



MONTHLY GAS MARKET REPORT

June 2023

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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.

Contributors

Project Leader

- Aydar Shakirov, Head of Gas Market Analysis Department (GMAD)

Experts Team (In Alphabetical Order)

- Adrian Sookhan, Gas Market Analyst, GMAD
- Amin Shokri, Energy Analyst, GMAD
- Hossam ElMasry, Research Assistant, GMAD
- Imran Mohammed, Gas Transportation and Storage Analyst, GMAD
- Rafik Amara, Senior Gas Market Analyst, GMAD
- Sandy Singh, Market Research Analyst, GMAD

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Tornado Tower, 47th & 48th Floors, West Bay, Doha, Qatar

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Highlights

Global economy: The projected global GDP growth for 2023 is expected to decelerate to 2.2%, as indicated by Oxford Economics. Inflationary pressures have been easing due to weaker energy and other commodity prices, as well as the alleviation of supply chain bottlenecks. Global inflation is anticipated to gradually subside to 5.6% in 2023. During the G7 Hiroshima Summit, the leaders acknowledged the importance of supporting investment in the gas sector in order to avert potential supply shortages.

Gas consumption: In May 2023, the European Union experienced a 6% y-o-y drop in gas consumption, reaching 20 bcm. However, amidst this decline, the residential sector defied expectations by embracing a surge in gas usage due to an unusually chilly two-week weather spell. Meanwhile, China showcased its insatiable thirst for progress by soaring to 129 bcm of apparent gas consumption from January to April 2023, a 3.5% y-o-y increase. As for the United States, gas consumption rose by 1% y-o-y in May, with a significant 5% growth in the power generation sector (equivalent to 1.3 bcm).

Gas production: In April 2023, Europe experienced a 3.2% y-o-y drop in its gas production, reaching an output level of 15.6 bcm. This reduction was primarily attributed to declining production in both the Netherlands and UK. In contrast, May 2023 witnessed a 5% y-o-y increase in gas production in the seven major US shale oil and gas regions, culminating in an output of 85.1 bcm. On a global scale, the gas rig count for May 2023 showed a slight monthly dip of 25 units. However, the gas rig count still marked a significant yearly growth of 36 units, bringing the total count to 383 units.

Gas trade: In May 2023, pipeline gas imports to the EU fell by 10% m-o-m, reaching 12.7 bcm. Global LNG imports experienced a 3.5% y-o-y growth, reaching 34.4 Mt. This growth was primarily driven by robust LNG demand in Europe and Latin America and the Caribbean (LAC), which offset weaker imports in the Asia Pacific and MENA regions. Despite favourable spot LNG prices in the Asia Pacific, there was a continued flow of LNG towards Europe. The expansion of European LNG imports can be attributed to the declining pipeline gas imports. In the LAC region, Argentina witnessed a doubling of LNG imports compared to the previous year, as pipeline gas imports from Bolivia continued to decline. Moreover, Hong Kong joined the ranks of LNG importers in May 2023.

Gas storage: The restocking of gas storage sites in Europe and North America continued during May 2023, albeit at a slower pace when compared to the same period in 2022. In the European Union, the average level of gas in underground storage was 67.3 bcm, which represents 65% of the region's storage capacity. The reduced injection demand exerted downward pressure on gas and LNG spot prices. Meanwhile, in the United States, the level of underground gas storage rose to 64.9 bcm, representing 48% of its capacity. The combined LNG in storage in Japan and South Korea was estimated to be 10.6 bcm.

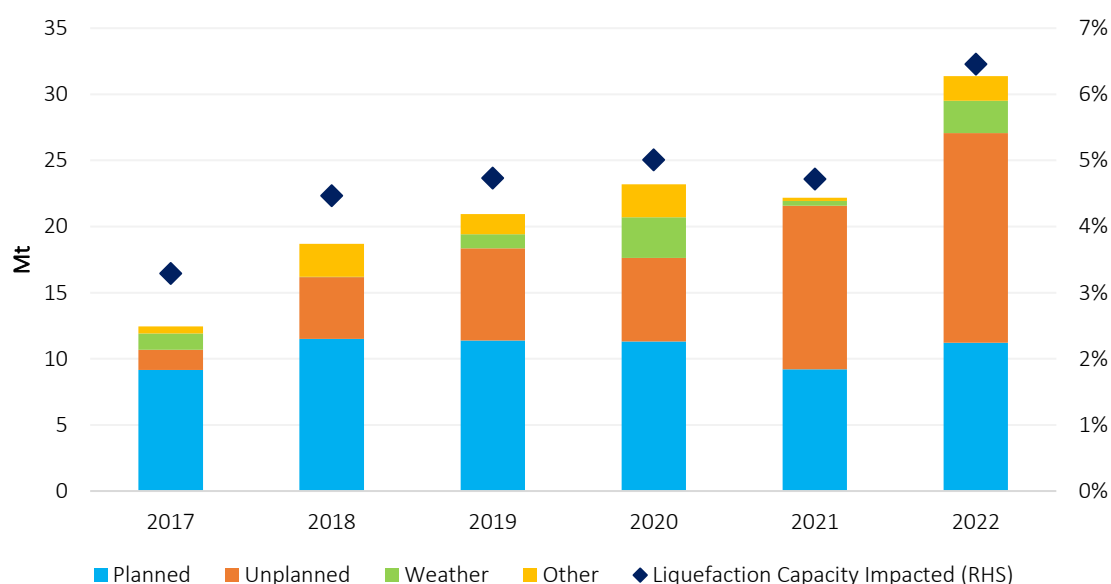
Energy prices: Gas and LNG spot prices in Europe and Asia reached their lowest levels in two years, primarily due to ongoing weak gas demand and ample EU storage levels. This resulted in downward pressure on prices. The average spot prices for TTF and NEA LNG stood at \$10/MMBtu, marking declines of 27% and 17%, respectively, compared to the previous month. The relatively low gas spot prices are expected to encourage coal-to-gas switching in Europe, potentially leading to price increases. In addition, the emerging buying interest from price-sensitive LNG importers in South and Southeast Asia may contribute to some upward movement in prices.

Feature Article: Impact of Maintenance Activity, Unplanned Outages and Weather Related Issues on Global LNG Supply

The utilisation of liquefaction facilities can be influenced by a variety of factors, including planned (scheduled) maintenance, unplanned outages, weather-related challenges and other unforeseen incidents. These factors consequently affect the supply of LNG. It is important to note that this analysis does not consider issues related to feedgas or economic considerations, which can also affect the utilisation of LNG liquefaction capacity. The impacted LNG volumes refer to liquefaction capacity that is temporarily switched offline or its utilisation rate is reduced.

In 2022, the impacted LNG volumes reached approximately 31 million tonnes (Mt). This means that 31 Mt of LNG was not produced globally due to various factors, representing the highest impact observed in a single year. This number increased from 22 Mt in 2021, primarily driven by an escalation in planned maintenance, unplanned outages, and weather-related issues. The impacted LNG volumes in 2022 represented 7.8% of the total global LNG production, which was 393 Mt last year. Furthermore, the impacted LNG volumes represented 6.5% of the 486 Mtpa of global liquefaction capacity in 2022. This figure was higher than the average of 4.4% observed between 2017 and 2021 (Figure 1).

Figure 1: Annual trend in impacted global LNG volumes by factor



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

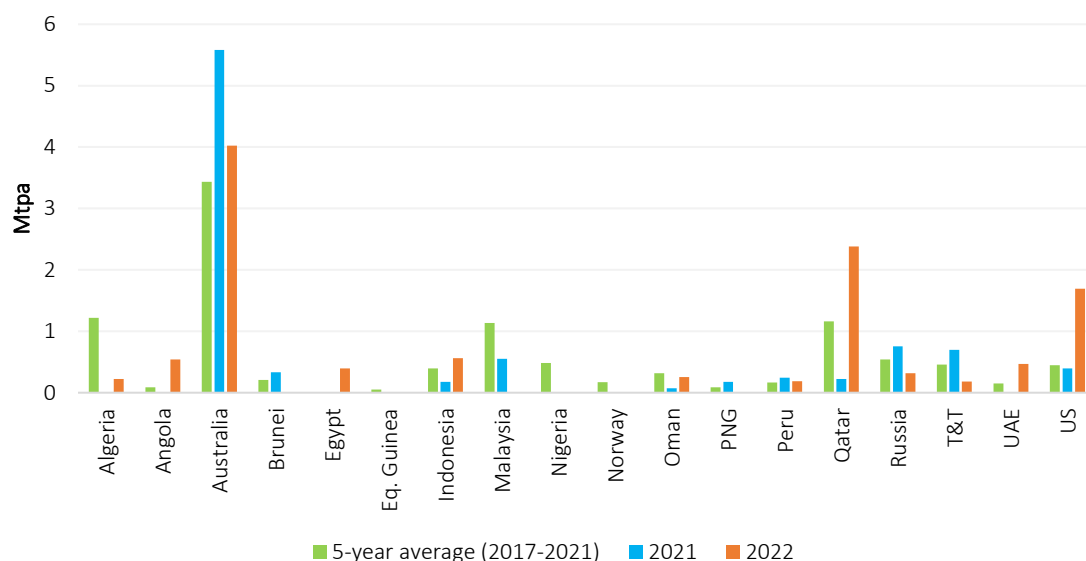
The impacted LNG volumes attributed to planned maintenance activity in 2022 stood at 11 Mt, slightly higher than the 9 Mt in 2021. Liquefaction facilities in Algeria, Angola, Egypt, Indonesia, Oman, Qatar, the UAE and the US experienced higher planned maintenance activity compared to 2021. Notably, Qatar and the US witnessed a significant rise in maintenance activity compared to the five-year average from 2017 to 2021. Conversely, maintenance activity at liquefaction facilities in Australia, Brunei, Malaysia, Papua New Guinea, Russia and Trinidad and Tobago was relatively lower (Figure 2).

Meanwhile, unplanned outages at liquefaction facilities resulted in a historic high of 16 Mt of impacted LNG volumes in 2022, marking a significant increase from the 12 Mt in 2021, and an average of 6 Mt over the 2017-2021 five-year period. Important unplanned outages in 2022

occurred at prominent LNG plants such as Freeport LNG in the US, Hammerfest in Norway, and Arzew in Algeria.

In terms of weather-related impact, Nigeria experienced extensive flooding in the fourth quarter of 2022, which caused gas supply disruptions to the Bonny LNG facility.

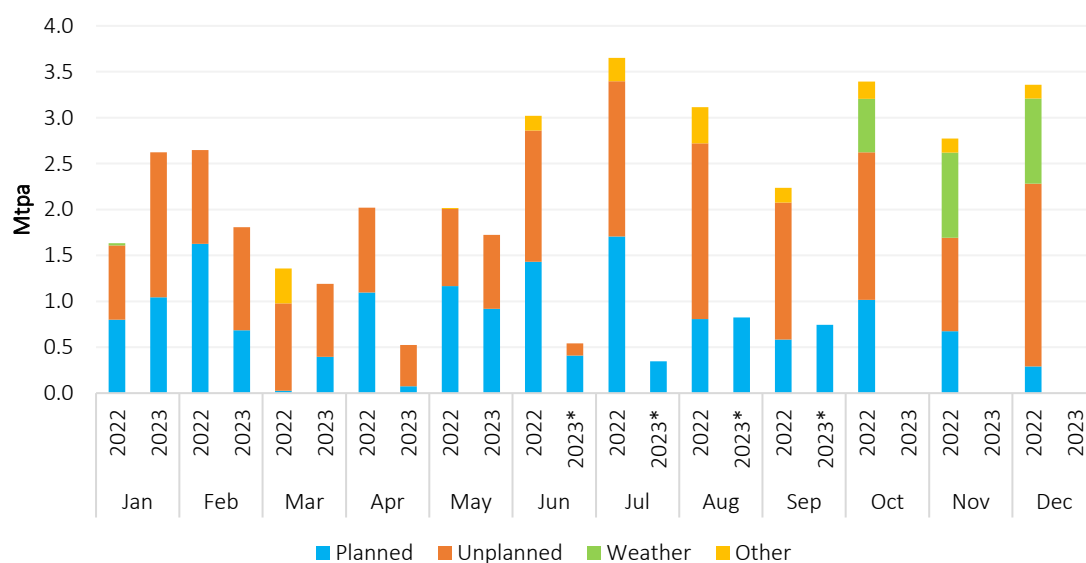
Figure 2: Trend in impacted LNG volumes due to planned maintenance activity at a country level



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

Between January and May 2023, a total of 7.9 Mt of LNG volumes were affected by planned maintenance (3.1 Mt) and unplanned outages (4.8 Mt). This represents a decrease compared to the 9.7 Mt of impacted LNG volumes during the same period in 2022. This decline was primarily driven by lower planned maintenance activity and other factors, offsetting a slight increase in maintenance due to unplanned outages (Figure 3).

Figure 3: Monthly trend in impacted global LNG volumes by factor



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

(*): Forecast for planned maintenance activity based on announced schedule by LNG operators

From January to May 2023, the impacted LNG volumes due to planned maintenance activity decreased by 1.6 Mt y-o-y. The decrease was mainly observed in facilities located in Australia, Indonesia, Qatar and the US. In contrast, the increase in maintenance activity resulting from unplanned outages at the Freeport LNG facility in the US was nearly offset by reduced unplanned maintenance at the Arzew LNG facility in Algeria, the Prelude LNG facility in Australia and the Hammerfest LNG facility in Norway.

For the full year 2023, the total impacted LNG volumes due to planned maintenance, unplanned outages, weather-related challenges and other factors are expected to decrease compared to 2021, averaging between 18-23 Mt. As for the liquefaction capacity impacted by these factors, it is projected to account for 4% of the global liquefaction capacity, showing a decrease from the 6.5% observed in 2022.

The planned maintenance schedule for global liquefaction facilities is generally not publicly disclosed, except for Australia, which typically announces its planned maintenance schedule for the full year. Based on Australia's maintenance schedule, a decrease in planned maintenance activity in the country is anticipated for 2023. Conversely, higher planned maintenance activity is expected at the Cameron and Corpus Christi liquefaction facilities in the US, while lower planned maintenance is forecasted at the Freeport LNG facility. However, Cheniere-operated facilities may implement enhanced maintenance techniques, potentially reducing the duration of planned maintenance compared to the previous year. Overall, it is projected that the impacted LNG volumes due to planned maintenance activity will align with the historical average of 10-12 Mt observed from 2018 to 2022.

This year, a decrease in unplanned maintenance activity is anticipated at global liquefaction facilities, primarily driven by reduced unplanned maintenance at the Arzew and Hammerfest LNG facilities, as well as the resumption of production at the Freeport LNG facility. Consequently, it is estimated that approximately 6-7 Mt of LNG volumes may be impacted due to unplanned maintenance activity in 2023, consistent with the annual average observed between 2018 and 2020. The unplanned maintenance activity in 2021 and 2022, which were exceptional years for unplanned outages, were excluded from the historical average.

Weather-related challenges and other factors may impact approximately 2-4 Mt of LNG volumes this year, taking into account the five-year average between 2018 and 2022. As a result, the total impacted LNG volumes are expected to decrease by approximately 10-11 Mt y-o-y, reaching a range of around 21-22 Mt. This reduction in impacted volumes is expected to contribute to an increase in global LNG supply, resulting in a looser supply-demand balance for LNG, which potentially places downward pressure on spot LNG prices.

1 Global Perspectives

1.1 Global Economy

In its World Economic Prospects June 2023 report, Oxford Economics revised its global GDP growth forecast for 2023, increasing it by 0.3 percentage points to 2.2% compared to the previous month's forecast. However, the global GDP growth forecast for 2024 was adjusted downwards by 0.1 percentage points to 2.2% due to expectations of moderate economic growth amidst sustained high inflation (Figure 4). Meanwhile, global economic growth is expected to decelerate in the second quarter of 2023, following a better-than-expected performance in the first quarter of 2023, particularly in Advanced Economies (AEs).

The outlook for GDP growth in AEs has been revised upwards by 0.3 percentage points, with an expected growth rate of 1% in 2023. However, there is a slight softening anticipated to 0.9% in 2024. In the case of the United States, the GDP growth forecast has been raised by 0.8 percentage points to 1.3% in 2023. The US economy has shown resilience due to a strong labour market and robust consumer spending. Nevertheless, it is still expected to enter a mild recession in the second half of 2023, driven by the lagged effect of tightening monetary policies. In the Euro area, the GDP growth has lost some momentum since the first quarter, resulting in the slightly downgraded forecast to 0.8% in 2023. Growth across the region has been divergent, with Italy and Spain experiencing strong growth, while Germany entered a recession during the first quarter of 2023. Regarding Japan, its GDP growth forecast stands at 0.7% in 2023, reflecting strong growth in the first quarter of 2023, primarily driven by increased consumption.

GDP growth in Emerging Markets and Developing Economies (EMDEs) has also seen an upward revision, with projected growth rates of 3.9% in 2023, followed by a slight softening to 3.8% in 2024. China's GDP growth is expected to reach 5.5% in 2023 before decelerating to 4.6% in 2024. Factors such as relatively low inflation rates, increased investment, pent-up demand, strong consumer spending and a robust labour market are expected to contribute to China's economic recovery. However, it is worth noting that slowing external demand and high debt burdens may impose limitations on China's growth prospects. In addition, India's GDP growth has been revised upwards by 0.7 percentage points to 5.6% in 2023, primarily driven by strong growth in the first quarter of 2023.

Figure 4: GDP growth forecast



Source: GECF Secretariat based on data from Oxford Economics

In May 2023, several economic forecasts were released, including the United Nation’s World Economic Situation and Prospects report and the European Commission’s Spring 2023 Economic Forecast. These reports provide insights into the global and regional economic outlook.

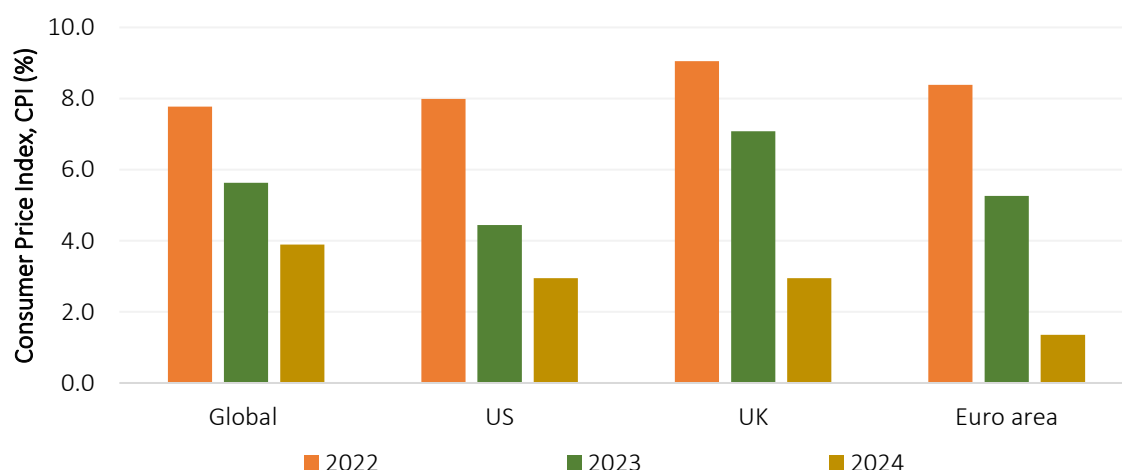
The UN now expects global GDP growth of 2.3% in 2023, an upward revision from its previous forecast of 1.9% in January 2023. This upward revision is driven by robust household spending in the US and EU, as well as the economic recovery taking place in China.

On the other hand, the European Commission anticipates GDP growth in the EU to be 1% in 2023, an upward revision from its previous forecast of 0.8% in February 2023. Several factors contributed to this upward revision, including lower energy prices, easing supply constraints, improved business confidence and strong labour markets. The decline in energy prices has led to reduced household energy bills, lowered production costs for energy-intensive industries and reduced costs of government support measures, all contributing to an improved economic outlook for Europe. However, it is important to note that high inflation remains a downside risk for the region.

Inflationary pressures in many countries have been easing, driven by factors such as tightening monetary policies, weaker energy and commodity prices and the resolution of supply chain bottlenecks. However, it is expected that headline inflation will still remain above targeted rates in major economies until 2024 or beyond. According to the latest forecast from Oxford Economics, global inflation is projected to decrease from 7.8% in 2022 to 5.6% in 2023, followed by a further reduction to 3.9% in 2024. While this indicates a gradual easing of inflation, it suggests that achieving the targeted inflation rates of around 2% will take some time. Specifically, in the US, inflation is projected to average 4.4% in 2023, with a decline to 2.9% in 2024. In the Euro area, inflation is anticipated to average 5.3% in 2023, followed by a subsequent decline to 1.4% in 2024. The UK is expected to experience inflation averaging 7.1% in 2023, before decreasing to 2.9% in 2024 (Figure 5).

These projections highlight the ongoing challenges in managing inflationary pressures and achieving price stability in major economies. While the easing of inflation is a positive development, policy makers will need to continue monitoring and implementing appropriate measures to ensure inflation remains under control and aligns with targeted rates.

Figure 5: Inflation rates

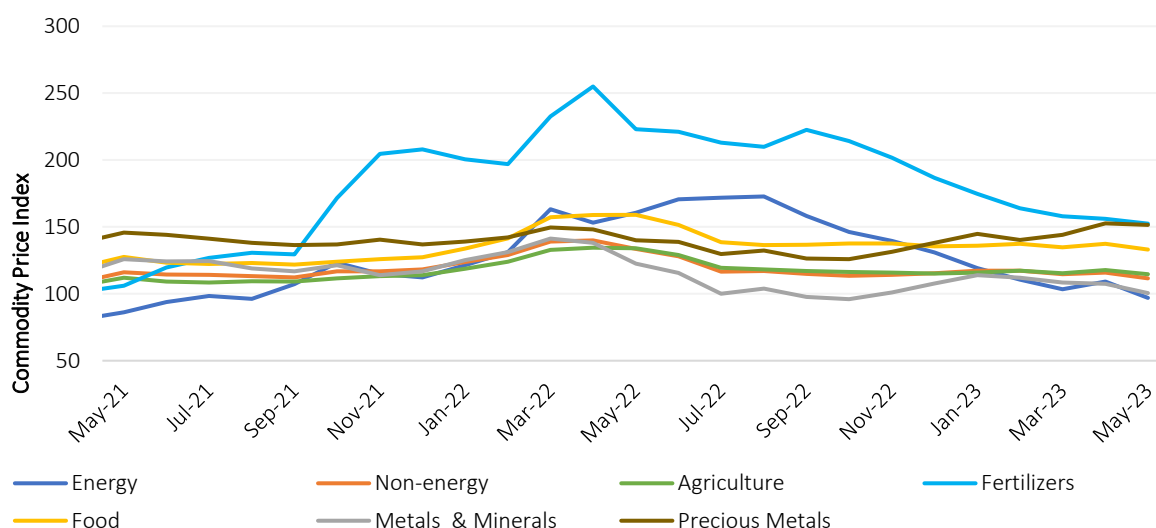


Source: GECF Secretariat based on data from Oxford Economics

In May 2023, commodity prices, particularly in the energy sector, experienced significant declines. The energy price index decreased by 11% m-o-m and was 40% lower y-o-y. This decline was driven by lower oil, gas and coal prices. Oil prices reached its lowest monthly average since December 2021. Gas and coal prices hit two-year lows.

The non-energy price index also saw a decrease of 4% m-o-m and was 16% lower y-o-y. Within the non-energy sectors, the agriculture price index decreased by 2% m-o-m, while the metals and minerals price index decreased further by 6% m-o-m. Additionally, the fertilizer price index decreased by 2% m-o-m, marking its eight consecutive monthly decline, and was 32% lower y-o-y (Figure 6).

Figure 6: Monthly commodity price indices

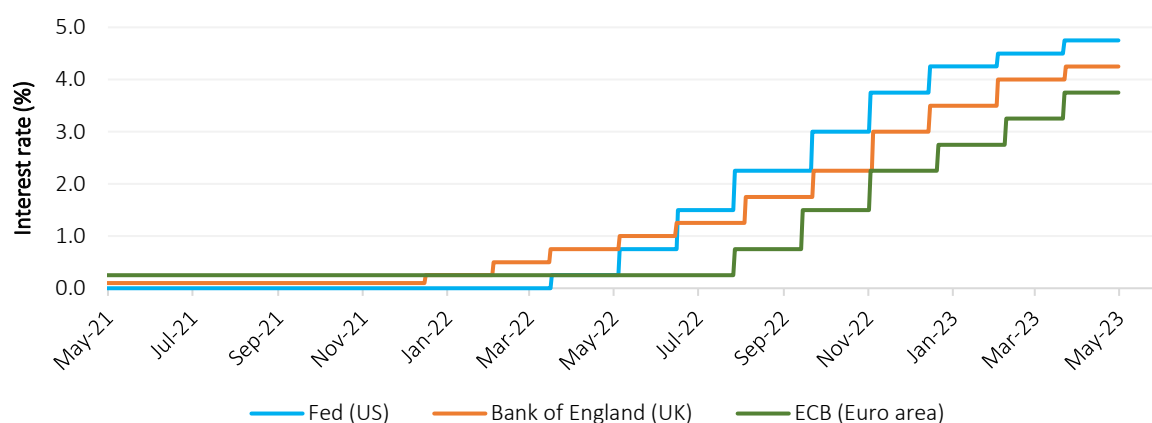


Source: GECF Secretariat based on data from World Bank Commodity Price Data

Note: Monthly price indices based on nominal US dollars, 2010=100, 1960 to present. 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%).

In May 2023, several central banks took action to raise their benchmark interest rates. The US Federal Reserve (Fed) initiated the move by increasing its benchmark interest rates by 0.25 percentage points on May 3, bringing them to the range of 5.00-5.25%. This marked the highest level in 17 years for US interest rates. Subsequently, the European Central Bank (ECB) followed suit and raised its key interest rates by 0.25 percentage points on May 10. Similarly, on May 11, the Bank of England (BOE) increased its benchmark interest rate by 0.25 percentage points to reach 4.5% (Figure 7).

