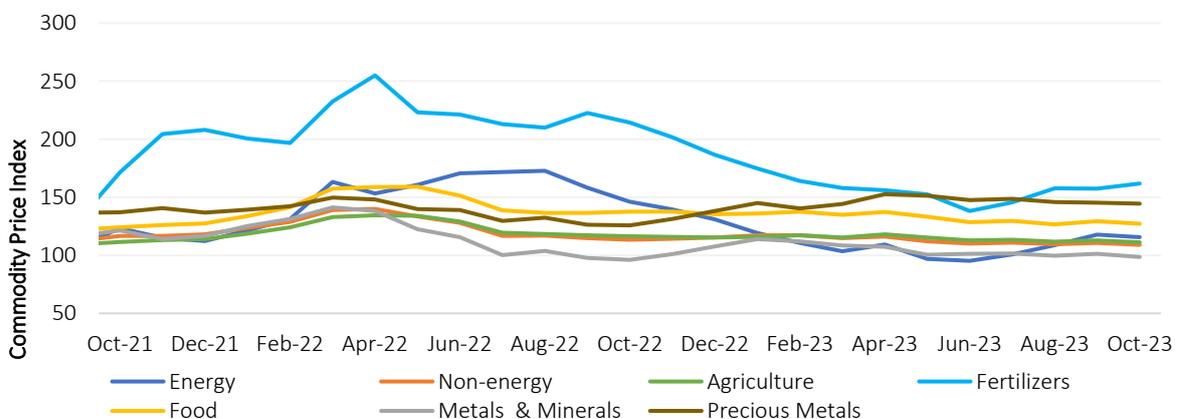
Figure 5: Inflation rates



Source: GECF Secretariat based on data from Oxford Economics

In October 2023, commodity prices in the energy sector declined following three months of bullish movement. The energy price index decreased by 2% m-o-m, but remained 21% lower y-o-y. This was primarily attributed to the decline in oil prices during the month. From January to October 2023, the energy price index was 30% lower y-o-y. Similarly, the non-energy price index decreased by 2% m-o-m and was 4% lower y-o-y, with the agriculture, and the metals and minerals price indices dropping by 1% and 3% m-o-m respectively. Additionally, the fertilizer price index increased by 3% m-o-m, but it remained 24% lower y-o-y. From January to October 2023, the non-energy price index was 10% lower y-o-y (Figure 6).

Figure 6: Monthly commodity price indices

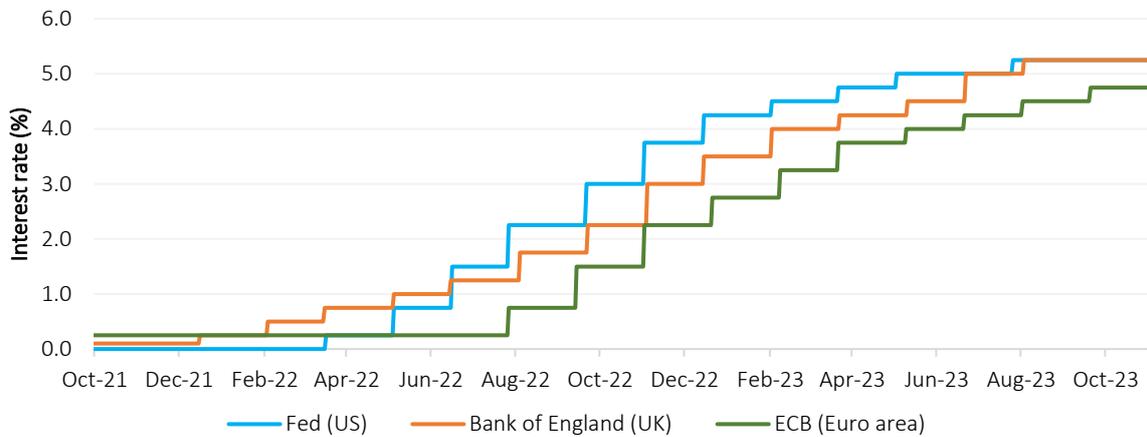


Source: GECF Secretariat based on data from World Bank Commodity Price Data

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) continued to hold its benchmark interest rate steady within the range of 5.25% to 5.50% in October 2023. The last rate hike by the Fed occurred in July 2023 (Figure 7). Similarly, the Bank of England (BOE) maintained its key interest rate at 5.25%, following the last increase in August 2023. The European Central Bank (ECB) also held its key interest rates on the main refinancing operations, marginal lending facility and deposit facility to 4.5%, 4.75% and 4%, respectively, after the last increase in September 2023. While interest rate increases may be on hold, rate reductions by the Fed may not begin until late 2024.

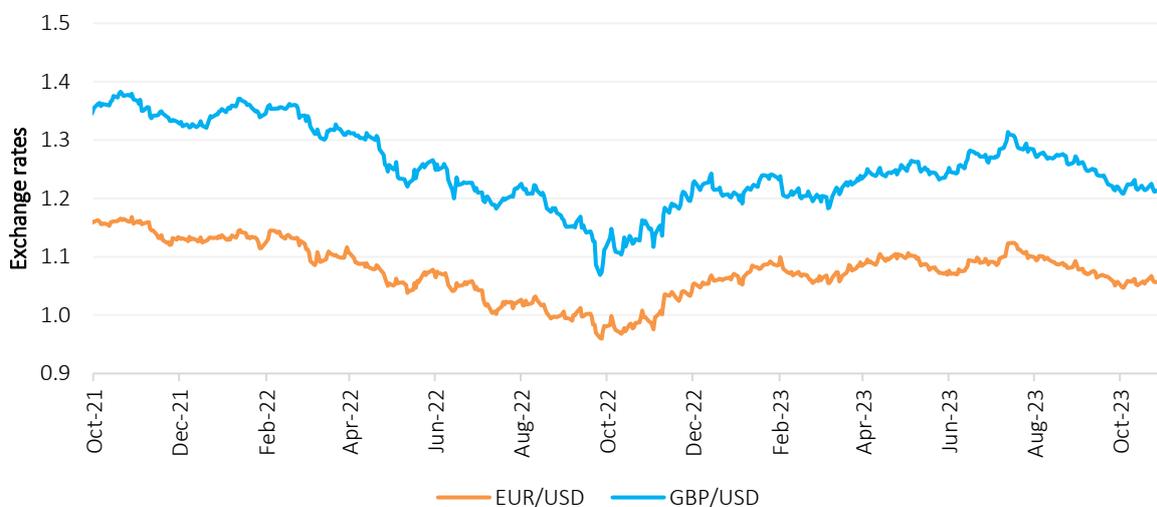
**Figure 7: Interest rates in major central banks**



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

In October 2023, the euro depreciated further against the US dollar, resulting in an average exchange rate of \$1.0566. This represented a 1% m-o-m decrease and a 7% y-o-y increase. Similarly, the British pound also lost value against the US dollar in October 2023, as the average exchange rate reached \$1.2176, reflecting a 2% decrease m-o-m and 8% increase y-o-y (Figure 8).

**Figure 8: Exchange rates**



Source: GECF Secretariat based on data from Refinitiv Eikon

## 1.2 Other Developments

*UNFCCC Regional Climate Weeks:* The Annual Regional Climate Week events bring together leaders of governments, businesses, international organizations and civil society in each region to explore ways to reduce greenhouse gas emissions. It is one of the key initiatives to build momentum ahead of COP28. In this regard, the Africa Climate Week took place on September 4-8, 2023, in Nairobi, Kenya. Following this, the Middle East and North Africa Climate Week took place on October 8-12, 2023, in Riyadh, Saudi Arabia. The Latin America and the Caribbean Climate Week took place on October 23-27, 2023, in Panama City, Panama. In addition, the Asia-Pacific Climate Week took place on November 13-17, 2023, in Johor Bahru, Malaysia.

*Africa Energy Week (AEW):* Africa Energy Week was held on October 16-20, 2023, in Cape Town, South Africa, under the common theme “*African Energy Renaissance: Prioritizing Energy Poverty, People, Planet, Industrialization and Free Markets.*” The President of Namibia, as well as the GECF Secretary General, delivered powerful keynote speeches with one common theme that Africa needs to harness its vast energy resources to lift its people out of poverty and pursue equitable and inclusive socio-economic development, while protecting the environment.

## 2 Gas Consumption

### 2.1 Europe

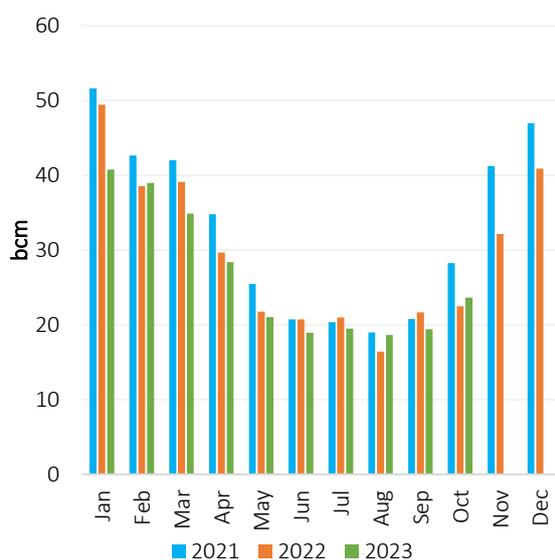
#### 2.1.1 European Union

In October 2023, gas consumption in the European Union (EU) returned to an upward trend after a decline in the previous month. Consumption increased by 5.1% y-o-y, totalling 23.6 bcm (Figure 9). This growth was primarily due to the resurgence of the industrial sectors. As gas prices decreased over the year, demand within the industrial sectors of several EU countries began to recover, albeit not reaching levels seen in previous years. Additionally, the power generation sector, particularly in Germany and Italy, showed signs of recovery.

In terms of electricity production, gas-based generation in the EU fell by 17% y-o-y, while total electricity production declined by 4% y-o-y, amounting to 200 terawatt-hours (TWh). This reduction in gas-fired power generation was offset by increased outputs from other energy sources. There was also a significant reduction of 19% y-o-y (equivalent to 6 TWh) in coal-generated electricity. In the meantime, nuclear, hydro, solar and wind power generation witnessed notable increases of 14%, 18%, 16% and 24% y-o-y, respectively (Figure 10). In the power mix, renewables comprised the largest portion at 35%, followed by nuclear (24%), gas (17%), coal (13%), and hydro (11%).

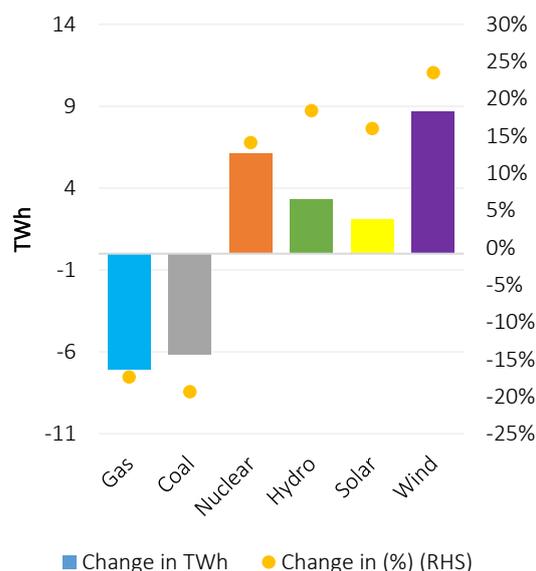
From January to October 2023, the EU's gas consumption decreased by 6% y-o-y to 264 bcm.

Figure 9: Gas consumption in the EU



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

Figure 10: Trend in electricity production in the EU in October 2023 (y-o-y change)

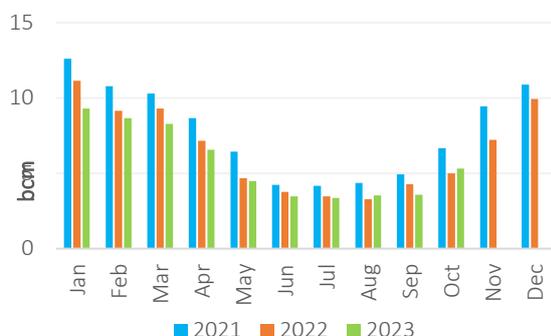


Source: GECF Secretariat based on data from Ember

### 2.1.1.1 Germany

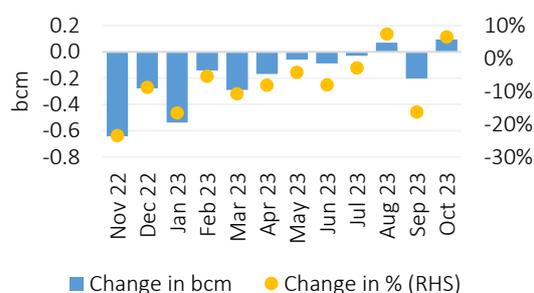
In October 2023, Germany experienced a notable rebound in gas consumption following a decline in the previous month. There was a 6.6% y-o-y increase, with consumption settling at 5.3 bcm (Figure 11). This growth in gas usage was observed in both the power generation and industrial sectors, showing increases of 9.4% and 7% y-o-y, respectively. Several factors drove this growth: firstly, the resurgence in natural gas consumption in the industrial sector, spurred by lower gas prices; secondly, the phase-out of nuclear power, which led to a greater reliance on natural gas in the power generation mix; and thirdly, the policy shift from coal to gas (Figure 12).

Figure 11: Gas consumption in Germany



Source: GECF Secretariat based on data from Refinitiv

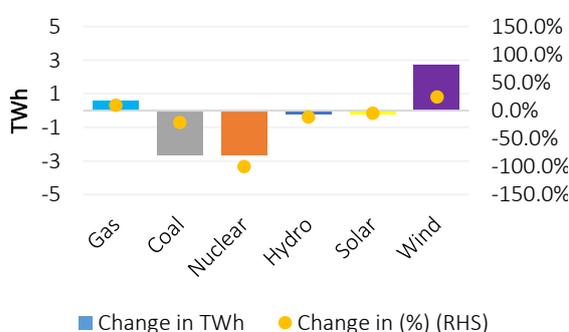
Figure 12: Trend in gas consumption in the industrial sector in Germany (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

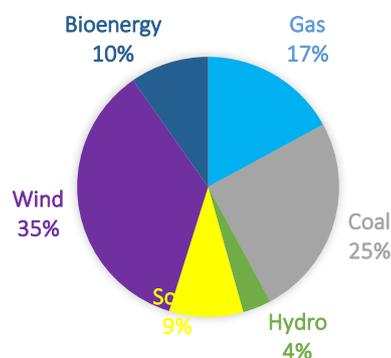
Gas-fired power generation saw a 9.4% y-o-y increase, despite a 4.5% decline in overall electricity production, totalling 39 TWh. Concurrently, there was a significant 24% y-o-y increase in wind energy generation. In contrast, electricity production from coal, hydro, and solar witnessed decreases of 21%, 11% and 5%, respectively, compared to the previous year. These changes were largely attributed to unfavourable weather conditions affecting solar energy generation and the ongoing nuclear phase-out in Germany (Figure 13). In the energy mix, renewables maintained a dominant position, comprising 54% of the total, followed by coal (25%), gas (17%), and hydro (4%) (Figure 14).

Figure 13: Trend in electricity production in Germany in October 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 14: German electricity mix in October 2023



Source: GECF Secretariat based on data from Refinitiv and Ember

From January to October 2023, Germany's overall gas consumption decreased by 7.6% y-o-y, reaching 57 bcm.

### 2.1.1.2 Italy

In October 2023, Italy witnessed a 1.7% y-o-y increase in gas consumption, totalling 4.4 bcm (Figure 15). The industrial and residential sectors experienced rises in consumption of 11% (1 bcm) and 14% (1.3 bcm), respectively. This growth was primarily driven by the resurgence of industrial activity in Italy, spurred by a slowdown in gas prices (Figure 16). Remarkably, after 20 consecutive months of y-o-y declines, the industrial sector recorded its second consecutive month of increased gas consumption, reaching 1 bcm. However, it is noteworthy to mention the decline in natural gas consumption in the power generation sector, largely attributed to an increase in hydro and wind energy production. A significant factor behind this boost in renewable energy sources was the impact of cyclone Medusa. This cyclone resulted in precipitation almost three times the seasonal average in northern Italy, providing favourable conditions for hydroelectric power generation and enhancing wind energy production as well.

Figure 15: Gas consumption in Italy

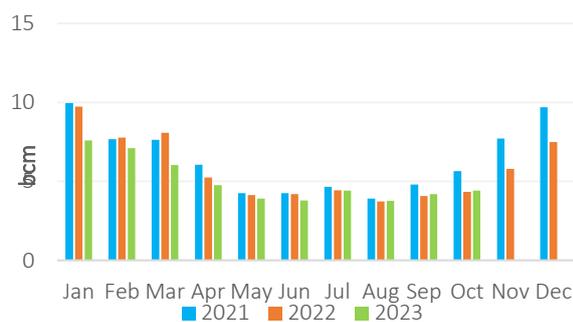
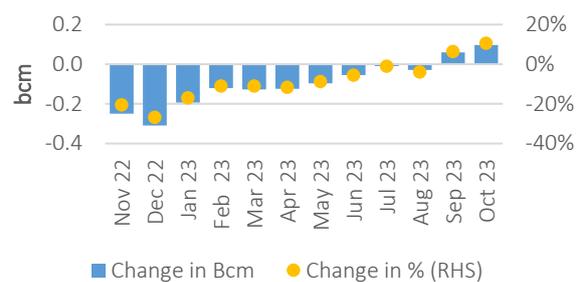


Figure 16: Trend in gas consumption in the industrial sector in Italy (y-o-y change)

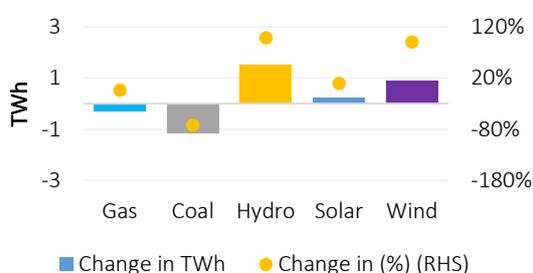


Source: GECF Secretariat based on data from Snam

Source: GECF Secretariat based on data from Snam

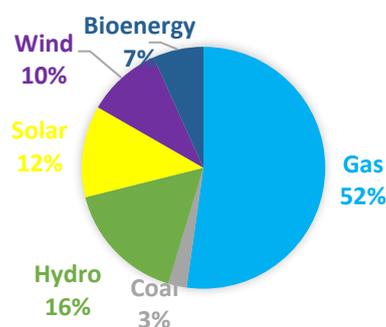
Gas-based electricity production fell by 3.2% y-o-y. Despite this, the total electricity production increased by 7.6% y-o-y, reaching 19 terawatt-hours (TWh). Additionally, there was a notable y-o-y increase in energy generation from hydro (99%), wind (91%), and solar (10%) (Figure 17). Meanwhile, gas continued to be the dominant fuel in the power mix, accounting for 52% of the total, followed by renewables (29%), hydro (16%), and coal (3%) (Figure 18).

Figure 17: Trend in electricity production in Italy in October 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 18: Italian electricity mix in October 2023



Source: GECF Secretariat based on data from Refinitiv and Ember

From January to October 2023, Italy's overall gas consumption decreased by 10% y-o-y, reaching 50 bcm.

### 2.1.1.3 France

In October 2023, France's gas consumption decreased by 14% y-o-y, totalling 2 bcm. This marked the eighteenth consecutive month of decline since a brief surge in February 2023 (Figure 19). The reduction in gas consumption was primarily due to a significant decrease in the power generation sector. This decline was attributed to a 40% resurgence in nuclear output compared to the previous year. In contrast, the residential and industrial sectors experienced increases in gas consumption, with the residential sector growing by 4.5% y-o-y to 1 bcm and the industrial sector by 1.6% y-o-y to 0.8 bcm (Figure 20).

Figure 19: Gas consumption in France

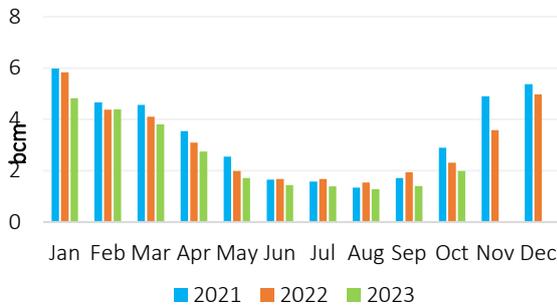
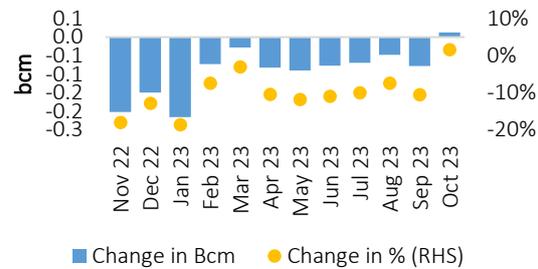


Figure 20: Trend in gas consumption in the industrial sector in France (y-o-y change)



Source: GECF Secretariat based on data from GRTgaz

Source: GECF Secretariat based on data from GRTgaz

Electricity production from gas witnessed a 65% y-o-y decrease, while the total electricity production in France increased by 24% y-o-y, reaching 38 TWh. This period also marked a significant recovery in nuclear power generation, which rose by 40% y-o-y. Nuclear capacity availability increased by 39% y-o-y and 4.5% m-o-m (Figure 22). According to forecasts from the French EDF utility program, the coming months are expected to witness further increases in nuclear availability. Additionally, higher electricity production was recorded from hydro (19% y-o-y), solar (27%), and wind (25%). Conversely, electricity production from coal fell by 67% y-o-y (Figure 21). In France's energy mix, nuclear power continued to dominate, comprising 73% of the total, followed by renewables (16%), hydro (8%), and gas (3%).

Figure 21: Trend in electricity production in France in October 2023 (y-o-y change)

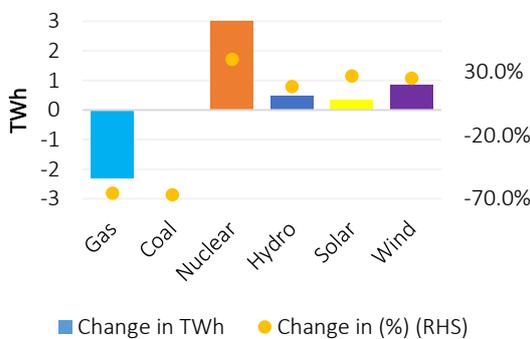
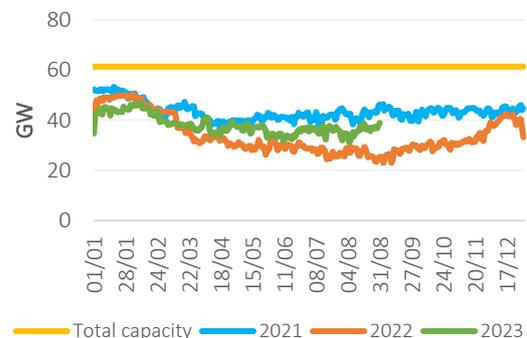


Figure 22: French nuclear capacity availability



Source: GECF Secretariat based on data from Ember

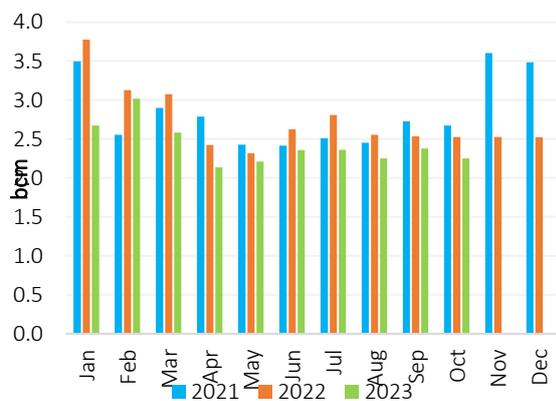
Source: GECF Secretariat based on data from Refinitiv and RTE

From January to October 2023, France's gas consumption decreased by 12% y-o-y, totalling 25 bcm.

### 2.1.1.4 Spain

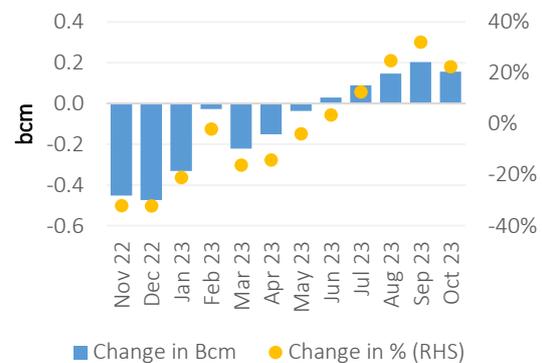
In October 2023, Spain experienced an eleven percent y-o-y decline in gas consumption, totalling 2.3 bcm. This decrease was primarily driven by a drop in gas use in the power generation sector because of the increased output from hydro, wind and solar energy, coupled with a reduction in electricity exports to France (Figure 23). However, the industrial sector witnessed its fifth consecutive month of growth, with a 22% y-o-y increase (Figure 24). This growth was propelled by higher gas consumption in several industries: refineries (76% y-o-y growth), pharmaceuticals (52%), textiles (35%) and agri-food (21%).