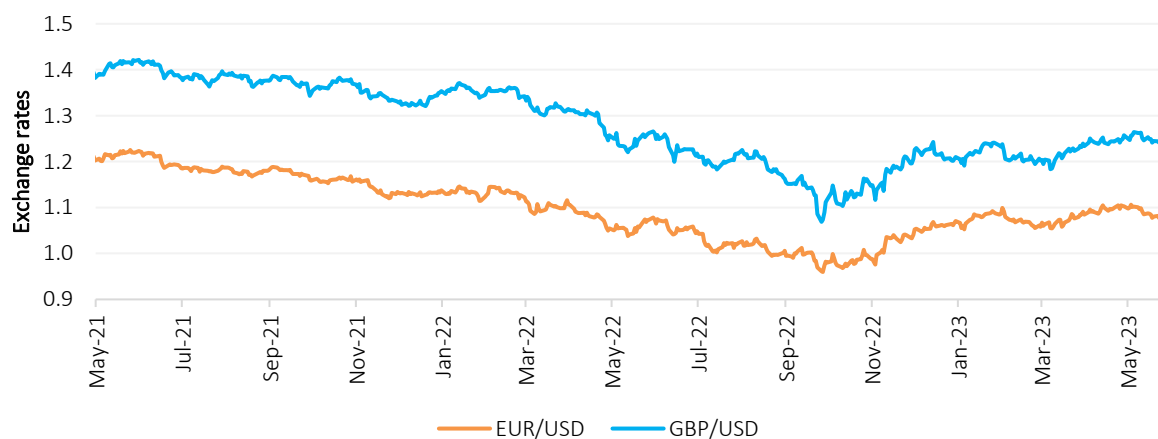
Figure 7: Interest rates in major central banks



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

In May 2023, the euro experienced a depreciation against the US dollar compared to the previous month. The average exchange rate for the euro was \$1.0865, representing a 1% decrease m-o-m. However, when compared to the same period last year, the euro remained 3% higher y-o-y. On the other hand, the British pound showed a slight increase in value against the US dollar in May 2023. The average exchange rate for the pound was \$1.2481, reflecting a marginal 0.2% increase both m-o-m and y-o-y (Figure 8). In terms of inflation in the Euro area, there was a slight decline in May 2023. The average inflation rate for the region was 6.1%, compared to 7% in the previous month.

Figure 8: Exchange rates



Source: GECF Secretariat based on data from Refinitiv Eikon

1.2 Other Developments

The US reached its debt ceiling on January 19, 2023. The debt ceiling is a statutory limit set by Congress on the amount of debt that the federal government can legally borrow. When the debt ceiling is reached, the government must seek authorization from Congress to raise it, allowing the government to continue borrowing funds to meet its financial obligations. The debt ceiling issue arises because the government's expenditures often exceed its revenue, resulting in budget deficits and the need to borrow money to cover the shortfall.

To manage the situation, since January 2023, the Treasury has implemented extraordinary measures to create additional borrowing capacity. However, these measures were projected to be effective only until June 5, 2023, highlighting the need for a critical agreement before that date. On June 3, 2023, the US President signed a bill to suspend the \$31.4 trillion debt ceiling until January 2025. This move effectively averted a potential default, which could have had severe consequences for the US economy. A default would have led to the government being unable to meet its financial obligations, potentially causing a cascade of negative effects on the global economy and financial markets.

In May 2023, significant policy developments occurred in the global economy and energy sector, involving key events and meetings such as the G7 Hiroshima Summit, G20 Working Group meetings, and APEC Energy Working Group meetings.

G7 Hiroshima Summit: The G7 Hiroshima Summit took place in Hiroshima, Japan from May 19 to 21, 2023. During the Summit, the G7 leaders reiterated their commitment to a coordinated approach in addressing economic resilience and security, as well as the transition to clean energy economies. In addition to the G7 nations, leaders from Australia, Brazil, Comoros (representing the African Union), Cook Islands (representing the Pacific Forum), India, Indonesia, South Korea and Vietnam also attended the meetings.

The G7 leaders reaffirmed their shared goals of achieving net-zero emissions by 2050 and striving to limit the global temperature rise to 1.5°C. While recognizing that countries may adopt different pathways to reach these goals, the leaders stressed the need to address energy security concerns, climate change and manage geopolitical risks. In the G7 Hiroshima Leaders' Communique, the leaders also highlighted the importance of supporting investment in the gas sector, stating *"the important role that increased deliveries of LNG can play, and acknowledge that investment in the sector can be appropriate in response to the current crisis and to address potential gas market shortfalls provoked by the crisis."*

G20 Meetings: Under India's G20 Presidency, two important working group meetings took place in Mumbai in May 2023. The third Energy Transitions Working Group Meeting (ETWG) gathered over 100 representatives from G20 member countries, specially invited countries and international organisations. Additionally, the third Environment and Climate Sustainability Working Group Meeting (ECSWG) was held during the same period. The ECSWG aimed to enhance cooperation among G20 nations in developing innovative approaches for the sustainable management of oceans and the conservation of marine biodiversity.

Asia-Pacific Economic Cooperation (APEC) Meetings: The APEC Energy Working Group (EWG) convened in Detroit, US, on May 21-22, 2023. The primary objective of the meeting was to enhance cooperation among APEC economies in the field of clean energy and promote sustainable and inclusive economic growth. It is important to note that the energy mix within the APEC region is currently dominated by fossil fuels, accounting for 86% of the total primary energy supply. The meeting also served as preparation for the upcoming 2023 APEC Energy Ministerial Meeting, scheduled to take place in August 2023.

Bonn Climate Change conference: The Bonn Climate Change conference commenced on June 5, 2023, in Germany. This conference plays a pivotal role in setting the stage for decision-making at the upcoming COP28 scheduled to be held from November 30 to December 12, 2023 in the United Arab Emirates. The Bonn conference is set to conclude on June 15, 2023, and further details on the outcomes will be provided in our next monthly report.

2 Gas Consumption

2.1 Europe

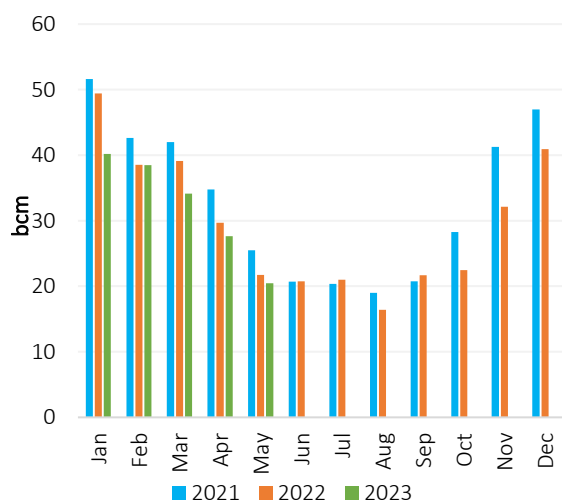
2.1.1 European Union

In May 2023, the European Union (EU) experienced a 6% y-o-y decrease in gas consumption, reaching a total of 20 bcm (Figure 9). This decline was primarily due to the increased renewable energy generation across several EU countries and the implementation of the EU regulation promoting a voluntary 15% reduction in gas demand from 1 April 2023 to 31 March 2024. Despite falling gas prices in Europe, the industrial sector has not fully recovered compared to the previous year, primarily due to demand destruction following the high prices recorded in 2021 and 2022.

Gas-based electricity production within the EU fell by 17% y-o-y, while total electricity production decreased by 3% y-o-y, reaching 187 TWh. The decrease in gas-fired power generation in May 2023 was offset by the increased output from other renewable energy sources. Nuclear power generation grew by 2% y-o-y, while hydro, solar, and wind power sources saw substantial growth of 11%, 10% and 18% y-o-y, respectively. Additionally, there was a significant decrease in coal generation, dropping by 35% y-o-y (equivalent to 10.5 TWh) (Figure 10). Renewables accounted for the largest share of the power mix at 36%, followed by nuclear (23%), gas (15%), hydro (15%) and coal (11%).

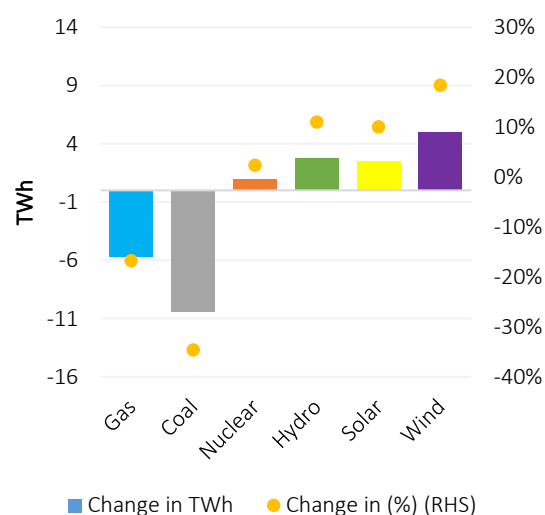
From January to May 2023, the EU's gas consumption fell by 10% y-o-y, amounting to 161 bcm.

Figure 9: Gas consumption in the EU



Source: GECF Secretariat based on data from EntsoG and McKinsey

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



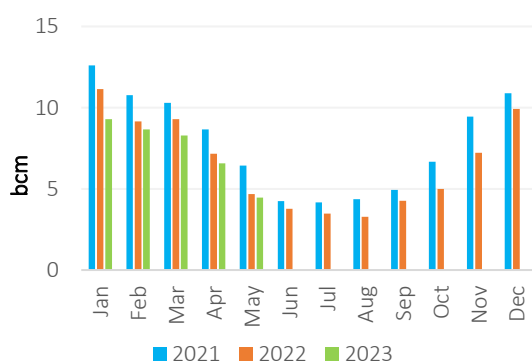
Source: GECF Secretariat based on data from Ember

2.1.1.1 Germany

In May 2023, Germany's gas consumption recorded a 5% y-o-y decrease, falling to 4.5 bcm. This was attributed to the implementation of a voluntary target set for EU member states, including Germany, to reduce natural gas consumption by 15% from 1 April 2023 to 31 March 2024, as well as the increased output of hydro and renewable energy during the month (Figure 11).

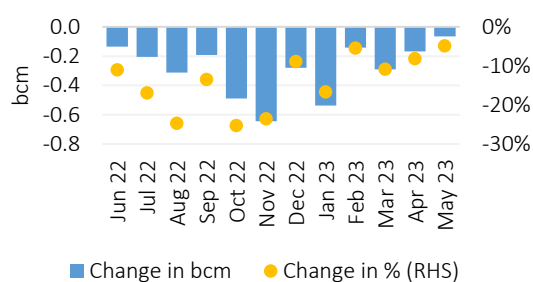
The industrial sector continued its downward trend for over twelve consecutive months, registering a 5% decline in gas consumption compared to the previous year (Figure 12). In contrast, consumption in the residential/commercial sector increased by 10% y-o-y due to colder than usual weather during the final two weeks of May, resulting in a growth of 0.1 bcm.

Figure 11: Gas consumption in Germany



Source: GECF Secretariat based on data from Refinitiv

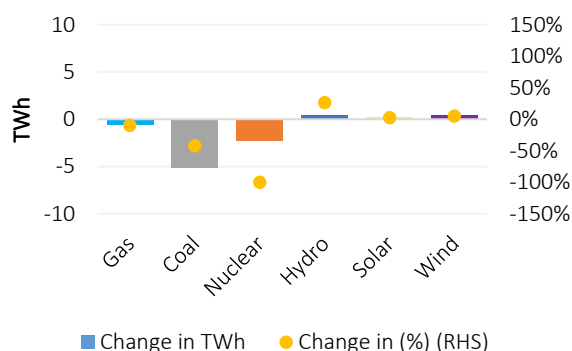
Figure 12 Trend in gas consumption in the industrial sector in Germany (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

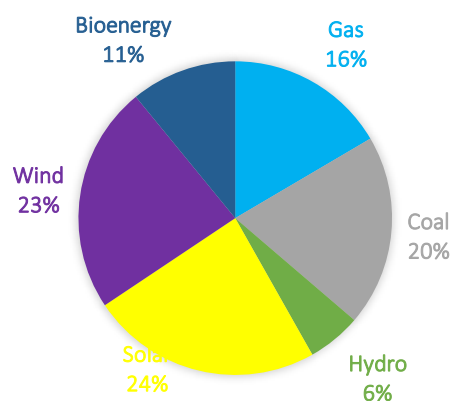
Electricity production from gas saw a 9.6% y-o-y decrease, while total electricity production fell by 17% y-o-y, amounting to 35 TWh. During the same period, there was a notable increase in energy generation from hydro (26% y-o-y), solar (3%) and wind (5%). However, electricity production from coal witnessed a substantial decline of 42% compared to the previous year, largely due to the increased output from hydro and renewable energy sources (Figure 13). Renewables held the dominant position in the energy mix, comprising 58% of the total, followed by coal (20%), gas (16%) and hydro (6%) (Figure 14).

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



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 14: German electricity mix in May 2023



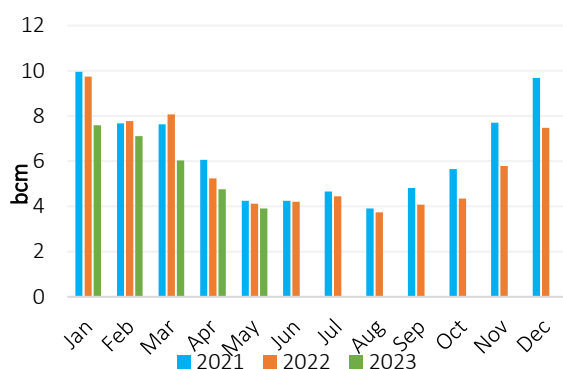
Source: GECF Secretariat based on data from Refinitiv and Ember

From January to May 2023, total gas consumption in Germany fell by 10% y-o-y to 37 bcm.

2.1.1.2 Italy

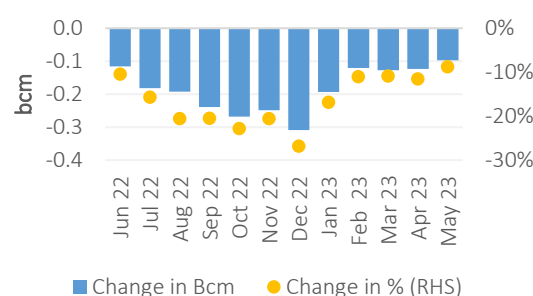
In May 2023, Italy's gas consumption dropped by 5.2% y-o-y to 3.9 bcm (Figure 15). Both the power generation and industrial sectors saw declines of 15% and 8.8%, respectively, reaching 1.4 bcm and 1 bcm. This decrease was driven by the high output of hydro and renewable energy due to the exceptional precipitation recorded during the month, with 50% above the seasonal norm. This abundant rainfall replenished river levels, allowing hydroelectric power plants to generate more electricity. For the 17th consecutive month, gas consumption in the industrial sector saw a y-o-y decline compared to the previous year (Figure 16). In contrast, the residential sector experienced a 4.6% y-o-y increase in gas consumption due to unusually cold temperatures recorded in southern Europe during the last two weeks of May 2023.

Figure 15: Gas consumption in Italy



Source: GECF Secretariat based on data from Snam

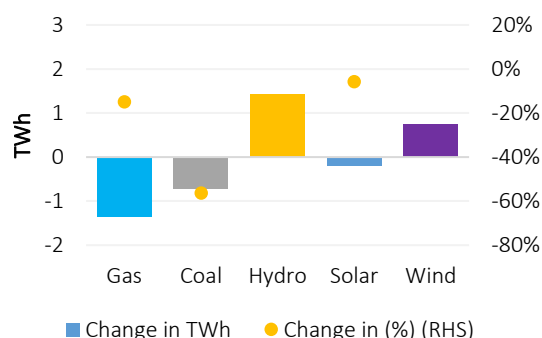
Figure 16: Trend in gas consumption in the industrial sector in Italy (y-o-y change)



Source: GECF Secretariat based on data from Snam

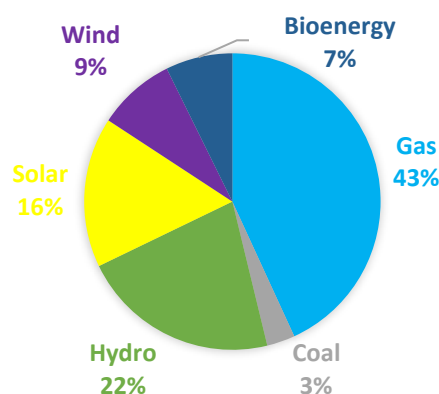
In May 2023, gas-based electricity production witnessed a notable decline of 15% y-o-y resulting in a total electricity production decrease of 1.5% y-o-y to reach 18 TWh. However, there was a significant increase in energy generation from hydro (58% y-o-y) and wind (95%) (Figure 17). Despite these changes, gas remained the dominant fuel in the power mix, accounting for 43% of the total, followed by renewables (32%), hydro (22%) and coal (3%) (Figure 18). It is worth mentioning that the risk of drought for summer of 2023 decreased significantly due to the above-average precipitation levels recorded during the month, displacing the use of natural gas in the power generation mix.

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



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 18: Italian electricity mix in May 2023



Source: GECF Secretariat based on data from Refinitiv and Ember

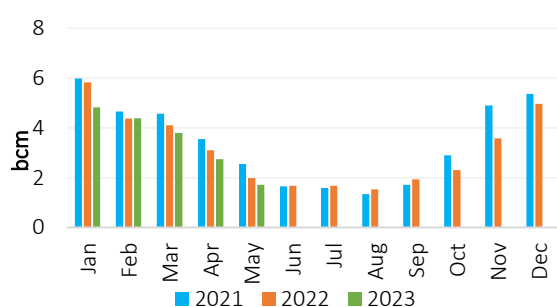
From January to May 2023, total gas consumption in Italy fell by 16% y-o-y to reach 30 bcm.

2.1.1.3 France

In May 2023, France's gas consumption declined by 14% y-o-y to reach 1.7 bcm. This marked the third consecutive monthly decrease following a temporary rebound observed in February 2023 (Figure 19). The reduction in gas consumption can be primarily attributed to decreased usage in the power generation sector, as there was a higher output from nuclear power compared to the previous year. It is worth noting that the No.1 reactor of the Chooz nuclear power plant, with a capacity of 1450 MW, was reconnected to the grid after a shutdown of over 16 months due to corrosion issues, starting from May 10.

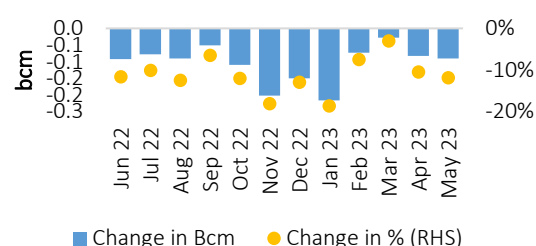
Despite falling gas prices, gas consumption in the industrial sector declined by 12% y-o-y (Figure 20) due to recent shutdowns or output reductions in some energy-intensive industries such as fertilizer and cement. In contrast, the residential sector experienced a 7.2% y-o-y growth in gas consumption due to colder temperatures in the final two weeks of the month.

Figure 19: Gas consumption in France



Source: GECF Secretariat based on data from GRTgaz

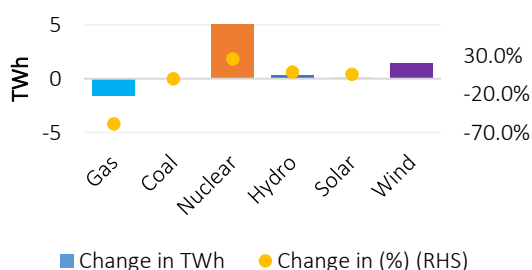
Figure 20: Trend in gas consumption in the industrial sector in France (y-o-y change)



Source: GECF Secretariat based on data from GRTgaz

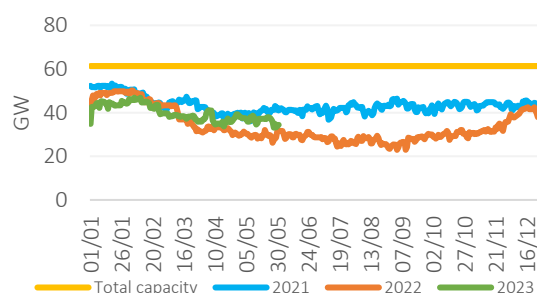
In May 2023, France experienced significant changes in its electricity production. Production from gas witnessed a notable decline of 59% y-o-y, while total electricity production increased by 17% y-o-y, reaching 37 TWh. The month also marked a recovery in electricity generation from nuclear power, with a 26% y-o-y increase. Nuclear capacity availability rose by 24% y-o-y and 2% m-o-m (Figure 22). The upcoming months are expected to see further increases in France's nuclear availability. Higher electricity production was recorded from hydro (9% y-o-y), wind (73%), and solar (6%). However, electricity production from coal remained unchanged (Figure 21). Nuclear power continued to hold the dominant position in the energy mix with a share of 67%, followed by renewables (17%), hydro (13%), and gas (3%).

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



Source: GECF Secretariat based on data from Ember

Figure 22: French nuclear capacity availability



Source: GECF Secretariat based on data from Refinitiv and RTE

From January to May 2023, gas consumption in France dropped by 10% y-o-y to 17.5 bcm.

2.1.1.4 Spain

In May 2023, Spain witnessed a decline in gas consumption across various sectors. Gas consumption fell by 4.6% y-o-y to 2.2 bcm. The industrial/residential sector experienced a decrease of 3.9%, while the power generation sector recorded a larger decline of 7.6%. These declines were attributed to increased output from solar and wind energy sources and a reduction in electricity exports to France (Figure 23). In the industrial sector, gas consumption continued to decline by 4% y-o-y for the 16th consecutive month, albeit at a slower rate, reflecting a prolonged trend amidst a low gas price environment (Figure 24).

Figure 23: Gas consumption in Spain

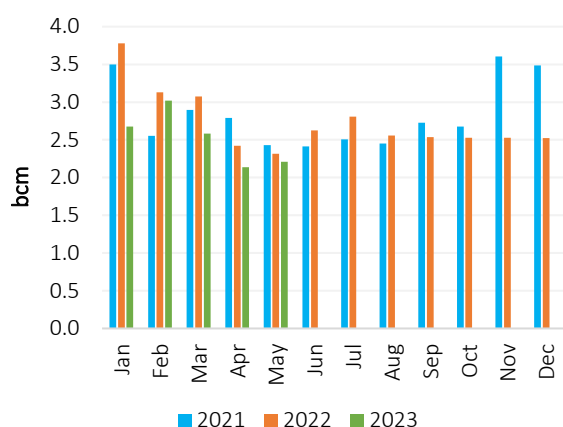
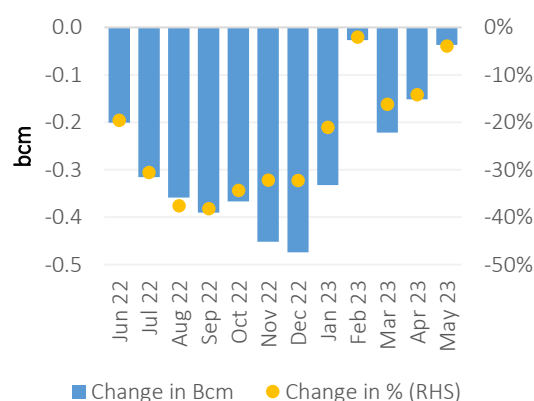


Figure 24: Trend in gas consumption in the industrial sector in Spain (y-o-y change)

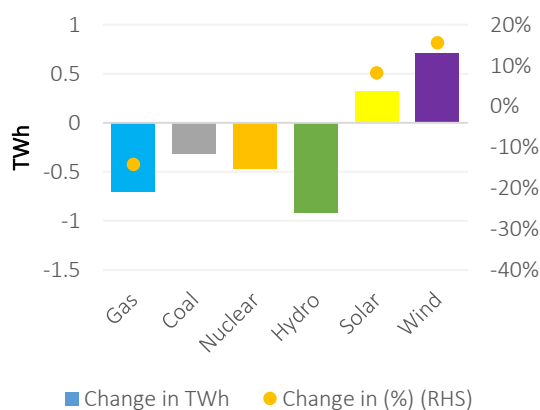


Source: GECF Secretariat based on data from Enagas

Source: GECF Secretariat based on data from Enagas

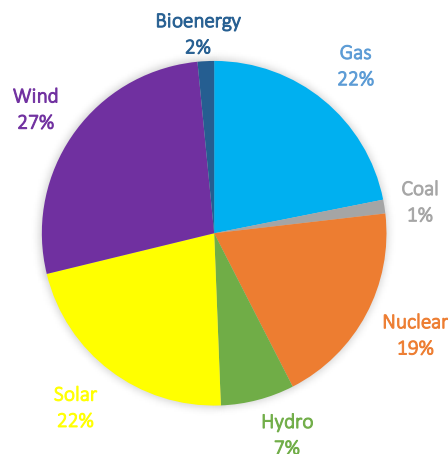
Electricity production from gas declined by 14% y-o-y, while total electricity production decreased by 6.8% y-o-y to reach 19.3 TWh. However, there were notable increases in electricity generation from solar (+8% y-o-y) and wind (16%). On the other hand, electricity production from coal, nuclear, and hydro recorded declines of 55%, 11% and 41%, respectively (Figure 25). Renewables held the dominant position in the power mix, accounting for 51% of the total, followed by nuclear (19%), gas (22%), hydro (7%) and coal (1%) (Figure 26).

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



Source: GECF Secretariat based on data from Ember and Ree

Figure 26: Spanish electricity mix May 2023



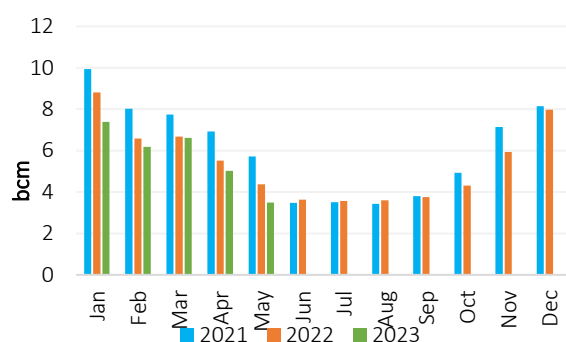
Source: GECF Secretariat based on data from Ember and Ree

From January to May 2023, Spain's gas consumption showed a y-o-y decline of 14%.