Figure 23: Gas consumption in Spain



Source: GECF Secretariat based on data from Enagas

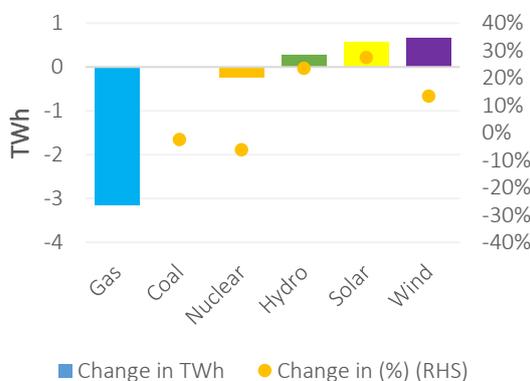
Figure 24: Trend in gas consumption in the industrial sector in Spain (y-o-y change)



Source: GECF Secretariat based on data from Enagas

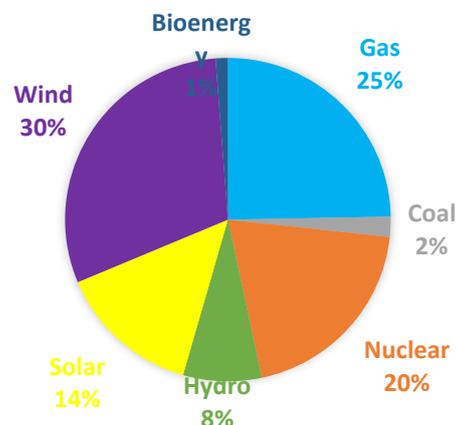
Electricity production from gas fell by 42% y-o-y, while total electricity production decreased by 8% y-o-y, reaching 19 TWh. Moreover, electricity production from coal and nuclear sources recorded declines of 3% and 6%, respectively. However, there were significant increases in electricity generation from hydro (24% y-o-y), solar (27%) and wind (13%) (Figure 25). Renewables maintained the dominant position in the power mix, accounting for 45% of the total, followed by gas (25%), nuclear (20%), hydro (8%) and coal (2%) (Figure 26).

Figure 25: Trend in electricity production in Spain in October 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember and Ree

Figure 26: Spanish electricity mix in October 2023



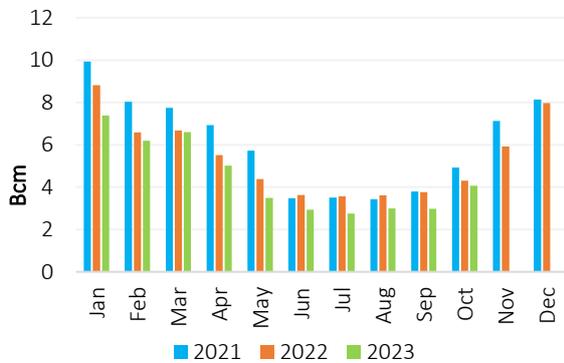
Source: GECF Secretariat based on data from Ember and Ree

From January to October 2023, Spain's gas consumption decreased by 13% y-o-y to reach 24 bcm.

### 2.1.2 United Kingdom

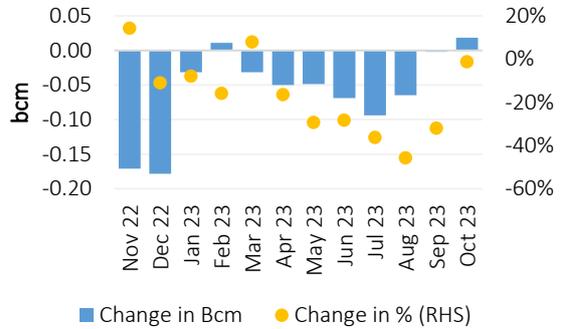
In October 2023, gas consumption in the UK decreased by 5.5% y-o-y, reaching 4 bcm (Figure 27). This decline was primarily due to a reduction in gas consumption in the power generation sector. The decrease in this sector was driven by increased hydro and coal outputs (Figure 28). In contrast, the residential and industrial sectors witnessed growth of 7% and 14% y-o-y, reaching 2.8 bcm and 0.2 bcm, respectively.

Figure 27: Gas consumption in the UK



Source: GECF Secretariat based on data from Refinitiv

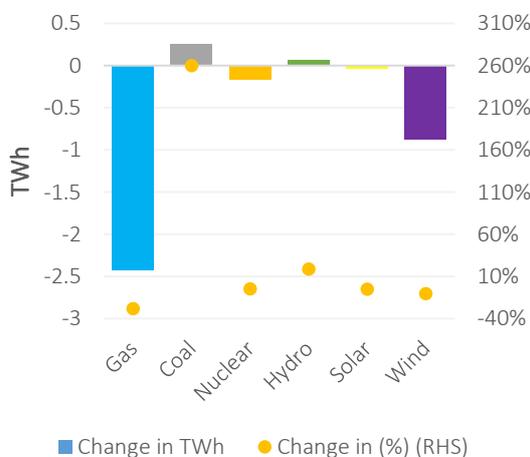
Figure 28: Trend in gas consumption in the industrial sector in the UK (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

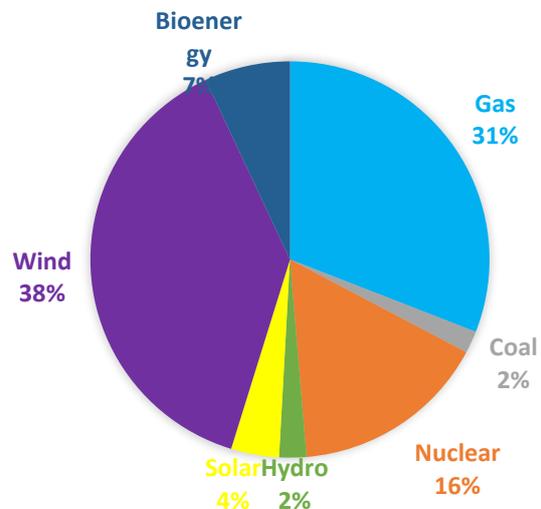
The UK's electricity production from gas fell by 28% y-o-y, while the total electricity production declined by 11% y-o-y, totalling 20 TWh. There were decreases in nuclear, solar and wind power generation by 5%, 5%, and 10% y-o-y, respectively. However, electricity production from coal and hydro experienced significant increases of 19% and 260% y-o-y, respectively (Figure 29). Renewables emerged as the leading source in the power mix, accounting for 49% of the total, followed by gas (31%), nuclear (16%), coal (2%), and hydro (2%) (Figure 30).

Figure 29: Trend in electricity production in UK in October 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

Figure 30: UK electricity mix in October 2023



Source: GECF Secretariat based on data from Refinitiv

From January to October 2023, the UK's gas consumption fell by 13% y-o-y, totalling 44 bcm.

## 2.2 Asia

### 2.2.1 China

In September 2023, China’s apparent gas demand, encompassing pipeline imports, LNG imports, and domestic production, rose by 5% compared to the previous year, reaching 32 bcm (Figure 31). This increase in natural gas consumption is linked to the revival of economic activities following the relaxation of stringent COVID-19 lockdown restrictions.

According to various projections, China is projected to experience an 8% increase in natural gas demand in 2023 compared to the previous year. This anticipated growth is attributed to the country’s economic recovery and a decrease in global LNG prices. The increase is driven primarily by a rebound in industrial gas demand during the second half of the year, with the stabilization of global gas prices likely to further boost demand.

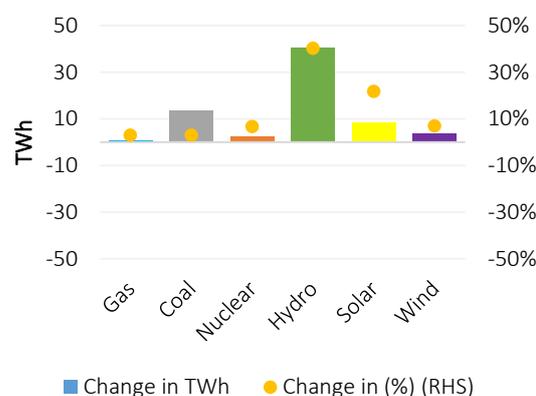
Electricity production from gas in China increased by 3% y-o-y, while the total electricity production rose by 10%, reaching 777 TWh. During the month, there was a significant surge in electricity generation from hydro (40%), nuclear (7%), solar (22%), and wind (7%) (Figure 32). Coal remained the dominant fuel in the power mix, accounting for 60% of the total, followed by renewables (15%), hydro (18%), nuclear (4%), and gas (3%).

From January to September 2023, China’s gas consumption rose by 7.1% y-o-y to 292 bcm.

Figure 31: Gas consumption in China



Figure 32: Trend in electricity production in China in September 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

Source: GECF Secretariat based on data from Ember

### 2.2.2 India

In September 2023, India’s gas consumption marked its ninth consecutive month of growth with a 24% y-o-y increase, reaching 5.8 bcm (Figure 33). This increase was primarily driven by the power generation and refinery sectors, which registered growth of 34% and 78% y-o-y, respectively. The rise coincided with the start of the festive season, typically associated with higher power generation demand and a surge in industrial activities following the end of the monsoon season. Notably, the Indian authorities extended the operational duration of gas-based utilities at maximum capacity to meet the rising electricity demand.

Within the sectoral breakdown, the fertilizer sector accounted for the largest share at 31%, followed by city gas distribution (19%), power generation (14%), refining (8%) and the petrochemical sector (4%) (Figure 34).

Figure 33: Gas consumption in India

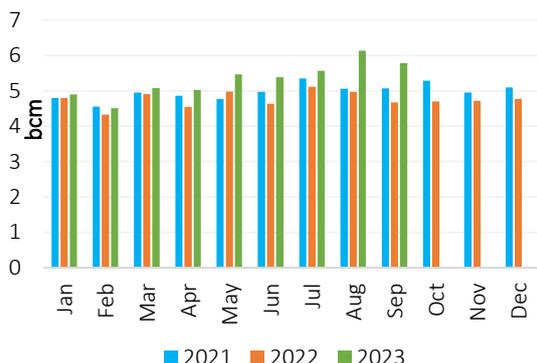
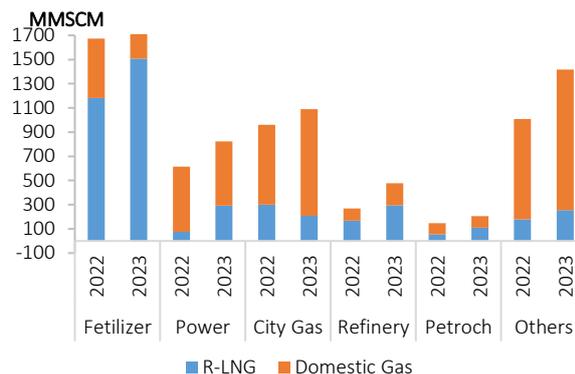


Figure 34: India's gas consumption by sector in Sep



Source: GECF Secretariat based on data from PPAC

From January to September 2023, India's total gas consumption grew by 11% y-o-y to 48 bcm.

### 2.2.3 Japan

In October 2023, following two consecutive months of growth, Japan experienced a 4% y-o-y decline in gas consumption, settling at 6.7 bcm (Figure 35). This decrease is largely attributed to a reduction in gas usage within the power generation sector as a result of decreased cooling demand due to temperatures returning to seasonal norms. Specifically, gas consumption in the power generation and city gas sectors decreased by 1% and 8% y-o-y, respectively. Additionally, Japan's Heating Degree Days (HDD), a measure of heating demand, averaged 0.97 during the month, indicating a significant 44% y-o-y decline. Nuclear availability during the month was 53% higher compared to the same period last year, contributing to the reduced reliance on gas for power generation (Figure 36).

From January to October 2023, Japan's total gas consumption decreased by 7.6% y-o-y, amounting to 77 bcm.

Figure 35: Gas consumption in Japan

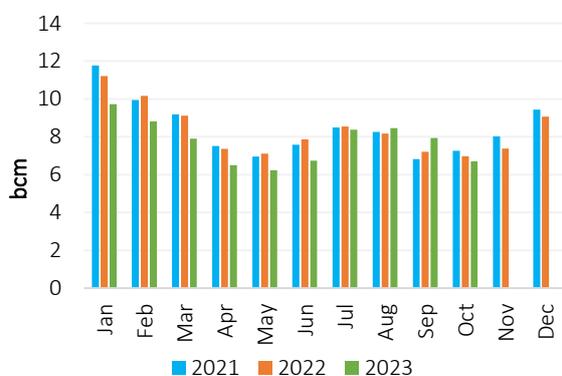
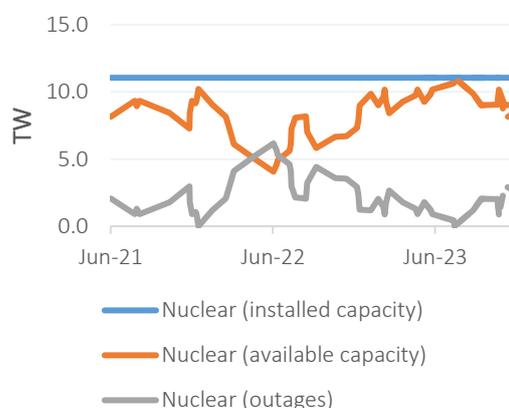


Figure 36: Nuclear availability in Japan



Source: GECF Secretariat based on data from Refinitiv

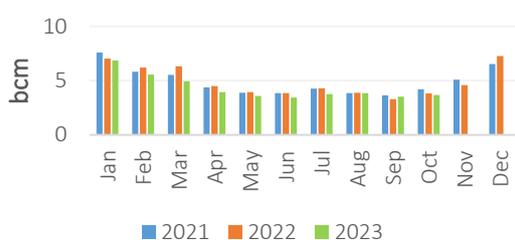
Source: GECF Secretariat based on data from Refinitiv

## 2.2.4 South Korea

In October 2023, following two consecutive months of growth, South Korea experienced a 4% y-o-y decline in gas consumption, reaching 3.7 bcm. This decline was primarily driven by a significant 12% decrease in gas consumption in the city town gas sector. Additionally, a modest decline in gas consumption in the power generation sector was also observed (Figure 37). Heating Degree Days (HDD) averaged 1.15 in October, marking a 57% y-o-y decline (Figure 38).

From January to October 2023, South Korea's gas consumption dropped by 9% y-o-y to 43 bcm.

Figure 37: Gas consumption in South Korea



Source: GECF Secretariat based on data from Refinitiv

Figure 38: HDD in South Korea (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

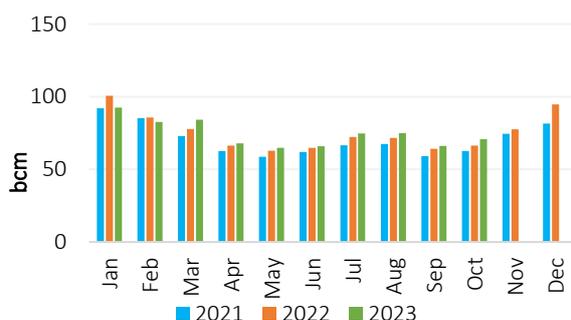
## 2.3 North America

### 2.3.1 US

In October 2023, the US witnessed a 6.7% y-o-y increase in gas consumption, reaching 71 bcm (Figure 39). The power generation sector contributed significantly to this rise, attributed to the ongoing reduction of coal power plants, heightened cooling demand and the falling prices of natural gas. The residential and commercial sectors saw 9.7% and 9.6% y-o-y increase in gas consumption. The industrial sector reported a 4.3% y-o-y growth, totalling 20 bcm.

Electricity production from gas showed a 10% y-o-y rise, while total electricity production grew by 4.1%. The month saw a decrease in generation from coal and hydro by 8% and 4%, respectively. However, there was a noticeable increase in production from nuclear (3% y-o-y), wind (12%) and solar (26%) (Figure 40). In the power mix, gas continued to lead with a 43% share, followed by nuclear (19%), coal (15%), renewable energy sources (19%) and hydro (4%).

Figure 39: Gas consumption in the US



Source: GECF Secretariat based on data from EIA and Refinitiv

Figure 40: Electricity production in the US in October 2023 (y-o-y change)



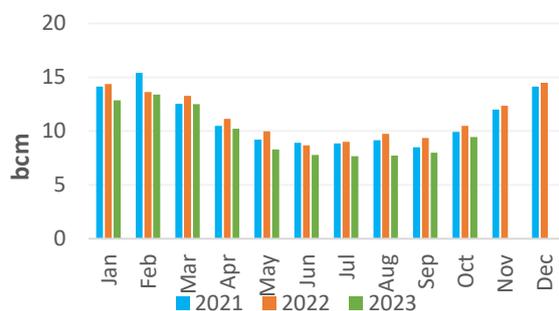
Source: GECF Secretariat based on data from Ember and Refinitiv

From January to October 2023, US gas consumption increased by 1.6% y-o-y to 744 bcm.

### 2.3.2 Canada

In October 2023, Canada observed a 10% y-o-y decline in gas consumption to 9.4 bcm (Figure 41), driven by a 14% reduction in gas usage within the combined industrial and power generation sectors. In contrast, the residential sector saw a growth of 9% y-o-y, while the commercial sector recorded a 5.2% y-o-y increase due to the higher HDD number (Figure 42).

Figure 41: Gas consumption in Canada



Source: GECF Secretariat based on data from Refinitiv

Figure 42: HDD in Canada (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

From January to October 2023, Canada's gas consumption fell by 11% y-o-y to 98 bcm.

### 2.4 Weather Forecast

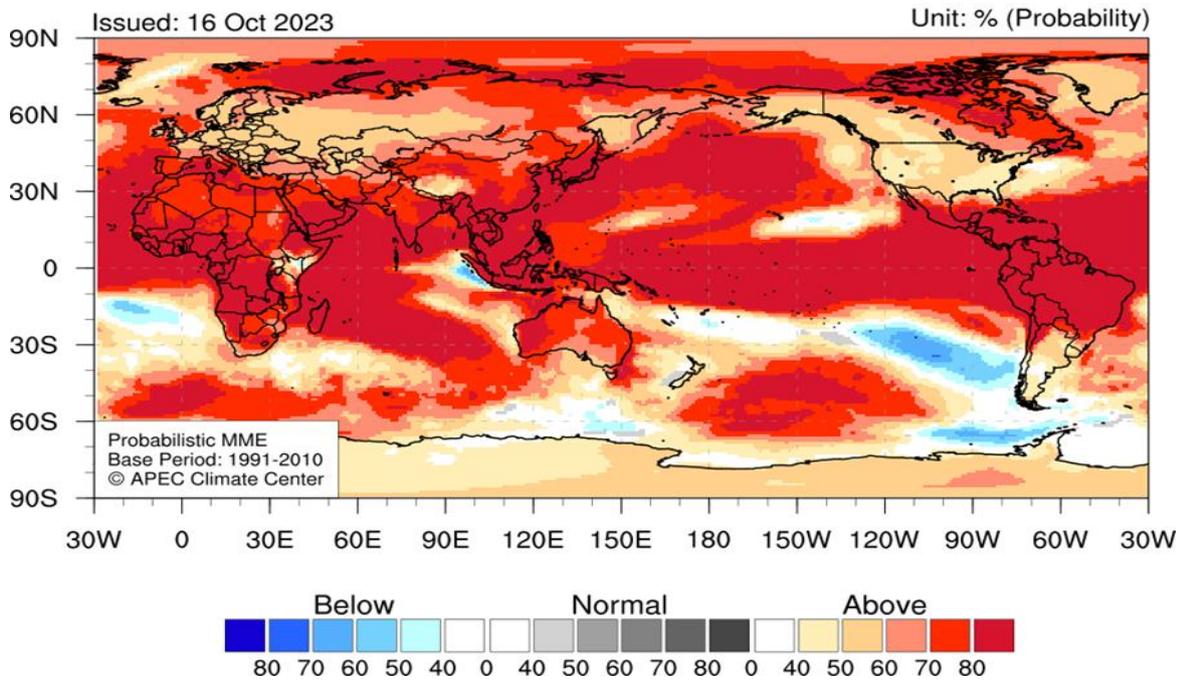
The weather and precipitation conditions have a significant impact on gas consumption. Below normal temperatures in winter and above normal temperatures in summer boost heating and cooling demand, respectively. Additionally, below normal precipitation levels result in lower hydro output, which can increase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

The World Meteorological Organization (WMO) reports that the current El Niño event, which rapidly intensified between July and September 2023, is expected to peak between November 2023 and January 2024 and persist until at least April 2024. This phenomenon, occurring every two to seven years and typically lasting 9 to 12 months, is characterized by warming ocean surface temperatures in the central and eastern tropical Pacific Ocean. The 2023 El Niño is contributing to record high land and sea-surface temperatures, likely making 2023 the warmest year on record, with 2024 potentially even warmer. This event enhances the likelihood of extreme weather conditions such as heatwaves, droughts, wildfires and floods. Additionally, the WMO's Global Seasonal Climate Update predicts widespread above-normal temperatures and varied rainfall patterns influenced by El Niño and other climate variability modes.

#### 2.4.1 Temperature Forecast for November 2023 to January 2024

According to the Climate Outlook by the APEC Climate Center published on October 16, 2023 (Figure 43), a pronounced likelihood of experiencing above normal temperatures is predicted for most of the globe (excluding the eastern Indian Ocean, the tropical South Atlantic and southeastern South Pacific) for the period November 2023 to January 2024.

Figure 43: Temperature forecast November 2023 to January 2024

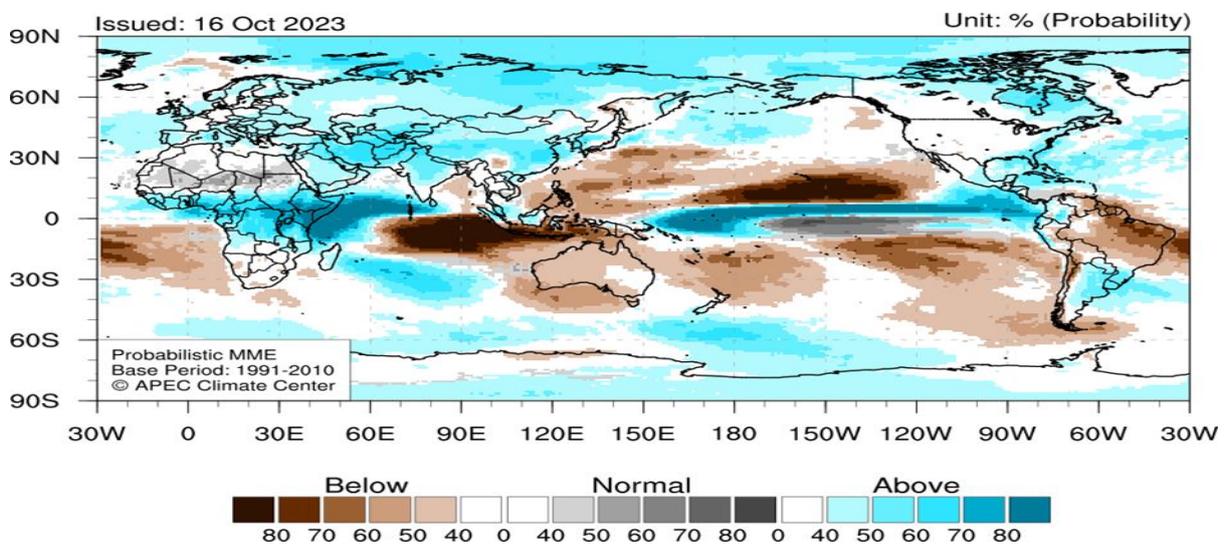


Source: APEC Climate Center

## 2.4.2 Precipitation Forecast for November 2023 to January 2024

According to the Climate Outlook by APEC Climate Center published on October 16, 2023 (Figure 44), above normal precipitation is expected for western equatorial Pacific, off-equatorial North Pacific, the western Indian Ocean, Arctic, central Africa, Eurasia and southern South America. While below normal precipitation is expected for the central off-equatorial North Pacific, the eastern Indian Ocean, the western tropical North Pacific, tropical South Pacific, tropical South Atlantic, northeastern South America, and the Great Australian Bight for the period November 2023 to January 2024.

Figure 44: Precipitation forecast October to December 2023



Source: APEC Climate Centre

### 3 Gas Production

#### 3.1 Global

The outlook for 2023 points to a resurgence in global gas production, with an expected uptick of 0.8% (Table 1). This growth is primarily expected in North America, the Middle East, Asia Pacific and Africa. Conversely, Europe and the CIS may witness a decline. Non-GECF producers are predicted to boost their gas output by 2.4%, achieving total production volumes of 2,393 bcm. Within this growth context, the US is projected to be a key contributor, with an anticipated increase of 50 bcm compared to the previous year's level, mainly driven by the rise in associated gas production from shale oil plays. Moreover, the Middle East's gas production is projected to witness a substantial 17 bcm boost, with Iran, Qatar and Saudi Arabia leading the growth.

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

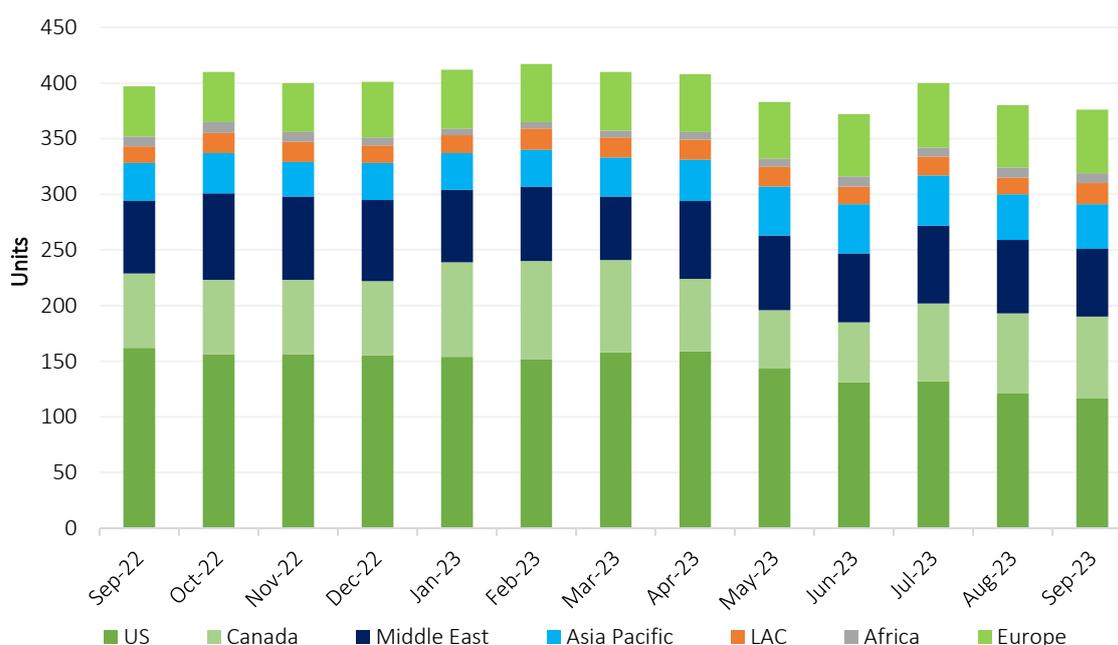
Region	2021	2022	2022 Revision*	2022 Growth	2023	2023 Revision*	2023 Growth
Africa	257	253	-3.0%	-1.5%	255	-3.4%	0.8%
Asia Pacific	642	648	-0.2%	0.9%	657	0.5%	1.4%
CIS	910	813	-2.2%	-10.7%	777	-4.3%	-4.4%
LAC	157	160	1.3%	1.8%	159	-3.0%	-0.7%
Europe	225	232	-0.1%	3.3%	221	-0.5%	-4.7%
Middle East	670	683	-0.2%	1.9%	700	-0.4%	2.5%
North America	1164	1228	1.1%	5.5%	1280	0.2%	4.2%
<b>World</b>	4026	4017	-0.31%	-0.2%	4050	-1.1%	0.8%
<b>GECF</b>	1758	1681	-0.8%	-4.4%	1657	-1.5%	-1.4%
<b>non-GECF</b>	2268	2336	0.1%	3.0%	2393	-0.8%	2.4%

Source: GECF Secretariat based on Rystad Energy Ucube

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

In October 2023, there was a m-o-m increase of 6 units in the global count of gas drilling rigs, which serve as a measure of upstream activity, resulting in a total of 382 rigs. However, there was a y-o-y decrease of 28 units compared to the 410 rigs observed in October 2022, mainly attributed to the drop in the number of gas rig in the US (Figure 45). On the other hand, the monthly increase was mainly driven by the uptick in the operational gas rigs in the Middle East, Europe and Canada which saw an increase of 3, 2 and 2 units, respectively. Asia Pacific was the only region that recorded a monthly decrease in the number of gas rigs (decrease of 2 rigs). Notably, LAC and Africa's operational gas rig fleet remained unchanged.

Figure 45: Trend in monthly global gas rig count



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

In September 2023, the total volume of gas and liquids discovered amounted to 82 million barrels of oil equivalent (boe). Of this, natural gas represented the vast majority, accounting for 96% (13 bcm), while oil only constituted 4% (3 million boe). This marked a record low in monthly discovered volumes because of the disappointing results in some key exploration wells, with both a monthly decrease (compared to the 260 million boe discovered in August 2023) and an annual decrease in volumes (compared to the 130 million boe discovered in September 2022). The cumulative volume of discoveries in the period January to September 2023 reached 3.6 billion boe, compared to discovered volumes of 5.2 billion boe for the same period in 2022. This resulted in an average monthly discovered volume of 400 million boe in the first nine months of 2023 (Figure 46). The decline in discovered volumes in 2023 reflects the challenges confronting global exploration activity. Approximately 68% of the total discoveries were made offshore.

In September 2023, 3 small discoveries were announced, 2 of which were offshore. Europe held the major share in the new discovered volumes of 96%, with Asia Pacific only accounting for 4% of the total. No significant discoveries were reported in Africa, LAC and North America. (Figure 47).

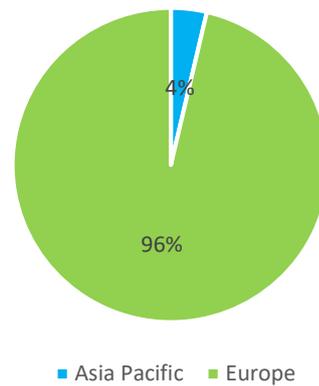
The Norma condensate gas discovery, offshore Norway, was the largest hydrocarbon discovery announced in September 2023. The discovery was made by the High-Pressure High-Temperature (HPHT) exploration well, Norma, which encountered 16m of hydrocarbon column. The estimated resources attributed to this new discovery reached approximately 12 bcm. According to the operating company, DNO, the presence of extensive infrastructure in the central part of the North Sea would allow for the commercialisation of this relatively small discovery through tie-backing to existing production facilities with minimum cost, while continuing to search for further upside potential.

Figure 46: Monthly gas and liquid discovered volumes



Source: GECF Secretariat based on Rystad Energy Ucube

Figure 47: Discovered volumes in September 2023 by region

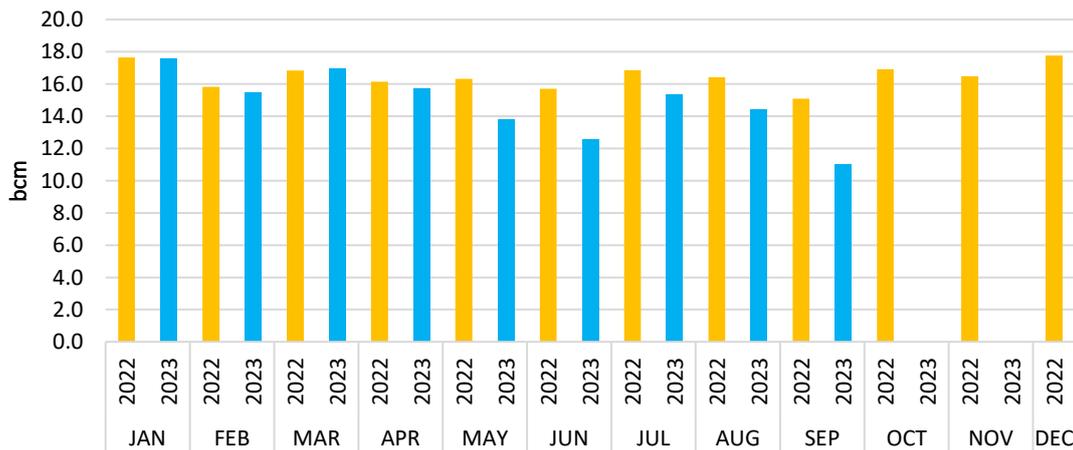


Source: GECF Secretariat based on Rystad Energy Ucube

### 3.2 Europe

In September 2023, gas production in Europe witnessed a y-o-y drop of 27%, resulting in a total output of 11 bcm (Figure 48). This reduction was mainly attributed to decreased production from the major producers in the region, in particular Norway which experienced a significant drop of 3 bcm compared to the previous year, the Netherlands and UK. As a result, the estimated total production for 2023 is expected to decrease by 11 bcm compared to the previous year.

Figure 48: Europe’s monthly gas production



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

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

In a major development for European gas production, Eni is set to start the appraisal phase of the Cronos gas discovery in Block 6, 160 km off the Cyprus coastline. Cronos was regarded as one of the major gas discoveries in 2022, with a preliminary gas-in-place volume of 2.5 tcf (71 bcm) and an additional upside potential, which will be investigated during the appraisal phase. This field, along with the other Cypriot discoveries (Calypso in 2018 and Zeus in late 2022) will help to restrict the decline in the European production when they begin production.

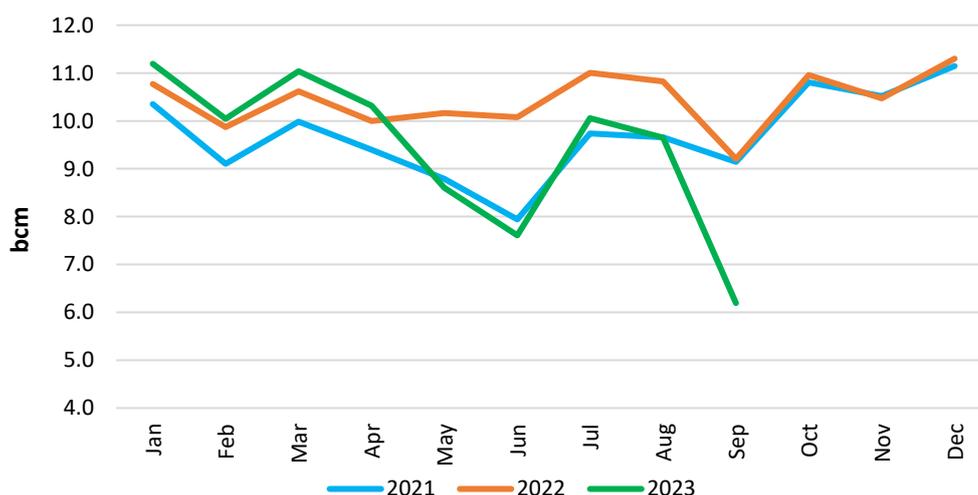
### 3.2.1 Norway

Preliminary data from the Norwegian Petroleum Directorate indicated that the country experienced a 33% y-o-y decrease in its gas production in September 2023, reaching 6.2 bcm (Figure 49). This is considered the lowest monthly production since September 1999, and mainly due to the extended duration of planned maintenance activities for the giant Troll field and Kollsnes processing plant. As a result, the cumulative gas production from January to September amounted to 84.7 bcm.

Furthermore, Equinor, along with its partner Kuwait Foreign Petroleum Exploration Company (KUFPEC), announced a new commercial gas discovery in the Gina Krog field in the North Sea, with gas production expected to commence in Q4 of 2023. One of the key factors contributing to the commercial viability of this discovery is the ability to utilize existing infrastructure provided by the Gina Krog platform. Despite the relatively small gas volume attributed to this new discovery, which is estimated to be between 1 and 2.5 bcm, it still represents evidence of the viability of the strategy to extend the lifetime of the North Sea assets by the development of small discoveries through the existing infrastructure with minimal cost. It is worth noting that the Gina Krog platform is already electrified, which helps in supplying gas with low CO<sub>2</sub> emissions.

Regarding maintenance activities, October 2023 witnessed the ramp up of Troll field and Kollsnes plant after a period of planned maintenance activities. Furthermore, both Oseberg and Gullfaks gas fields underwent planned maintenance outages which resulted in a capacity cut of 14 and 6.7 mcm/d, respectively, for a period of 10 days.

Figure 49: Trend in gas production in Norway



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

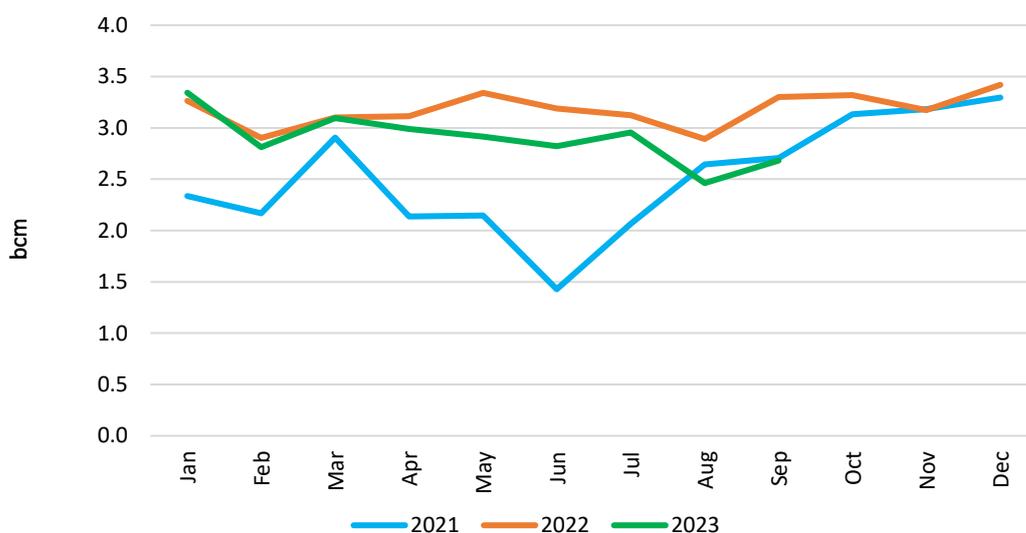
### 3.2.2 UK

In September 2023, gas production in the UK saw a 19% reduction y-o-y, totalling 2.68 bcm (Figure 50). The aggregated gas production from January to September was 26.1 bcm, representing a 7.5% decrease compared to the same period in the previous year.

In a recent development, the North Sea Transition Authority (NSTA), the regulator overseeing the process of granting new oil and gas exploration and production licences in the North Sea, awarded 27 new exploration licences through its 33<sup>rd</sup> oil and gas licencing round. These 27 areas were prioritised to have a fast-track production potential. The licences are located in the central and

northern part of the North Sea and West of Shetland. It is worth noting that the 33<sup>rd</sup> oil and gas licencing round was launched in October 2022 and included approximately 931 blocks.

Figure 50: Trend in gas production in the UK

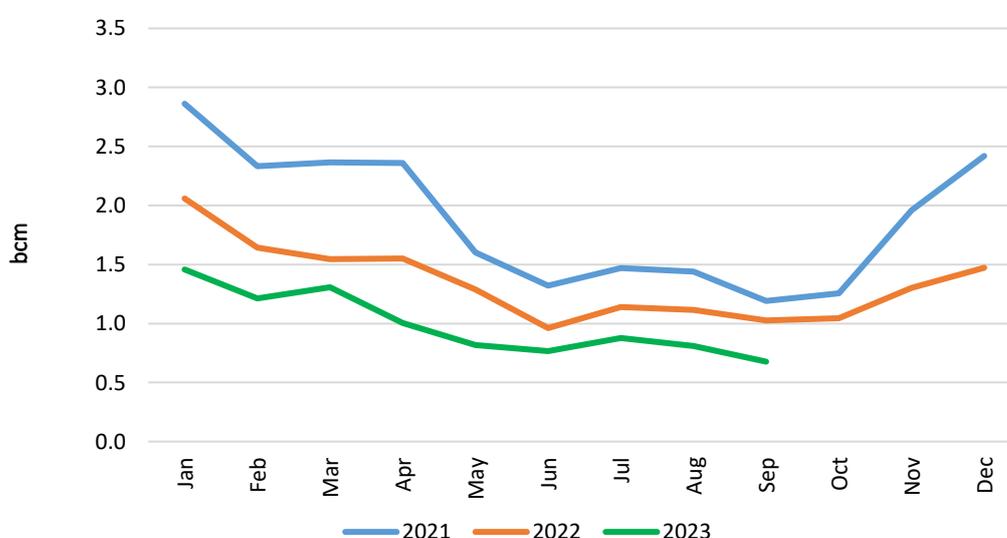


Source: GECF Secretariat based on data from Refinitiv

### 3.2.3 Netherlands

In September 2023, the Netherlands recorded a 32% drop in gas production compared to the previous year, resulting in an output of 0.7 bcm (Figure 51). Furthermore, the cumulative gas production from January to September 2023 amounted to 8.95 bcm, which represented a 27% reduction in output compared to the same period in 2022. This reduction in the Dutch output is mainly attributed to the production decline from its mature fields and the abandonment of the Groningen field.

Figure 51: Trend in gas production in the Netherlands



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

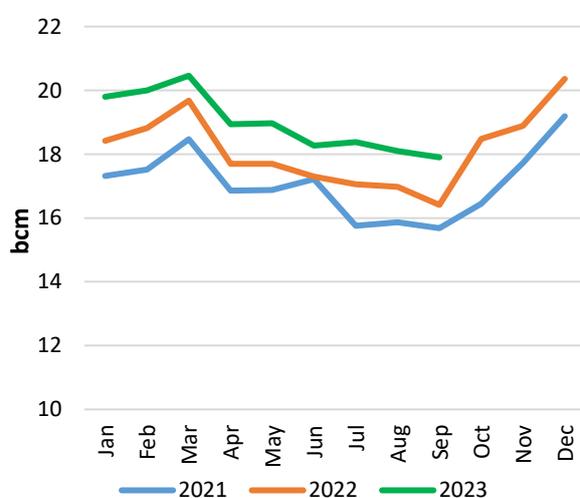
### 3.3 Asia

In September 2023, China witnessed a 9% y-o-y rise in gas production, reaching 17.9 bcm (Figure 52). Furthermore, the total gas output from January to September recorded a 6% y-o-y increase, totalling 170.8 bcm. The country also reported a coal-bed methane (CBM) output of 1.16 bcm for the month.

Furthermore, in October 2023, the Chinese state oil and gas company CNOOC announced the discovery of a significant deep coal-bed methane reservoir with proven reserves of more than 100 bcm. The Shenfu CBM field is located at the Shaanxi province, north of the country at reservoir depths of approximately 2,000m. The well produced more than 19,000 cm<sup>3</sup>/d, with plans to drill more than 100 wells in the field. It is worth noting that Shenfu CBM discovery represented the second significant onshore discovery for CNOOC and a major boost for its unconventional production.

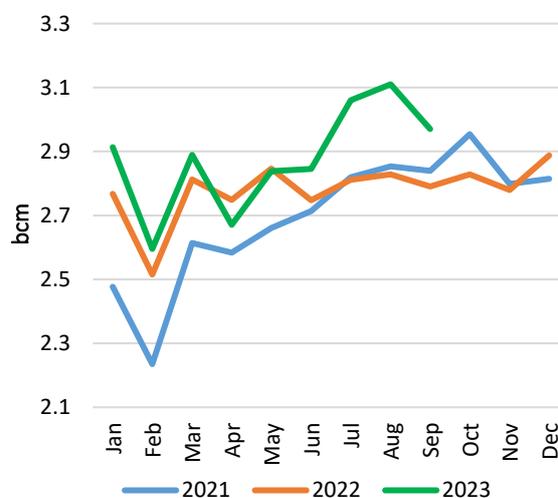
In September 2023, India witnessed a 6% y-o-y increase in gas production, amounting to an aggregated output of 2.97 bcm (Figure 53). For the period from January to September 2023, the total gas production was 25.9 bcm, marking a 4.1% rise compared to the same period in the previous year.

Figure 52: Trend in gas production in China



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

Figure 53: Trend in gas production in India



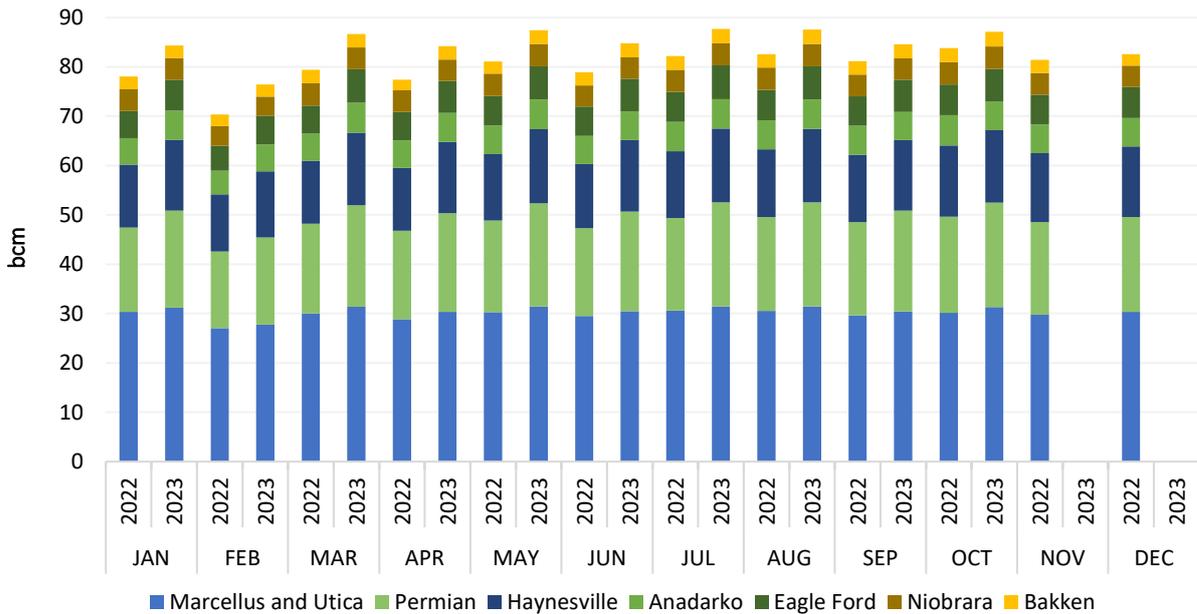
Source: GECF Secretariat based on data from Refinitiv, Ministry of Petroleum (India)

### 3.4 North America

#### 3.4.1 US

In October 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, reaching 87.1 bcm (Figure 54). Among these, the Appalachian region, encompassing the Marcellus and Utica shale formations, contributed a share of 36% of the total production. Moreover, the Permian shale oil field saw an 8.2% y-o-y increase in associated gas production, totalling 21.1 bcm, representing 24% of the entire shale gas output. It is worth noting that the average dry gas production in October 2023 reached over 91.1 bcm (104 bcf/d), representing a 5% increase y-o-y.

Figure 54: Trend in shale gas production in the US shale oil/gas producing regions



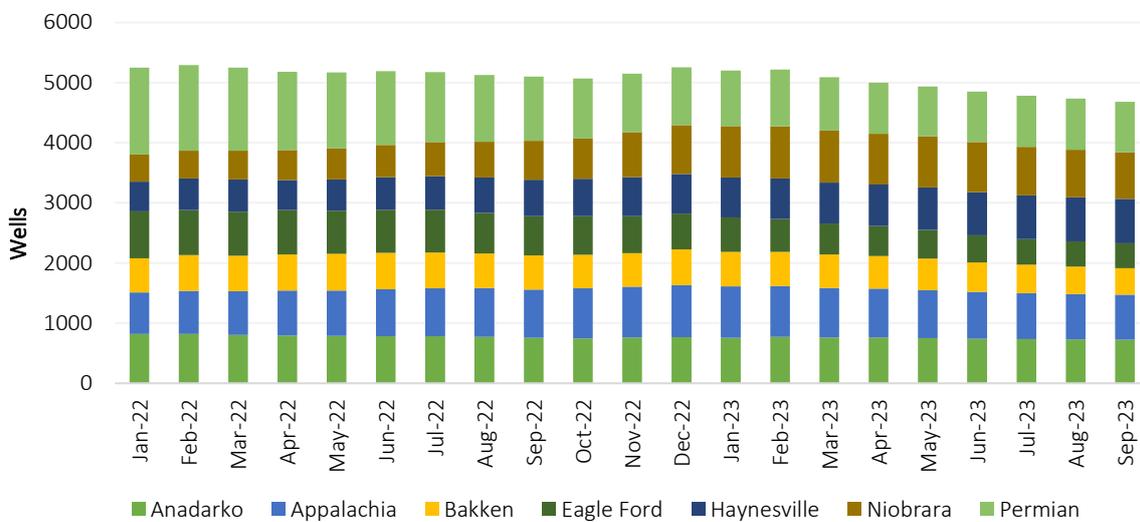
Source: GECC Secretariat based on data from Refinitiv, EIA

In September 2023, the total number of oil and gas rigs across the seven major shale oil and gas production regions in the US stood at 552. This indicates a decrease of 19 rigs from August 2023 and a drop of 103 rigs when compared to September 2022 (Figure 55).

Furthermore, in September 2023, the seven regions reported 4,681 drilled but uncompleted (DUC) wells, representing a decline of 54 wells compared to August 2023 (Figure 56).

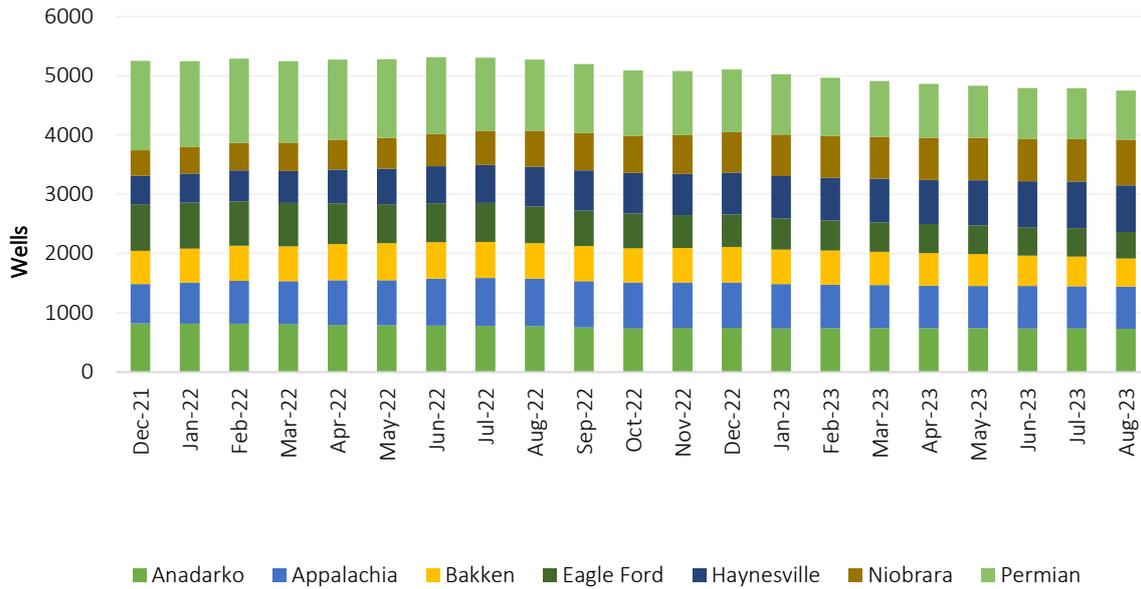
The EIA's Drilling Productivity Report outlined both monthly and annual reduction in new well gas production per rig for October 2023 at levels of 0.2% and 5.3% respectively (Figure 57). This brought the average new well production per rig across all regions to the level of 5,274,000 cubic feet per day.