2.1.2 United Kingdom

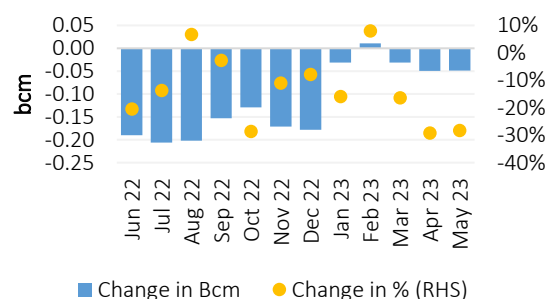
In May 2023, gas consumption in the UK fell by 20% y-o-y, reaching 3.5 bcm (Figure 27). This decline was largely due to higher-than-average temperatures during the month, which resulted in a 9% y-o-y reduction in natural gas consumption in the residential sector, totalling 2.2 bcm. Furthermore, the increased output from solar energy sources contributed to a decrease in the share of natural gas in the power generation mix. The industrial sector also experienced a significant drop in gas consumption, with a decline of 28% y-o-y. Despite a significant decrease in wind speeds in the UK during the month, natural gas consumption in the power generation sector declined by 30% y-o-y (Figure 28).

Figure 27: Gas consumption in the UK



Source: GECF Secretariat based on data from Refinitiv

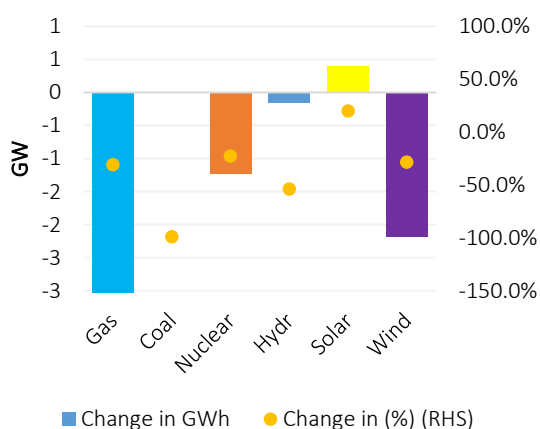
Figure 28: Trend in gas consumption in the industrial sector in the UK (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

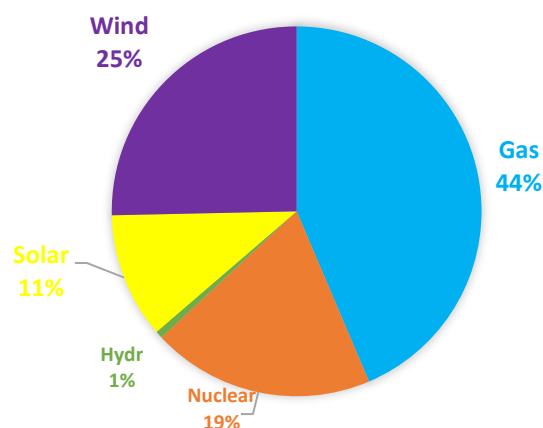
The UK's electricity production from gas decreased by 30% y-o-y, while total electricity production fell by 25% y-o-y, reaching 22 TWh. Solar power generation increased by 20% y-o-y. However, electricity production from nuclear, hydro and wind declined by 23%, 54%, and 29% y-o-y, respectively (Figure 29). Gas emerged as the dominant energy source in the power mix with a share of 44% of the total, followed by renewables (36%), nuclear (19%) and hydro (1%) (Figure 30).

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



Source: GECF Secretariat based on data from Refinitiv

Figure 30: UK electricity mix May 2023



Source: GECF Secretariat based on data from Refinitiv

For the period from January to May 2023, gas consumption in the UK declined by 3.3 bcm, or 10% year-on-year.

2.2 Asia

2.2.1 China

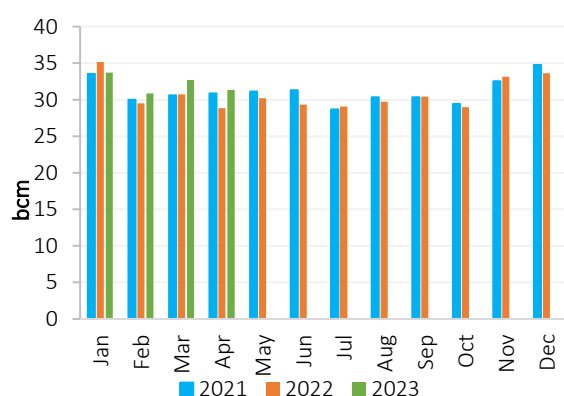
In April 2023, China's apparent gas demand, encompassing pipeline imports, LNG imports, and domestic production, rose by 8.6% y-o-y, reaching 31 bcm. This growth can be attributed primarily to the easing of COVID-19 lockdown measures and the subsequent recovery observed in the industrial sector (Figure 31).

Electricity production from gas increased by 12% y-o-y, while total electricity production declined by 1.5% year-on-year, amounting to 699 TWh. During the month, there was a surge in generation from coal (+12% y-o-y), nuclear (+6%), hydro (+75%), solar (+10%) and wind (+35%) (Figure 32). Coal remained the dominant fuel in the power mix, accounting for 60% of the total, followed by renewables (22%), hydro (10%), nuclear (5%), and gas (3%).

In line with its commitment to achieving net-zero emissions by 2060, China has made significant strides in expanding its installed solar capacity during the first four months of this year. The installed solar capacity has tripled compared to the same period last year, driven by decreasing production costs and the growing demand for clean electricity. As a result, solar energy has gained a larger share in China's power generation mix, contributing to the country's efforts in transitioning to renewable energy sources.

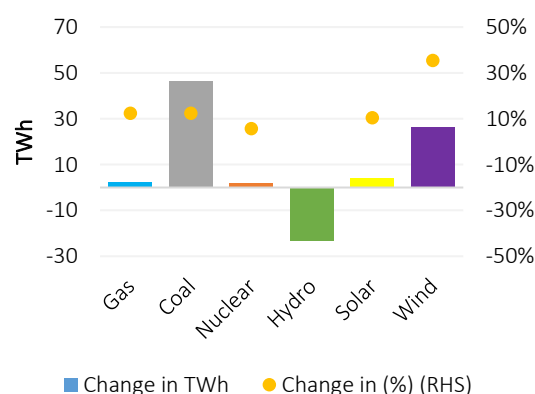
From January to April 2023, China's gas consumption increased by 3.5% y-o-y to 129 bcm.

Figure 31: Gas consumption in China



Source: GECF Secretariat based on data from Refinitiv

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



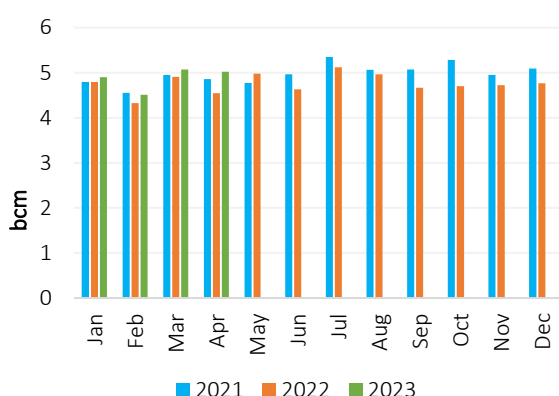
Source: GECF Secretariat based on data from Ember

2.2.2 India

In April 2023, India's gas consumption continued its upward trend, marking the fourth consecutive month of growth with a 10% y-o-y increase to reach 5 bcm (Figure 33). However, the share of regasified LNG in India's gas supply fell to 49%. The fertilizer sector had the largest share of gas consumption by sector at 35%, followed by city gas (23%), power generation (12%), refining (8%) and the petrochemical sector (2%) (Figure 34).

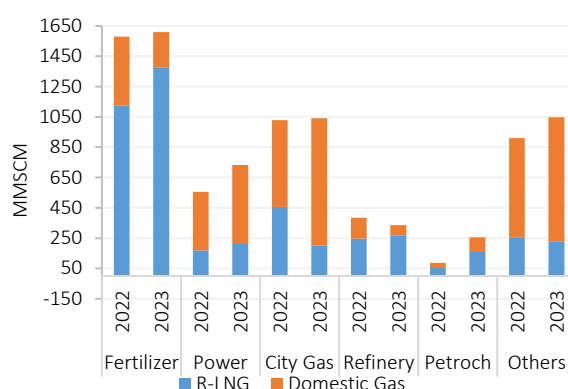
The increase in gas consumption in India was driven by the power generation sector, which experienced a growth of 32% y-o-y. This rise in gas consumption can be attributed to the implementation of emergency measures aimed at addressing anticipated shortfalls in electricity output during the peak power demand period from April to June. The directive mandates that gas-fired power plants operate at full capacity during this period.

Figure 33: Gas consumption in India



Source: GECF Secretariat based on data from India's PPAC

Figure 34: India's gas consumption by sector



Due to the ongoing heatwave in India, which has led to an increased cooling demand, it is projected that the share of natural gas in the electricity mix will grow in the coming months.

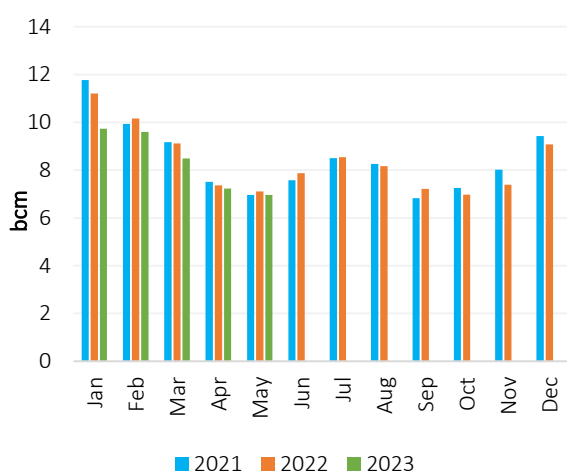
From January to April 2023, India's total gas consumption increased by 5% y-o-y to 19.5 bcm.

2.2.3 Japan

In May 2023, Japan's gas consumption decreased by 2.2% y-o-y to reach 7 bcm (Figure 35). This decline was due to milder weather, with the average temperature in Japan being approximately 0.2 degrees higher compared to the same period last year. The power generation sector was particularly affected, witnessing an 8.6% y-o-y decrease in gas consumption. Despite the routine maintenance that led to the temporary halt of operations at the Sendai No.2 nuclear reactor on May 13, the availability of nuclear power during the month was on average 60% higher y-o-y. Additionally, Japan's Heating Degree Days (HDD) averaged 0.1 during the month, indicating a 2% y-o-y increase (Figure 36).

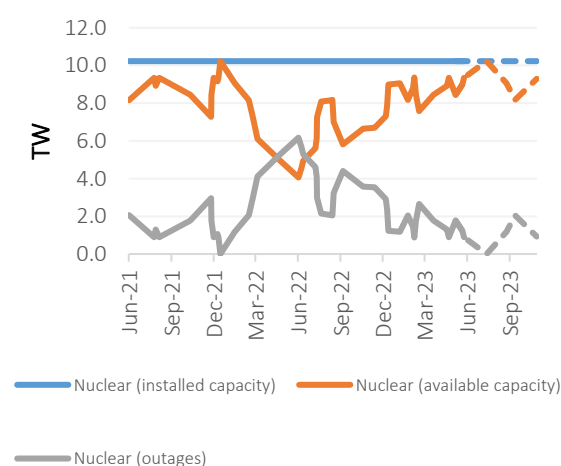
From January to May 2023, gas consumption in Japan decreased by 6.6% y-o-y to 42 bcm.

Figure 35: Gas consumption in Japan



Source: GECF Secretariat based on data from Refinitiv

Figure 36: Nuclear availability in Japan



Source: GECF Secretariat based on data from Refinitiv

2.2.4 South Korea

In May 2023, South Korea witnessed a 10% y-o-y decline in gas consumption, reaching 3.8 bcm. This decrease was primarily driven by lower gas utilization in the residential sector, resulting from above-normal temperatures recorded during the month. Consequently, gas consumption within the residential sector experienced a 12% y-o-y. In the power generation sector, gas consumption also decreased by 5.2% y-o-y mainly due to higher output from nuclear and coal-based sources during the month (Figure 37). Notably, new nuclear capacity installations are expected to increase by 5% Y-o-Y for the period from June to August 2023. Furthermore, the higher solar output anticipated during the summer months is likely to have a negative impact on the share of natural gas in the Korean power generation mix for the same period. Korea's HDD averaged 3.6 in May, down by 0.7% Y-o-Y, which directly influences the country's heating demand. (Figure 38).

Figure 37: Gas consumption in South Korea

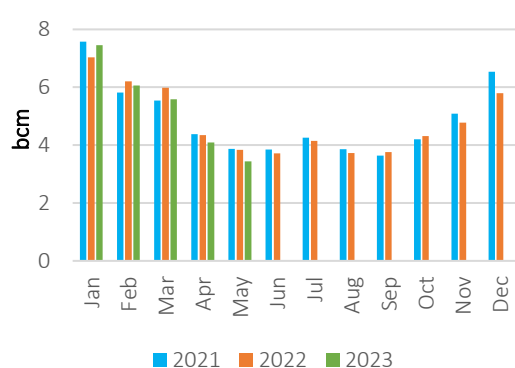
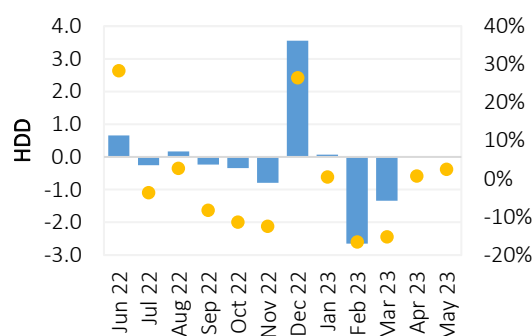


Figure 38: HDD in South Korea (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

Source: GECF Secretariat based on data from Refinitiv

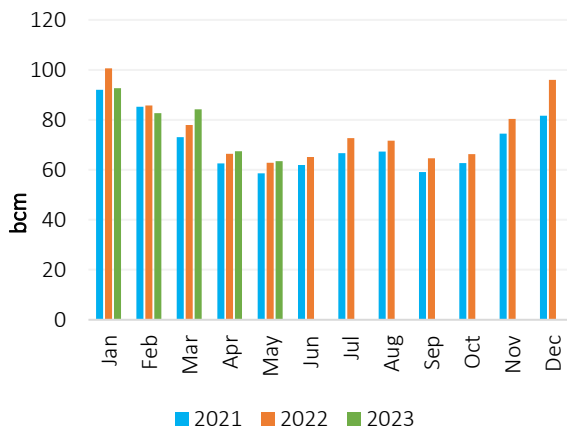
2.3 North America

2.3.1 US

In May 2023, gas consumption in the US increased by 1% y-o-y, reaching 64 bcm (Figure 39). The power generation sector played a significant role in driving this growth with a 5% y-o-y increase in gas consumption. This rise was due to higher utilization of gas in the power generation sector as a result of increased coal-to-gas switching and lower hydro output. Additionally, gas consumption in the residential sector experienced a modest growth of 1% y-o-y. However, in contrast, gas consumption in the commercial and industrial sectors declined by 5.4% and 0.6% y-o-y, respectively.

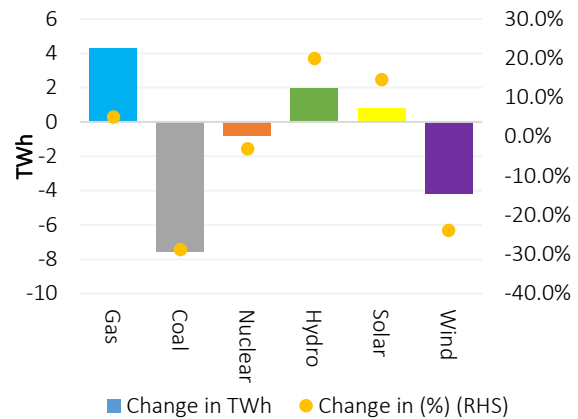
Electricity production from gas rose by 5% y-o-y, while total electricity production decreased by 3.4%. The month witnessed a decrease in generation from coal (-29% y-o-y), nuclear (3%) and wind (24%). However, there was higher production from hydro (20%) and solar (15%) in comparison to the previous year (Figure 40). Gas remained the dominant fuel in the power mix with a share of 40% followed by nuclear (20%), renewable (16%), coal (15%) and hydro (9%).

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 May 2023 (y-o-y change)

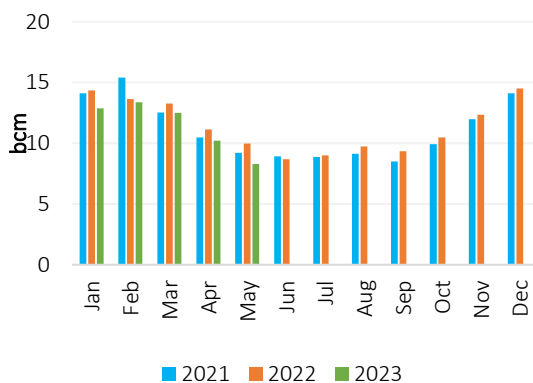


Source: GECF Secretariat based on data from Ember and Refinitiv

2.3.2 Canada

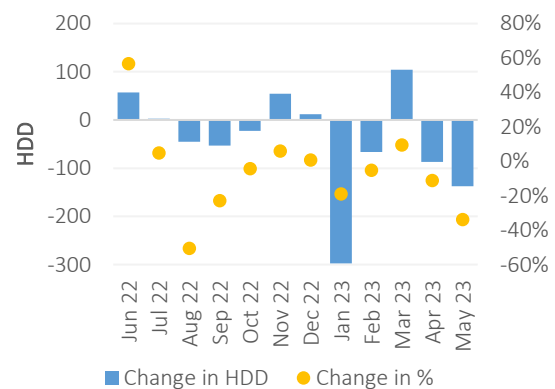
In May 2023, Canada's gas consumption declined by 17% y-o-y to reach 8.3 bcm. This decrease was primarily attributed to lower gas consumption in the industrial/power generation, residential and commercial sectors, which fell by 12%, 29% and 42% y-o-y, respectively (Figure 41). This decline was driven by warmer weather experienced in May 2023 compared to the same period in 2022, with an average Heating Degree Day of 269, marking a 34% from the previous year (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

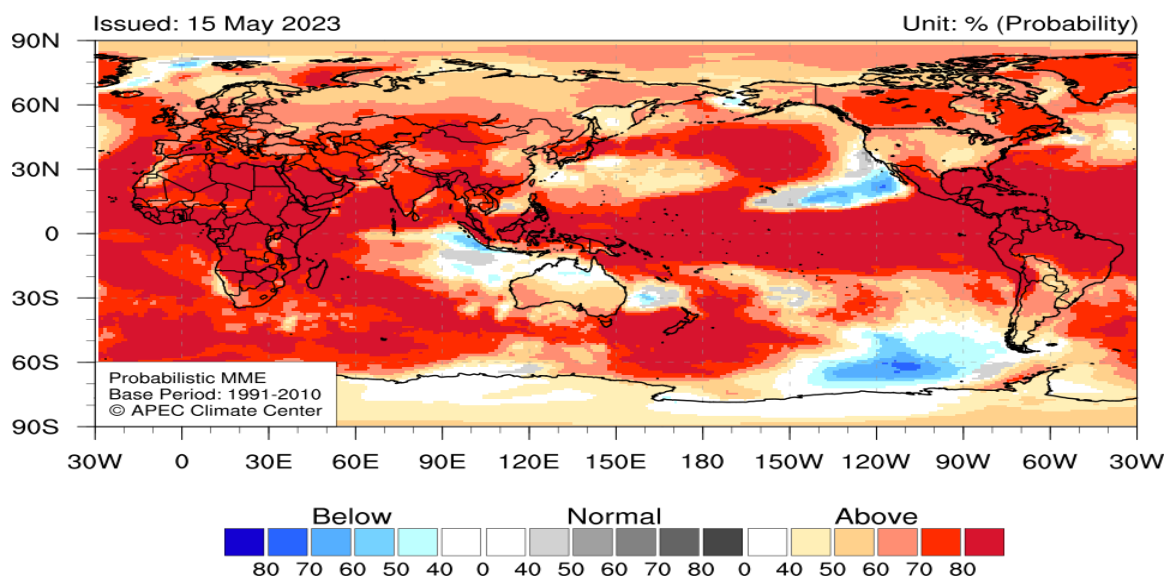
2.4 Weather Forecast

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

2.4.1 Temperature Forecast for June to August 2023

According to the APEC Climate Center Climate Outlook published on May 15, 2023 (Figure 43), the weather forecast for the period June to August 2023 is as follows: Above normal temperatures are expected for most of the globe (excluding subtropical North Pacific and south-eastern South Pacific); Below normal temperatures are expected for the south-eastern South Pacific region.

Figure 43: Temperature forecast June to August 2023

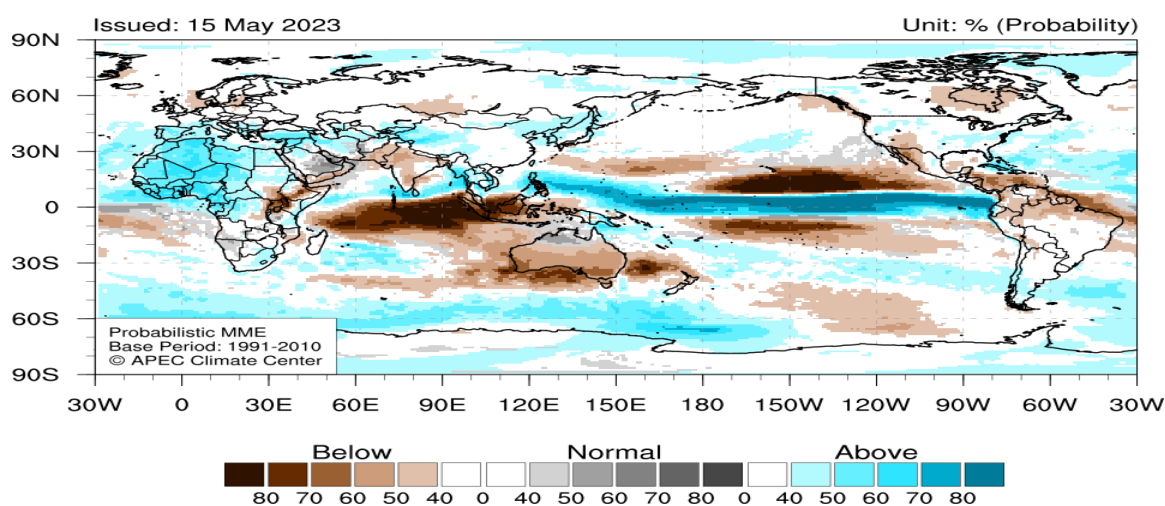


Source: APEC Climate Center

2.4.2 Precipitation Forecast for June to August 2023

According to the APEC Climate Center Climate Outlook published on May 15, 2023 (Figure 44), the precipitation prediction for the period June to August 2023 is as follows: Above normal precipitation is expected for the northern and western Africa and equatorial Pacific; Below normal precipitation is expected for the central off-equatorial Pacific, western and eastern Indian Ocean, Indonesia, southern Australia, South Asia and some regions of northern South America.

Figure 44: Precipitation forecast June to August 2023



Source: APEC Climate Centre

3 Gas Production

3.1 Global

Preliminary data suggests a modest global gas production increase of 0.2% in 2022, resulting in a total production of 4,042 bcm. This surge was principally attributed to enhanced output from North America and the Middle East. However, the CIS and Africa witnessed a decline in their gas production during the same period (Table 1). Revised data from the previous month has led to an upward adjustment of the global gas production figures for 2022.

Forecasts for 2023 indicate a resurgence in global gas production, with an expected increase of 1.5%. Specific regions, such as Africa, LAC, the Middle East and North America, are anticipated to lead this growth, while other regions are likely to sustain stable or potentially reduce their production levels. Non-GECEF Countries are projected to increase their gas production by 2.8%, reaching a total of 2,417 bcm. The United States is expected to be the principal contributor to this increase, with a rise of 34 bcm compared to the previous year.

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

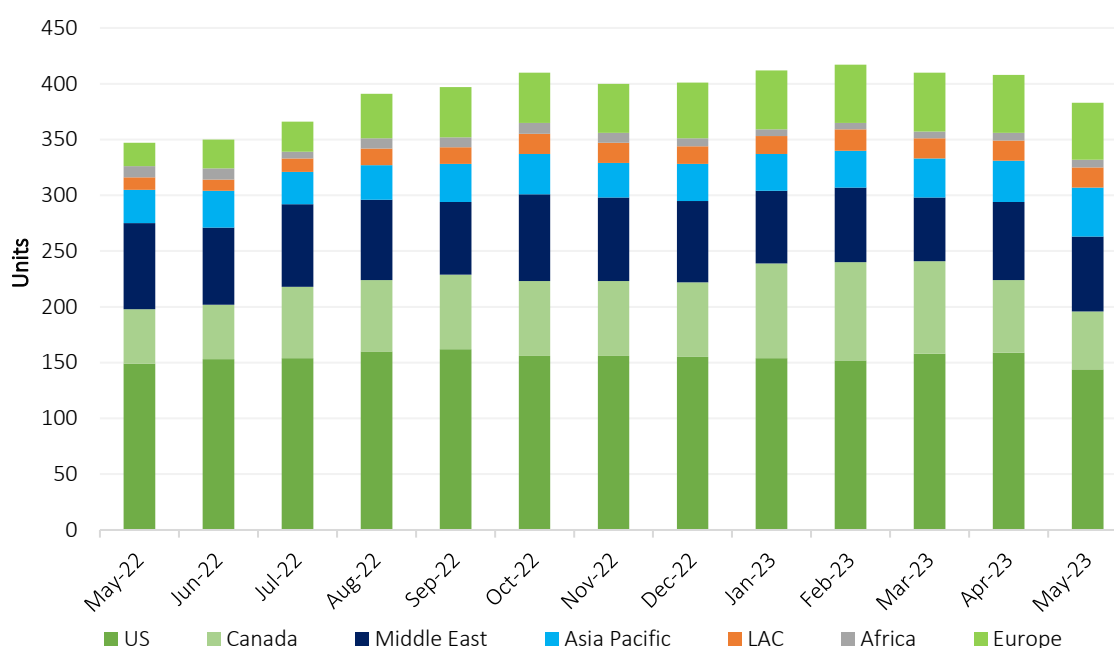
Region	2021	2022	2022 Revision*	2023	2023 Revision*
Africa	264	261	0.0%	266	1.2%
Asia Pacific	653	657	0.0%	651	1.0%
CIS	909	831	0.3%	810	1.1%
LAC	151	156	1.2%	164	2.5%
Europe	224	233	0.7%	229	2.1%
Middle East	670	687	0.0%	713	1.0%
North America	1163	1217	0.1%	1271	1.9%
World	4034	4042	0.19%	4102	1.4%
GECEF	1758	1690	0.2%	1685	1.5%
non-GECEF	2276	2352	0.2%	2417	1.4%

Source: GECEF Secretariat based on Rystad Energy Ucube

*Revision for 2022 and 2023 global gas production compared to the previous estimation

In May 2023, the global gas rig count, which serves as a measure of upstream activity, dropped by 25 units m-o-m and rose by 36 units y-o-y, reaching a total of 383 units (Figure 45). The US, Canada, the Middle East and Europe saw a decrease in active gas rigs by 15, 13, 3 and 1 units, respectively, while Asia Pacific saw an increase in gas rig count by seven units. The number of active rigs in other regions remained unchanged from the previous month.

Figure 45: Trend in monthly global gas rig count



Source: GECF Secretariat based on data from Baker Hughes

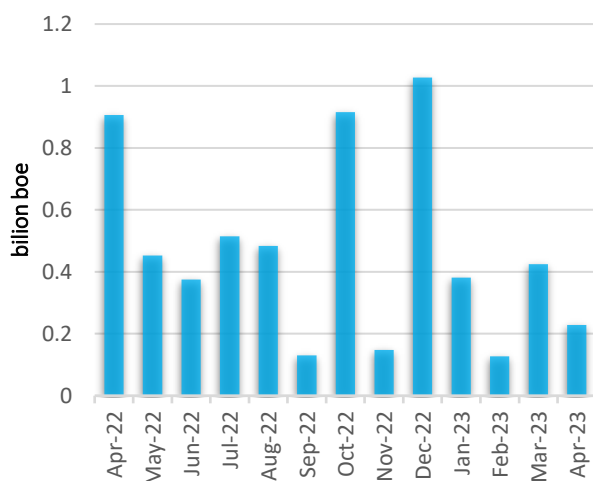
Note: Excludes data for Eurasia and Iran

In April 2023, the total volume of gas and liquids discovered amounted to 228 million barrels of oil equivalent (boe). Of this, gas accounted for 7% (3 bcm), while oil constituted the remaining 93% (213 million boe). This marked a decrease compared to the 425 million boe discovered in March 2023 and the 906 million boe discovered in April 2022, resulting in an average monthly discovery of 330 million boe in 2023 (Figure 46). The cumulative volume of discoveries from January to April 2023 reached 1.3 billion boe, reflecting the challenges faced by global exploration activity. The majority of the new volumes in 2023 were liquids, accounting for approximately 75% of the discoveries. Additionally, offshore discoveries dominated the newly discovered volumes in 2023, representing approximately 73% of the total.

All four of the new discoveries made in April 2023 were offshore, with the regions of LAC, Europe and North America accounting for 56%, 33% and 11% of the discovered volumes, respectively. No significant discoveries were reported in Africa, Asia Pacific, Eurasia and the Middle East during this period (Figure 47). Among the countries leading in new exploration success, Guyana, Namibia and Norway stood out with approximately 360 million boe, 300 million boe and 185 million boe discovered, respectively.

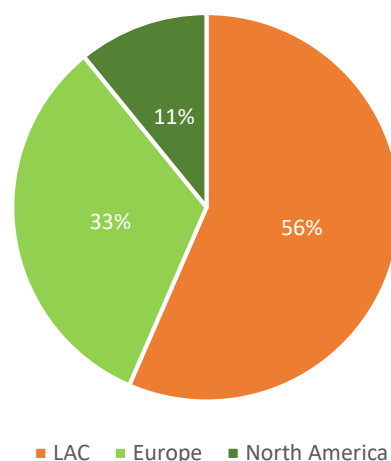
The Lancetfish discovery, located off the coast of Guyana within the Stabroek Block, was the largest discovery announced in April 2023. This significant find follows the earlier discovery of Fangtooth SE-1 in January, making it the second discovery in 2023. The Lancetfish-1 exploration well was drilled to a total depth of 5842m and encountered a net hydrocarbons column of 28m. Based on estimates from Rystad Energy, the discovery is estimated to hold 130 million boe of recoverable resources.

Figure 46: Monthly gas and liquid discovered volumes



Source: GECF Secretariat based on Rystad Energy Ucube

Figure 47: Discovered volumes in April 2023 by regions

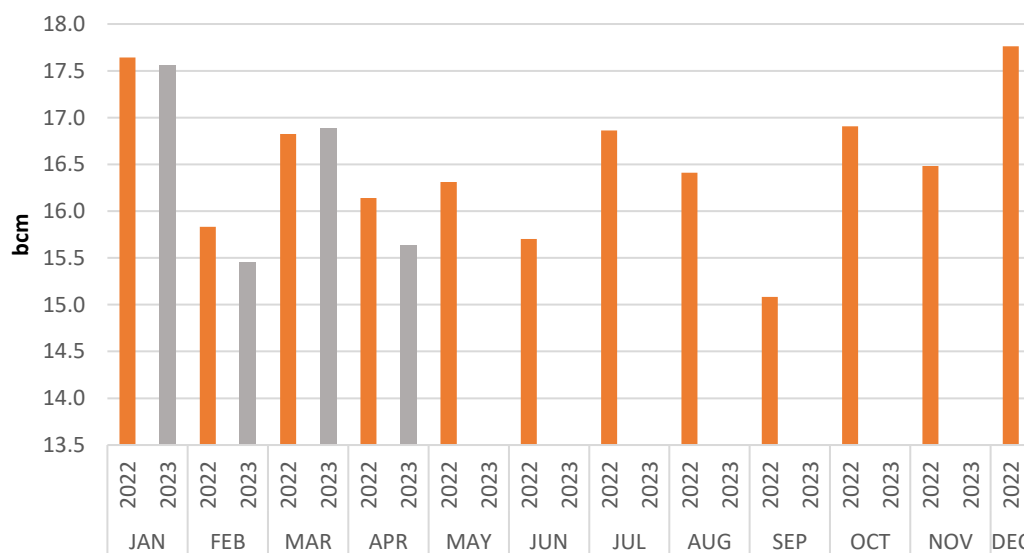


Source: GECF Secretariat based on Rystad Energy Ucube

3.2 Europe

In April 2023, Europe's gas production decreased by 3.2% y-o-y, resulting in a total output of 15.6 bcm (Figure 48). This decline can be attributed to reduced output from the region's major producers, namely the UK and Netherlands. Looking at the annual production for 2023, Europe's gas production is expected to shrink by 4 bcm compared to the previous year, primarily by driven by a reduction in production from the UK and Netherlands.

Figure 48: Europe's* monthly gas production



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

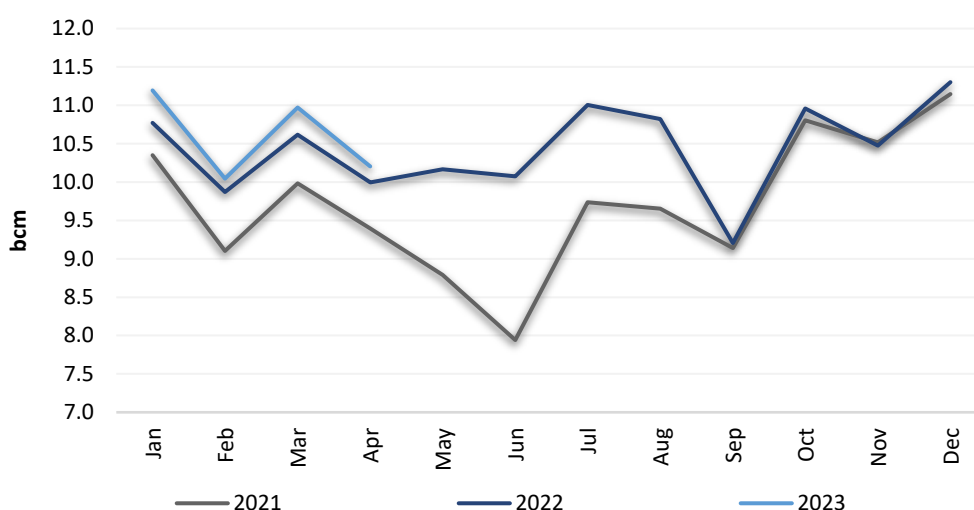
*Europe's production: UK, the Netherlands, Norway, Germany, Italy, Poland, Denmark, Austria and Romania

3.2.1 Norway

According to preliminary data from the Norwegian Petroleum Directorate, Norway's gas production increased by 2% y-o-y to reach 10.2 bcm in April 2023 (Figure 49). The cumulative gas production for the first quarter of 2023 also saw a 3% y-o-y increase, reaching 32.2 bcm.

In addition, the Norwegian Minister of Petroleum and Energy officially inaugurated the Njord field in the Norwegian Sea in May 2023, as stated in a release by Equinor. The Njord field's platform and the floating storage and offloading vessel (FSO) have undergone extensive upgrades to double the field's lifespan and more than double its production capacity. Originally started production in 1997 with an expected operational life until 2013, the Njord field still holds significant volumes of oil and gas that require extensive efforts to increase recovery. Moreover, new discoveries in the area can be tied-in to the Njord field for export purposes.

Figure 49: Trend in gas production in Norway



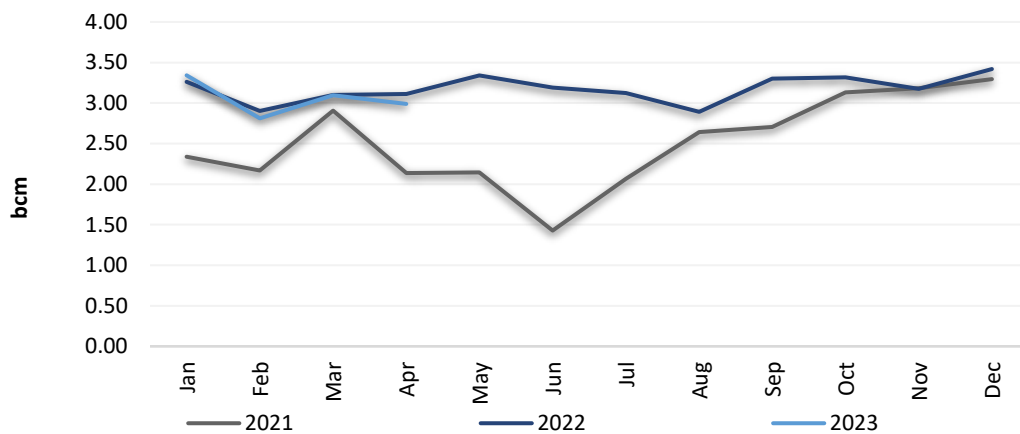
Sources: GECF Secretariat based on data from Refinitiv, Norwegian Petroleum Directorate

3.2.2 UK

UK's gas production decreased by 3.3% y-o-y to reach 2.99 bcm in April 2023. The cumulative gas production for the period January to April 2023 stood at 12.24 bcm, representing a 1% y-o-y decrease (Figure 50).

On 27 April 2023, Neptune Energy and its partner, Spirit Energy, announced the commencement of production from the 11th well at the Cygnus gas field in the southern North Sea. This development brings much-needed additional gas supplies and supports the energy security of the UK. The new well is expected to produce approximately 0.25 bcma, which is enough to heat around 200,000 UK homes. Combined with the 10th well, which began production earlier in the year, Neptune Energy anticipates the Cygnus facility producing sufficient gas per day to meet the needs of approximately 1.9 million UK households. The Cygnus field, which commenced gas production in 2016, has a projected field life of over 20 years.

Figure 50: Trend in gas production in the UK

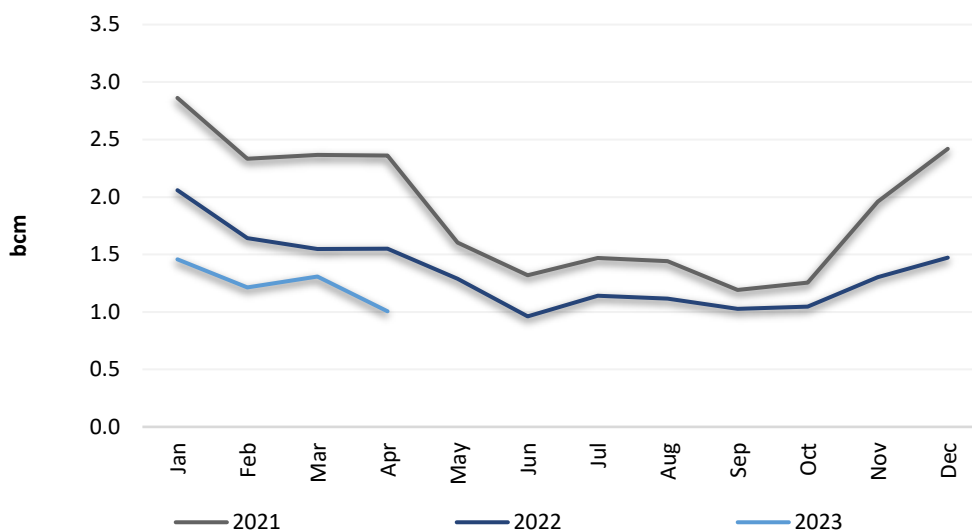


Sources: GECF Secretariat based on data from Refinitiv

3.2.3 Netherlands

Total gas production in the Netherlands stood at 1 bcm in April 2023, representing a y-o-y decrease of 35% (Figure 51). This decline comes as the Dutch government confirmed its plan to halt production from the Groningen field by October 2023. There is an option to extend production for one more year if there is a gas shortage in Europe after the winter. In March 2023, gas production from the Groningen field amounted to 0.38 bcm, compared to 0.41 bcm in March 2022, representing 7% decrease y-o-y.

Figure 51: Trend in gas production in the Netherlands



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

3.3 Asia

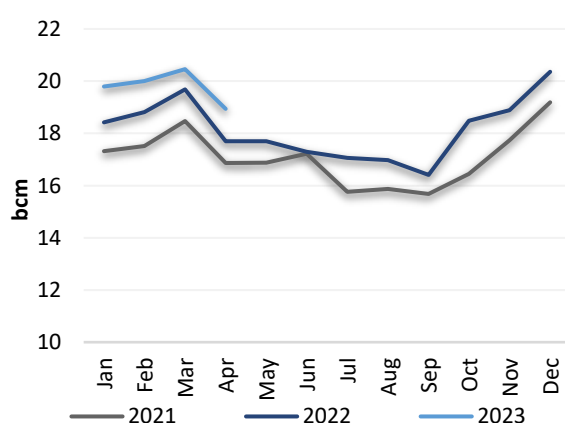
China's gas production increased by 7% y-o-y to reach 18.9 bcm in April 2023, according to preliminary data from National Bureau of Statistics (Figure 52). Additionally, the cumulative gas production from January to April witnessed a 6% increase, reaching 79.2 bcm. In April 2023, China's output of coal-bed methane (CBM) amounted to 1.06 bcm.

In May 2023, PetroChina commenced gas production from the Tieshanpo sour gas field located in the Sichuan basin in south-western China. The company aims to unlock the potential reserves in the field, which includes high sulphur content and complicated geological structures, as part of its energy transition objectives to boost gas production. As per the field development plan, PetroChina has drilled six production wells with a total production capacity of 0.6 bcm of gas. Furthermore, the company plans to drill three additional production wells within the Tieshanpo sour gas field.

India's gas production decreased by 3% y-o-y to reach 2.67 bcm in April 2023 (Figure 53). Cumulative gas production in January-April 2023 stood at 11.06 bcm, representing a 2% y-o-y increase.

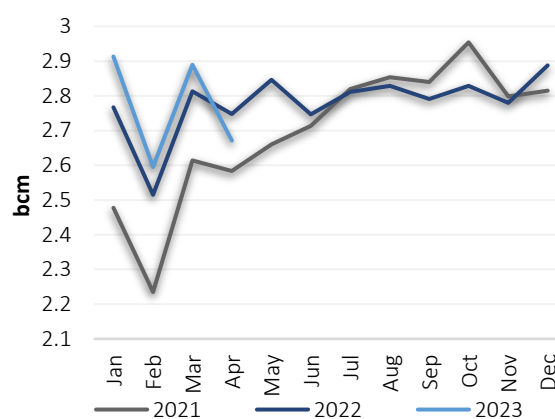
The Indian Directorate General of Hydrocarbons has announced an extension of the bid due date for the exploration and development of 10 oil and gas blocks under the eighth round of the Open Acreage Licensing Policy (OALP). The original deadline of May 16, 2023 has been extended to July 5, 2023. Additionally, the deadline for the special coal bed methane (CBM) bid round has been extended to June 30, 2023. Furthermore, the government has approved several modifications to the bid documents of the eighth bidding round, with the aim of incentivizing the early monetization of discoveries.

Figure 52: Trend in gas production in China



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

Figure 53: Trend in gas production in India



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

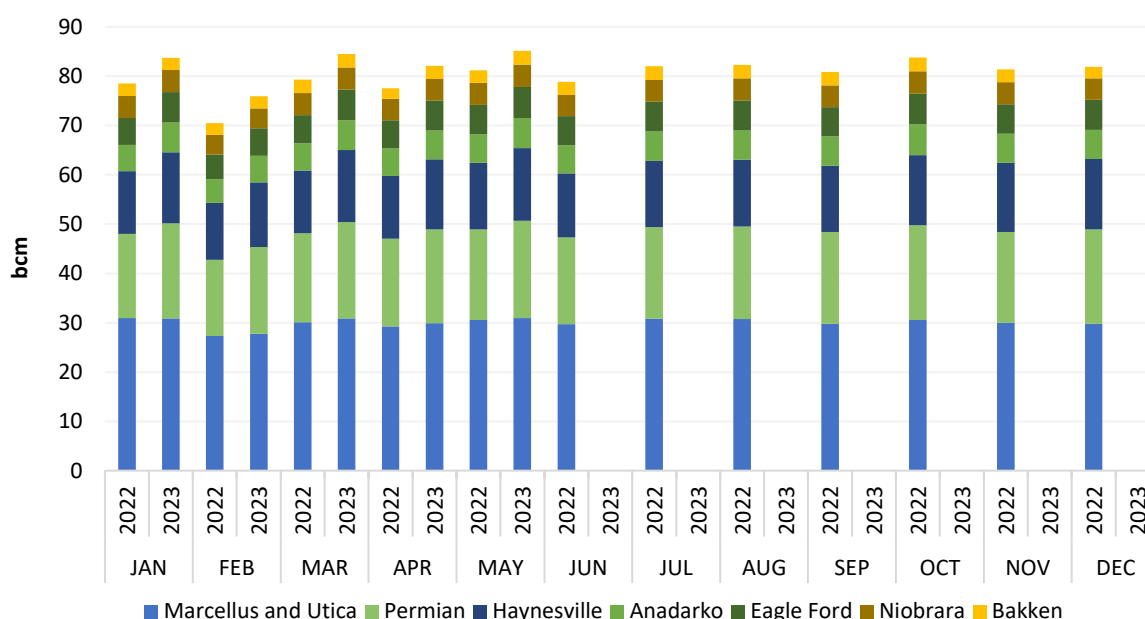
3.4 North America

3.4.1 US

In May 2023, shale gas production in the seven major producing regions, namely Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara and Permian increased by 5% y-o-y, reaching a total production of 85.1 bcm (Figure 54). The Appalachian region, which includes the Marcellus and Utica shale plays, contributed the larger share, accounting for 36% of the total production. In addition, the Permian shale oil field witnessed an increase in associated gas production, reaching 19.7 bcm or 23% of the total shale gas production and representing a 7% increase compared to the previous year.

It is noteworthy that the Haynesville shale play, located in north-eastern Texas and north-western Louisiana, achieved record-high natural gas production levels in May 2023. The average production for the month reached 14.7 bcm, which represents a 12% increase compared to the annual average of 13.1 bcm. Haynesville's current natural gas production accounts for approximately 17% of the total US shale gas production.

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



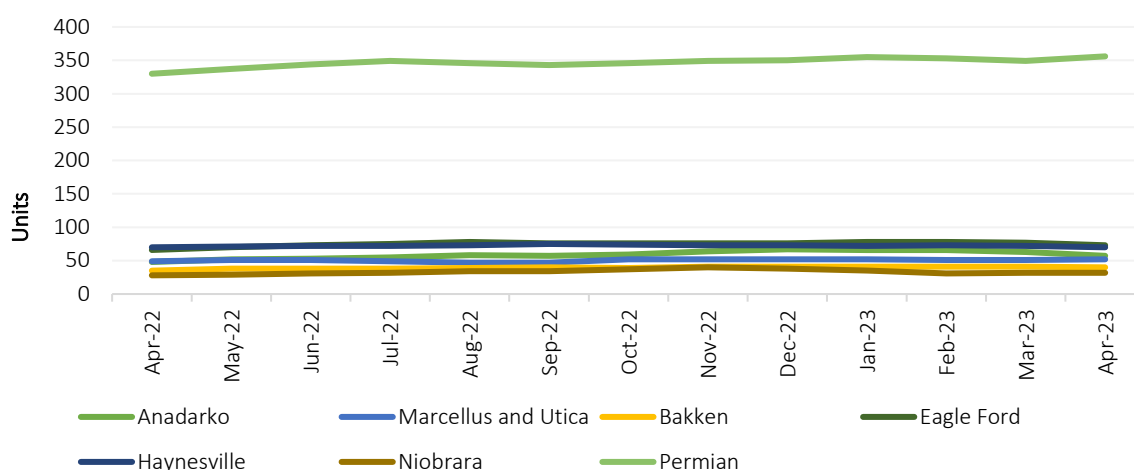
Source: GECF Secretariat based on data from Refinitiv, EIA

In April 2023, the total number of oil and gas rigs in the seven major shale oil and gas producing regions of the US stood at 680, representing a 5-unit decrease from March 2023. However, when compared to April 2022, the rig count increased by 54 unit, indicating overall growth (Figure 55).

In addition, the seven key US shale oil and gas regions had 4,863 drilled but uncompleted (DUC) wells in April 2023. This figure represented a decrease of 42 wells compared to the previous month and 425 wells compared to April 2022 (Figure 56).

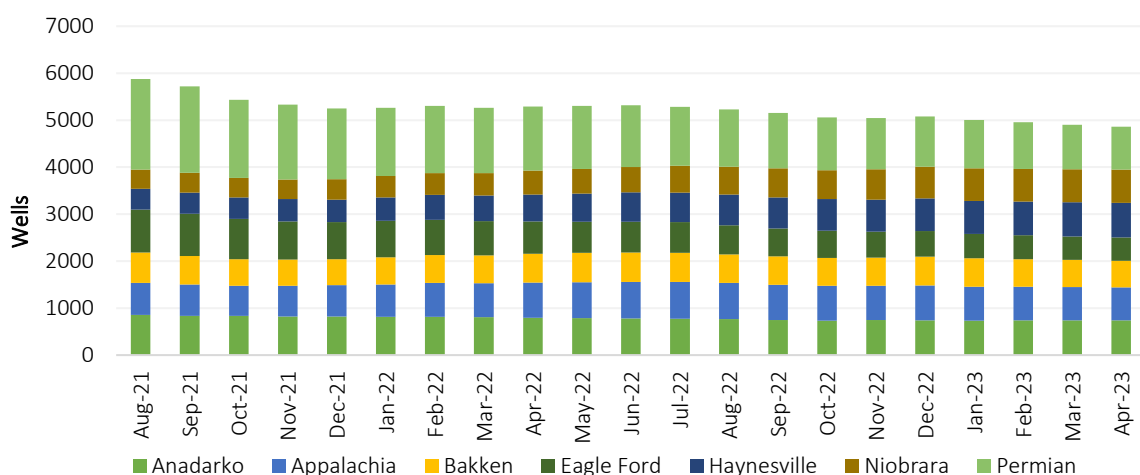
According to the EIA's Drilling Productivity Report, gas production per rig in the seven major shale oil and gas regions experienced a decline in May 2023. The production per rig dropped to 5,266 thousand cubic feet per new well, marking a 0.6% m-o-m decrease and 14.7% y-o-y decrease (Figure 57).

Figure 55: US shale region oil and gas rig count



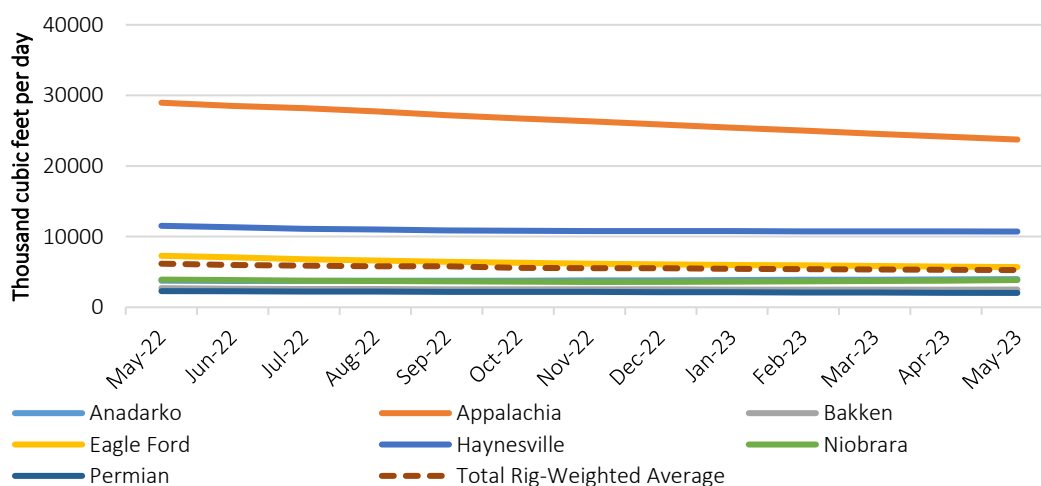
Source: GECF Secretariat based on data from Refinitiv

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



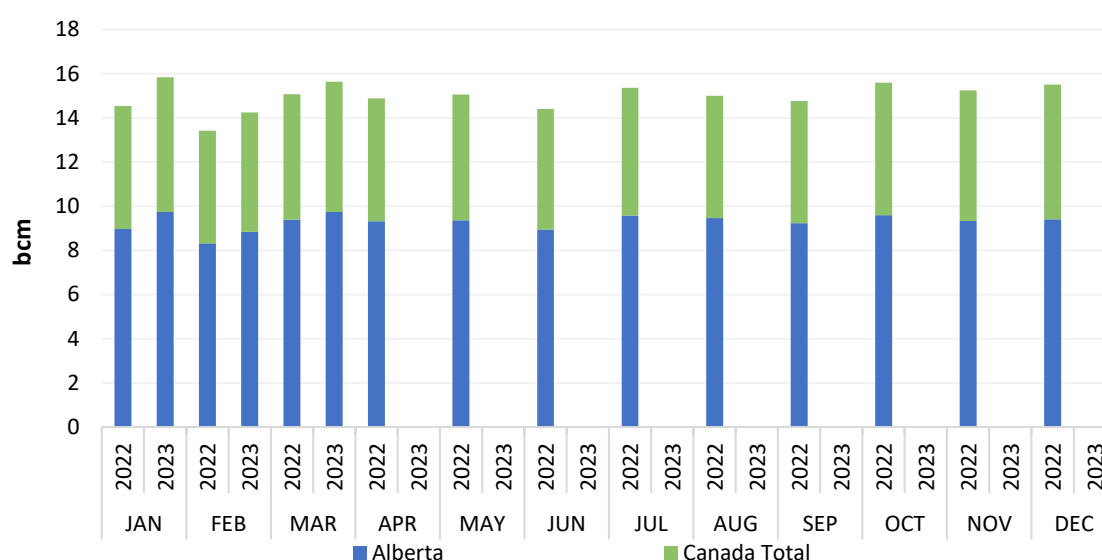
Source: GECF Secretariat based on data from Refinitiv, US EIA

3.4.2 Canada

According to data from the Canada Energy Regulator (CER), Canada's gas production in March 2023 showed a vibrant and robust landscape. Displaying a y-o-y increase of 4%, Canada's gas production increased to a robust 15.6 bcm (Figure 58).