Figure 55: US shale region oil and gas rig count



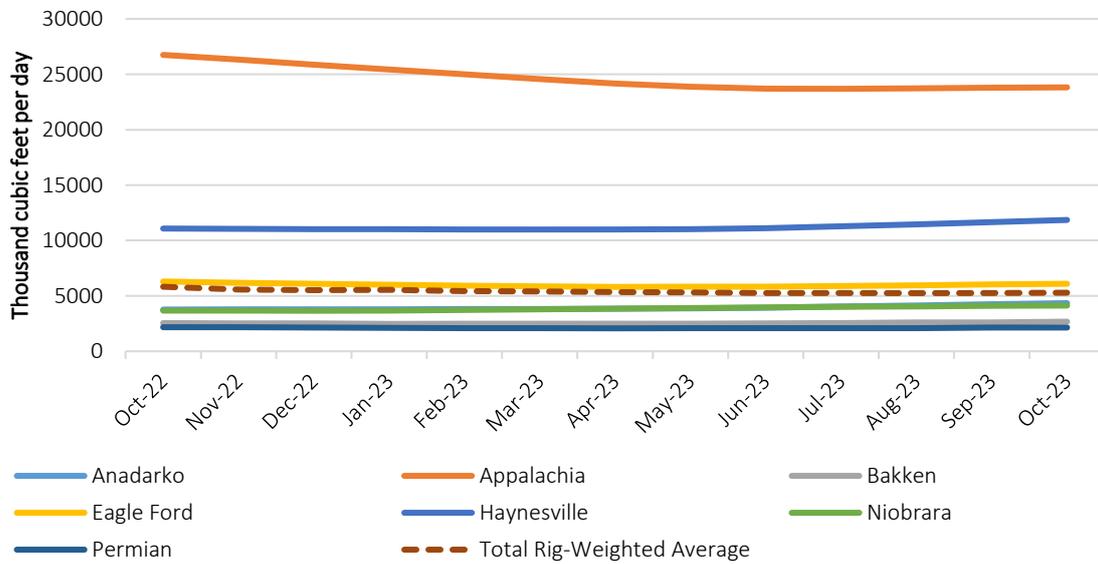
Source: GECC Secretariat based on data from Refinitiv and EIA

Figure 56: Drilled but uncompleted well (DUCs) counts in the US



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

Figure 57: New-well gas production per rig

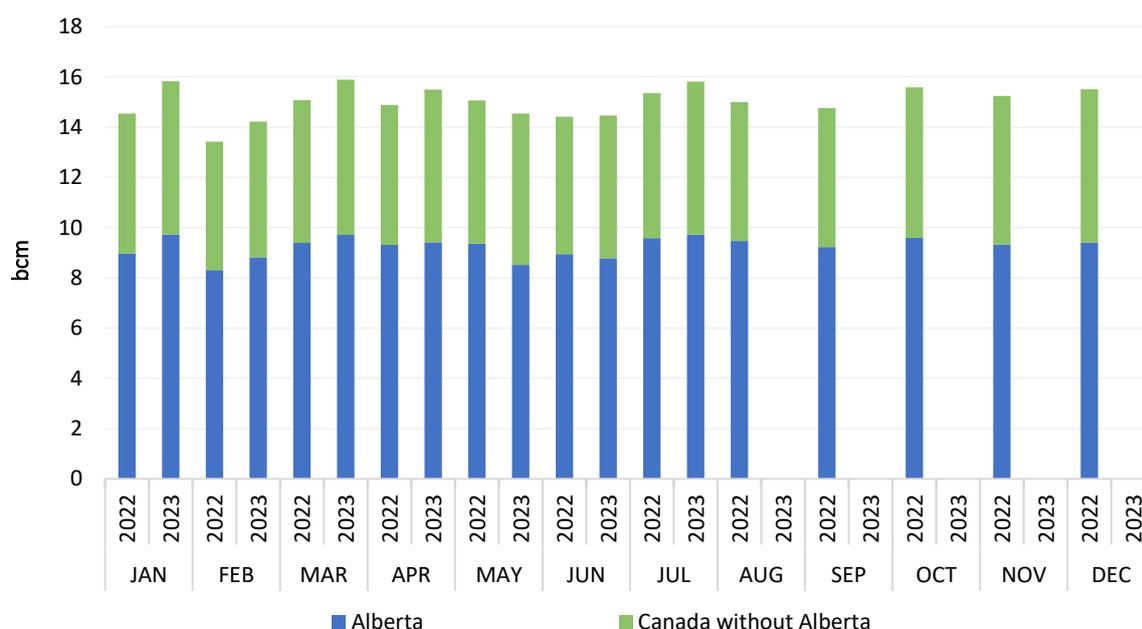


Source: GECF Secretariat based on data from Refinitiv, US EIA

### 3.4.2 Canada

According to the Canada Energy Regulator (CER), the country’s gas production in July 2023 reached 15.8 bcm, reflecting a 3% increase y-o-y and driven by the rise in Alberta’s production (Figure 58). From January to July, there was a 3% y-o-y growth in the aggregated gas production, reaching 106.3 bcm. In July 2023, Gas production in Alberta witnessed an increase of 0.9 bcm, reaching 9.7 bcm (the same levels recorded in March 2023).

Figure 58: 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 4.74 bcm in September 2023, according to data from the Brazilian National Agency of petroleum (ANP). This represented a record high output level that surpassed the previous high of 4.63 bcm, recorded in July 2023. It also represented a 6.9% m-o-m increase compared to August 2023 and 10.4% y-o-y increase compared to September 2022 level (Figure 59). Approximately 54% of the produced gas was reinjected into reservoirs, the highest reinjection level achieved so far, while gas flaring witnessed an 11% m-o-m reduction. In terms of distribution, offshore gas fields accounted for 87.2% of the gross monthly gas production, with the Tupi field in the Santos pre-salt basin emerging as the largest gas-producing field at 1.33 bcm (20% increase in production m-o-m). The FPSO facility in Guanabara in the shared Mero field was the highest gas producing facility with approximately 0.35 bcm, nearly mirroring the same level of the previous month.

In Argentina, gross gas production reached a record high of 4.3 bcm in September 2023, based on data provided by the Argentinian Ministry of Economy. This represents a 3.9% decrease compared to the record highs attained in August 2023 (4.47 bcm). However, it represents a 2% increase compared to September 2022 (4.08 bcm) (Figure 60). The cumulative gas production from January to September 2023 amounted to 36.7 bcm, aligning closely with the production levels for the same period in 2022. Shale gas production amounted to 2 bcm in September 2023, representing 46.5% of the gross production while tight gas reservoir production was 0.62 bcm, accounting for 14.6% of the total gas production. The remaining part of production stemmed from the conventional gas fields.

Figure 59: Trend in gas production in Brazil

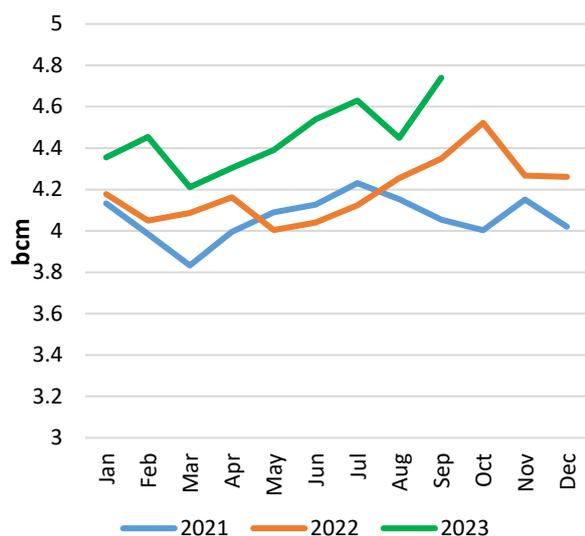
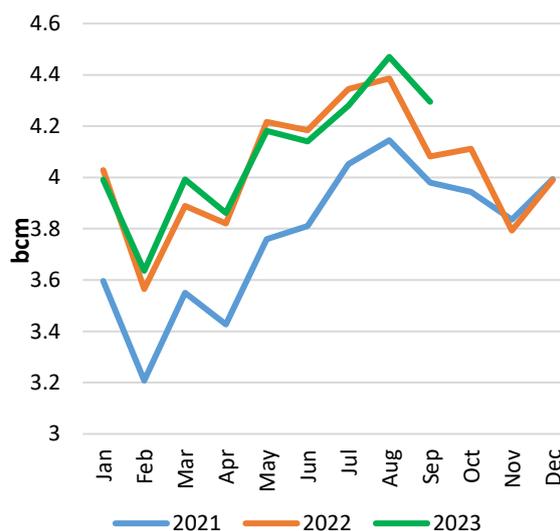


Figure 60: Trend in gas production in Argentina



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

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

### 3.6 Other Regions

*Iran announced the discovery of the largest onshore gas field in Fars province:* The Iranian Minister of Oil announced the discovery of a massive gas field in the Lamerd area, south of Fars province, as reported by the Islamic Republic News Agency. The discovery is the largest onshore gas discovery ever made in Iran, with estimated gas volumes of approximately 22 trillion cubic feet (623 bcm). The development of this new discovery would have a substantial economic impact on Fars province and its five million population, in terms of job creation and infrastructure development in the region.

*Iraq launched the development of three oil and gas fields with Crescent Petroleum:* According to the Iraqi Ministry of Oil statement, Iraq has put into effect three 20-year oil and gas field development projects with the UAE's Crescent Petroleum. The fields, located in Basra and Diyala provinces are expected to start production in 2025, with about 400 mmcf/d (4.1 bcma). Iraq is encouraging investments in gas projects, aiming to reduce gas flaring and increase power generation from processed gas.

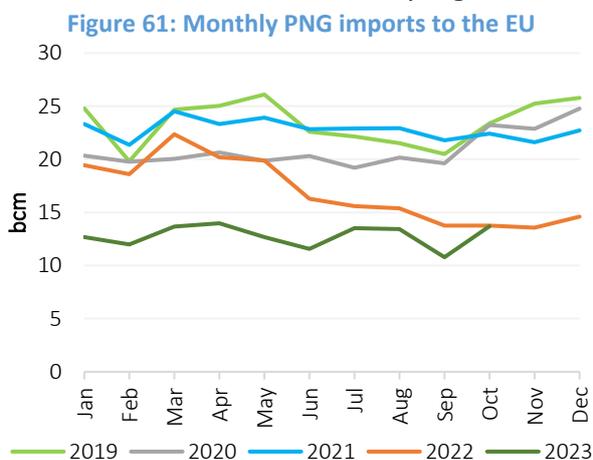
*Geng North gas field emerged as a significant discovery in Indonesia:* According to Eni, the Geng North gas discovery, offshore Indonesia, is one of the remarkable gas discoveries in 2023 thus far, with more than 5 tcf (142 bcm) of original gas-in-place and more than 400 million bbl of condensate. Eni is considering the option of a fast-track development utilising a Floating Production, Storage and Offloading (FPSO) vessel. Preliminary estimates suggest that production could commence in 2027, with an annual output reaching 9.5 bcma.

## 4 Gas Trade

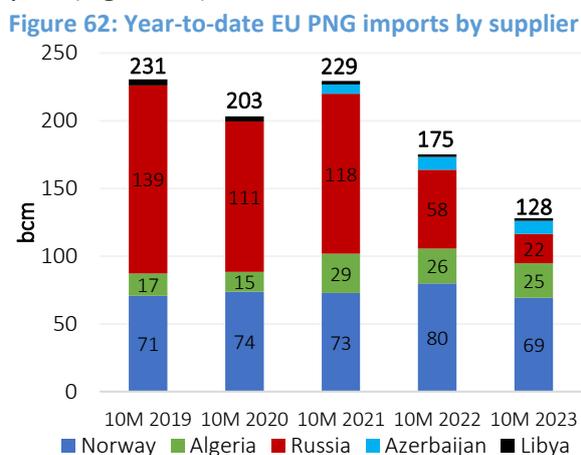
### 4.1 Pipeline Natural Gas (PNG) Trade

#### 4.1.1 Europe

PNG imports to the EU rebounded in October 2023, reaching 13.7 bcm, the highest level in six months (Figure 61). This volume reflects a 27% increase from the previous month and the same level achieved in October 2022. After ten months, cumulative PNG volumes imported by the EU in 2023 totalled 128.0 bcm, some 27% short of the level reached during same point last year (Figure 62). Following the production outages in September, Norway has now completed its scheduled annual maintenance program for the year (Figure 63).



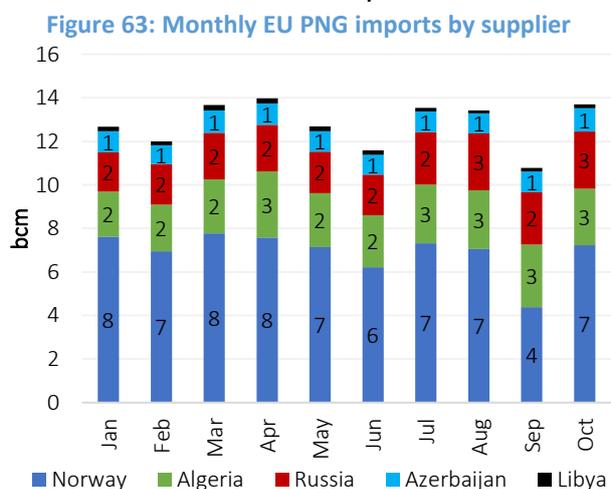
Source: GECF Secretariat based on data from McKinsey and Refinitiv



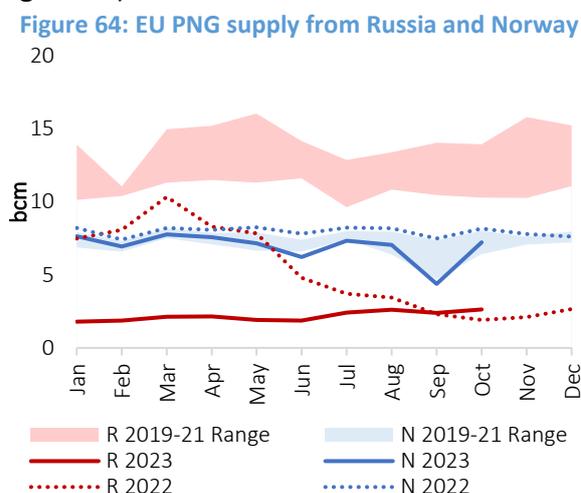
Source: GECF Secretariat based on data from McKinsey and Refinitiv

In 2023 thus far, Norway has supplied 54% of pipeline gas supply to the EU, followed by Algeria with 20% and Russia with 17%. During the period January to October 2023, imports from Russia fell by 63% y-o-y (36 bcm), while imports from Norway fell by 13% y-o-y (11 bcm). PNG imports from Algeria, Azerbaijan and Libya were virtually unchanged y-o-y.

Within these ten months of 2023, PNG imports from Norway have averaged 6.9 bcm per month, compared with 8.0 bcm in 2022 and 7.2 bcm in the years 2019 to 2021. At the same time, the average PNG imports from Russia reached 2.2 bcm per month in 2023, compared with 5.8 bcm in 2022 and 12.3 bcm in the years 2019 to 2021 (Figure 64).



Source: GECF Secretariat based on data from McKinsey and Refinitiv



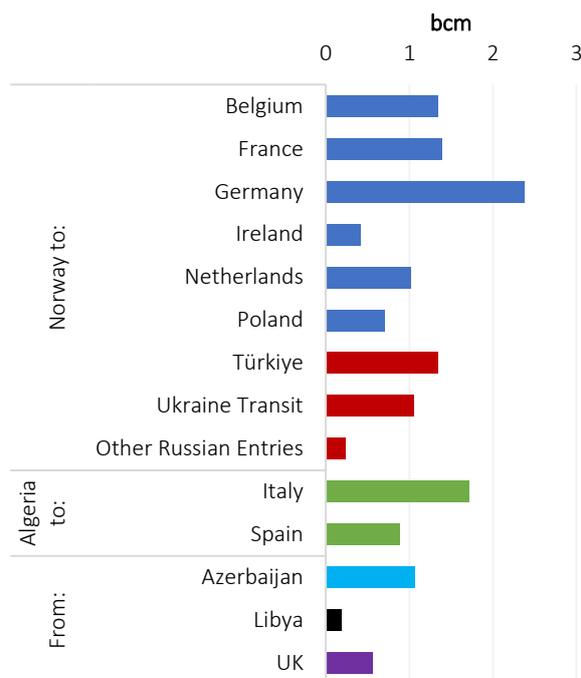
Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 65 shows the PNG imports to the EU via the major supply routes in October 2023.

PNG exports from all suppliers, via almost all supply routes, increased m-o-m. Norwegian exports to France surged by 224% to reach 1.4 bcm. However, Germany remained the top importer of PNG within the bloc, at 2.4 bcm. Russian gas entries via the Ukraine transit rose by 10%. Algeria’s volumes to Italy fell by 21% m-o-m, but still accounted for two-thirds of its overall exports. Net PNG volumes from the UK to Europe picked up by 49% m-o-m, to reach 0.6 bcm.

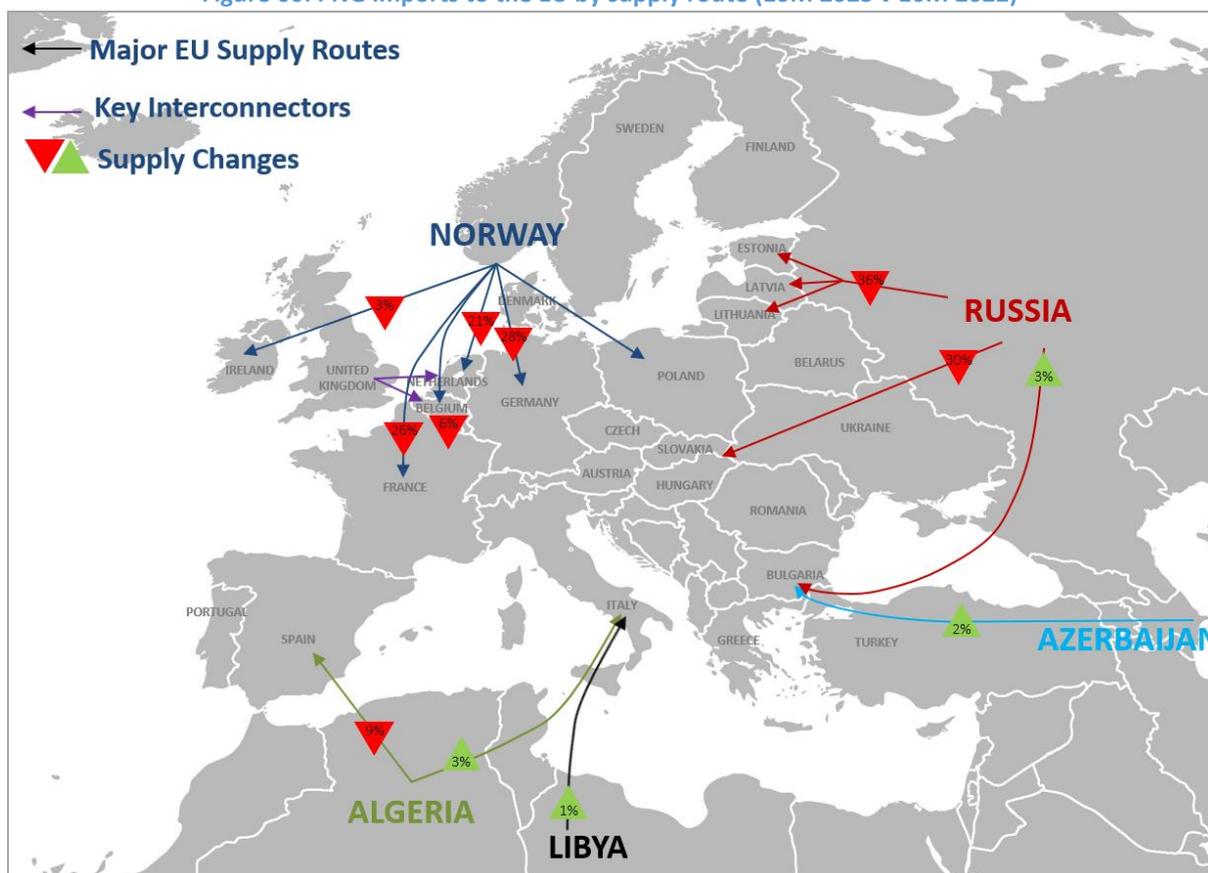
Figure 66 compares the PNG imports to the EU via major supply routes during the first ten months of 2023, with the same period in 2022. Russia’s exports via Turkstream grew by 3%. Similarly, PNG supply from Algeria to Italy also reflected a 3% rise. Norway recorded declines along all supply routes.

Figure 65: EU PNG imports by supply route, in October 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 66: PNG imports to the EU by supply route (10M 2023 v 10M 2022)

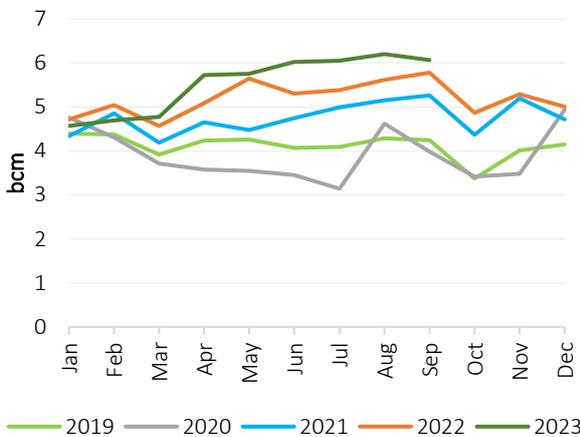


Source: GECF Secretariat based on data from McKinsey and Refinitiv

### 4.1.2 Asia

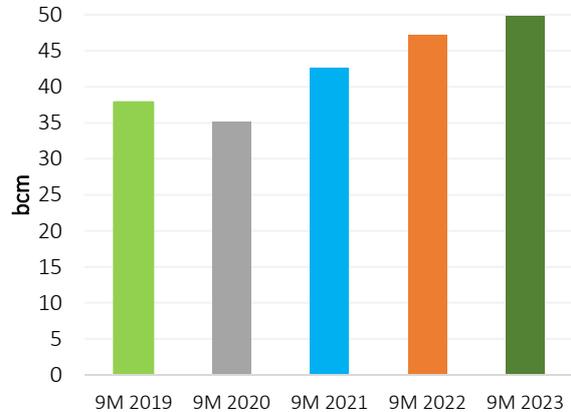
The level of PNG imports to China has stabilised, reaching 6.1 bcm in September 2023. This quantity was 2% lower m-o-m but was 5% higher than one year ago (Figure 67). With a slight decline in LNG imports during the month, the share of PNG in China's total imports rose to 44%. For the period January to September 2023, total PNG imports reached 50 bcm, representing a 6% increase compared with the same period in 2022 (Figure 68). The average monthly import rate in 2023 thus far was 5.5 bcm, up from 5.2 bcm in 2022.

Figure 67: Monthly PNG imports in China



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

Figure 68: Year-to-date PNG imports in China

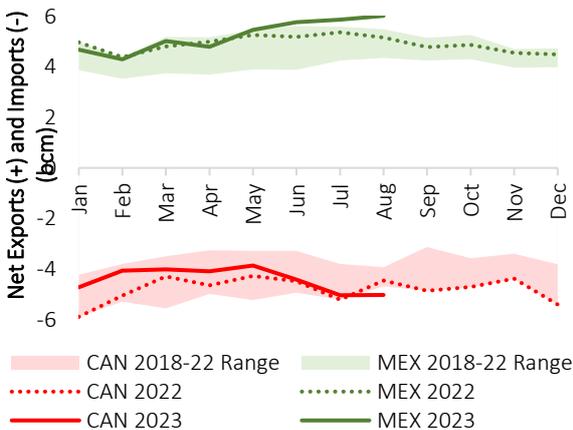


Source: GECF Secretariat based on data from Refinitiv and General Administration of Customs China

### 4.1.3 North America

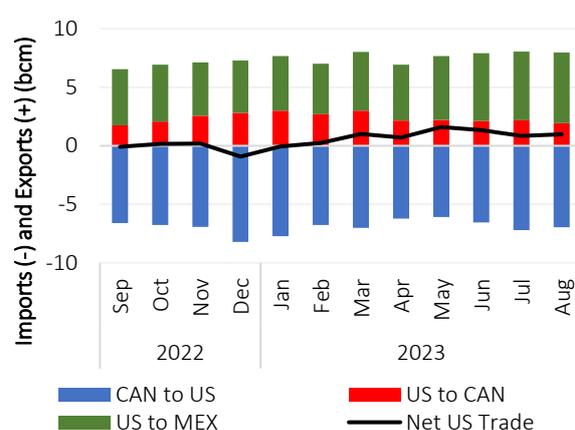
The US continues to increase gas supply to Mexico, with PNG exports for September 2023 surpassing the record, for the third consecutive month (Figure 69). At 6.0 bcm, this volume represented a 2% increase m-o-m and 16% increase y-o-y. Net PNG imports from Canada were unchanged m-o-m at 5.0 bcm, but were 13% higher y-o-y. After two thirds of the year, net PNG imports from Canada to the US fell by 8% y-o-y, while exports to Mexico rose by 4%. As a result, in September, there was 1.0 bcm of net PNG flows in the direction from the US to the other countries (Figure 70). The average monthly flows in the region in 2023 were 6.8 bcm from Canada to the US, 2.4 bcm from the US to Canada and 5.2 bcm from the US to Mexico.