Furthermore, the cumulative gas production for the first quarter of 2023 demonstrated a significant 6% y-o-y growth. The total gas production for this period amassed a substantial 45.7 bcm, showcasing a flourishing performance in Canada's gas sector.

Figure 58: Trend in gas production in Canada



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

3.5 Other Regions

Algeria gas production reached all-time high in March 2023: Algerian achieved a significant milestone in its gas production according to data from Argus and Jodi, Algerian gas production reached an all-time high of approximately 13.1 bcm. This remarkable surge in gas output had a direct impact on Algeria's LNG exports, which also reached an all-time high in March 2023. The increase gas production can be attributed to the successful implementation of new gas production capacities in key fields such as Hassi Messaoud, Hassi R'Mel and Berkine South fields.

Egypt to extend current oil and gas bid round: The Egyptian General Petroleum Corporation (EGPC) has announced an extension to the closing date for their bid round, which focuses on the development of brownfields. Additionally, the Egyptian Natural Gas Holding Company (EGAS) has also extended their bid round for gas exploration and exploitation in 12 open blocks situated in the Mediterranean Sea and the Nile Delta. The new closing date for both bid rounds is set for 16 July 2023, as per official announcement. This decision aims to provide sufficient time for interested parties to submit additional offers through the Egypt Upstream Gateway (EUG).

UAE giant Shah sour gas field expansion complete: ADNOC Sour Gas (ASG) has successfully completed the expansion of the Shah gas, a prominent energy project located in the southern region of the UAE. This notable achievement positions the Shah Gas Plant as the world's largest ultra-sour gas operation, boasting an impressive daily gas production capacity of 1.28 bcf and an annual sulphur production capacity of 4.2 million tons. According to ASG, it is currently the only company in the world that processes more than 1 bcfd of ultra-sour gas ($H_2S > 23\%$) from a single gas plant. The project is a joint venture between ADNOC and Occidental Petroleum Corporation (Oxy), with Oxy holding a 40% participating interest.

Saudi Aramco to explore potential cooperation in developing the Akkas gas field in Iraq: Iraq's Minister of Oil has announced an initial agreement with Saudi Aramco to study cooperation mechanisms in the development of the Akkas gas field in Anbar province in western Iraq. The field is estimated to have a target capacity of up to 4.2 bcma and is considered "one of the most promising strategic projects in the petrochemical industries in Iraq and the region" according to the Minister.

Brazil gas production reached 4.25 bcm in April 2023: Recent data from the Brazilian National Agency for Petroleum (ANP) revealed positive gas trends in Brazil. In April 2023, gross gas production in Brazil reached 4.25 bcm, indicating a 2.2% increase compared to March 2023 and a 3.4% increase compared to April of the previous year. Notably, 51% of the produced gas was reinjected into the reservoirs. Offshore gas fields accounted for 85% of the gross monthly gas production, with the Tupi field in the Santos pre-salt basin emerging as the largest gas-producing field, reaching a level of 1.2 bcm.

Argentina gas production increased 1% y-o-y: According to data from the Argentinian Ministry of Economy, gross gas production in Argentina reached approximately 3.86 bcm in April 2023, representing a 1% increase (3.82 bcm) compared to April 2022. However, it is important to note that there was a 3.2% decrease compared to the production level in March 2023 (3.99 bcm). The cumulative gas production for the period of January to April 2023 amounted to 15.5 bcm. Shale gas production accounted for 1.55 bcm in April 2023, representing 40% of the gross production. Production from tight gas reservoirs contributed 0.61 bcm, accounting for 16% of the total, while the remaining production came from conventional fields.

Mexico released the updated gas reserve status: The National Hydrocarbons Commission (CNH), Mexico's oil and gas regulator, has released the updated gas reserve status (proven, probable and possible). As of January 1, 2023, Mexico's proven gas reserves amounted to 310 bcm, marking a 2.3% increase compared to the reserves recorded on January 1, 2022, which stood at 300 bcm.

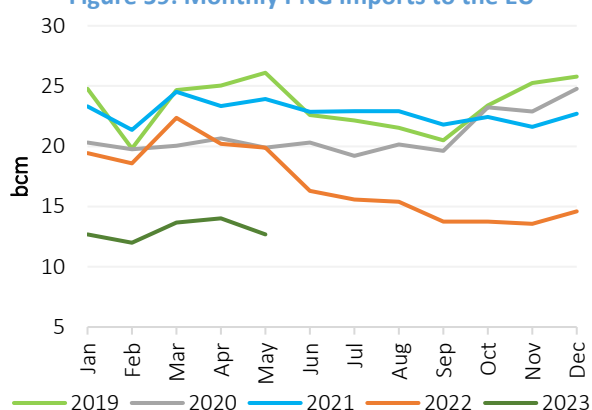
4 Gas Trade

4.1 Pipeline Gas (PNG) Trade

4.1.1 Europe

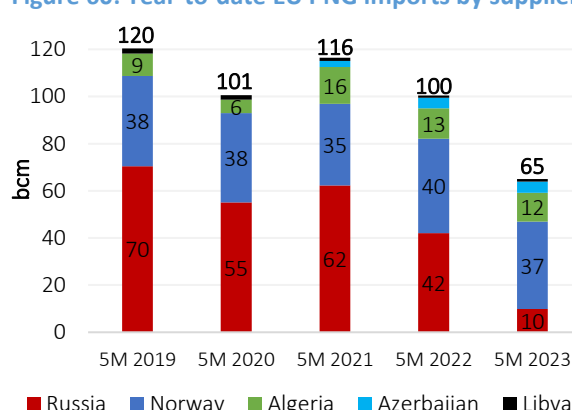
In May 2023, the EU witnessed a decline in the import of PNG compared to the previous months and the same period last year. The import volume of PNG to the EU amounted to 12.7 bcm, reflecting a 10% decrease from the previous month and a significant 36% decrease from May 2022 (Figure 59). Furthermore, the cumulative pipeline gas supply to the EU for the first five months of 2023 experienced a substantial y-o-y decline of 35%, totalling 65.0 bcm (Figure 60). This decline was driven by reduced imports from Russia, Norway and Algeria, while imports from both Azerbaijan and Libya increased. Figure 61 provides a breakdown of pipeline imports by supplier and month for 2023.

Figure 59: Monthly PNG imports to the EU



Source: GECF Secretariat based on data from McKinsey and Refinitiv

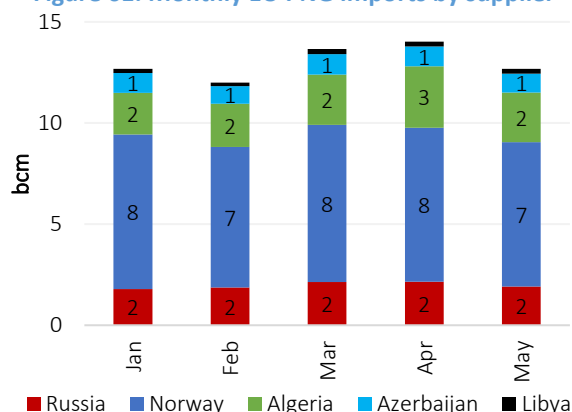
Figure 60: Year-to-date EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

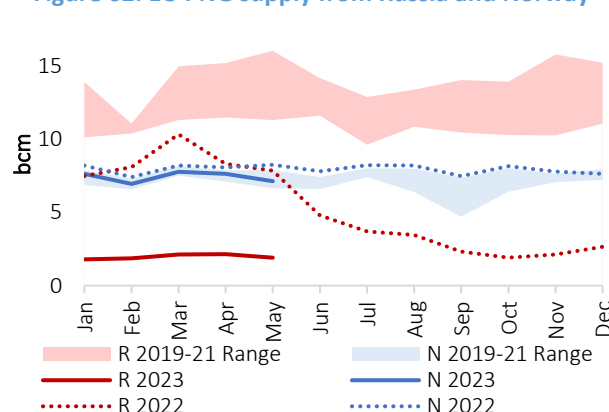
During the first five months of 2023, supply from Norway declined by 8% y-o-y to reach 37.1 bcm, while imports from Russia decreased by 77% y-o-y to reach 9.9 bcm. Norway accounted for 57% of the total EU supply, followed by Algeria at 19% and Russia at 15% during this period. From January to May 2023, Norway's average monthly PNG exports to the EU were 7.4 bcm, compared with 8.0 bcm during the same period in 2022, and 7.4 bcm during the same period from 2019 to 2021 (Figure 61). In contrast, Russia's average monthly PNG exports to the EU for the same period were 2.0 bcm, compared to 8.4 bcm in 2022 and an average of 12.4 bcm from 2019 to 2021 (Figure 62).

Figure 61: Monthly EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 62: EU PNG supply from Russia and Norway

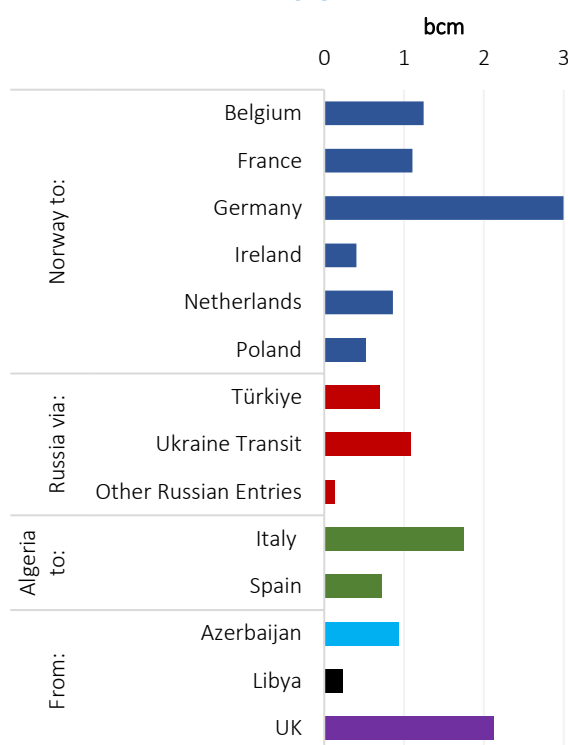


Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 63 illustrates the gas flows to the region in May 2023 through the major import supply routes. Germany remains the primary recipient, accounting for 42% of Norwegian PNG exports, followed by Belgium (17%) and France (15%). Russia supplied approximately 1.0 bcm through the Ukraine transit pipelines, while supply via the Turkstream route experienced a 30% decrease, reaching 0.7 bcm. Algerian supply to Italy experienced a decrease to 71% of its overall exports, while supply via the UK, making it the second-largest supply route for the region in May.

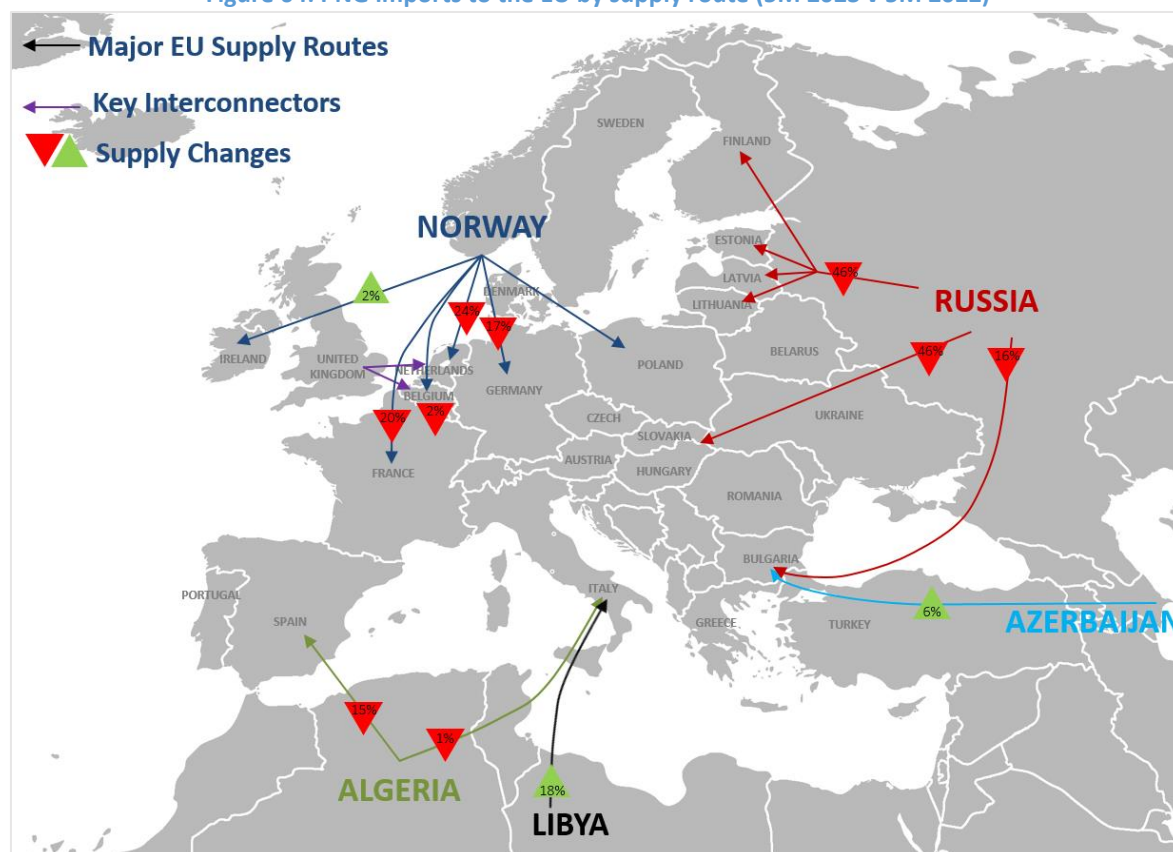
In Figure 64, the EU's PNG imports via major supply routes for the first five months of 2023 are compared to the same period in the previous year. Azerbaijan's PNG exports to the region increased by 6%, while Norway's supply to Germany and the Netherlands are being redirected to Poland. Net PNG imports to the region from the UK increased by 24%.

Figure 63: EU PNG imports by supply route, in May 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 64: PNG imports to the EU by supply route (5M 2023 v 5M 2022)

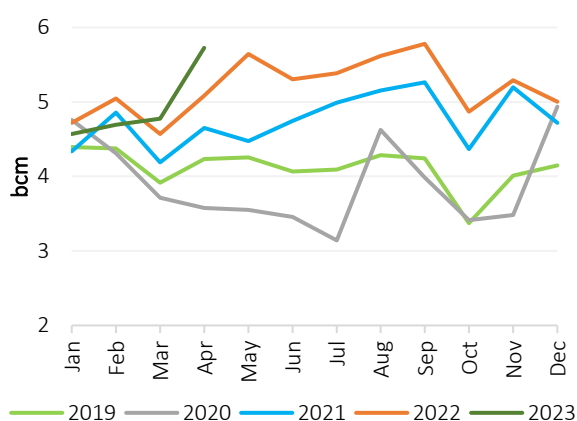


Source: GECF Secretariat based on data from McKinsey and Refinitiv

4.1.2 Asia

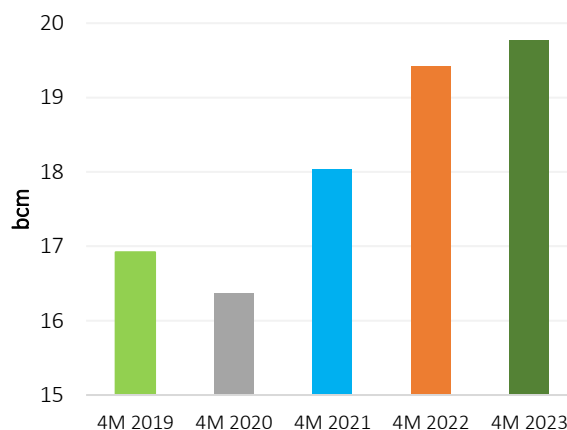
In April 2023, China's PNG imports amounted to 5.7 bcm, which is a 20% increase compared to the previous month and a 13% increase y-o-y (Figure 65). The resurgence in China's industrial sector, which is now fully operational, has contributed to the upward trend in both pipeline and LNG imports, reflecting a return to pre-lockdown levels observed in the middle of 2022. In fact, April's PNG import volume reached the second-highest level on record, surpassing levels seen since September 2022. The average monthly PNG imports during the first four months of 2023 were 4.94 bcm, compared to 4.86 bcm during the same period in 2022, an increase of 2% (Figure 66).

Figure 65: Monthly PNG imports in China



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

Figure 66: Year-to-date PNG imports in China

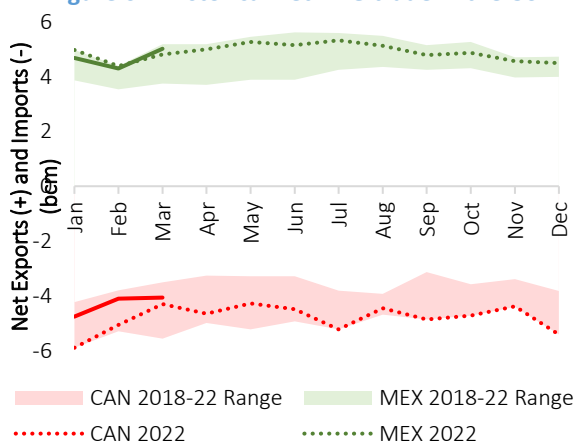


Source: GECF Secretariat based on data from Refinitiv and General Administration of Customs China

4.1.3 North America

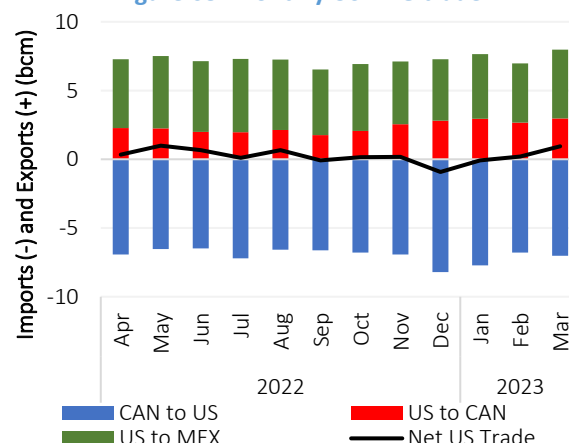
In March 2023, net PNG imports from Canada to the US reached 4.1 bcm, showing a slight decrease of 1% compared to the previous month and a 5% decline compared to the same month in 2022 (Figure 67). However, during the same period, the net PNG exports from the US to Mexico reached 5.0 bcm, rising by 17% from the previous month, and by 4% y-o-y. These PNG flows resulted in 1.0 bcm of net pipeline exports from the US into Mexico (Figure 68). Looking at the overall trend in the region for 2023, the average monthly flows have been 7.2 bcm from Canada to the US, 2.9 bcm from the US to Canada and 4.7 bcm from the US to Mexico.

Figure 67: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 68: Monthly US PNG trade



Source: GECF Secretariat based on data from US EIA

4.1.4 Other Developments

Uzbekistan to import gas from Russia: The landlocked central Asian state of Uzbekistan is set to import pipeline natural gas from Russia. In the past, Uzbekistan had been exporting gas to Russia through the Bukhara-Ural Gas Pipeline. However, with the country's modest gas reserves declining, Uzbekistan has now redirected its focus towards importing gas from Russia instead. As part of this shift, Gazprom is exploring the possibility of repurposing line 4 of the Central Asia-Centre pipeline system. Currently, this pipeline transports gas from Turkmenistan to Russia via Uzbekistan, but there are plans to reverse the flows and supply Uzbekistan with gas instead.

Increased pipeline gas exports from Kazakhstan to China: During a visit by the President of Kazakhstan to China, QazaqGaz, the state-operated gas company, signed an agreement with China's National Petroleum Corporation. The aim of the agreement is to enhance exploration activity and further increase gas exports from Kazakhstan to China. Currently, Kazakhstan exports gas to China via the Central Asia-China Gas Pipeline, which has been a vital energy link between the two countries. Additionally, Kazakhstan is actively engaged in discussions to facilitate the transit of Russian gas to China.

Finland terminates PNG imports from Russia: Finland's national gas importing company, Gasum, has officially terminated its long-term pipeline gas supply agreement with Russia's Gazprom. This move comes as a result of ongoing arbitration discussions between the two parties regarding a dispute related to Gazprom's special payment scheme for gas transactions conducted in Russian roubles. It is worth noting that the gas supply route from Russia to Finland is relatively small, accounting for just 1.7 bcm in 2021, and has been suspended since May 2022. Gasum has maintained that its long-term LNG supply contract with Gazprom remains unaffected and continues to be in effect.

Resumption of gas pipeline operations in Malaysia: Petronas, the national oil and gas company of Malaysia, is targeting the restart of the Sabah-Sarawak gas pipeline by the first quarter of 2024. The pipeline's functionality was impacted by a leak caused by soil movement, forcing Petronas to declare force majeure in October 2022. The Sabah-Sarawak pipeline holds significant importance as it plays a crucial role in supplying gas to Malaysia's LNG export terminal.

4.2 LNG Trade

4.2.1 LNG Imports

In May 2023, there was a modest increase in global LNG imports, with y-o-y growth of 1.16 Mt (3.5%), reaching a total of 34.66 Mt (Figure 69). However, the pace of growth slowed significantly compared to April 2023. The increase in LNG imports can be attributed to robust demand in Europe and the Latin America and Caribbean (LAC) regions, while imports declined in the Asia Pacific and MENA regions (Figure 70). Between January and May 2023, the cumulative global LNG imports experienced a y-o-y increase of 4.0% (6.65 Mt), amounting to 174.57 Mt. This growth was primarily driven by stronger LNG imports in the Asia Pacific, Europe and LAC regions, which counterbalanced weaker import volumes in the MENA region.

Figure 69: Trend in global monthly LNG imports

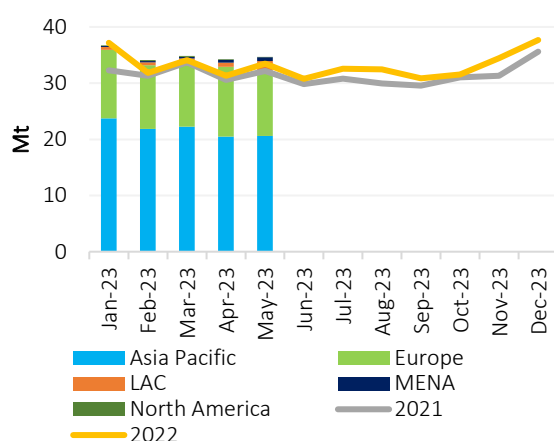
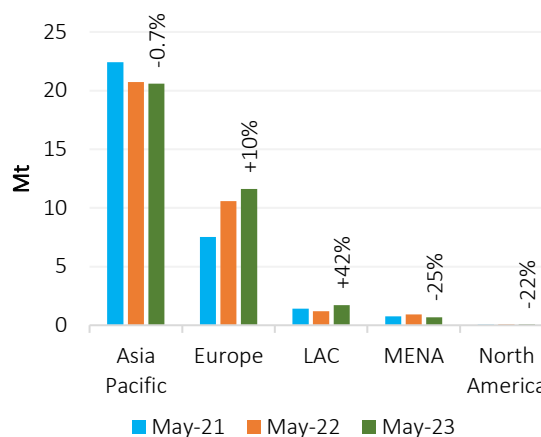


Figure 70: Trend in regional LNG imports in May



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.1 Europe

In May 2023, European LNG imports experienced a substantial 10% y-o-y growth, reaching a total of 11.62 Mt, which represented an increase of 1.04 Mt (Figure 71). This strong expansion in LNG imports in the region was due to a decrease in pipeline gas imports from Russia. The driving factors behind the surge in Europe's LNG imports were Germany, the Netherlands, the UK and Belgium, which more than compensated for the weaker imports observed in Spain and France (Figure 72). Between January and May 2023, cumulative LNG imports in Europe demonstrated significant growth, with a y-o-y increase of 10% (5.15 Mt), reaching 58.90 Mt.

The rise in Germany's LNG imports was fuelled by a reduction in pipeline gas imports from Russia, facilitated by the deployment of FSRUs that played a crucial role in facilitating the LNG imports. Additionally, a decline in domestic gas production and reduced pipeline gas imports from Norway, coupled with robust pipeline gas exports to Germany, contributed to the growth in the Netherlands' LNG imports. Similarly, the increase in the UK's LNG imports was attributed to weaker domestic gas production and diminished pipeline gas imports from Norway. In Belgium, the decline in LNG imports was a result of increased demand for pipeline gas imports from Germany, along with reduced pipeline gas imports from Norway.

Conversely, an upsurge in pipeline gas imports from Algeria, combined with healthy gas and LNG inventories as well as weaker gas demand, contributed to the decline in Spain's LNG imports. Finally, the decrease in French LNG imports was due to maintenance activities at the Dunkerque, Fos Cavaou and Montoir regasification terminals.

Figure 71: Trend in Europe's monthly LNG imports

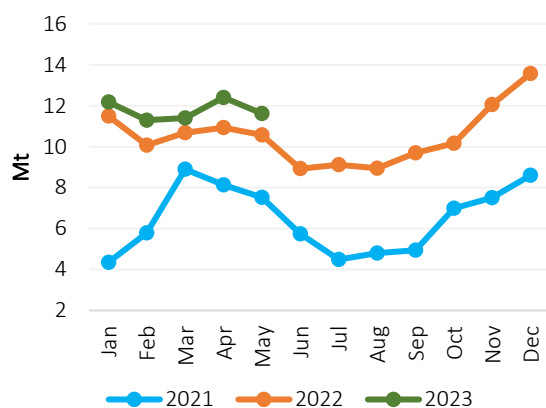
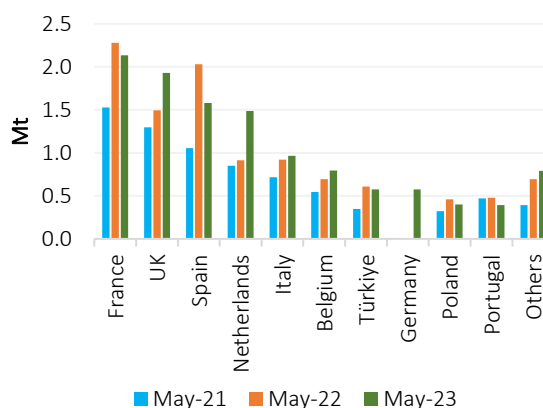


Figure 72: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.2 Asia

In May 2023, LNG imports in the Asia Pacific region witnessed a marginal decrease of 0.7% (0.14 Mt) y-o-y, amounting to 20.58 Mt (Figure 73). This marks the first y-o-y decline since January 2023. This decrease was primarily driven by a reduction in LNG imports in Japan, Indonesia, and Pakistan, offsetting the strong performance in China, Thailand and Taiwan (Figure 74). However, the cumulative LNG imports from January to May 2023, the Asia Pacific region still experienced modest growth of 1.6% (1.69 Mt) y-o-y, reaching 108.92 Mt.

The growth in Chinese LNG imports during May 2023 was supported by the recovery of gas demand following the end of Zero-COVID measures. However, these imports remained significantly lower compared to the levels observed in May 2021. In Thailand, LNG imports surged in May 2023 due to stronger gas demand and decreased domestic gas production, as well as reduced pipeline gas imports from Myanmar. Similarly, LNG imports in Taiwan significantly rose compared to the previous year, driven by increased gas demand in the electricity sector. The maintenance activity at the Maanshan No. 2 nuclear reactor in Taiwan, which took place from April 1 to May 12, 2023, resulted in decreased nuclear output and an elevated reliance on gas for power generation. On the other hand, Japan experienced a decline in LNG imports, primarily attributed to weaker gas demand in the electricity sector, due to a y-o-y increase in nuclear and solar output and higher LNG inventory levels.

Figure 73: Trend in Asia's monthly LNG imports

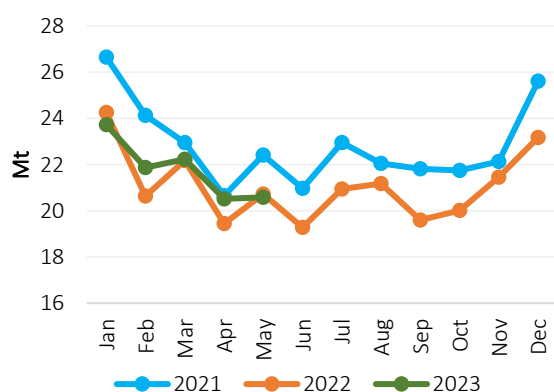
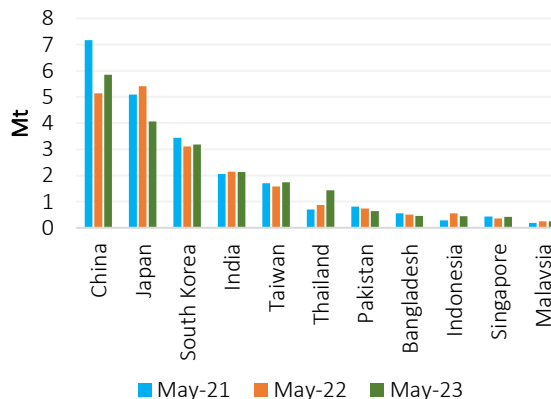


Figure 74: Top LNG importers in Asia



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.3 Latin America & the Caribbean (LAC)

In May 2023, LNG imports in LAC region experienced a significant expansion for the second consecutive month, reaching a total of 1.67 Mt with a y-o-y growth of 39% (0.47 Mt) (Figure 75). The increase in LNG imports was primarily driven by Argentina, Jamaica and Puerto Rico, compensating for a decline in Brazil's LNG imports (Figure 76). Between January and May 2023, cumulative LNG imports in the LAC region grew by 4.6% (0.19 Mt) compared to the same period in 2022. In total, the LAC region imported 4.25 Mt of LNG during this period.

Argentina experienced a doubling of LNG imports in May 2023 compared May 2022. This growth was supported by a reduction in pipeline gas imports from Bolivia and lower spot LNG prices relative to 2022. However, the commissioning of a new gas pipeline from Vaca Muerta, expected to occur this month, is anticipated to result in a short-term decrease in Argentina's LNG imports. On the other hand, Jamaica witnessed a surge in LNG imports last month, which can be attributed to stronger gas demand and an increase in LNG reloads to Puerto Rico.

Figure 75: Trend in LAC's monthly LNG imports

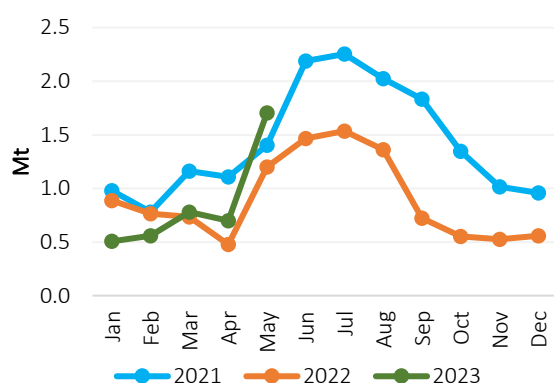
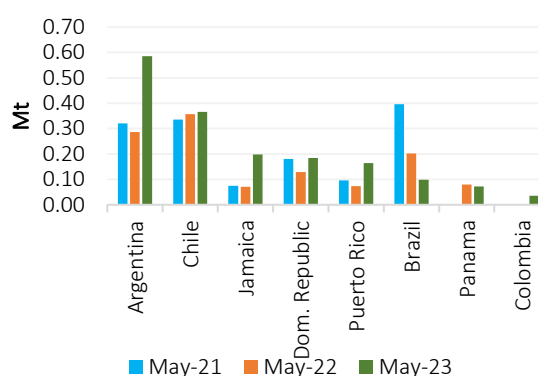


Figure 76: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.4 MENA

In May 2023, LNG imports in the MENA region experienced a significant decline of 25% (0.23 Mt) y-o-y, reaching 0.68 Mt (Figure 77) as a result of weaker imports in Kuwait (Figure 78). Between January and May 2023, cumulative LNG imports in the MENA region showed a decrease of 20% (0.46 Mt) y-o-y, totalling 1.89 Mt. Increased availability of low sulphur fuel oil (LSFO) for electricity generation led to the decline in Kuwait's LNG imports.

Figure 77: Trend in MENA's monthly LNG imports

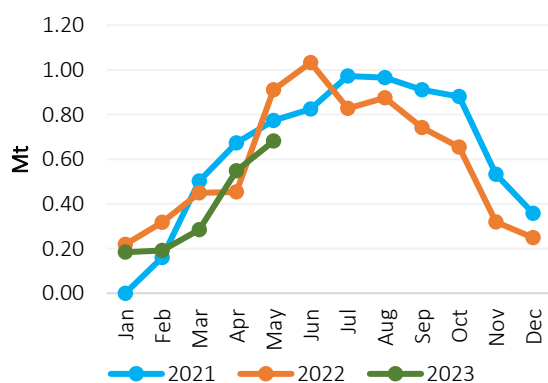
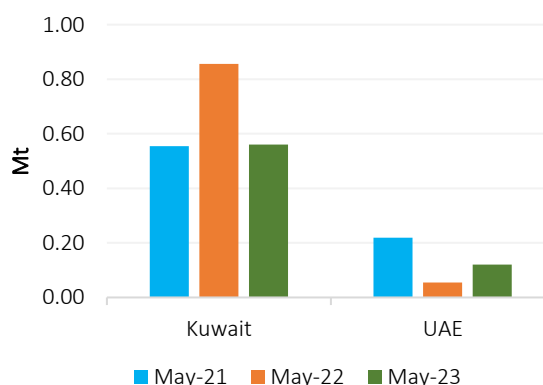


Figure 78: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2 LNG Exports

In May 2023, global LNG exports grew by 3.2% (1.03 Mt) y-o-y, totalling 33.52 Mt (Figure 79). The increase was mainly driven by non-GECF countries with a smaller rise observed in GECF member countries and LNG reloads. The share of non-GECF countries in global LNG exports modestly increased from 51.1% in May 2022 to 51.2% last month. Similarly, the share of LNG reloads in global LNG exports rose from 0.3% to 1.1% during the same period. Conversely, the GECF's market share in global LNG exports declined from 48.6% in the previous year to 47.7% in May 2023. From January to May 2023, global LNG exports grew by 5.7% (9.45 Mt) y-o-y, reaching a total of 174.79 Mt. The top three LNG exporting countries in May 2023 were the US, Australia and Qatar (Figure 80).

Figure 79: Trend in global monthly LNG exports

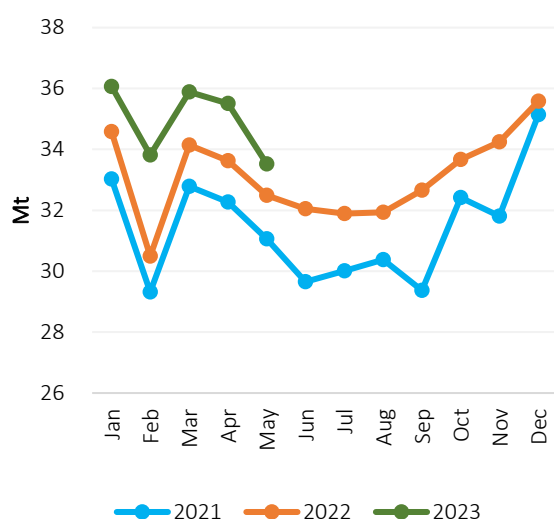
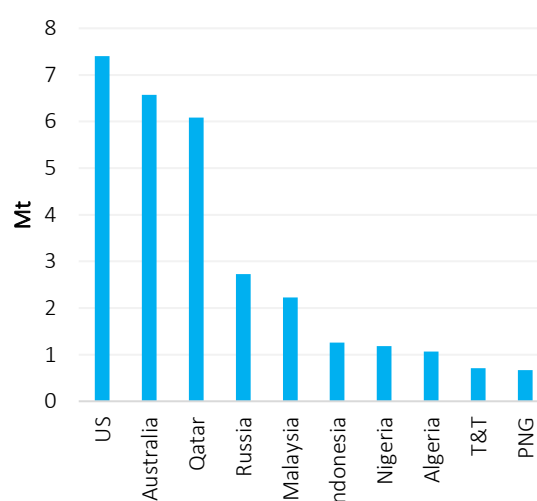


Figure 80: Top 10 LNG exporters in May 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.1 GECF

In May 2023, LNG exports from GECF member countries and observers increased by 1.1% (0.18 Mt) y-o-y, reaching 15.98 Mt (Figure 81). Malaysia, Algeria, Mozambique, Norway, Trinidad and Tobago, Peru, Nigeria and the United Arab Emirates were the key contributors to this growth. Conversely, LNG imports declined in Egypt, Qatar, Russia, Angola and Equatorial Guinea (Figure 82). Cumulatively, from January to May 2023, LNG exports from GECF member and observer countries grew by 3.9% (3.24 Mt) y-o-y, totalling 85.27 Mt.

Malaysia and Trinidad and Tobago saw an increase in LNG exports due to improved feedgas availability. Algeria's rise in LNG exports was attributed to reduced maintenance activity and increased feedgas availability compared to May 2022. Mozambique experienced a surge in LNG exports as production from the Coral South FLNG facility continued to ramp up. Despite planned maintenance in Norway, stronger LNG exports were supported by the ongoing production increase from the Hammerfest LNG facility, which resumed operations in June 2022.

However, Angola and Egypt faced lower feedgas availability, resulting in decreased LNG exports. Despite reduced maintenance at Qatar's LNG facility, the country witnessed a decrease in LNG imports. Russia's LNG exports were affected by lower exports from the Sakhalin 2 and Yamal LNG facilities.

Figure 81: Trend in GECF monthly LNG exports

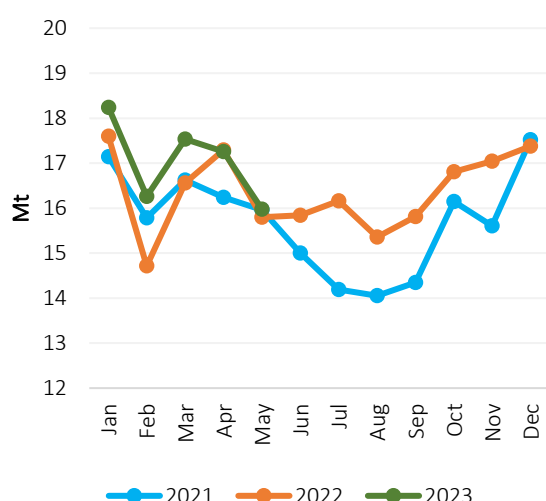
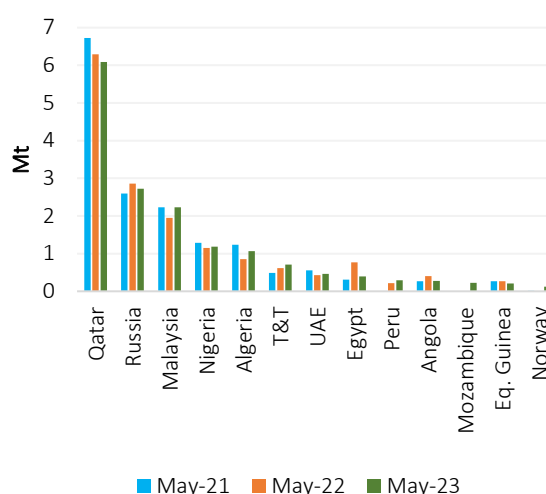


Figure 82: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.2 Non-GECF

In May 2023, non-GECF countries' LNG exports grew by 3.6% (0.59 Mt) y-o-y, reaching 17.18 Mt (Figure 83). The notable increase was driven by the US, Brunei, Indonesia and Australia, offsetting lower exports from Oman, Cameroon and Papua New Guinea (Figure 84). Cumulatively, non-GECF LNG exports from January to May 2023 expanded by 6.0% (4.89 Mt) y-o-y, totalling 86.95 Mt.

In the US, the ongoing production ramp-up at the Calcasieu Pass LNG facility and increased output from the Freeport LNG facility supported the growth in LNG exports compared to the previous year. Brunei experienced a significant increase in LNG exports in May 2023, although they remained lower than the 0.52 Mt exported in May 2021. Australia's LNG exports remained stable in May 2023 despite higher maintenance at some facilities, as lower maintenance at other facilities and stronger exports from APLNG and QCLNG LNG facilities offset the impact. However, higher maintenance activity at the Qalhat LNG facility limited Oman's LNG exports.

Figure 83: Trend in non-GECF monthly LNG exports

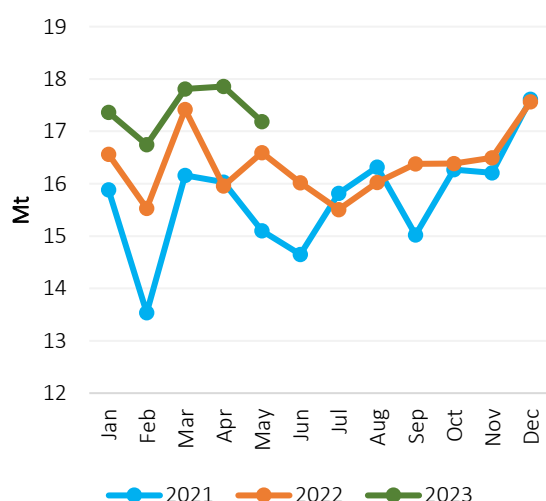
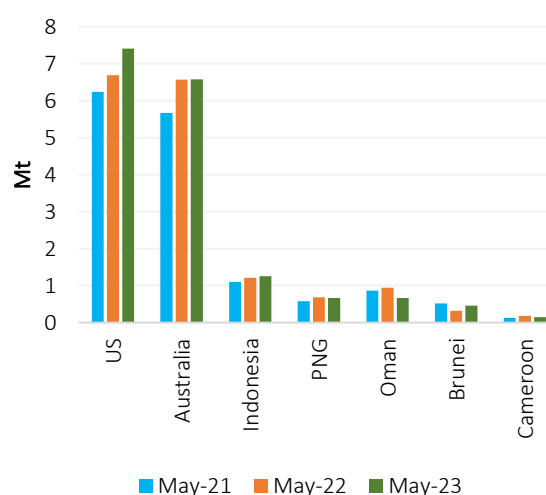


Figure 84: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.3 Global LNG Reloads

In May 2023, global LNG reloads experienced a significant surge, with a remarkable y-o-y increase of 253% (0.26 Mt) and a total volume of 0.36 Mt (Figure 85). This represents the highest level of LNG reloads for the month of May since May 2016. The growth in LNG reloads was driven by increased activity in several countries, including Indonesia (+0.10 Mt), France (+0.07 Mt), Spain (+0.05 Mt), Singapore (+0.02 Mt), Jamaica (+0.01 Mt) and Lithuania (+0.01 Mt) (Figure 86). Cumulatively, global LNG reloads from January to May 2023 showed a significant y-o-y growth of 96% (1.26 Mt), reaching 2.58 Mt.

In Indonesia, the higher LNG reloads can be attributed to the higher utilisation of the Arun and Cilamaya LNG import facilities. The Arun LNG facility is used by portfolio players for LNG storage and subsequent reloading to other Asian markets. On the other hand, the Cilamaya LNG facility is primarily used for intra-country trade.

In France, the increase in LNG reloads was influenced by the widening price gap between North East Asian and Western European spot LNG prices, which averaged \$1.44/MMBtu in May 2023. The reloaded LNG cargo from France was exported to China. Meanwhile, Spain continued to increase its LNG reloads for intra-regional trade, particularly with Italy and Germany.

Figure 85: Trend in global monthly LNG reloads

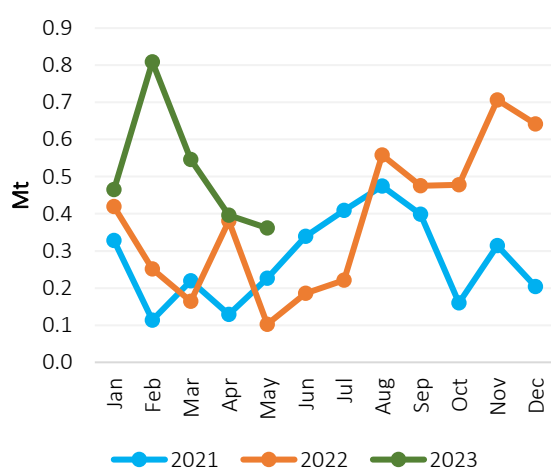
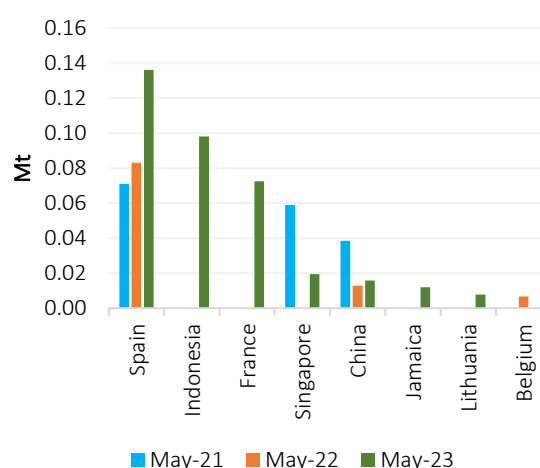


Figure 86: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.4 Arbitrage Opportunity

In May 2023, the opportunity for LNG reloads from Europe to the Asia Pacific region became more favourable. The premium of spot shipping costs from Europe to Asia compared to spot LNG price differences between the markets decreased, indicating improved profitability (Figure 87). Additionally, the price difference between spot LNG prices in Asia and oil-indexed prices in Europe dropped below the spot shipping cost from Europe to Asia for the first time since Q1 2021.

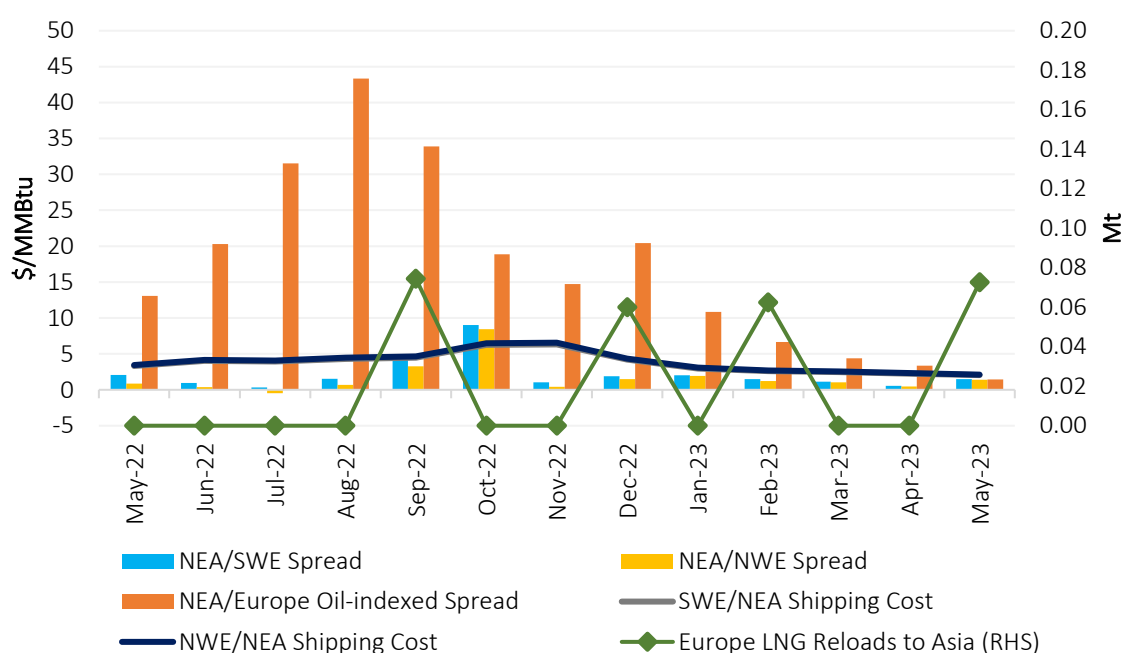
The price spreads between NEA/SWE and NEA/NWE significantly increased last month, with a rise of 171% (\$0.94/MMBtu) and 209% (\$0.94/MMBtu) m-o-m, reaching \$1.49/MMBtu and \$1.39/MMBtu, respectively. This was mainly due to a notable decrease in European spot LNG prices compared to NEA spot LNG prices, resulting in a wider price gap between the two regions. On the other hand, the price difference between spot LNG prices in Asia and oil-

indexed prices in Europe decreased by 57% (\$1.92/MMBtu) m-o-m, reaching \$1.45/MMBtu, the lowest level since September 2020.

Shipping costs for the NEA/SWE and NEA/NWE spot routes slightly declined by 8.5% (\$0.19/MMBtu) and 9.1% (\$0.21/MMBtu) m-o-m, reaching \$2.05/MMBtu and \$2.11/MMBtu, respectively. However, it is important to note that shipping costs can vary depending on the specific vessels used, and medium to long-term chartered vessels may have lower costs compared to spot shipping rates. The widening price spreads between spot LNG prices in Asia and Europe provided an opportunity for an LNG reload from France to China in May 2023, as the economics became more favourable.

Meanwhile, the NEA/SWE price differential, as well as the price spread between NEA spot LNG and European oil-indexed gas prices, decreased by 28% (\$0.58/MMBtu) and 89% (\$11.64/MMBtu) y-o-y, respectively. In contrast, the NEA/NWE price differential experienced a significant y-o-y increase of 62% (\$0.53/MMBtu). Lastly, the NEA/SWE and NEA/NWE spot shipping costs decreased by 39% (\$1.32/MMBtu) each compared to the previous year.

Figure 87: 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 Other Developments

Arrival of Excelsior FSRU at Bahia Blanca in Argentina: On May 3, 2023, the Excelsior floating storage and regasification unit (FSRU) arrived at the Bahia Blanca terminal in Argentina. This FSRU, with a regasification capacity of 3.7 Mtpa (5 bcma), was chartered by Argentina in response to a decline in pipeline gas imports from Bolivia. The FSRU will operate in Bahia Blanca from May to August 2023. Following this period, in the third quarter of 2023, the FSRU will be relocated to Germany, where it will serve as the second FSRU in Wilhelmshaven under a five-year contract.

First regasified LNG sent out from Italy's Piombino LNG import terminal: On May 12, 2023, the first regasified LNG from Italy's Piombino LNG import terminal was sent out to the gas grid. Golar's Tundra FSRU is being used as the import terminal and has a regasification capacity of 3.7 Mtpa (5 bcma). The initial LNG cargo was delivered from Egypt's Damietta LNG facility on May 4, 2023. Commercial operations for the FSRU were expected to commence by the end of May 2023.