Figure 69: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 70: Monthly US PNG trade



Source: GECF Secretariat based on data from US EIA

#### 4.1.4 Other Developments

*Gazprom expands pipeline gas trade with China:* During the visit by Russian President Vladimir Putin to China and on the sidelines of the Beijing's Belt and Road Forum, Gazprom chief executive Alexei Miller signed an agreement for the supply of additional pipeline gas to China during 2023. Initially projected to reach 22 bcm, flows to China through the Power of Siberia 1 (POS1) pipeline are now expected to reach 22.6 bcm for the year. As part of the planned phasing of supply, Gazprom had previously indicated there will be 30 bcm of flows through POS1 in 2024, in line with the target of full capacity (38 bcm) by 2025. In addition, Miller also signalled Gazprom's intention to commence deliveries to China via the Far East route by 2027. This arrangement is expected to supply 10 bcma over a 25-year term.

*Damaged Balticconnector pipeline to remain shut over the winter:* On 8 October 2023, the Balticconnector pipeline suffered extensive rupture damage, rendering it inoperable. This important pipeline gas link connects Inkoo, Finland with Paldiski, Estonia, and is capable of flowing 2.6 bcma of supply in either direction, as needed. The Balticconnector is jointly owned and operated by Finland's Gasgrid and Estonia's Elering. Both companies have indicated that customers will continue to receive gas sourced from other supply, as well as from underground storage. In the meantime, Gasgrid expects the line to remain shut until at least April 2024.

*Venezuela agrees gas export to Trinidad and Tobago:* The long-standing project for the export of gas from Venezuela's Dragon field to Trinidad and Tobago received a substantial boost with the signing of agreements between both governments. Negotiations on the project between both countries were hindered by the imposition of economic restrictions by the US in 2020. In February 2023, the US Treasury granted a waiver for a period of two years, and in October 2023 the terms were amended to provide less restrictive payment options. It was reported previously that the deal would involve the import of 150 mmcf of gas from the Dragon field via pipeline to a Shell platform in Trinidad's waters. The Dragon field is one of a number of hydrocarbon plays within Venezuela's Mariscal Sucre complex, which is estimated to contain some 14.7 tcf of gas. Trinidad and Tobago and Venezuela are already progressing on the unitisation of the cross-border Loran-Manatee field.

## 4.2 LNG Trade

### 4.2.1 LNG Imports

In October 2023, global LNG imports increased slightly by 1.9% (0.61 Mt) y-o-y to 32.11 Mt (Figure 71). The Asia Pacific region accounted for the bulk incremental increase in LNG imports, while imports in LAC and MENA regions grew at a lesser extent (Figure 72). In contrast, Europe's LNG imports continued to decline, albeit at a slower pace. Between January and October 2023, the cumulative global LNG imports stood at 335.35 Mt, representing a growth of 2.9% (9.30 Mt) y-o-y.

Figure 71: Trend in global monthly LNG imports

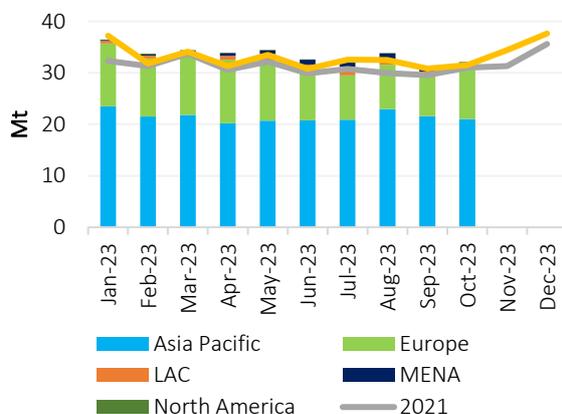
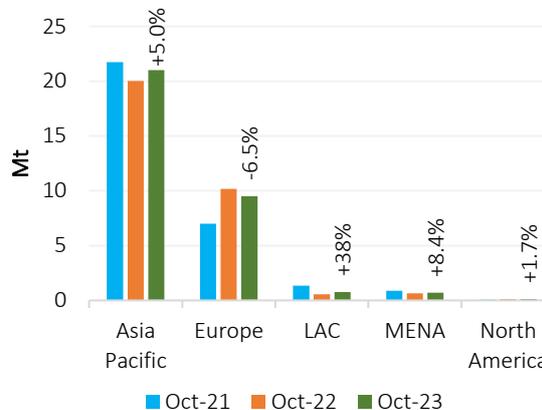


Figure 72: Trend in regional LNG imports



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.1.1 Europe

In October 2023, Europe's LNG imports experienced a modest 6.5% y-o-y decrease, amounting to 0.66 Mt, ultimately reaching 9.50 Mt (Figure 73) and marking the fourth consecutive monthly decline. The reduction in Europe's LNG imports can be attributed to several factors, including elevated gas storage levels, decreased gas consumption and a favourable price differential between spot LNG prices in Asia and the TTF price, making the Asia Pacific market more attractive for spot LNG shipments. Belgium, France, Spain and the UK experienced significant declines in LNG imports, while Finland, Germany, and the Netherlands saw substantial increases (Figure 74). Over the period from January to October 2023, cumulative LNG imports in Europe grew by 1.5% (1.47 Mt) y-o-y, totalling 102.1 Mt.

The drop in Belgium's LNG imports resulted from a combination of reduced gas consumption, abundant gas storage levels and diminished pipeline gas exports to Germany and the Netherlands. In France, high gas storage levels, increased pipeline gas imports from Spain, along with declining gas consumption and maintenance activity at the Montoir and Fos Tonkin LNG facilities, restrained its LNG imports. Spain's decline in LNG imports was driven by higher pipeline gas imports from Algeria, ample gas storage and reduced gas consumption. On the other hand, the decrease in UK's LNG imports can be attributed to lower gas consumption and pipeline gas exports to mainland Europe.

Conversely, the ramp-up in LNG imports at the Inkoo LNG facility, which is also utilised by Estonia, significantly boosted Finland's LNG imports. Higher gas consumption, reduced pipeline gas imports from Norway and ramp-up in LNG imports at new facilities boosted Germany's LNG imports. Finally, an increase in gas consumption, coupled with lower gas production, led to higher LNG imports in the Netherlands.

Figure 73: Trend in Europe’s monthly LNG imports

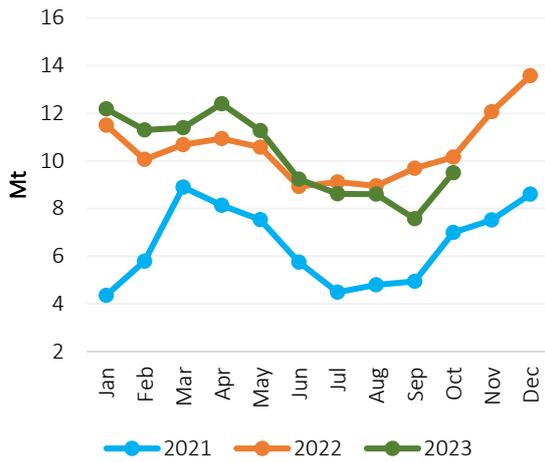
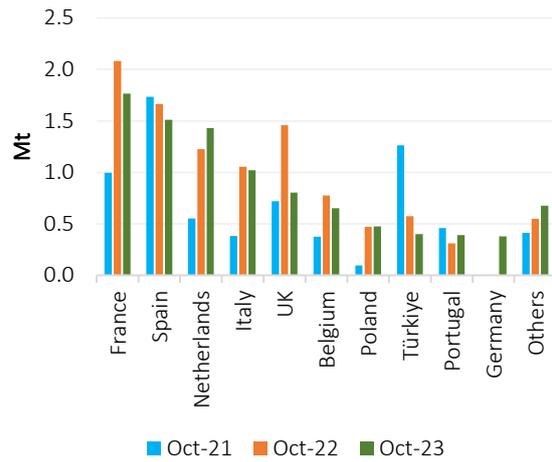


Figure 74: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.1.2 Asia

In October 2023, Asia Pacific’s LNG imports expanded by 5.0% (1.00 Mt) y-o-y to reach 21.01 Mt, however these volumes were lower than the imports in October 2021 (Figure 75). The higher LNG imports were driven by Bangladesh, China, India, Japan, Philippines, Singapore and Thailand, which offset weaker imports in South Korea and Taiwan (Figure 76). Between January and October 2023, the cumulative LNG imports in Asia Pacific grew by 3.2% (6.71 Mt) y-o-y to 214.94 Mt.

Lower spot LNG prices compared to a year earlier and weak LNG demand in Europe supported the stronger LNG imports in Bangladesh, India, Singapore and Thailand. In China, the continued post-COVID-19 recovery in gas demand and winter restocking supported the rise in LNG imports. The sharp increase in Japan’s LNG imports was attributed to LNG restocking ahead of the winter season. In the Philippines, the ramp-up in LNG imports at the recently commissioned LNG import terminal supported the rise in LNG imports. Conversely, the slump in LNG imports in South Korea and Taiwan was mainly due to higher LNG storage levels in both countries, compared to a year earlier.

Figure 75: Trend in Asia’s monthly LNG imports

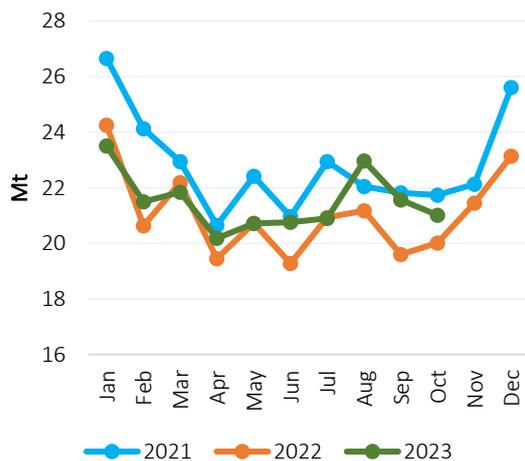
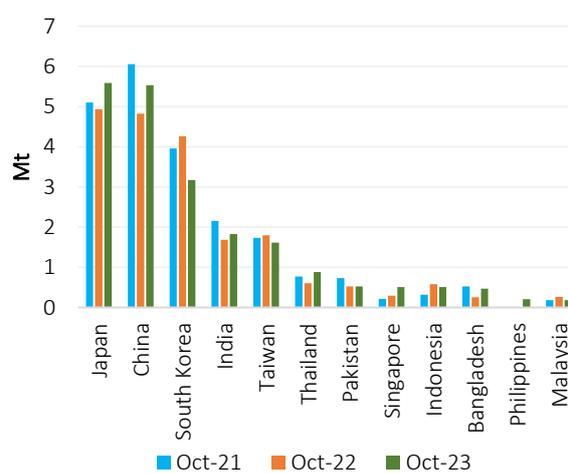


Figure 76: Top LNG importers in Asia Pacific



Source: GECF Secretariat based on data from ICIS LNG Edge

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

In October 2023, LNG imports in LAC stood at 0.76 Mt, which represents a significant increase of 38% (0.21 Mt) y-o-y (Figure 77). The jump in LNG imports was mainly driven by Colombia, Jamaica and Puerto Rico (Figure 78). From January to October 2023, the cumulative LNG imports in LAC expanded by 8.1% (0.78 Mt) y-o-y to 10.5 Mt.

Colombia continues to increase its LNG imports to boost its electricity generation from gas as the El Nino phenomenon is expected to cause drought conditions and reduced hydro output. The rise in Jamaica's LNG imports was attributed to New Fortress Energy (NFE) utilising the Portland Bight terminal for LNG storage and reloading to other Caribbean islands. Meanwhile, higher term LNG deliveries from NFE and Naturgy contributed to the uptick in Puerto Rico's LNG imports.

Figure 77: Trend in LAC's monthly LNG imports

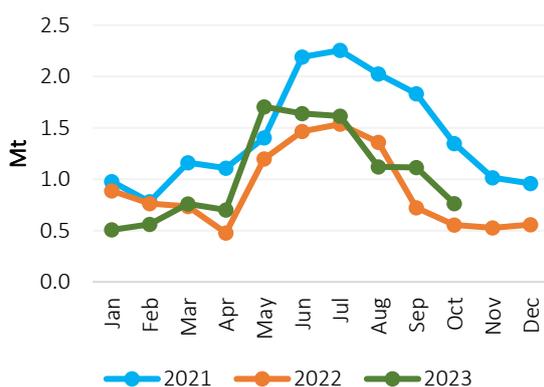
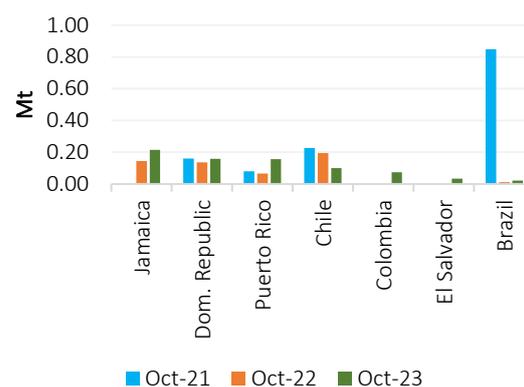


Figure 78: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.1.4 MENA

In October 2023, the MENA region's LNG imports grew by 8.4% (0.06 Mt) y-o-y to reach 0.71 Mt (Figure 79), driven by higher imports in Kuwait (Figure 80). Between January and October 2023, the MENA region's cumulative LNG imports rose by 4.3% (0.28 Mt) y-o-y to 6.76 Mt.

The increase in Kuwait's LNG imports came mainly from Qatar, and to a lesser extent from Malaysia, which together offset weaker imports from the US.

Figure 79: Trend in MENA's monthly LNG imports

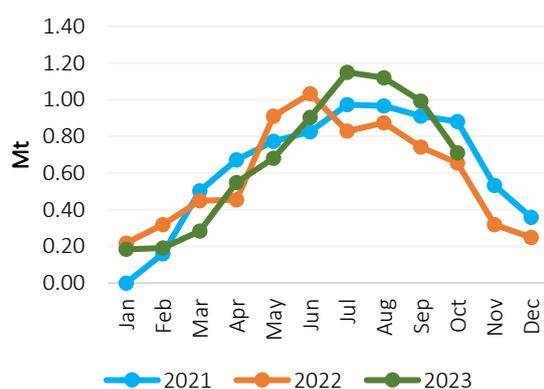
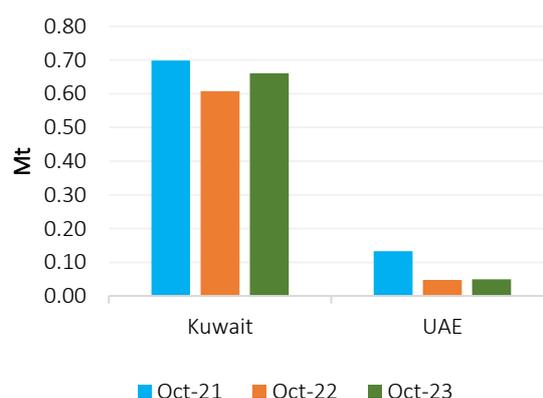


Figure 80: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

## 4.2.2 LNG Exports

In October 2023, global LNG exports increased by 3.0% (1.02 Mt) y-o-y to reach 34.70 Mt, the highest monthly exports since April 2023 (Figure 81). Non-GECF countries accounted for the bulk incremental increase in LNG exports. In contrast, GECF member countries recorded a y-o-y decline in its LNG exports. Non-GECF countries were the largest LNG exporter in October with a market share of 51.6%, up from 48.7% a year earlier. The share of LNG reloads in global LNG exports also increased from 1.4% to 1.9% while GECF's market share declined from 49.9% to 46.5%. The leading LNG exporting countries were the US, Qatar and Australia (Figure 82).

Between January and October 2023, the cumulative global LNG exports grew by 3.5% (11.61 Mt) y-o-y growth to 339.2 Mt.

Figure 81: Trend in global monthly LNG exports

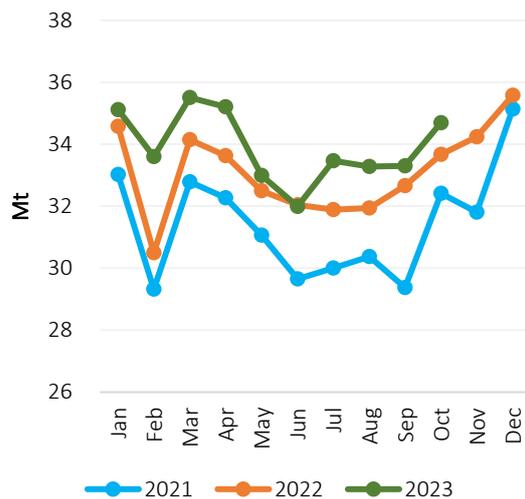
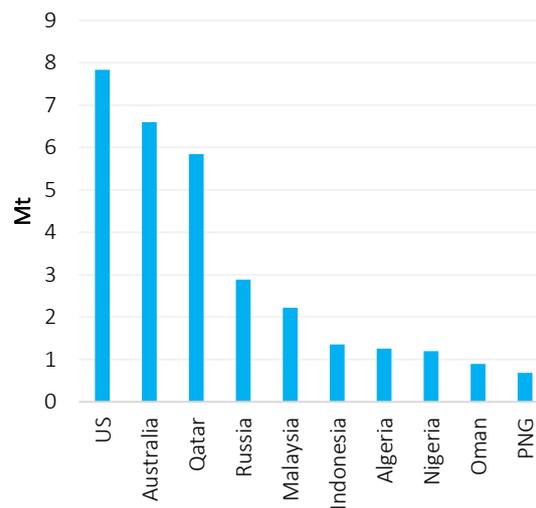


Figure 82: Top 10 LNG exporters in Oct 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.2.1 GECF

In October 2023, LNG exports from GECF member countries and observers declined by 4.0% (0.66 Mt) y-o-y to 16.1 Mt (Figure 83). The weaker LNG exports came from Egypt and Qatar, which were partially offset by stronger exports from Algeria, Nigeria, Mozambique and the United Arab Emirates (Figure 84). Over the period January to October 2023, the cumulative LNG exports of GECF member countries grew modestly by 0.7% (1.19 Mt) y-o-y to 163.1 Mt.

In Egypt, lower feedgas availability curbed the country's LNG exports. Meanwhile, planned maintenance activity at Qatargas 2 led to the decline in Qatar's LNG exports, falling to the lowest level since February 2022.

On the other hand, lower maintenance activity at the Arzew LNG facility compared to a year earlier, as well as high feedgas availability, boosted Algeria's LNG exports. In Nigeria, feedgas availability was higher compared to a year earlier, when severe flooding in the country disrupted feedgas supply, drove its LNG exports higher. The continued ramp-up in production at the Coral South FLNG facility led to the stronger LNG exports in Mozambique. Finally, lower maintenance activity compared to October 2022 contributed to the rise in LNG exports from the United Arab Emirates.

Figure 83: Trend in GECF monthly LNG exports

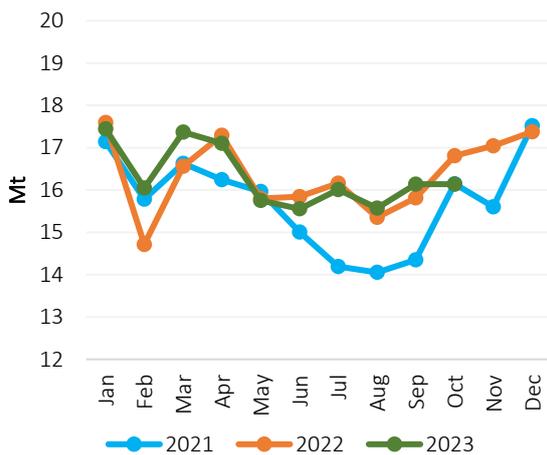
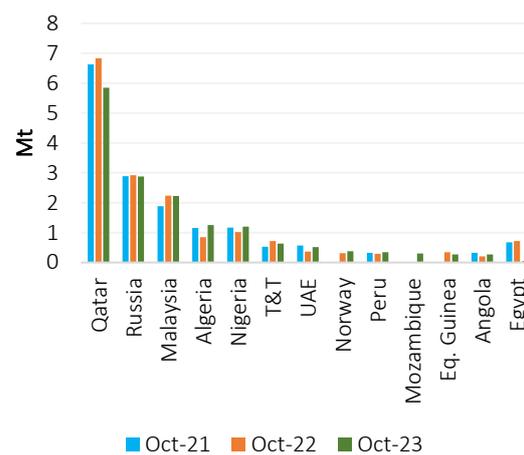


Figure 84: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.2.2 Non-GECF

In October 2023, LNG exports from non-GECF countries stood at 17.90 Mt, representing a growth of 9.3% (1.52 Mt) y-o-y (Figure 85). The stronger LNG exports came mainly from Cameroon, Indonesia and the US, which offset a decline in exports in Australia (Figure 86). From January to October 2023, non-GECF countries' cumulative LNG exports expanded by 5.5% (8.98 Mt) y-o-y to 171.36 Mt.

The rise in Cameroon's LNG exports was driven by lower maintenance activity compared to a year earlier. In Indonesia, the start-up of Tangguh LNG train 3 contributed to the increase in the country's LNG exports. Meanwhile, lower maintenance activity at the Cove Point and Sabine Pass facilities and the ramp-up production at the Calcasieu Pass LNG facility, coupled with the return of operation at Freeport LNG, boosted LNG exports from the US. Conversely, the drop in Australia's LNG exports was attributed to lower feedgas availability from the North West Shelf LNG facility, higher planned maintenance at Prelude FLNG facility and a decline in exports from the Wheatstone LNG facility. The lower exports from these facilities were partially offset by an increase in exports from the Gorgon and QCLNG facilities.

Figure 85: Trend in non-GECF monthly LNG exports

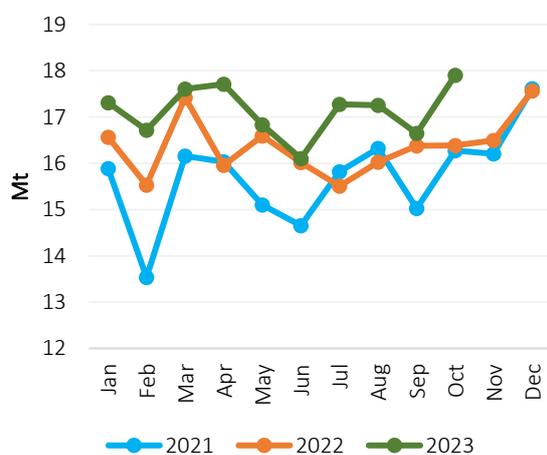
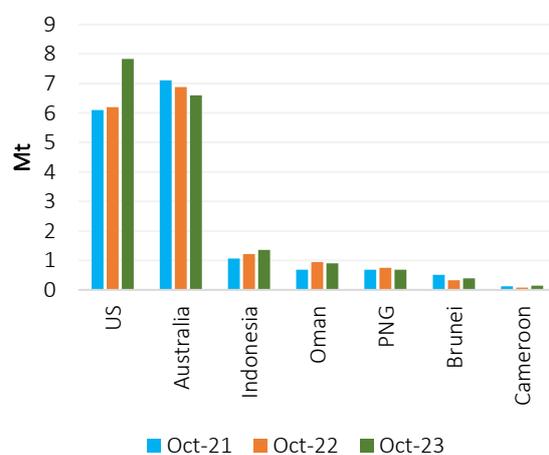


Figure 86: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.3 Global LNG Reloads

In October 2023, global LNG reloads jumped by 36% (0.17 Mt) y-o-y to 0.65 Mt, which is the highest level since February 2023 (Figure 87). The higher reloading activity was driven by China, Indonesia, Jamaica and Türkiye, which offset a decline in LNG reloads in Spain (Figure 88). Between January and October 2023, the cumulative global LNG reloads expanded sharply by 45% (1.44 Mt) y-o-y to 4.68 Mt.

The higher LNG reloads in China was due to an increase in LNG exports to Japan and higher intra-country LNG trade. China reloaded and exported two LNG cargoes to Japan in October 2023 compared to just one cargo a year earlier. The increase in LNG reloads from the Arun LNG facility for export to Japan and South Korea boosted Indonesia's LNG reloading activity. In Jamaica, New Fortress Energy boosted its LNG reloads from the Portland Bight LNG facility for exports to other Caribbean islands. Furthermore, TotalEnergies reloaded an LNG cargo from the Marmara Ereğlisi LNG facility for term delivery to China, which contributed to the rise in Türkiye's LNG reloads. Conversely, the decline in Spain's LNG reloads is attributed to weaker exports to Italy.

Figure 87: Trend in global monthly LNG reloads

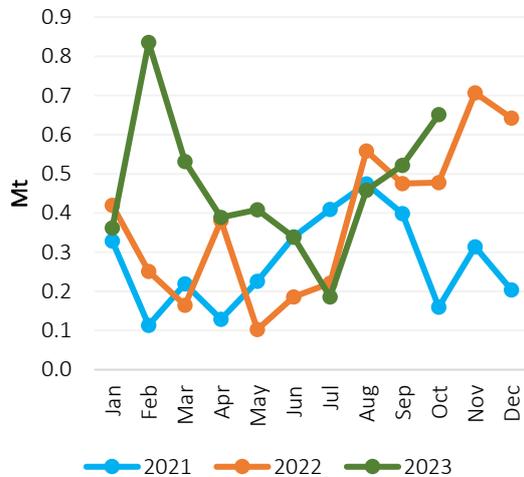
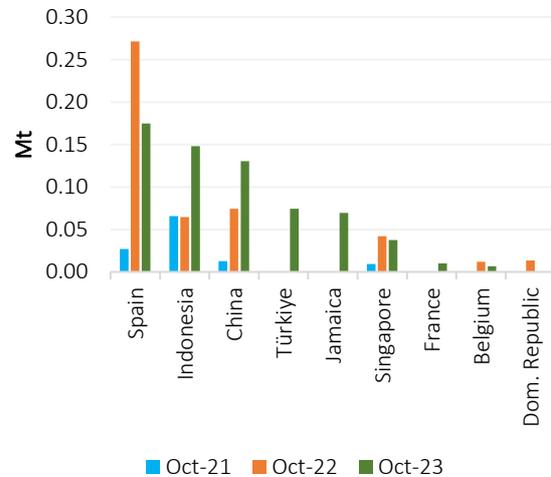


Figure 88: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.4 Arbitrage Opportunity

In October 2023, there was no arbitrage opportunity for LNG reloads from Europe to Asia Pacific. This was due to a significant decline in the spot LNG price spreads between Asia Pacific and Europe, which were less than half of the spot LNG shipping costs between both markets (Figure 89). Meanwhile, the price spread between spot LNG prices in Asia Pacific and oil-indexed prices in Europe continued to hold a substantial premium over the spot shipping cost from Europe to Asia Pacific.

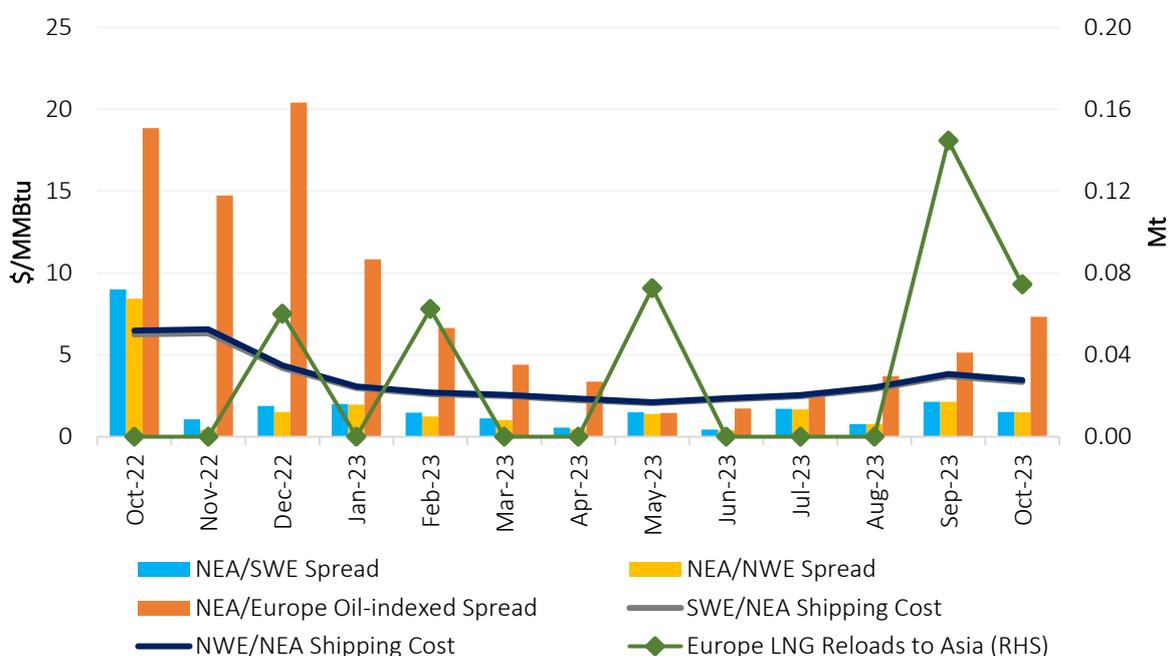
The price differentials between NEA/SWE and NEA/NWE fell by 30% (\$0.63/MMBtu) m-o-m to average \$1.50/MMBtu. The tighter price spread was attributed to a stronger increase in spot LNG prices in Europe compared to Asia Pacific. Conversely, the price differential between spot LNG prices in Asia Pacific and oil-indexed prices in Europe averaged \$7.32/MMBtu, representing an increase of 42% (\$2.18/MMBtu).

In terms of the shipping costs for the NEA/SWE and NEA/NWE spot routes, they declined by 10% (\$0.36/MMBtu) each to \$3.34/MMBtu and \$3.46/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.

Although the arbitrage opportunity for LNG reloads was absent, 0.07 Mt of LNG was reloaded from Europe to the Asia Pacific region in October. As mentioned before, TotalEnergies reloaded one LNG cargo in Türkiye for delivery under a long-term contract with CNOOC.

Furthermore, the NEA/SWE and NEA/NWE price differentials slumped by 83% (\$7.49/MMBtu) and 82% (\$6.94/MMBtu) y-o-y, respectively. Likewise, 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 fell by 61% (\$11.53/MMBtu), 47% (\$2.91/MMBtu) and 47% (\$3.03/MMBtu) y-o-y, respectively.

Figure 89: Price spreads & shipping costs between Asia & Europe spot LNG markets

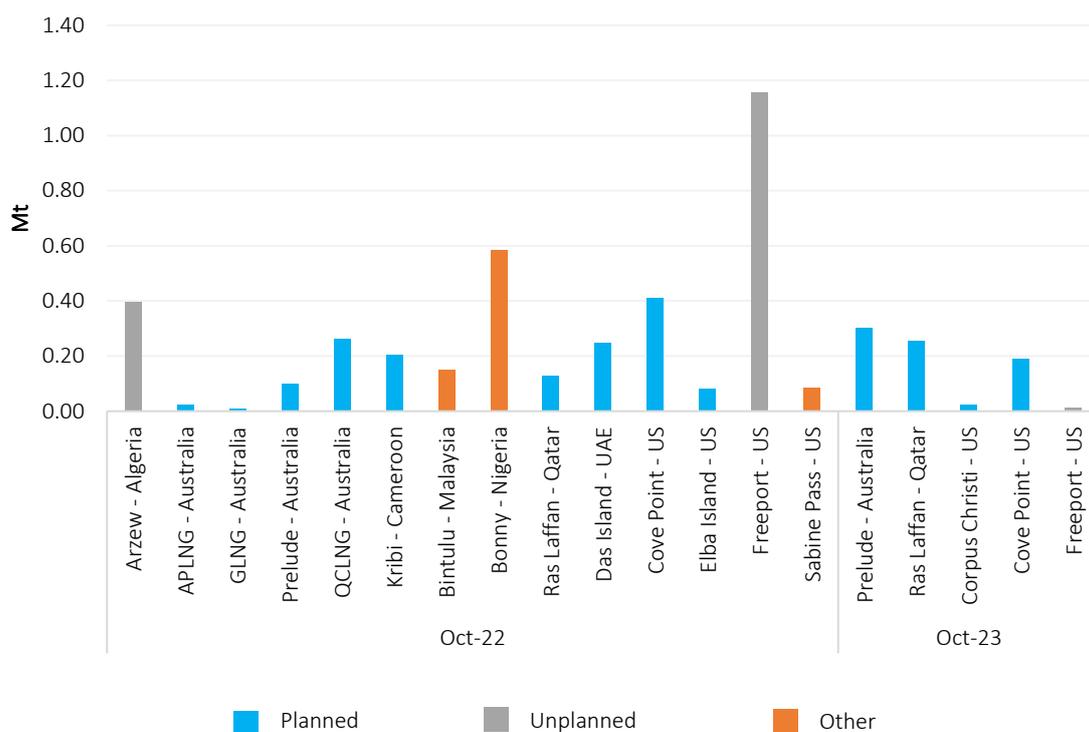


Source: GECF Secretariat based on data from GECF Shipping Model, Argus and ICIS LNG Edge

#### 4.2.5 Maintenance Activity at LNG Liquefaction Facilities

In October 2023, the cumulative impact of scheduled maintenance, unplanned outages and other factors at liquefaction facilities worldwide reached 0.78 Mt, which represents a significant decline from 3.84 Mt in October 2022 (Figure 90). Among the main events, there were planned maintenance activities at several LNG facilities, including Prelude FLNG in Australia, Ras Laffan in Qatar and Corpus Christi and Cove Point in the US. Meanwhile, there was a short unplanned outage at the Freeport LNG facility in the US.

Figure 90: Maintenance activity at LNG liquefaction facilities during October (2022 and 2023)



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

#### 4.2.6 Other Developments

**Third round of EU joint gas purchasing completed** – The third round of the EU joint gas purchasing took place between September 21 and October 4, 2023. During the demand aggregation phase, 39 European companies registered 16.49 bcm of their gas purchase needs. Global gas suppliers offered a total gas supply of 18.10 bcm during the tender phase. Prisma, the operator of the gas-purchasing platform, matched 11.86 bcm of gas supply offers with the gas demand needs of buyers, similar to the volumes matched during the second round. Both gas buyers and suppliers are engaged in the negotiation for the potential Sales and Purchase Agreements (SPAs).

**Tangguh LNG train 3 exports first LNG cargo** – On October 19, 2023, BP initiated the shipment of the inaugural LNG cargo from Indonesia's Tangguh LNG train 3. The commencement of the third LNG train, with a capacity of 3.8 Mtpa, increased the total LNG facility capacity at Tangguh to 11.4 Mtpa. Ownership of the Tangguh LNG facility is divided among BP Berau Ltd., MI Berau B.V., CNOOC Muturi Ltd., Nippon Oil Exploration, KG Berau Petroleum Ltd., KG Wiriagar Petroleum Ltd. and Indonesia Natural Gas Resources Muturi Inc. This LNG cargo was loaded onto the British Partner LNG vessel and subsequently exported to Incheon, South Korea, towards the end of October 2023.

**Artic LNG 2 train 3 starts construction** – During October 2023, the construction of the gravity-based platform for the third train at Russia's Artic LNG 2 facility commenced in the Kola Bay within the Murmansk region. Each of the three trains within the facility boasts a capacity of 6.6 Mtpa, resulting in a combined total capacity of 19.8 Mtpa for the entire facility. The third

train is anticipated to become operational in 2026, with the first train slated for start-up by the end of 2023 and the second train in 2024.

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

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

<b>Contract Type</b>	<b>Exporting Country</b>	<b>Project</b>	<b>Seller</b>	<b>Importing Country</b>	<b>Buyer</b>	<b>Volume (Mtpa)</b>	<b>Duration (Years)</b>
SPA	Qatar	North Field East	QatarEnergy	France	TotalEnergies	2	27
SPA	Qatar	North Field South	QatarEnergy	France	TotalEnergies	1.5	27
SPA	Equatorial Guinea	Punta Europa	Marathon Oil	UK	Glencore		5
SPA	Qatar	North Field East	QatarEnergy	Netherlands	Shell	2	27
SPA	Qatar	North Field South	QatarEnergy	Netherlands	Shell	1.5	27
SPA	UAE		ADNOC Gas	Japan	JERA Global Markets		
SPA	Qatar	North Field East	QatarEnergy	Italy	Eni	1	27

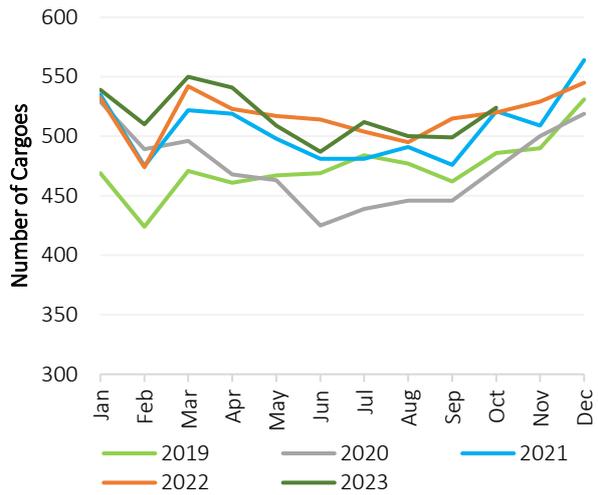
Source: GECF Secretariat based on Project Updates and News

### 4.2.7 LNG Shipping

October 2023 witnessed a 5% m-o-m increase in the total number of LNG shipments exported globally, reaching 524 (Figure 91). From January to October, the total number of shipments reached 5,171. Compared with the same period in 2022, this represented an increase of 1%, or 35 cargoes (Figure 92).

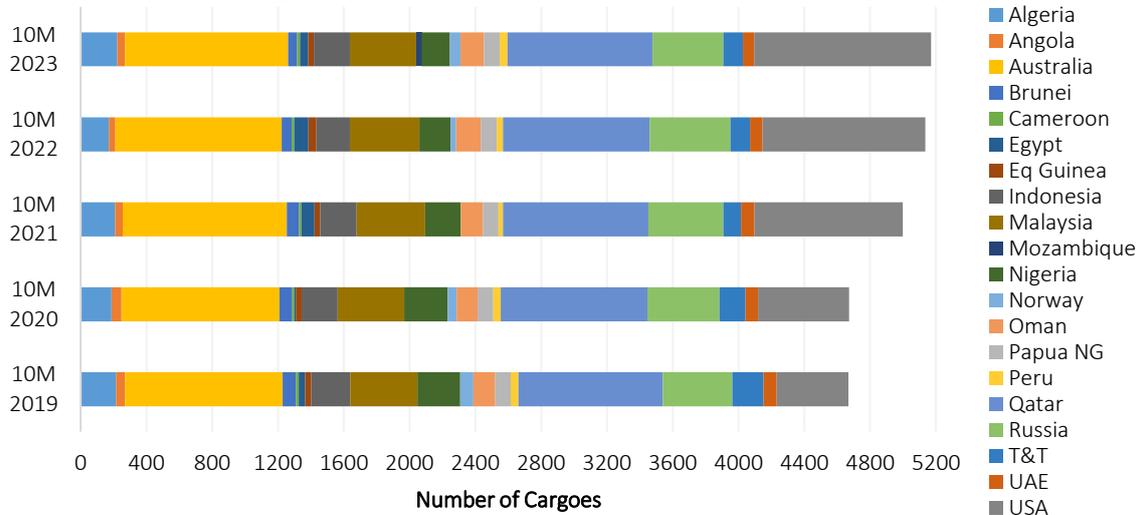
Within this period, there were increases in cargoes from the US (85), Algeria (51) and Norway (30), when compared with January to October 2022 (Figure 93). Norway has recorded the largest percentage increase in cargo exports at 91%, followed by Algeria (30%) and Peru (24%).

Figure 91: Number of LNG export cargoes



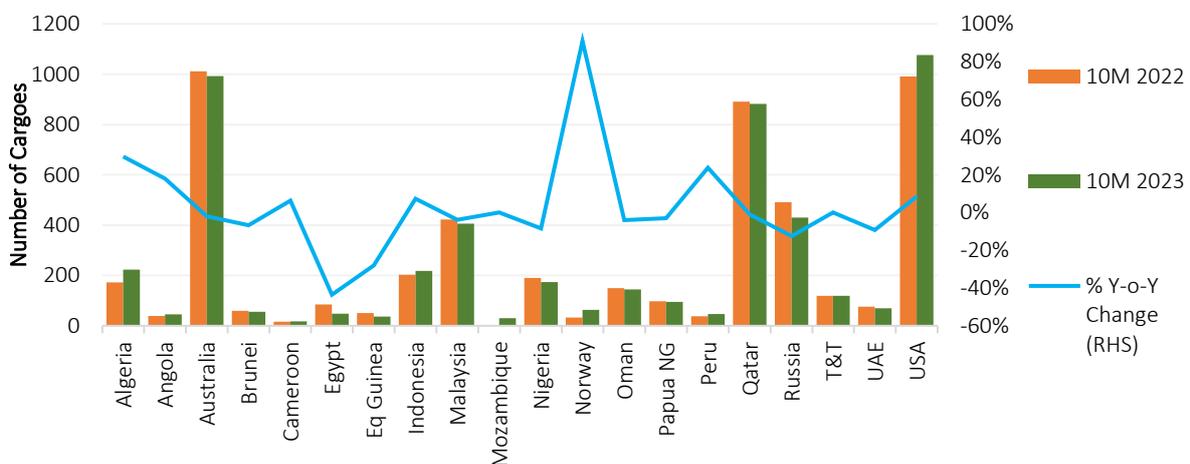
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 92: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 93: Changes in LNG cargo exports

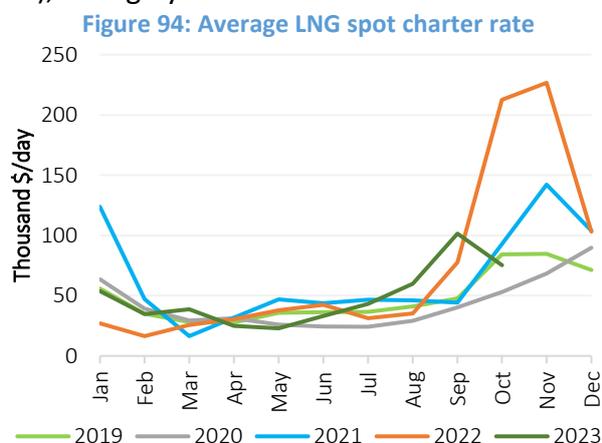


Source: GECF Secretariat based on data from ICIS LNG Edge

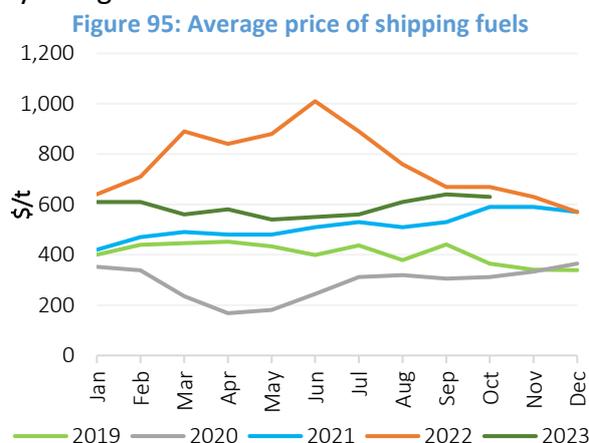
Following four months of increases, the monthly average spot charter rate for steam turbine LNG carriers fell by 26% m-o-m to \$75,400 per day in October 2023 (Figure 94). This average rate was 65% lower y-o-y and was \$29,900 less than the five-year average price for the month. The other segments of the global LNG carrier fleet also experienced a softening of charter rates during the month. The average spot charter rate for TDFE vessels fell by 19% m-o-m to reach \$136,100 per day, while the average spot charter rate for two-stroke vessels declined by 15% m-o-m to reach \$177,700 per day.

Such a decline in spot charter rates is atypical for this time of year. The first three weeks of October continued the trend from end of the previous month. With the expected premium for December cargoes into northwest Europe being eroded, shippers elected to deliver early, and several floating cargoes were subsequently discharged. These market conditions persisted until the final week of the month, when charter rates experienced an uptick, as the inter-basin arbitrage supported LNG shipments from US projects to the Asian market. The ongoing scheduling challenges at the Panama Canal has the potential to further exacerbate this market tightness.

In October 2023, the average price of the leading shipping fuels was \$630 per tonne (Figure 95), falling by 2% m-o-m and 6% lower than one year ago.



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



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

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

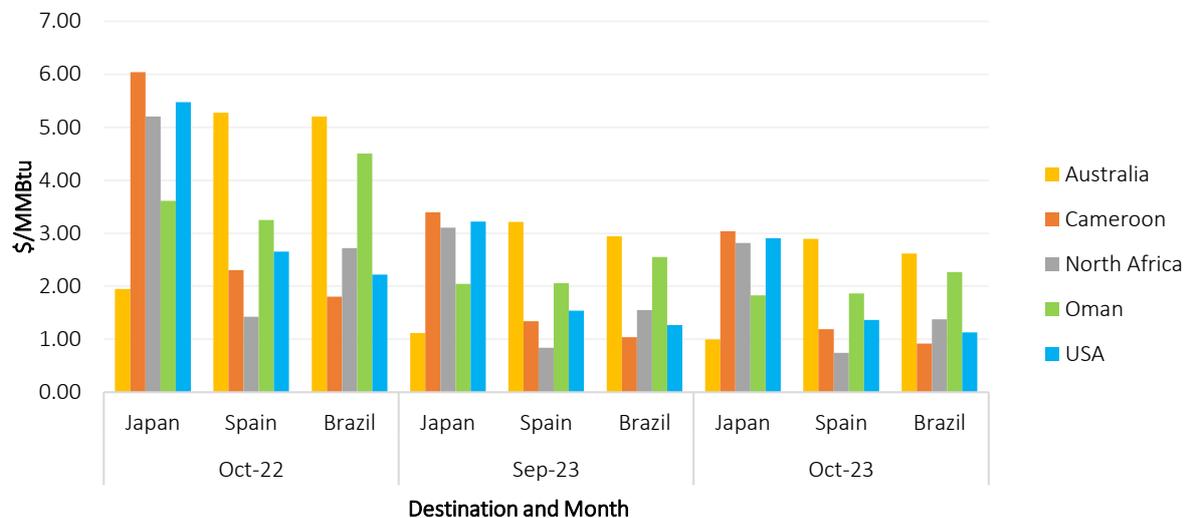
**Table 3: Shipping costs for LNG spot cargoes from selected regions (\$/MMBtu) – October 2023**

		Destination						
		To Japan	China	India	UK	Spain	Argentina	Brazil
LNG Supplier	From							
	Spot LNG delivered price	16.05	16.05	15.55	14.16	14.09	14.25	14.20
	Australia	0.99	1.05	1.21	3.00	2.90	2.38	2.62
	Cameroon	3.04	3.00	2.00	1.30	1.19	1.40	0.92
	North Africa	2.82	2.80	1.51	0.85	0.74	1.96	1.38
	Oman	1.83	1.70	0.37	1.97	1.86	2.28	2.27
	USA	2.91	3.21	3.08	1.41	1.37	1.88	1.13

Source: GECF Shipping Cost Model

In October 2023, there were decreases in the average LNG carrier spot charter rate as well as the cost of LNG shipping fuels when compared with the previous month. On the other hand, there was a moderate increase in the delivered spot LNG prices. Consequently, there was a net decrease in the LNG spot shipping costs for steam turbine carriers by up to \$0.36/MMBtu on certain routes from the previous month (Figure 96). However, the spot charter rate and delivered spot LNG prices were much lower in October 2023 compared to last year, resulting in LNG shipping costs of up to \$3.00/MMBtu lower.

Figure 96: LNG spot shipping costs for steam turbine carriers



Source: GECF Shipping Cost Model

**Challenges for LNG carriers at the Panama Canal:** Since September, the transit of vessels through the Panama Canal has been affected by falling levels at the Gatun Lake. In response, the Panama Canal Authority had been gradually reducing the number of voyages through the canal. In preparation for the winter season, and with the latest weather projections indicating no turnaround in the persistent low rainfall levels, the Authority has once again decreased the number of ships transiting through the canal, for the period November 2023 to February 2024. In particular, LNG carriers are already limited to a maximum of two transits per day, which has led to increased competition and record prices being offered for booking slots. Furthermore, a large number of US Gulf Coast suppliers may be compelled to sail via the longer routes (Suez, Good Hope) to Asia.

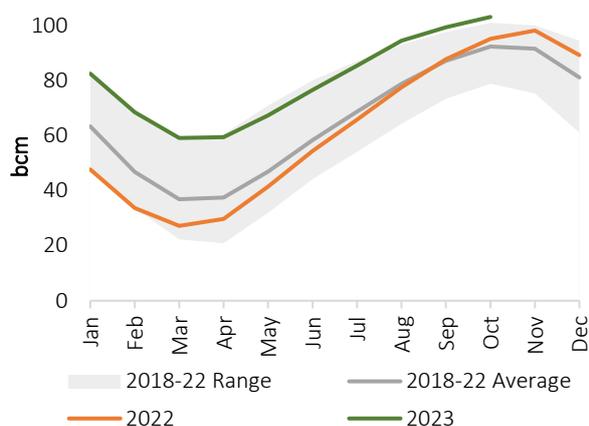
**Qatar boosts its LNG carrier construction drive:** QatarEnergy has recently entered into a \$3.9 billion agreement with South Korean shipyard Hyundai Heavy Industries, marking the commencement of the second phase of its LNG shipping fleet expansion. The order involves the construction of 17 LNG carriers, each vessel having a capacity of 174,000 m<sup>3</sup>. Moreover, the cost per vessel of \$229 million is lower than the current prices for newbuilds at similar South Korean shipyards. At the signing ceremony in Seoul, HE Mr Saad Sherida Al-Kaabi, Minister of State for Energy Affairs, President and CEO of QatarEnergy, highlighted that the new vessels' will be built to the highest technical standards, as well as to reduced carbon emissions.