First regasified LNG sent out from Hong Kong's LNG import terminal: On May 14, 2023, the first regasified LNG from Hong Kong's LNG import terminal was sent out to the gas grid during the trial operations phase. The LNG import terminal is utilising the Bauhinia Spirit FSRU. Commercial operations for the LNG import terminal are expected to commence by the middle of this year. The regasified LNG from the FSRU will primarily be utilised for electricity generation in Hong Kong.

BP and PetroChina books regas capacity at gate LNG import terminal in the Netherlands: On May 25, 2023, the operator of the Gate LNG import terminal in the Netherlands has announced that BP and PetroChina have secured regasification capacity at the facility. Each company has booked 1.5 Mtpa (2 bcma) of regasification capacity for a period of 20 years, starting from October 1, 2026. There are plans underway to increase the existing regasification capacity at the Gate terminal from its current level of 12 Mtpa (16 bcma) to 15 Mtpa (20 bcma) by October 2026. The final investment decision (FID) for the expansion is expected to be made in September 2023. As a result, BP and PetroChina have secured the entire capacity expansion at the LNG import terminal.

First tender of EU gas demand aggregation and joint gas purchasing: First round of the EU gas demand aggregation for joint gas purchasing took place from April 25 to May 2, 2023. EU gas buyers submitted a total demand of 11.6 bcm of gas, with 8.6 bcm requested for delivery via pipeline and the remaining amount was for delivery via LNG. From May 10 to 15, 2023, international gas suppliers were invited to submit bids for gas delivery to EU buyers. In response, a total of 25 gas suppliers offered to deliver 13.4 bcm of gas. Prisma, the operator of the EU energy platform, matched 10.9 bcm of the most favourable gas supply offers with the gas demand requirements of buyers. Currently, negotiations for gas sales and purchase contracts are underway, and the first gas deliveries are expected to take place in June or July 2023.

In terms of LNG agreements, two contracts were signed in May 2023, and their details are shown in Table 2 below.

Table 2: New LNG sale agreements signed in May 2023

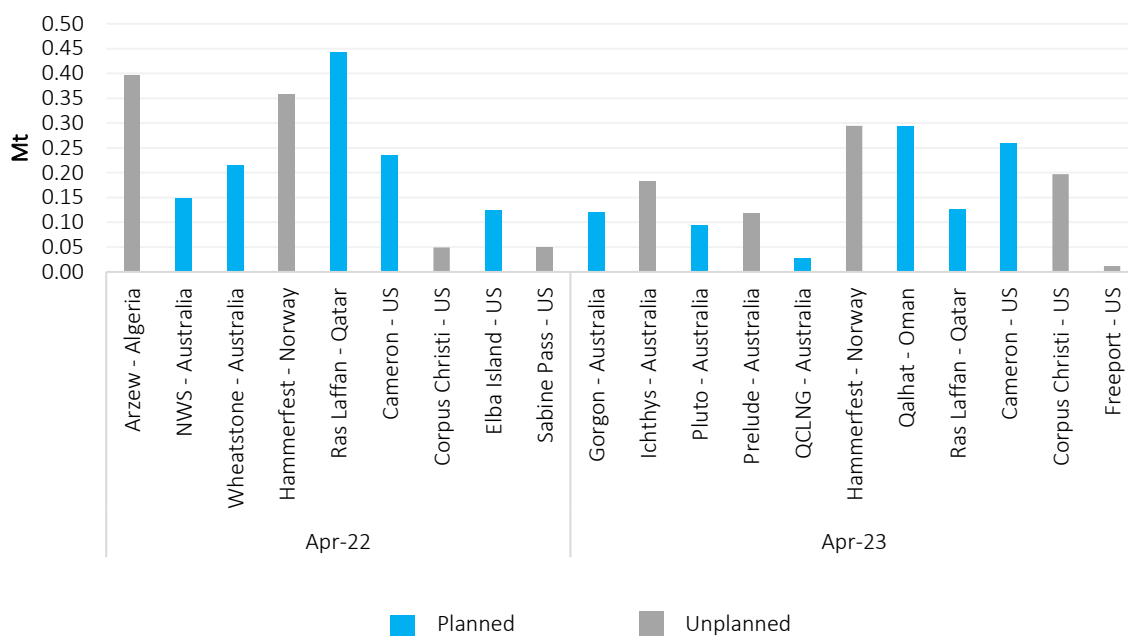
Contract Type	Exporting Country	Project	Seller	Importing Country	Buyer	Volume (Mtpa)	Duration (Years)
SPA	UAE	Das Island	Adnoc Gas	Portfolio	TotalEnergies	0.7	3
SPA	US	Sabine Pass Expansion	Cheniere	South Korea	Korea Southern Power (KOSPO)	0.4	20

Source: GECF Secretariat based on Project Updates and News

4.2.6 Maintenance Activity at LNG Liquefaction Facilities

In May 2023, the total planned maintenance and unplanned outages at global liquefaction capacity amounted to 1.72 Mtpa, down slightly compared to the 2.02 Mtpa of global liquefaction capacity outages in May 2022 (Figure 88). The Gorgon, Pluto and QCLNG LNG facilities in Australia, Qalhat LNG facility in Oman, Ras Laffan LNG facility in Qatar and the Cameron LNG facility in the US underwent scheduled maintenance activity. Additionally, the Ichthys and Prelude LNG facilities in Australia, Hammerfest LNG facility in Norway and Corpus Christi and Freeport LNG facilities in the US encountered unplanned outages.

Figure 88: Maintenance activity at LNG liquefaction facilities during May (2022 and 2023)



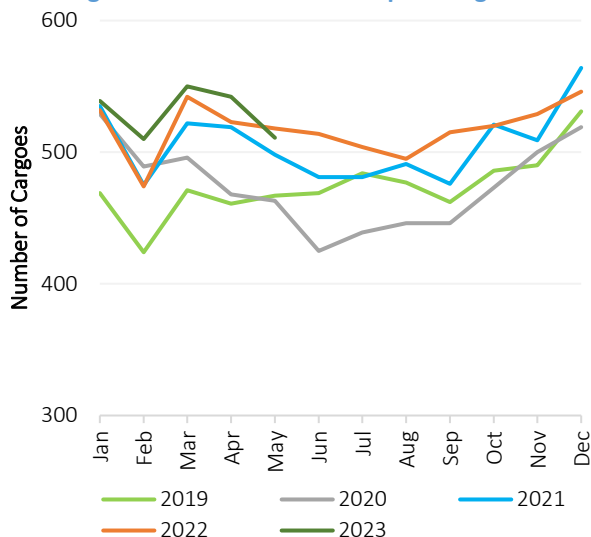
Source: GECF Secretariat based on information from Argus, ICIS LNG Edge and Refinitiv

4.2.7 LNG Shipping

In May 2023, the total number of LNG export cargoes recorded a 6% m-o-m decrease, to reach 511 (Figure 89). The total number of shipments for the first five months of 2023 reached 2,652, marking a 2% increase (or 63 cargoes) compared with the same period in 2022 (Figure 90).

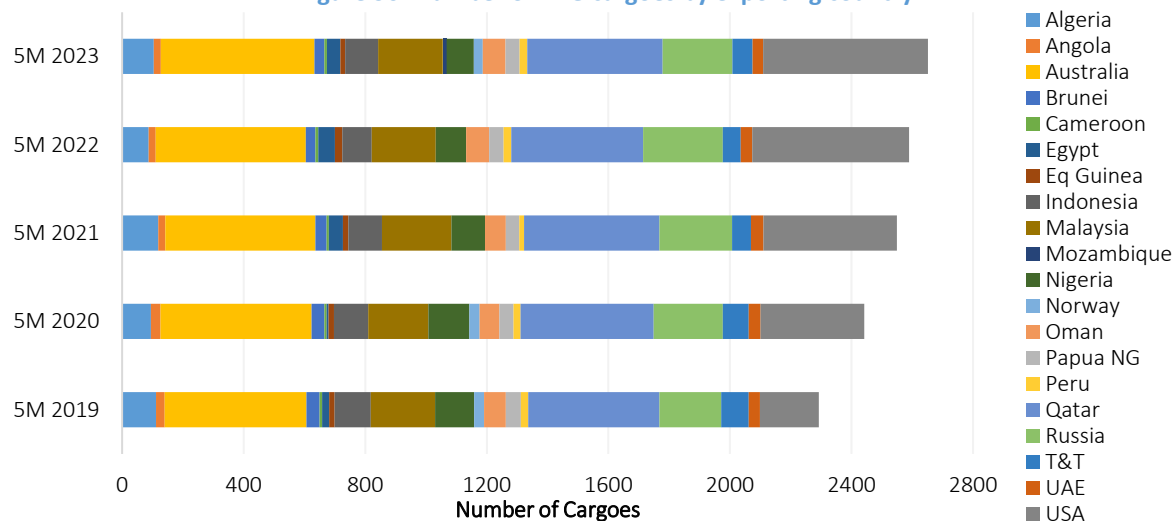
Specifically, the US and Norway saw significant increases in LNG deliveries compared to the previous year, with the US delivering 27 more cargoes and Norway delivering 30 more cargoes, following the restart of its Hammerfest terminal in June 2022 (Figure 91). Algeria recorded the largest relative year-to-date increase in 2023, with a 20% growth representing 17 extra cargoes this year.

Figure 89: Number of LNG export cargoes



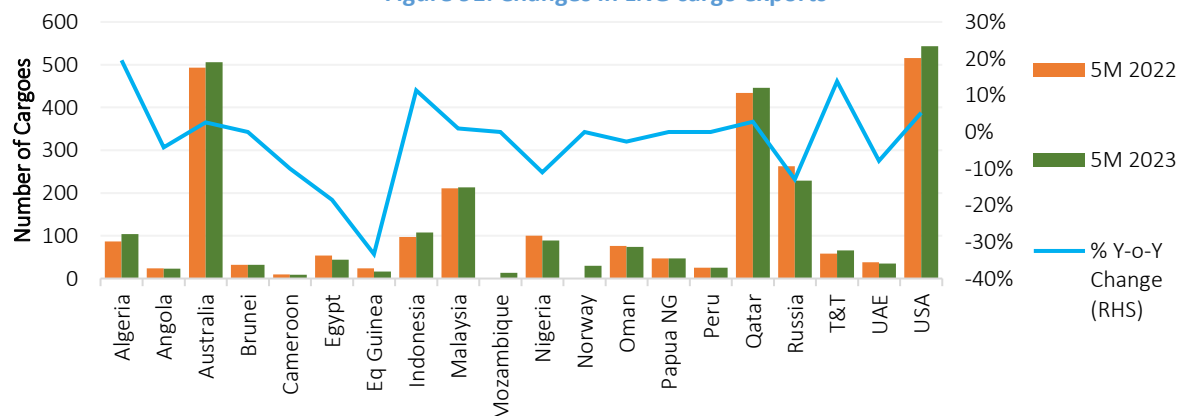
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 90: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 91: Changes in LNG cargo exports

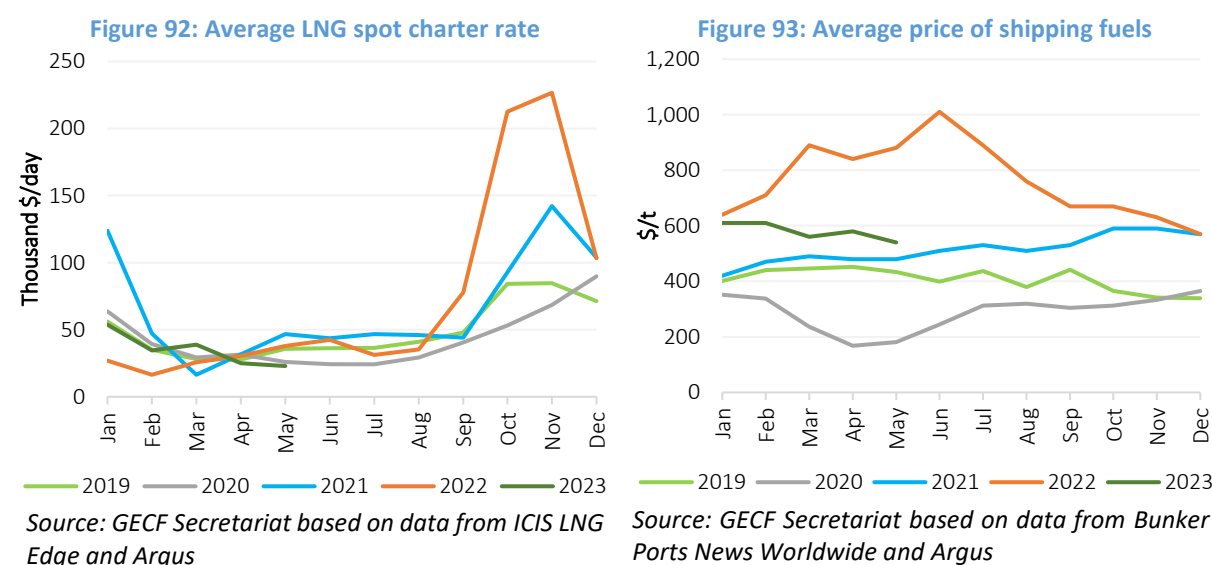


Source: GECF Secretariat based on data from ICIS LNG Edge

The spot charter rate for steam turbine LNG carriers continued to fall during May 2023, reaching an average of \$22,900 per day. This was a decline of 8% m-o-m, and 40% y-o-y (Figure 92). Spot charter rates for steam turbine carriers are now \$12,700 per day lower than the five-year average, with only two months in the last five years recording lower rates (March 2021 and February 2022). With respect to other segments of the LNG carrier fleet, the average monthly spot charter rate for TDFE-propelled vessels registered a 13% decline in May 2023, reaching \$38,000 per day. Similarly, the average monthly spot charter rate for two-stroke propelled vessels fell by 11%, reaching \$60,100 per day.

Historically, the trend in the charter market has been for spot rates to reach their lowest point at the end of the northern hemisphere winter. However, in 2023, charter rates continued to plummet in the ensuing months, reflecting the subdued LNG demand in Europe and Asia. This has resulted in limited shipping activity in both the Atlantic and Pacific Basins. Despite the current market conditions, there is speculation that a significant contango has the potential to drive charter rates upwards later in the year.

In May 2023, the average price of the leading shipping fuels was \$540 per tonne, a 7% decrease from the previous month, and a 39% decrease y-o-y (Figure 93).



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

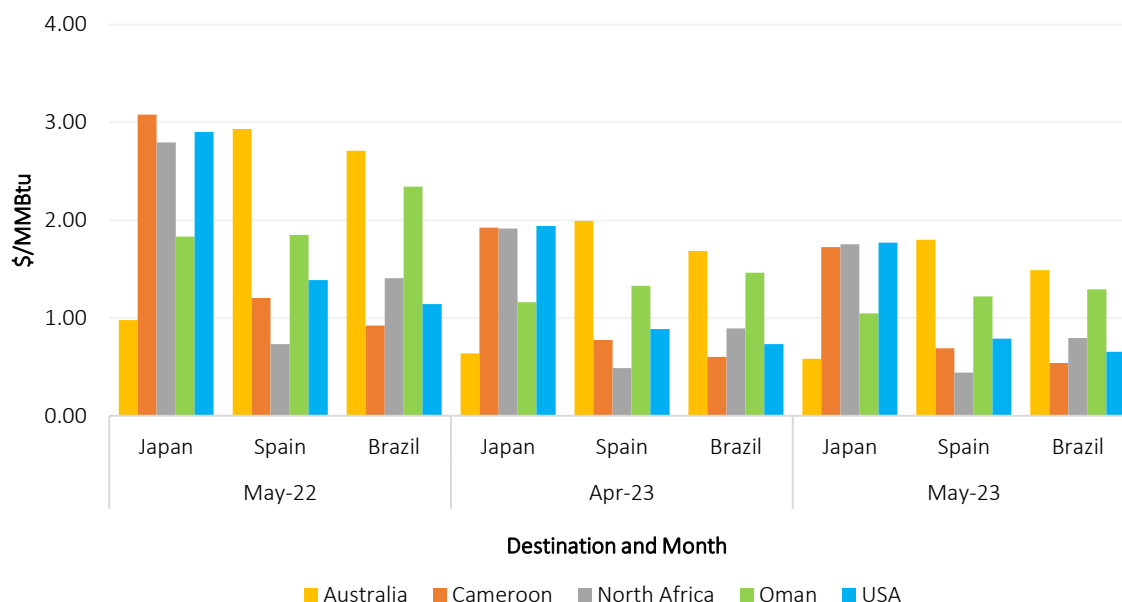
Table 3: Shipping costs for LNG spot cargoes from selected regions (\$/MMBtu) – May 2023

		Destination						
LNG Supplier	To	Japan	China	India	UK	Spain	Argentina	Brazil
	From							
	Spot LNG delivered price	9.78	9.78	9.40	7.56	8.75	10.30	8.75
	Australia	0.58	0.61	0.70	1.82	1.80	1.40	1.49
	Cameroon	1.72	1.70	1.14	0.73	0.69	0.83	0.54
	North Africa	1.75	1.74	1.02	0.49	0.44	1.16	0.80
	Oman	1.05	0.98	0.23	1.25	1.22	1.35	1.29
	USA	1.77	1.94	1.90	0.79	0.79	1.11	0.65

Source: GECF Shipping Cost Model

In May 2023, there were declines observed in the LNG carrier spot charter rate, the cost of LNG shipping fuels and the delivered spot LNG prices. Consequently, LNG shipping costs decreased by up to \$0.21/MMBtu compared to the previous month (Figure 94). Furthermore, when compared to the same month in the previous year, charter rates, fuel prices and delivered spot LNG prices were all lower in May 2023, resulting in LNG shipping costs being up to \$1.35/MMBtu lower.

Figure 94: LNG spot shipping costs for steam turbine carriers



Source: GECF Shipping Cost Model

South Korean shipyards continue to secure large orders for LNG carriers: The recent boom in construction of new LNG carriers continues, with the latest announcement by South Korean ship manufacturer Hyundai Heavy Industries (HHI) of a contract for the construction of six vessels. Among them, two of the carriers will have a capacity of 200,000m³ each, with a combined cost of \$556 million. The other four carriers will have a capacity of 174,000m³ each with a total cost of \$1.1 billion.

Chinese shipyards maintain their appeal for newbuild LNG carriers: China Merchant Energy Shipping, a prominent domestic shipping company, has recently placed an order with the Dalian shipyard for two LNG carriers with a capacity 175,000m³ each. The first carrier is scheduled for delivery in the second half of 2026, followed by the second carrier in the first half of 2027. With a price of \$235 million per vessel, these orders offer a cost advantage of approximately \$30 to \$40 million compared to similar vessels built at South Korean shipyards.

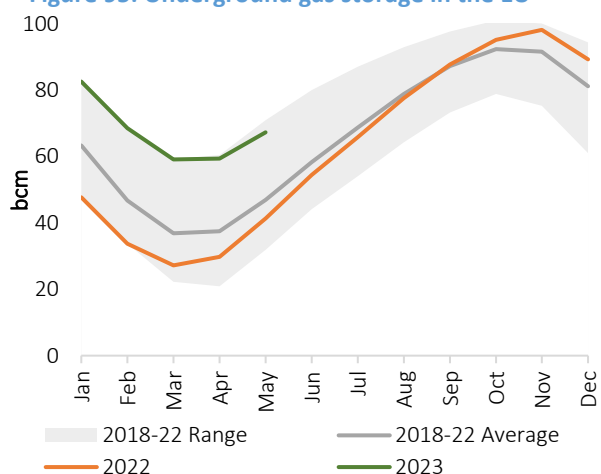
LNG carriers selected for trial “Smart Shipping” solution: Two LNG carriers have been chosen to be outfitted with a novel “Smart Shipping” digitalisation solution aimed at enhancing various aspects of LNG vessel operations. GTT, a cryogenic engineering firm, has partnered with Chinese energy company JOVO to explore technology advancements in voyage management, cargo optimisation and fuel monitoring, among other aspects. This initiative aims to improve data collection and reporting, aligning with the International Maritime Organisation’s (IMO) Carbon Intensity Index and the EU’s monitoring, reporting and verification regulations.

5 Gas Storage

5.1 Europe

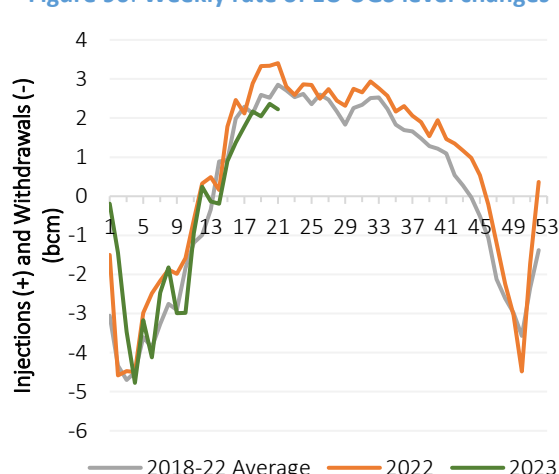
The total working capacity for underground gas storage (UGS) sites in the EU currently stands at 104 bcm. As the net injection season is underway in the region, gas storage sites are continuing to add to their already substantial storage levels. In May 2023, the average daily volume of gas in storage rose to 67.3 bcm, surpassing the 59.4 bcm recorded in the previous month (Figure 95). This volume of gas in storage was 25.9 bcm higher compared to the same month the previous year and is 20.4 bcm higher than the 5-year historical average. The average UGS capacity utilization in the region increased to 65%. Throughout May, a total of 10.4 bcm of gas was injected into UGS facilities, while gas withdrawals amounted to 0.8 bcm.

Figure 95: Underground gas storage in the EU



Source: GECF Secretariat based on data from AGSI+

Figure 96: Weekly rate of EU UGS level changes



Source: GECF Secretariat based on data from AGSI+

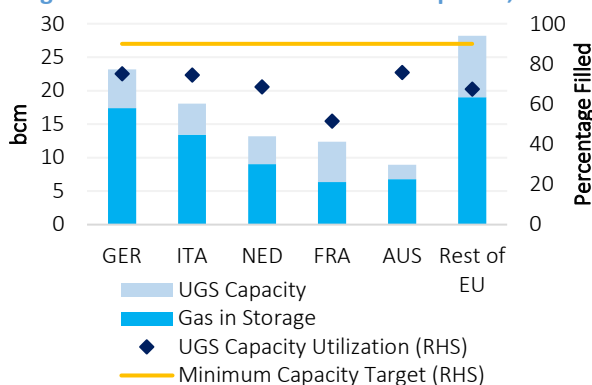
During May 2023, gas storage levels in the EU continued to increase with net gas injections occurring on all 31 days of the month. However, the average gas injection rate during the month was slower compared to previous years. The average injection rate in May 2023 was 2.2 bcm/week, which is lower than the 3.2 bcm/week recorded in 2022 and the 2.5 bcm/week for the 5-year historical average (Figure 96).

As of May 31, 2023, the UGS level exceeded the preliminary average target for EU member states by 34.2 bcm. This indicates that the current gas storage levels are already higher than what is required to meet the prescribed gas filling targets. In order to achieve a regional average level of filling of 90% by November 1, 2023, approximately 21.5 bcm of further stock build is required.

By the end of May 2023, Austria (76%), Germany (75%) and Italy (75%) have each filled their UGS sites to at least three quarters of their capacity (Figure 97). France, following the resumption of LNG imports after a period of industrial unrest, is also replenishing its gas stocks and is currently at 50% capacity.

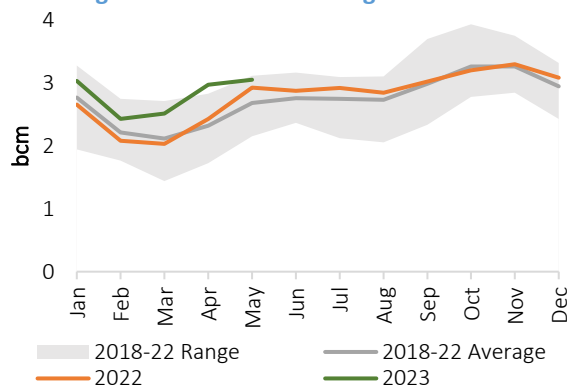
The EU has a total LNG storage capacity of 5.0 bcm, primarily concentrated in Spain (40%) and France (16%). In May 2023, the total amount of LNG stored within the EU stood at 3.1 bcm, representing a 3% increase compared to the previous month and a 4% increase compared to the same period last year (Figure 98). The robust LNG storage levels have been bolstered by the sustained growth in imports to the region.

Figure 97: UGS in EU countries as of April 30, 2023



Source: GECF Secretariat based on data from AGSI+

Figure 98: Total LNG storage in the EU

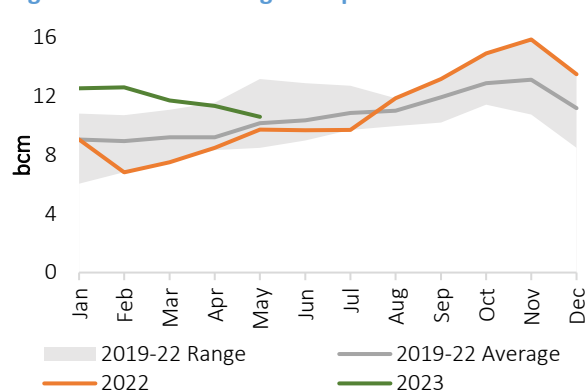


Source: GECF Secretariat based on data from ALSI

5.2 Asia

Japan and South Korea possess LNG storage capacities of 9.8 bcm and 6.8 bcm respectively. As of May 2023, the total volume of LNG in storage reached an estimated 10.6 bcm, with Japan accounting for 4.2 bcm, and South Korea 6.4 bcm (Figure 99). This total quantity was 6% lower m-o-m, but 9% higher y-o-y, and was 0.4 bcm higher than the four-year average. The region's LNG imports have been notably affected by the lower-than-anticipated gas demand which was observed in recent months.