## 5 Gas Storage

### 5.1 Europe

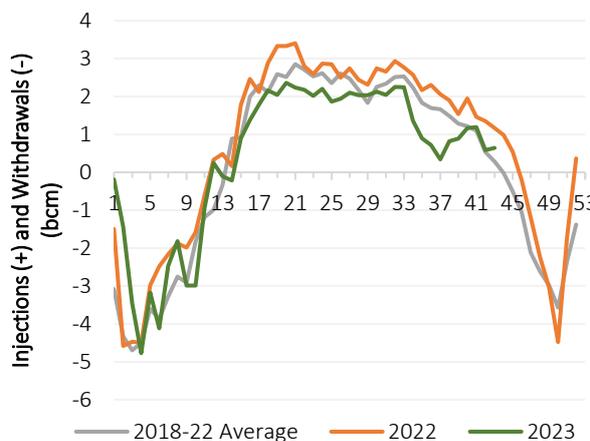
In October 2023, the underground gas storage (UGS) in the EU reached in excess of 99% capacity utilization within the region. During the month, the average daily volume of gas in storage rose to 103.1 bcm, up from 99.3 bcm one month earlier (Figure 97). There were 8.0 bcm more gas in storage than in October 2022, and 10.7 bcm more gas in storage than the five-year average for the month. Throughout October 2023, there were 4.8 bcm of gas injections into UGS facilities, along with just 0.8 bcm of gas withdrawals.

Figure 97: Underground gas storage in the EU



Source: GECF Secretariat based on data from AGSI+

Figure 98: Weekly rate of EU UGS level changes



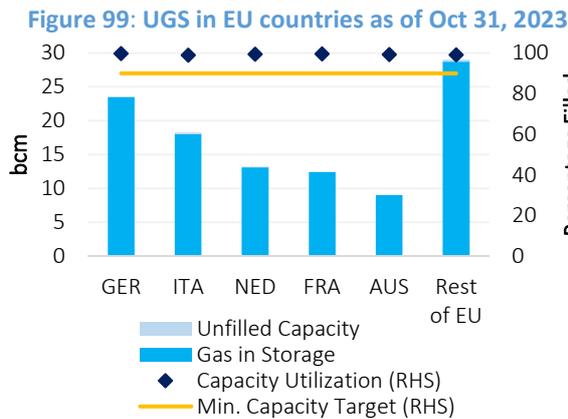
Source: GECF Secretariat based on data from AGSI+

The rate of net gas restocking has been waning since mid-August when the EU countries met their initial 90% filling target. This trend continued in October 2023 with a net 0.9 bcm per week stored during the month. This rate was much lower than the 1.5 bcm/week observed in October 2022, but was in line with the five-year average rate of 0.8 bcm/week (Figure 98).

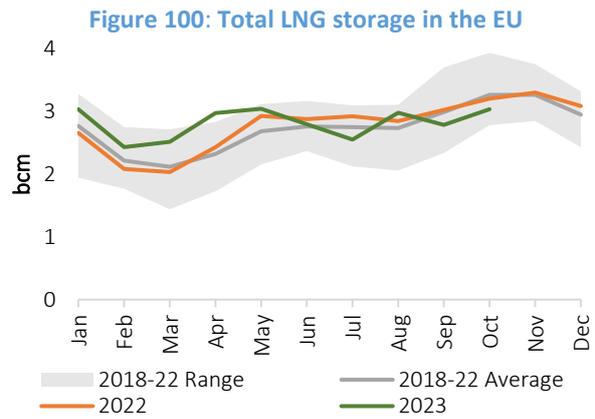
The EU has legislated that its member states must fill their respective UGS sites to a minimum level of 90% of capacity by November 1, while setting key checkpoints throughout the year. In addition, mild temperatures plus demand reduction measures ensured that EU member states ended the 2022/23 winter season with elevated storage levels. Accordingly, whereas 71 bcm of gas was injected into storage over the summer of 2022, just 47 bcm of stockbuild was required to meet the EU's targets for 2023. By October 31, EU member states had collectively surpassed the regional target by approximately 11 bcm.

The top EU countries for UGS capacity are Germany, Italy, Netherlands, France and Austria. By the end of October 2023, all had attained at least 99% filled capacity (Figure 99).

The EU has a total LNG storage capacity of 5.1 bcm, primarily concentrated in Spain (39%) and France (16%). In October 2023, the combined amount of LNG stored in the EU countries was 3.0 bcm (Figure 100). This was an increase of 9% m-o-m but was 5% lower than the five-year historical average for that month.



Source: GECF Secretariat based on data from AGSI+

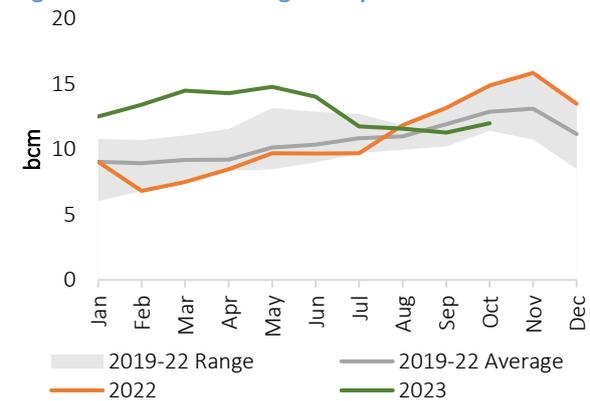


Source: GECF Secretariat based on data from ALSI

## 5.2 Asia

Japan and South Korea possess a combined capacity of 17 bcm of LNG storage. Following a period of high LNG drawdown to combat a heatwave in the region, by October 2023 there was a reversal of the trend and the combined level of LNG in storage rose by 6% m-o-m to an estimated 12.0 bcm (Figure 101). However, this quantity was still 19% lower than in the same month one year ago, but just 0.9 bcm below the four-year average. Storage in Japan and South Korea accounted for 5.5 bcm and 6.5 bcm, respectively.

**Figure 101: LNG in storage in Japan and South Korea**

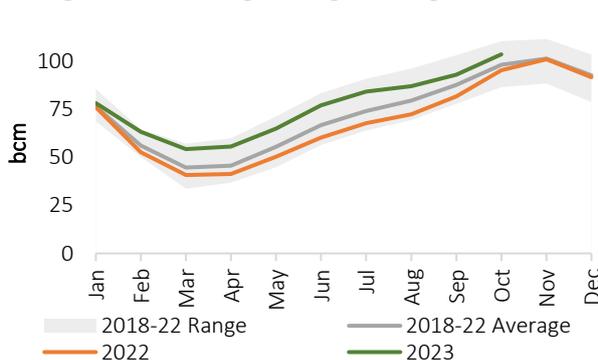


Source: GECF Secretariat based on data from Refinitiv

## 5.3 North America

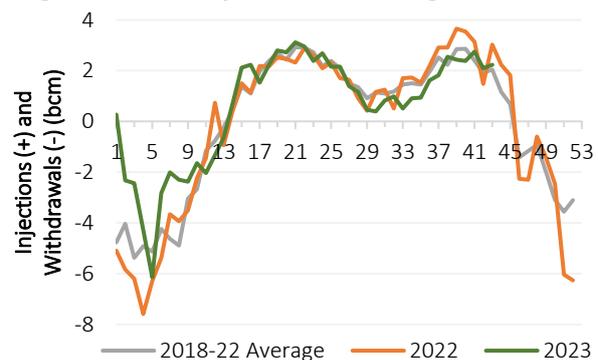
Net gas restocking continues in the US, with the average daily volume of gas in storage rising to 103.6 bcm in October 2023, up from 93.0 bcm in the previous month (Figure 102). This quantity was 8.3 bcm higher than one year ago, and 5.4 bcm more than the five-year historical average. With the US having 134 bcm of working gas storage capacity, the country's capacity utilization for the month jumped to 77%. As per the seasonal trend, there was an uptick in stock build in October 2023, averaging 2.4 bcm per week, compared with 2.8 bcm/week in 2022, and the five-year average rate of 2.3 bcm/week (Figure 103).

**Figure 102: Underground gas storage in the US**



Source: GECF Secretariat based on data from US EIA

**Figure 103: Weekly rate of UGS changes in the US**



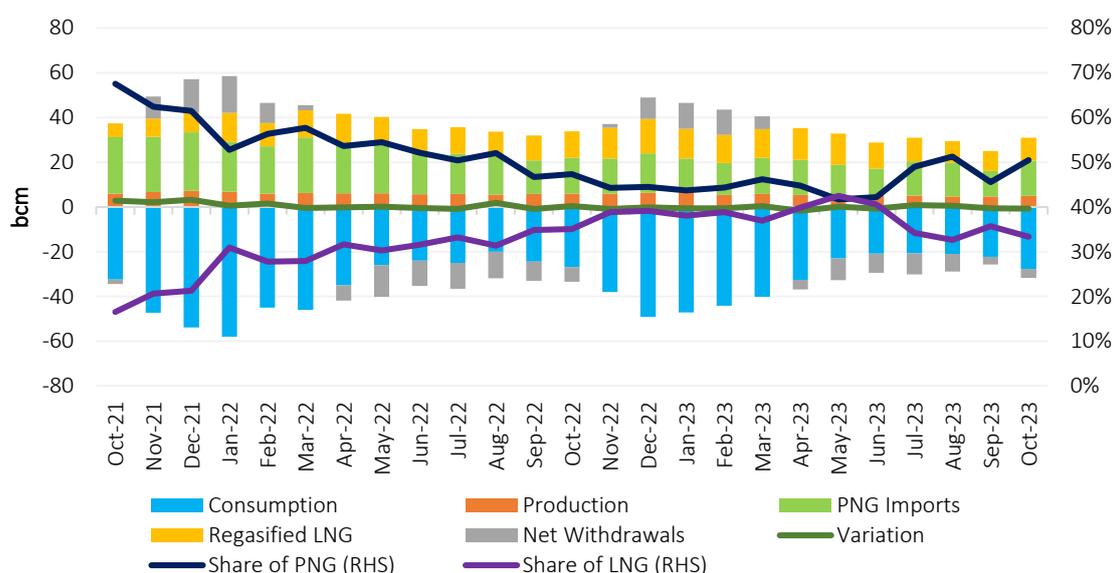
Source: GECF Secretariat based on data from US EIA

## 6 Gas Balance

### 6.1 EU + UK

In October 2023, the share of regasified LNG in the gas supply of the EU and UK declined by 3% to reach 33% compared to September 2023. In comparison to October 2022, the share decreased by 2%. Conversely, the share of gas imports via pipelines increased by 5% m-o-m and 4% y-o-y to reach 51% (Figure 104). The expansion in the share of pipeline gas imports relative to the share of regasified LNG in the EU and UK was attributed to stronger growth 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 104: 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 October 2023.

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

	2022	Oct-22	Oct-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
<b>(a) Gas Consumption</b>	417.40	26.80	27.71	330.30	299.55	3%	-9%
<b>(b) Gas Production</b>	72.73	5.95	5.00	60.28	52.83	-16%	-12%
<b>Difference (a) - (b)</b>	344.67	20.85	22.71	270.02	246.72	9%	-9%
<b>PNG Imports</b>	230.46	16.01	15.66	197.22	144.57	-2%	-27%
<b>Regasified LNG</b>	146.57	11.85	10.34	117.34	117.83	-13%	0%
<b>Net Withdrawals</b>	-31.79	-6.62	-3.97	-43.02	-18.55	-40%	-57%
<b>Variation</b>	-0.57	-0.39	0.68	-1.53	2.86		

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 Oct 2023 compared to Oct 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 July 2023.

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

	2022	Jul-22	Jul-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) OECD Gas Consumption	1803.0	133.0	132.7	1078.1	1041.7	-0.3%	-3.4%
(b) OECD Gas Production	1656.2	142.4	144.1	961.5	985.7	1.2%	2.5%
Difference (a) - (b)	146.8	-9.4	-11.4	116.6	55.9	22.0%	-52.1%
OECD LNG Imports	346.9	26.7	23.0	199.2	197.7	-13.8%	-0.8%
LNG Imports from GECF	161.8	13.5	10.7	92.1	89.5	-20.3%	-2.8%
LNG Imports from Non-GECF	185.1	13.2	12.3	107.2	108.1	-7.1%	0.9%
OECD LNG Exports	223.2	17.2	19.7	128.1	137.6	14.7%	7.5%
Intra-OECD LNG Trade	152.7	10.9	10.6	87.9	90.7	-2.4%	3.2%
OECD Pipeline Gas Imports	630.9	51.2	41.3	401.4	298.6	-19.4%	-25.6%
OECD Pipeline Gas Exports	567.0	47.6	40.1	346.6	289.9	-15.7%	-16.4%
Stock Changes and losses	40.9	22.5	15.9	9.3	12.9		

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

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

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

## 6.3 India

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

**Table 6: India's 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) India Gas Consumption	60.96	4.67	5.25	45.41	46.07	12.6%	1.4%
(b) India Gas Production	33.46	2.79	2.98	24.96	25.90	6.6%	3.8%
Difference (a) - (b)	27.50	1.88	2.28	20.45	20.16	21.4%	-1.4%
India LNG Imports	28.07	1.75	2.96	20.93	22.44	69.1%	7.2%
LNG Imports from GECF	22.15	1.29	2.48	16.97	17.52	91.8%	3.2%
LNG Imports from Non-GECF	5.92	0.46	0.47	3.96	4.92	4.3%	24.3%
Stock Changes and losses	0.57	-0.13	0.68	0.48	2.28		

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

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

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

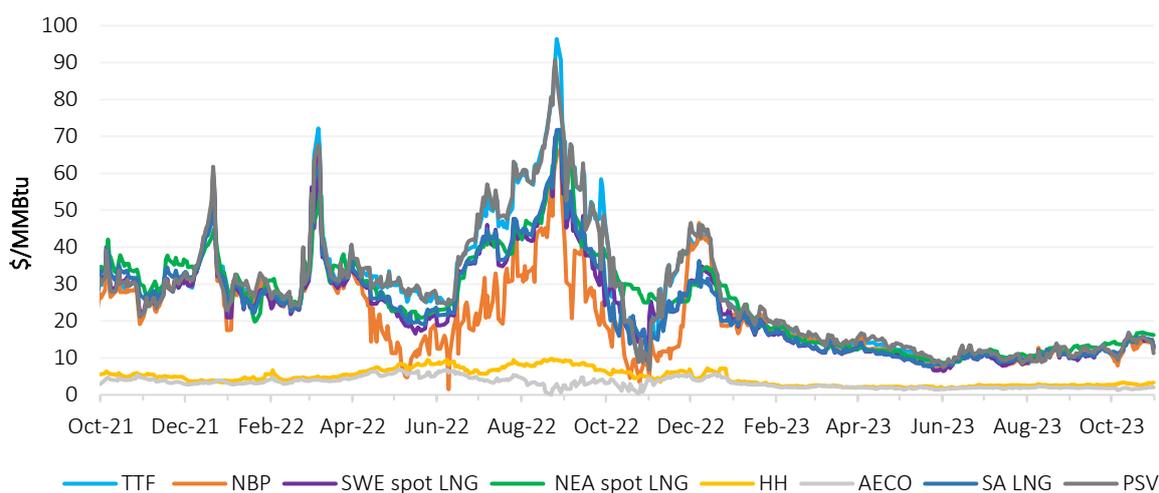
## 7 Energy Prices

### 7.1 Gas Prices

#### 7.1.1 Gas & LNG Spot Prices

In October 2023, gas and LNG spot prices in Europe and Asia increased significantly for the third consecutive month. Spot prices experienced greater volatility, predominantly due to the increased geopolitical risk in the Middle East heightening concerns about gas supply (Figure 105 and Figure 106). Additionally, the re-emergence of potential strikes at Australian LNG facilities and damage to the Balticconnector gas pipeline also contributed to bullish price movements. However, any further price gains were capped by overall soft market fundamentals. In the upcoming winter months, prices will be highly dependent on temperatures across Europe and Asia.

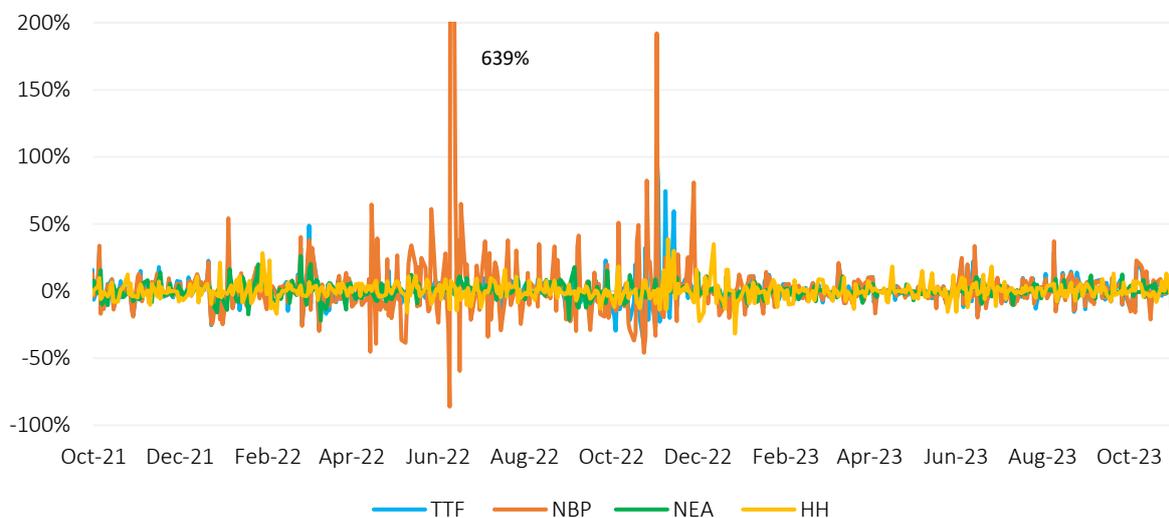
Figure 105: Daily gas & LNG spot prices



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 106: 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 October 2023, TTF spot gas prices averaged \$13.40/MMBtu, reflecting a 17% increase m-o-m and 36% decrease y-o-y. In addition, NBP spot prices averaged \$12.77/MMBtu, reflecting a 12% increase m-o-m and an 11% increase y-o-y, as shown in Figure 107. The SWE spot LNG prices averaged \$13.78/MMBtu in October 2023 (26% increase m-o-m and 33% decrease y-o-y). As for the PSV spot price, it averaged \$13.61/MMBtu in October 2023, a 14% increase m-o-m and a 38% decline y-o-y.

European gas and LNG spot prices continued their bullish movement as geopolitical tensions in the Middle East escalated, heightening concerns about gas supply. In addition, the market was also wary of the re-emergence of potential strike action in Australia, as well as damage to the Balticconnector between Finland and Estonia. In mid-October, daily TTF spot prices rose to an 8-month high above \$16/MMBtu. However, further price gains were capped by higher Norwegian pipeline gas imports, as annual maintenance in several facilities were completed.

From January to October 2023, TTF and NBP averaged \$12.97/MMBtu and \$12.41/MMBtu, respectively, representing substantial declines of 66% and 52% y-o-y, respectively.

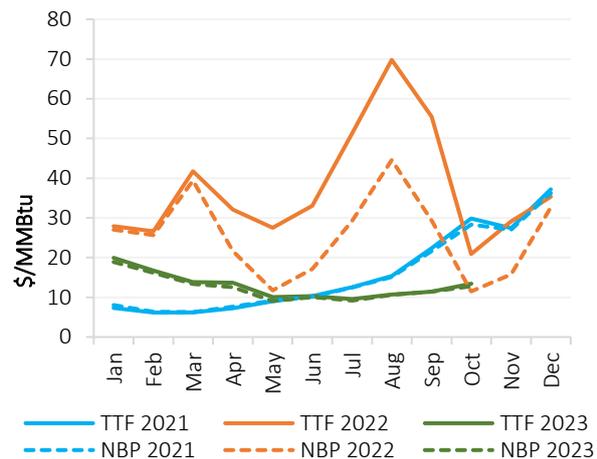
### 7.1.1.2 Asian Spot LNG Prices

In October 2023, the average North East Asia (NEA) spot LNG price experienced an increase of 17% m-o-m, reaching an average of \$15.29/MMBtu. This represents a 49% decrease compared to the same period last year (Figure 108).

Despite modest demand and expectations for a mild winter in Northeast Asia, Asian LNG prices increased significantly, tracking gains in TTF. While there was some emerging demand for spot cargoes, most buyers remained on the side-lines. Daily NEA spot LNG prices surpassed \$16/MMBtu.

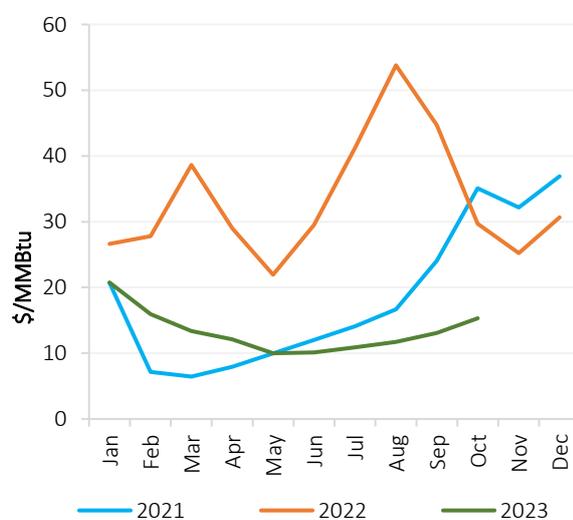
From January to October 2023, the average NEA spot LNG price stood at \$13.32/MMBtu, representing a 61% y-o-y decrease.

Figure 107: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Figure 108: 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

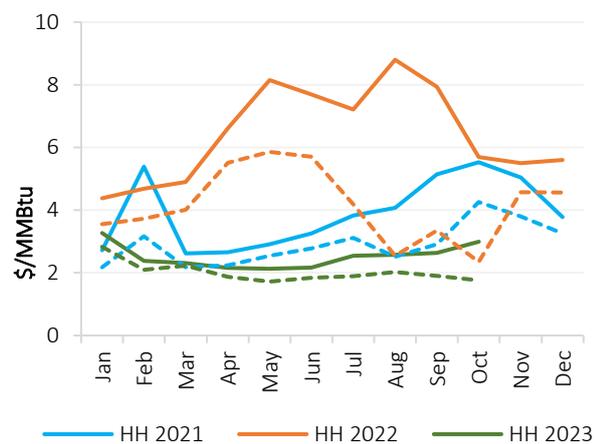
In October 2023, the HH spot gas price averaged \$2.99/MMBtu, reflecting an increase of 13% m-o-m. However, it was significantly lower y-o-y, dropping by 47%, compared to the average price of \$5.69/MMBtu observed in October 2022. (Figure 109).

Henry Hub prices experienced some bullish movement driven by strong gas demand in the power sector and robust LNG exports. However, gas storage levels remained above the five-year average. Moreover, daily HH spot prices reached a peak of \$3.34/MMBtu.

Similarly, in Canada, the AECO spot price decreased by 7% m-o-m and 25% y-o-y, averaging \$1.76/MMBtu in October 2023.

From January to October 2023, the HH spot price averaged \$2.52/MMBtu, representing a decline of 62% y-o-y. The AECO spot price averaged \$2.02/MMBtu, marking a 51% y-o-y decrease.

Figure 109: Monthly North American gas spot prices



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

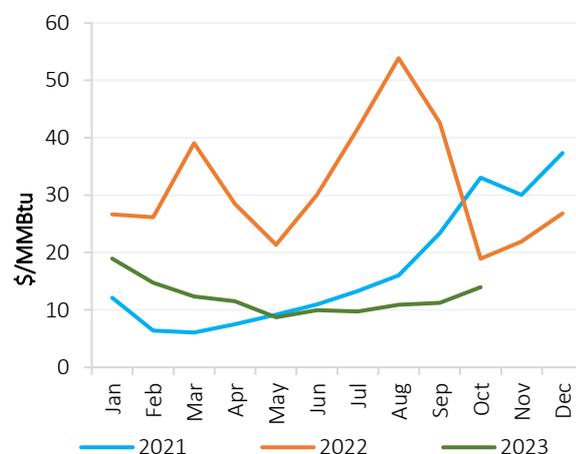
### 7.1.1.4 South American Spot LNG Prices

In October 2023, the South American (SA) LNG price experienced a 24% m-o-m increase, averaging \$13.94/MMBtu. However, this price was 26% lower compared to the average price of \$18.92/MMBtu observed in October 2022 (Figure 110).

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 \$14.20/MMBtu, \$13.41/MMBtu and \$14.22/MMBtu, respectively.

From January to October 2023, the SA LNG spot price averaged \$12.19/MMBtu, marking a substantial 63% y-o-y decrease.

Figure 110: Monthly South American LNG spot prices



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

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

In October 2023, the average Oil-indexed I LNG price was \$12.70/MMBtu, reflecting an increase of 2% m-o-m and a decrease of 20% y-o-y. Similarly, the Oil-indexed II LNG price averaged \$10.21/MMBtu, showing an increase of 5% m-o-m and a decrease of 12% y-o-y (Figure 111). Furthermore, the Oil-indexed I prices held an average discount of \$3/MMBtu over NEA spot LNG prices, increasing from the previous month. In addition, the Oil-indexed II prices held an average discount of \$5/MMBtu compared to the NEA spot LNG prices.

In Europe, the Oil-indexed III price averaged \$7.97/MMBtu in October 2023, reflecting a 1% m-o-m decrease and a 26% y-o-y decrease (Figure 112). Moreover, the Oil-indexed III price held a discount of \$6/MMBtu over the average SWE LNG.

From January to October 2023, the Oil-indexed I LNG price exhibited a 12% y-o-y decrease, while the Oil-indexed II LNG price showed a 15% y-o-y decrease. Additionally, the Oil-indexed III LNG price for the same period was 6% lower y-o-y.

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

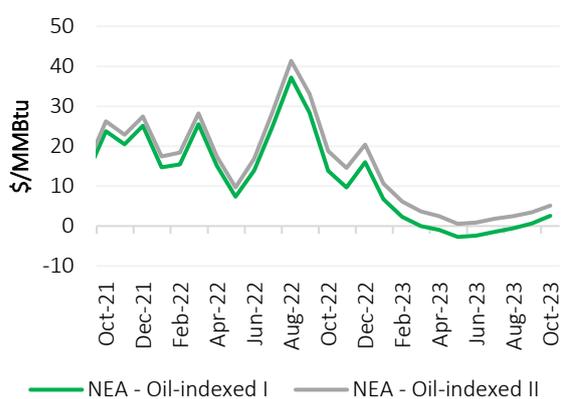
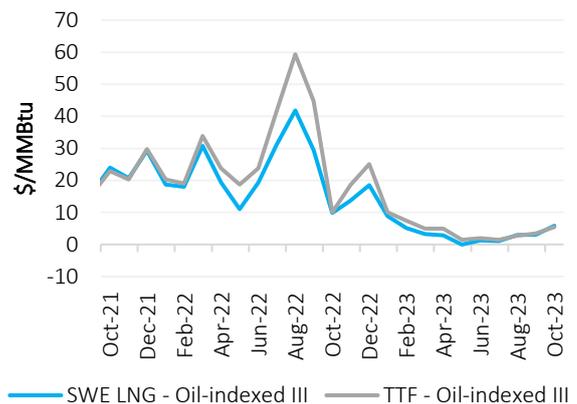


Figure 112: Europe: Spot and oil-indexed price spread



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 October 2023, the NEA-TTF price spread remained positive and increased for the third consecutive month. The average premium of NEA LNG spot price over the average TTF spot price was \$1.89/MMBtu. Both benchmark prices experienced bullish movement during the month (Figure 113).

NBP traded at a discount of \$0.63/MMBtu compared to TTF, which was higher than the average discount of \$0.02/MMBtu in the previous month (Figure 114). The NBP-TTF spread remained negative and widened due to a looser UK gas market.

Furthermore, the NWE LNG-TTF spread turned positive, with the NWE LNG spot price trading at a premium of \$0.40/MMBtu compared to TTF, indicating lower LNG sendout in the region (Figure 115). The NWE LNG-SA LNG price spread remained negative, averaging \$0.14/MMBtu (Figure 116). The NEA-HH and TTF-HH spreads both widened to \$12.30/MMBtu and \$10.41/MMBtu, respectively (Figure 117 and Figure 118). Asian and European spot prices held higher premiums over North American spot prices during the month.

Figure 113: NEA-TTF price spread

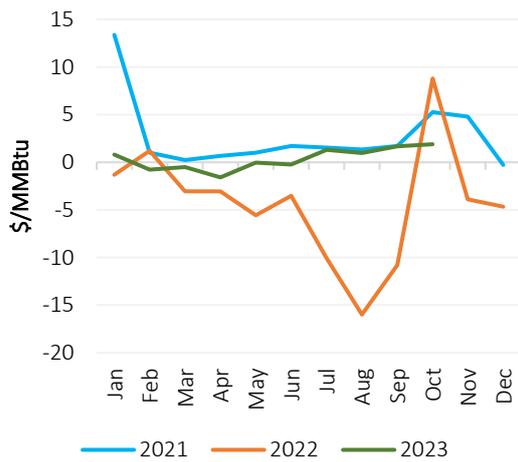


Figure 114: NBP-TTF price spread

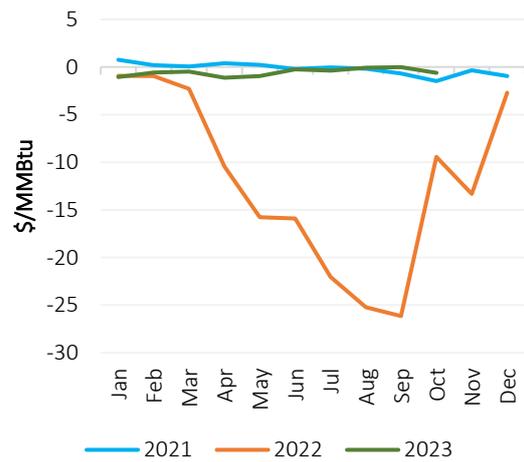


Figure 115: NWE LNG-TTF price spread

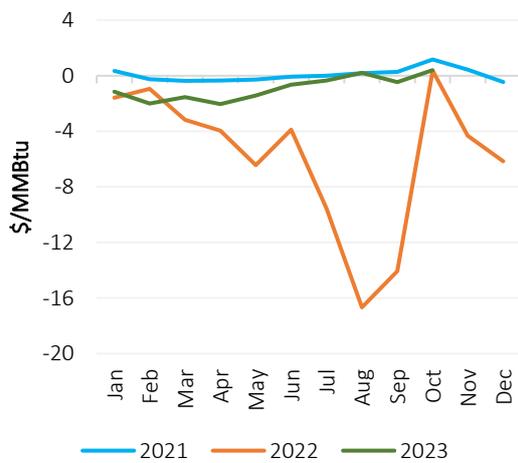


Figure 116: NWE LNG – SA LNG price spread

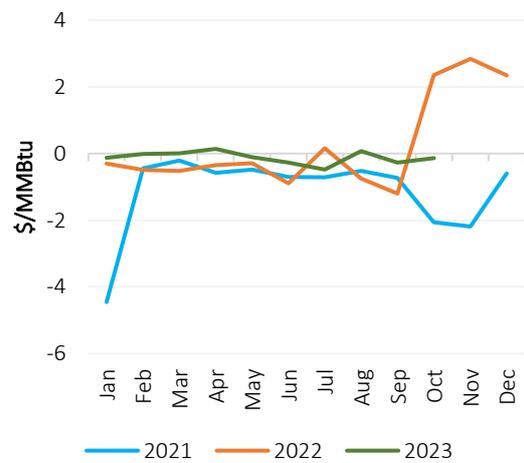


Figure 117: NEA-HH price spread

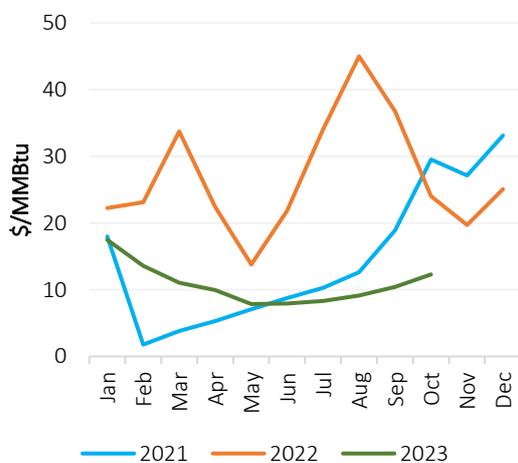
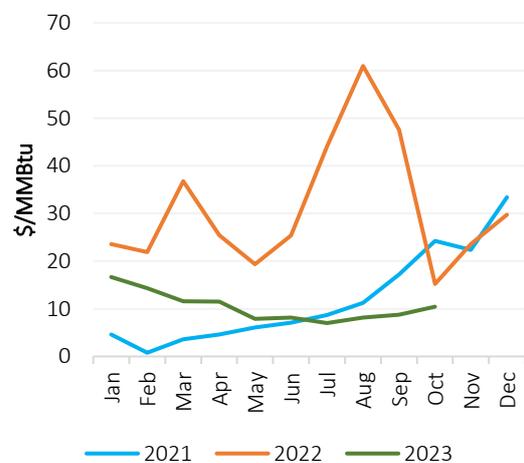


Figure 118: TTF-HH price spread



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

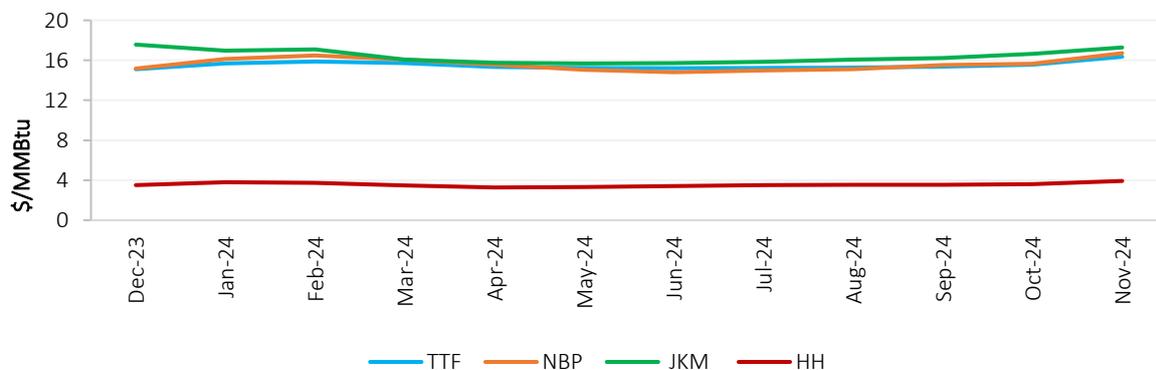
### 7.1.4 Gas & LNG Futures Prices

For the 6-month period spanning from December 2023 to May 2024, the JKM-TTF futures price spread is expected to remain positive, reflecting the likelihood for Asian LNG prices to maintain a slight premium over European spot prices. Moreover, in December 2023, JKM is expected to trade at a premium above \$2/MMBtu compared to TTF. For the first two months of 2024, the JKM-TTF spread is projected to significantly narrow to just above \$1/MMBtu (Figure 119).

In December 2023, NBP is expected to trade at a small premium to TTF of \$0.1/MMBtu. Subsequently, in Q1 2024, the NBP-TTF spread is expected to increase slightly, with NBP potentially gaining a slight premium of around \$0.5/MMBtu.

For the 6-month period from December 2023 to May 2024, gas and LNG futures prices for TTF, NBP and JKM (as of November 5, 2023) are higher than the futures prices expectations considered on October 1, 2023 (as reported in the GECF MGMR October 2023). Moreover, as of November 5, 2023, the average futures prices for TTF, NBP and JKM during the same 6-month period are \$15.49/MMBtu, \$15.74/MMBtu and \$16.52/MMBtu, respectively. Meanwhile, the average HH futures price is \$3.52/MMBtu, which is also higher than previous expectations (Figure 120).

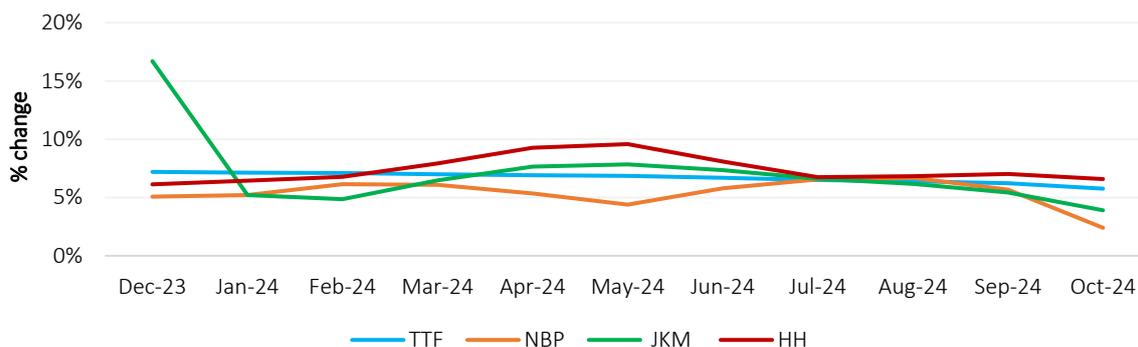
Figure 119: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Note: Futures prices as of November 5, 2023.

Figure 120: Variation in gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Note: Comparison with the futures prices as of October 1, 2023, as reported in GECF MGMR October 2023.

## 7.2 Cross Commodity Prices

### 7.2.1 Oil Prices

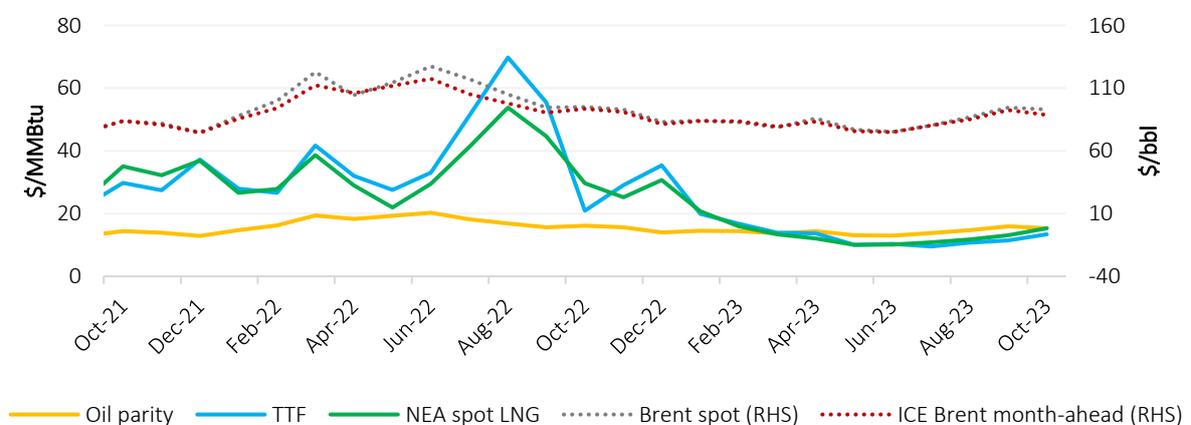
In October 2023, the average Brent spot price was \$92.96/bbl, reflecting a decrease of 2% m-o-m and y-o-y (Figure 121). The Brent month-ahead price averaged \$88.70/bbl, marking a 4% decrease m-o-m and a 5% decrease y-o-y.

Oil prices experienced greater volatility than previous months as heightened geopolitical risks in the Middle East led to price spikes, although oil market fundamentals remained soft and oil supply was not disrupted. Fears of a wider regional conflict drove daily spot price increases of \$4/bbl during the month. However, oil price gains dissipated as economic headwinds persisted, resulting in a lower average monthly price.

Furthermore, in October 2023, both TTF spot prices continued to trade at a discount to the oil parity price of \$1.9/MMBtu. Meanwhile, NEA LNG spot prices traded at the same level as the oil parity price.

From January to October 2023, the average Brent spot price was \$83.83/bbl, representing a 18% decrease y-o-y. Similarly, the average Brent month-ahead price was \$82.73/bbl, representing a 17% decrease y-o-y.

Figure 121: 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

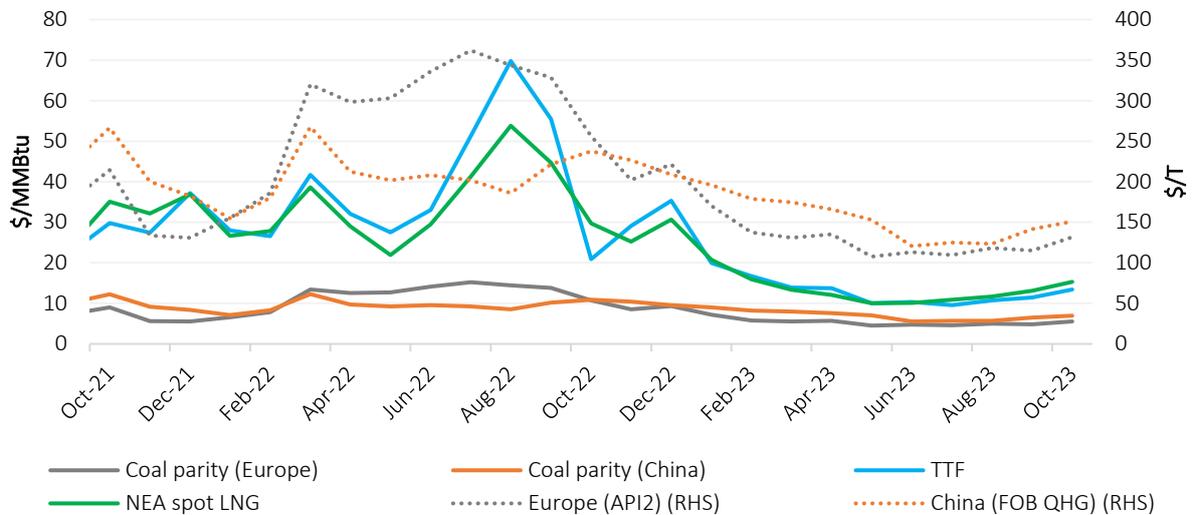
In October 2023, the European coal price (API2) averaged \$131.77/T, experiencing a 14% m-o-m increase and a 49% y-o-y decrease. Meanwhile, in China, the QHG coal price averaged \$151.05/T, reflecting an increase of 7% m-o-m, but was 36% lower y-o-y (Figure 122).

European coal prices increased during the month, tracking gains in TTF spot prices. In addition, high TTF prices may have reversed the trend for coal-to-gas switching seen in recent months, increasing demand for coal. Furthermore, while escalating tensions in the Middle East do not have a direct impact on the coal market, the broader implications on the energy market may have influenced coal prices.

The premium of TTF spot price over the API2 parity price increased by 20% m-o-m to \$7.9/MMBtu in October 2023. Additionally, the premium of NEA spot LNG price over the QHG parity price increased by 27% m-o-m to \$8.4/MMBtu.

From January to October 2023, the European API2 averaged \$126.93/T, representing a 56% decrease y-o-y. Meanwhile, the Chinese QHG price averaged \$152.95/T, which was 26% lower y-o-y.

Figure 122: 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.

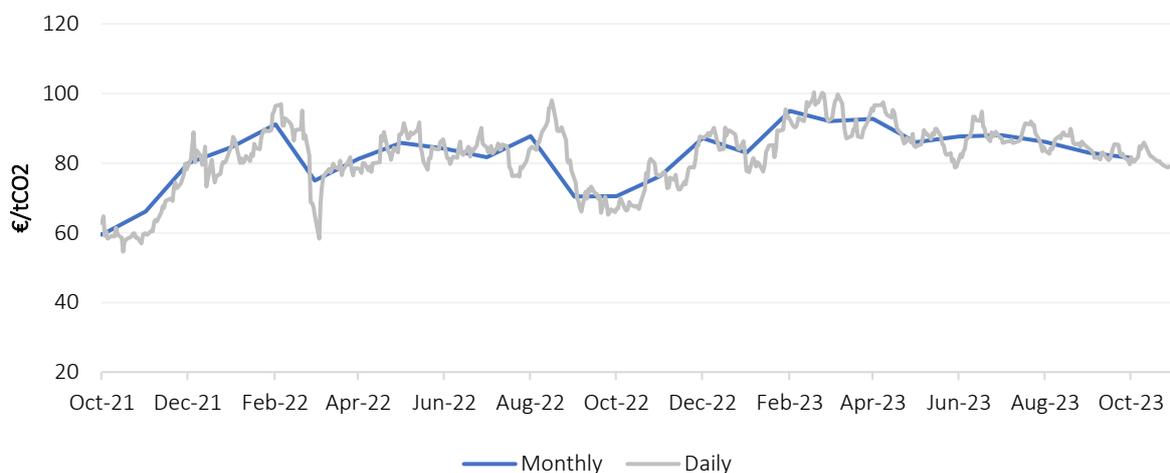
### 7.2.3 Carbon Prices

In October 2023, EU carbon prices averaged €81.53/tCO<sub>2</sub>, reflecting a 2% decline m-o-m but a 16% increase y-o-y (Figure 123).

EU carbon prices declined for the third consecutive month, with daily carbon prices falling to a 4-month low and even reached below €80/tCO<sub>2</sub> at the end of October. This dip was primarily driven by reduced demand from the power sector due to warmer-than-usual temperatures.

From January to October 2023, EU carbon prices averaged €88.51/tCO<sub>2</sub>, representing an increase of 8% y-o-y.

Figure 123: EU carbon prices

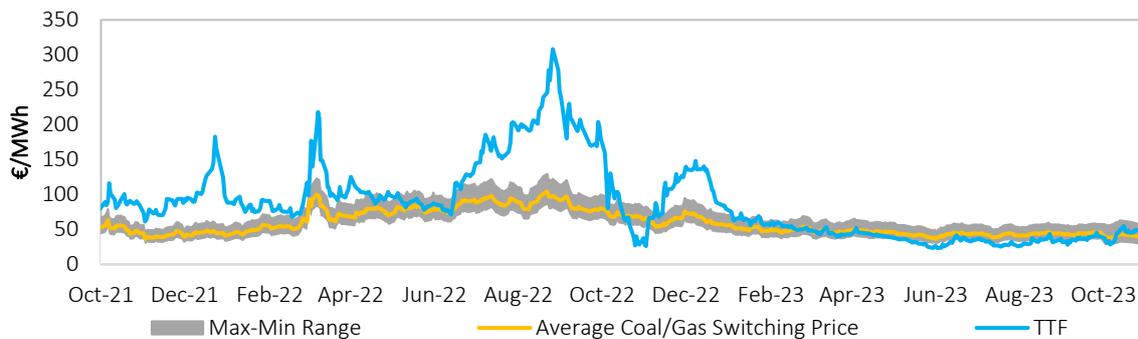


Source: GECF Secretariat based on data from Refinitiv Eikon

## 7.2.4 Fuel Switching

In October 2023, daily TTF spot prices climbed within the range suitable for coal-to-gas switching, following several months of remaining below the range. The average coal-to-gas switching price was €40.14/MWh, marking a 9% m-o-m decrease. Moreover, the average monthly spread between the TTF spot price and the coal-to-gas switching price was €3/MWh, turning positive for the first time since March 2023 (Figure 124). Looking ahead to December 2023, the TTF spot price is expected to oscillate above the average coal-to-gas switching price, as gas prices increase during the winter season. This may reduce the incentive for coal-to-gas switching in Europe.

Figure 124: Daily TTF vs coal-to-gas switching prices



Source: GECF Secretariat based on data from Refinitiv Eikon

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

## 7.3 Other Developments

**Australia:** Potential threat of strike action at Chevron's Gorgon and Wheatstone LNG facilities resurfaced as discussions continued between Chevron and the Australian union group, Offshore Alliance (OA), to finalize the terms of an Enterprise Agreement (EA). This agreement remained unresolved following strike action from September 8-22, 2023. However, a deal was struck on October 18, 2023, averting the potential plans for strike action by the workers.

**China:** China's state-owned CNOOC and French utility Engie settled an LNG trade in Chinese yuan on October 17, 2023, marking the fourth such LNG trade on the Shanghai Petroleum and Gas Exchange (SHPGX). The first transaction settled in yuan was conducted in March 2023 between TotalEnergies and CNOOC. The second deal was between CNPC and ADNOC in April 2023. The third was between China's CNOOC and Singapore-based Pavilion Energy in August 2023. China has been actively seeking to increase the use of yuan in international trade to protect its financial system from potential US dollar risks and sanctions.

**Japan:** On October 11, 2023, carbon credit trading was launched on Japan's Tokyo Stock Exchange (TSE). Approximately 200 registered members can now trade J-Credits on the TSE, which represent the government-certified amount of greenhouse gas (GHG) emissions reduced or removed through efforts to introduce energy-saving devices along with renewable energy facilities. Forest management is also an eligible activity for credit trading qualification. Traded volumes were reported to be relatively low.

## 8 Abbreviations

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

<b>G7</b>	Group of Seven
<b>GDP</b>	Gross Domestic Product
<b>GECF</b>	Gas Exporting Countries Forum
<b>GHG</b>	Greenhouse Gas
<b>HDD</b>	Heating Degree Days
<b>HH</b>	Henry Hub
<b>IEA</b>	International Energy Agency
<b>IMF</b>	International Monetary Fund
<b>IMO</b>	International Maritime Organization
<b>JKM</b>	Japan Korea Marker
<b>LNG</b>	Liquefied Natural Gas
<b>LAC</b>	Latin America and the Caribbean
<b>LT</b>	Long term
<b>MMBtu</b>	Million British thermal units
<b>mmcm</b>	Million cubic metres
<b>MENA</b>	Middle East and North Africa
<b>METI</b>	Ministry of Trade and Industry in Japan
<b>m-o-m</b>	month-on-month
<b>Mt</b>	Million tonnes
<b>Mtpa</b>	Million tonnes per annum
<b>MWh</b>	Megawatt hour
<b>NEA</b>	North East Asia
<b>NBP</b>	National Balancing Point
<b>NDC</b>	Nationally Determined Contribution
<b>NGV</b>	Natural Gas Vehicle
<b>NZBA</b>	Net-Zero Banking Alliance
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>PNG</b>	Pipeline Natural Gas

<b>PPAC</b>	Petroleum Planning & Analysis Cell
<b>QHG</b>	Qinhuangdao
<b>R-LNG</b>	Regasified LNG
<b>SA</b>	South America
<b>SPA</b>	Sales and Purchase Agreement
<b>SWE</b>	South West Europe
<b>T&amp;T</b>	Trinidad and Tobago
<b>TANAP</b>	Trans-Anatolian Natural Gas Pipeline
<b>TCFD</b>	Task Force on Climate-Related Financial Disclosure
<b>Tcm</b>	Trillion cubic metres
<b>tCO<sub>2</sub></b>	Tonne of carbon dioxide
<b>TTF</b>	Title Transfer Facility
<b>TWh</b>	Terawatt hour
<b>UGS</b>	Underground Gas Storage
<b>UAE</b>	United Arab Emirates
<b>UK</b>	United Kingdom
<b>UQT</b>	Upward Quantity Tolerance
<b>US</b>	United States
<b>y-o-y</b>	year-on-year

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