Figure 99: LNG in storage in Japan and South Korea

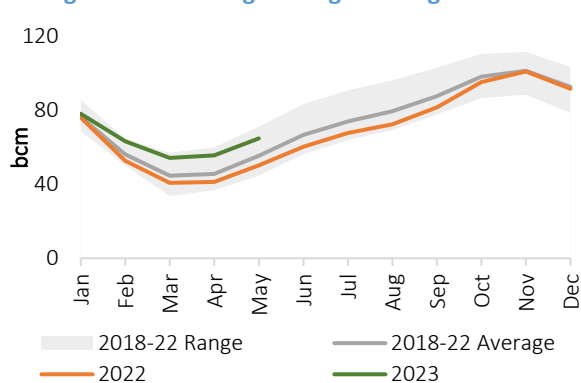


Source: GECF Secretariat based on data from Refinitiv

5.3 North America

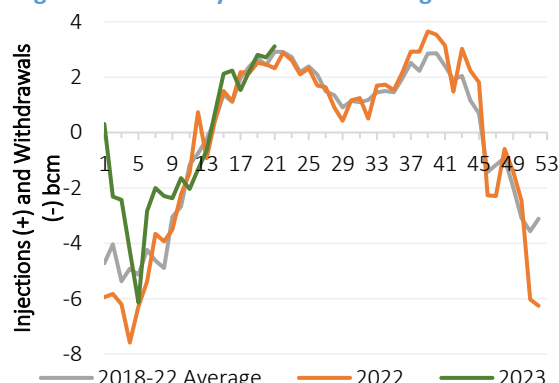
The US currently possesses a total working gas storage capacity of 134 bcm. As of May 2023, the country is in the midst of the net gas injection season, and the average daily volume of gas in storage rose to 64.9 bcm from 55.6 bcm in the previous month (Figure 100). This amount was 14.6 bcm higher than in the same month the previous year, and 9.4 bcm higher than the 5-year historical average. The average UGS capacity utilization rose to 48%. During May 2023, gas withdrawal from storage occurred at an average rate of 2.7 bcm/week, compared with 2.4 bcm/week in 2022 and 2.6 bcm/week for the 5-year average (Figure 101).

Figure 100: Underground gas storage in the US



Source: GECF Secretariat based on data from US EIA

Figure 101: Weekly rate of UGS changes in the US



Source: GECF Secretariat based on data from US EIA

6 Gas Balance

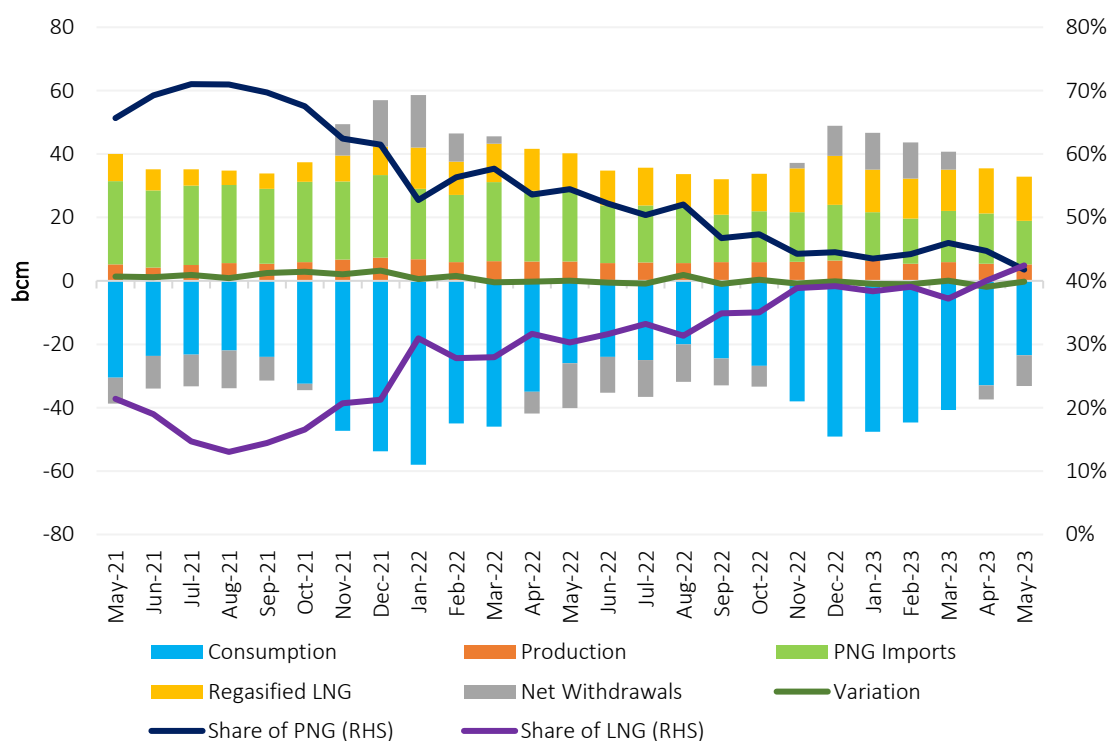
6.1 EU + UK

Historically, pipeline gas imports from PNG have been a significant source of gas supply, comprising over 50% of the gas supply to the EU + UK. However, since January 2022, the share of regasified LNG in the gas supply to these countries has increased substantially. The rise in the share of regasified LNG indicates a shift in the gas supply dynamics, with a greater reliance on LNG imports for meeting the energy demands of the EU + UK.

In May 2023, a significant milestone was reached as regasified LNG supply surpassed pipeline gas supply for the first time in the EU + UK's gas supply mix. The share of regasified LNG in total gas supply increased by two percentage points compared to April 2023, reaching 42%. Moreover, the share of regasified LNG was 12 percentage points higher compared to the same month a year earlier (Figure 102).

Conversely, the share of PNG in EU + UK's gas supplies declined to 42% in May 2023, down by three percentage points m-o-m and 12 percentage points y-o-y. The sharper decline in pipeline gas imports compared to the decline in regasified LNG send-out boosted the share of regasified LNG in EU + UK's gas supply. The shifting reliance from PNG to LNG imports in the EU + UK was driven by the EU's targeted reduction in gas imports from Russia.

Figure 102: EU + UK monthly gas balance



Note: Variation refers to losses and statistical differences

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

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

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

	2022	May-22	May-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) Gas Consumption	417.4	26.00	23.00	210.00	187.00	-12%	-11%
(b) Gas Production	72.72	6.15	5.18	31.34	28.29	-16%	-10%
Difference (a) - (b)	344.68	19.85	17.82	178.66	158.72	-10%	-11%
PNG Imports	230.46	21.93	13.73	112.59	75.31	-37%	-33%
Regasified LNG	146.57	12.18	13.95	60.92	66.70	14%	9%
Net Withdrawals	-31.79	-14.17	-9.74	6.70	15.36	-31%	129%
Variation	-0.55	-0.10	-0.12	-1.55	1.34		

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 Feb 2023 compared to Feb 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 February 2023.

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

	2022	Feb-22	Feb-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) OECD Gas Consumption	1804.0	178.3	170.4	389.7	361.2	-4.4%	-7.3%
(b) OECD Gas Production	1651.1	124.3	130.6	262.1	275.1	5.1%	5.0%
Difference (a) - (b)	153.0	54.0	39.7	127.5	86.1	-26.4%	-32.5%
OECD LNG Imports	346.9	29.0	32.0	62.1	66.3	10.4%	6.9%
LNG Imports from GECF	161.8	13.7	14.5	28.1	30.3	5.7%	7.7%
LNG Imports from Non-GECF	185.1	15.3	17.5	34.0	36.1	14.6%	6.2%
OECD LNG Exports	223.2	17.5	19.1	36.1	38.7	8.7%	7.2%
Intra-OECD LNG Trade	152.7	12.4	14.1	27.5	28.7	14.3%	4.4%
OECD Pipeline Gas Imports	630.2	54.6	42.1	113.8	88.4	-22.8%	-22.3%
OECD Pipeline Gas Exports	561.5	45.0	39.4	95.3	84.2	-12.3%	-11.7%
Stock Changes and losses	39.5	-33.0	-24.1	-83.2	-54.3	-26.9%	-34.8%

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

(*): y-o-y change for Feb 2023 compared to Feb 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 April 2023.

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

	2022	Apr-22	Apr-23	YTD-2022	YTD-2023	Change* y-o-y	Change** 2023/2022
(a) India Gas Demand	60.96	4.83	4.88	19.78	20.04	1.2%	1.3%
(b) India Gas Production	33.46	2.75	2.67	10.94	11.07	-2.8%	1.2%
Difference (a) - (b)	27.50	2.08	2.21	8.85	8.97	6.5%	1.4%
India LNG Imports	28.07	2.30	2.90	9.36	9.32	26.2%	-0.5%
LNG Imports from GECF	22.15	2.10	2.41	8.30	7.69	14.5%	-7.4%
LNG Imports from Non-GECF	5.92	0.20	0.50	1.06	1.63	149.8%	54.2%
Stock Changes and losses	0.57	0.22	0.69	0.52	0.35	209.7%	-32.0%

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

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

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

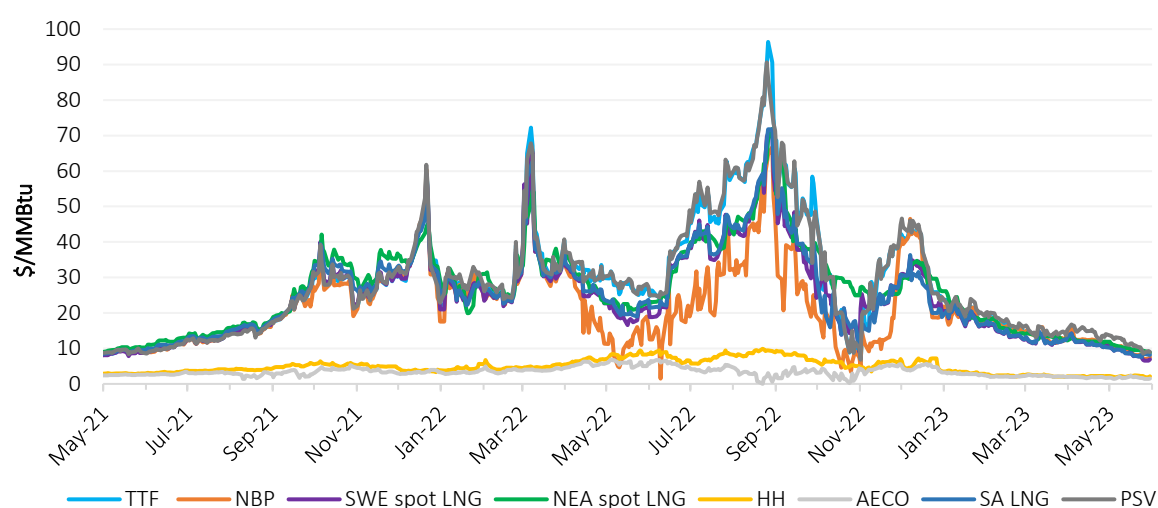
7 Energy Prices

7.1 Gas Prices

7.1.1 Gas & LNG Spot Prices

In May 2023, gas and LNG spot prices in Europe and Asia experienced a decline for the fifth consecutive month, reaching its lowest level in two years. Spot price volatility remained relatively low during this period (Figure 103 and Figure 104). The bearish sentiment in the market was driven by persistently weak gas demand and healthy EU storage levels, despite maintenance activities at certain LNG facilities. The current lower price levels are expected to stimulate more fuel switching, particularly in the power sector, potentially providing support for prices in the coming months.

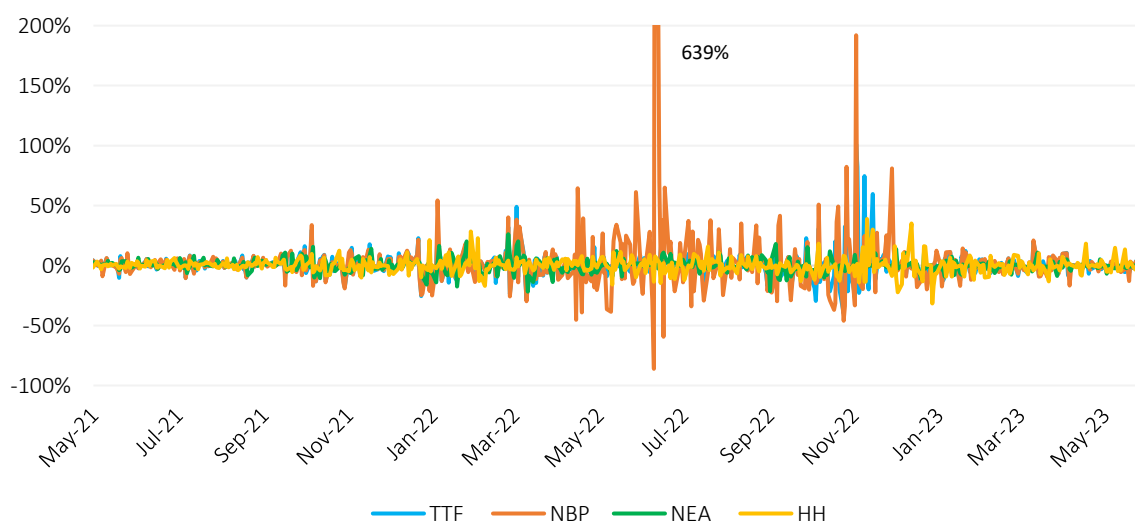
Figure 103: Daily gas & LNG spot prices



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 104: Daily variation of spot prices



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

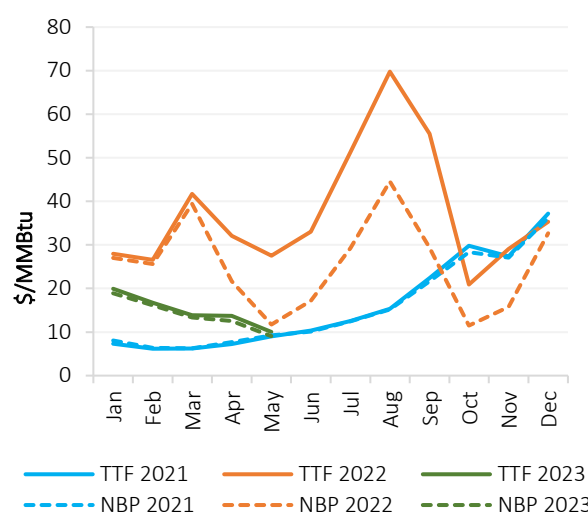
7.1.1.1 European Spot Gas and LNG Prices

In May 2023, average TTF and NBP spot gas prices were \$10.03/MMBtu and \$9.06/MMBtu, respectively, representing sharp declines of 27% and 26% m-o-m. TTF fell to its lowest levels since June 2021 (Figure 105). Additionally, these spot prices were 64% and 23% lower y-o-y for TTF and NBP, respectively. The SWE spot LNG prices averaged \$8.50/MMBtu in May 2023, marking a 26% decrease m-o-m and a 57% decrease y-o-y. As for the PSV spot price, it averaged \$11/MMBtu in May 2023, showing a 26% decrease m-o-m and a significant 61% decline y-o-y.

European gas and LNG spot prices continued to decline due to weak gas demand, strong LNG inflows and healthy storage levels. Despite lower Norwegian production and unplanned maintenance at the Hammerfest LNG facility, caused by compressor failure from May 4 to 27, 2023, prices remained bearish. Towards the end of the month, daily TTF spot prices even dropped below \$7.50/MMBtu, reaching their lowest level since April 2021.

From January to May 2023, TTF and NBP averaged \$14.85/MMBtu and \$14/MMBtu, respectively, representing substantial declines of 52% and 44% y-o-y.

Figure 105: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

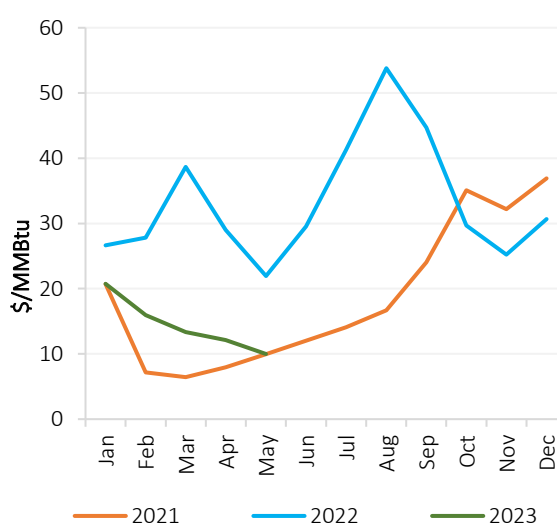
7.1.1.2 Asian Spot LNG Prices

In May 2023, the average North East Asia (NEA) spot LNG price experienced a 17% m-o-m decline, reaching an average of \$9.99/MMBtu. This represents a 54% decrease compared to the same period last year (Figure 106).

Asian LNG prices declined to its lowest level since May 2021 due to soft market fundamentals. Additionally, daily NEA spot LNG prices fell below \$9/MMBtu. Although there is emerging buying interest from price-sensitive LNG importers, the demand from Japan and South Korea remains muted.

From January to May 2023, the average NEA spot LNG price stood at \$14.43/MMBtu, representing a substantial 50% y-o-y decrease.

Figure 106: 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

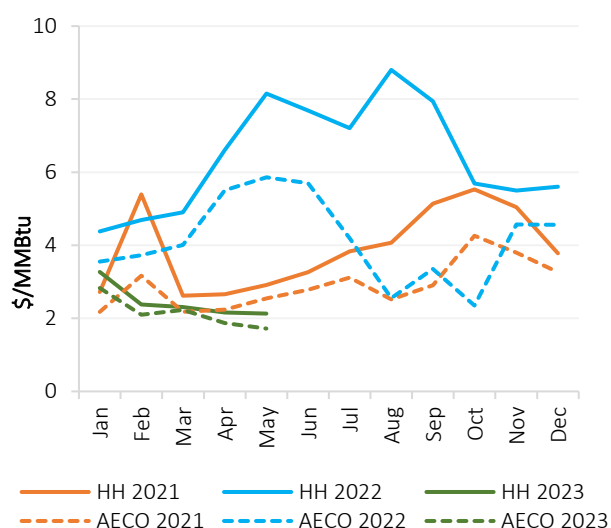
In May 2023, the HH spot gas price averaged \$2.13/MMBtu, reflecting a 1% m-o-m decrease. However, it was significantly lower, plummeting by 74%, compared to the average price of \$8.15/MMBtu observed in May 2022. Notably, the HH spot price reached its lowest level since September 2020 (Figure 107).

Strong domestic gas production, ample gas storage levels and reduced gas demand in the midst of an economic slowdown, continued to put downward pressure on HH spot prices. Daily HH spot prices reached a low of \$1.85/MMBtu during the month.

Similarly, in Canada, the AECO spot price declined by 8% m-o-m, averaging \$1.72/MMBtu in May 2023, and was 71% lower y-o-y.

From January to May 2023, the HH spot price averaged \$2.45/MMBtu, representing a significant 57% y-o-y decrease. Furthermore, the AECO spot price averaged \$2.15/MMBtu, marking a substantial 53% y-o-y decrease.

Figure 107: Monthly North American gas spot prices



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

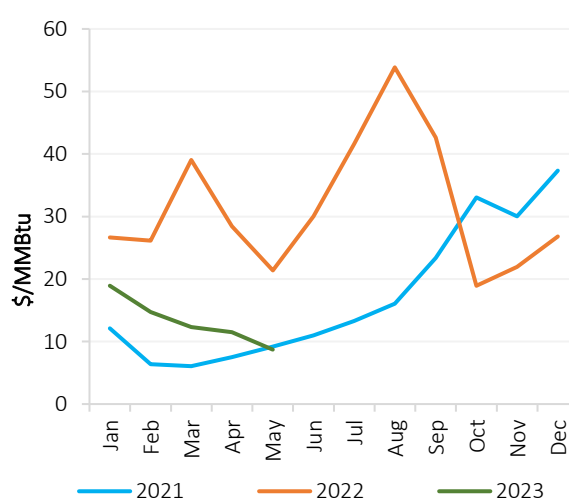
7.1.1.4 South American Spot LNG Prices

In May 2023, the South American (SA) LNG price experienced a 24% m-o-m decrease, averaging \$8.71/MMBtu. This price was significantly lower, dropping by 59%, compared to the average price of \$21.37/MMBtu observed in May 2022 (Figure 108).

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 \$8.76/MMBtu, \$8.56/MMBtu and \$8.82/MMBtu, respectively.

From January to May 2023, the SA LNG spot price averaged \$13.24/MMBtu, marking a substantial 53% y-o-y decrease.

Figure 108: 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 May 2023, the average Oil-indexed I LNG price was \$12.71/MMBtu, representing a 3% m-o-m decrease and a 13% y-o-y decrease. Similarly, the Oil-indexed II LNG price averaged \$9.44/MMBtu, showing a 2% m-o-m and a 19% y-o-y decrease (Figure 109). Additionally, the Oil-indexed I prices gained a premium of \$3/MMBtu over NEA spot LNG prices. Meanwhile, the Oil-indexed II prices maintained a discount of \$1/MMBtu compared to the average NEA spot LNG prices.

In Europe, the Oil-indexed III price averaged \$8.54/MMBtu in May 2023, reflecting a 3% m-o-m decrease, but a 3% y-o-y increase (Figure 110). Moreover, the price spread between the average SWE LNG and Oil-indexed III prices was negligible.

From January to May 2023, the Oil-indexed I LNG price exhibited a 1% y-o-y increase, while the Oil-indexed II LNG price demonstrated an 8% y-o-y decrease. Additionally, the Oil-indexed III LNG price for the same period experienced a 13% y-o-y increase.

Figure 109: Asia: Spot and oil-indexed price spread

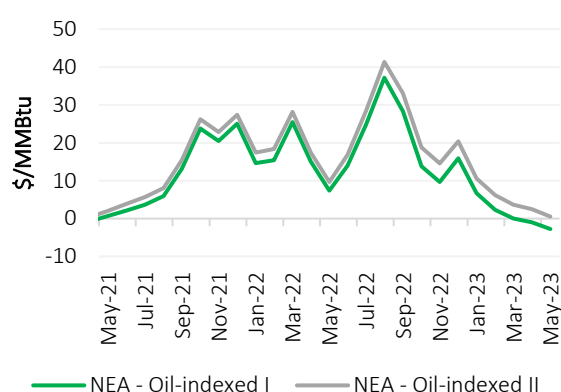
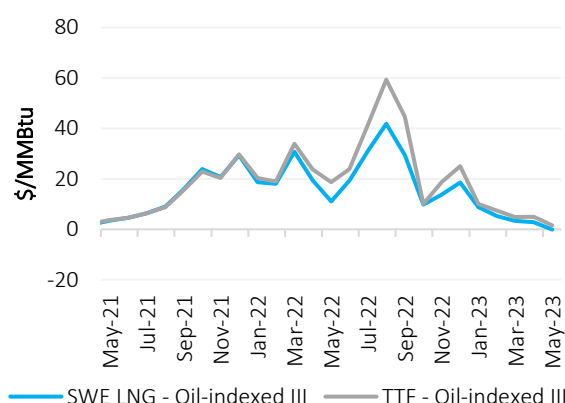


Figure 110: Europe: Spot and oil-indexed price spread



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 May 2023, the average NEA-TTF price spread remained negative, but narrowed to \$0.04/MMBtu (Figure 111). Both NEA LNG and TTF spot prices experienced a loss of momentum during the month, but the TTF spot prices saw a sharper decline.

NBP traded at a discount of \$0.97/MMBtu compared to TTF, which was lower than the average discount of \$1.13/MMBtu in the previous month (Figure 112). The NBP-TTF spread narrowed due to softer demand in the UK, which increased flows from the UK to NWE.

Furthermore, the NWE LNG spot price traded at a narrower discount of \$1.43/MMBtu compared to TTF (Figure 113) due to higher LNG sendout in the region. The NWE LNG-SA LNG price spread was slightly negative, averaging \$0.11/MMBtu (Figure 114). The NEA-HH and TTF-HH spreads narrowed to \$7.86/MMBtu and \$7.90/MMBtu respectively (Figure 115 and Figure 116). Thus, European and Asian spot prices held a lower premium over North American spot prices due to soft market fundamentals in both regions.

Figure 111: NEA-TTF price spread

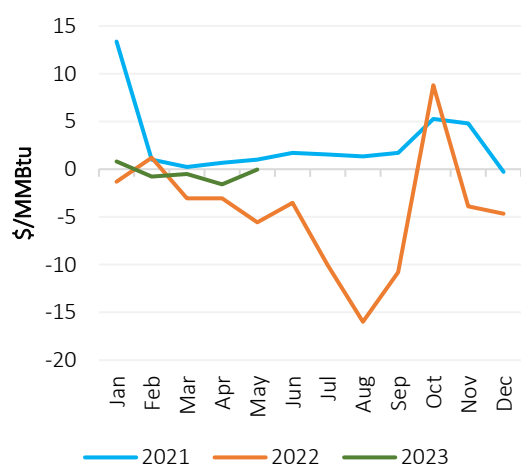


Figure 112: NBP-TTF price spread

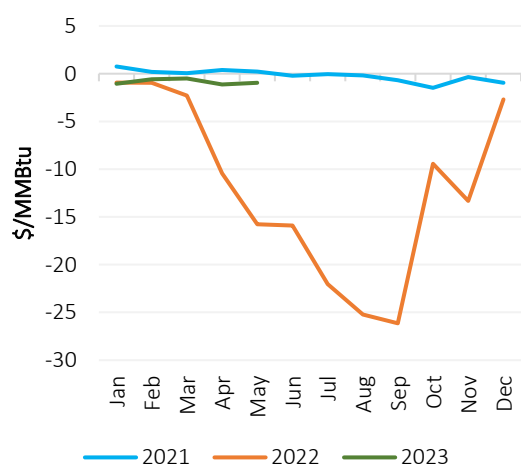


Figure 113: NWE LNG-TTF price spread

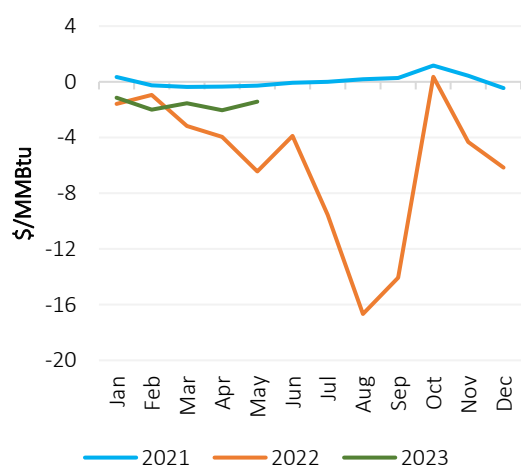


Figure 114: NWE LNG – SA LNG price spread

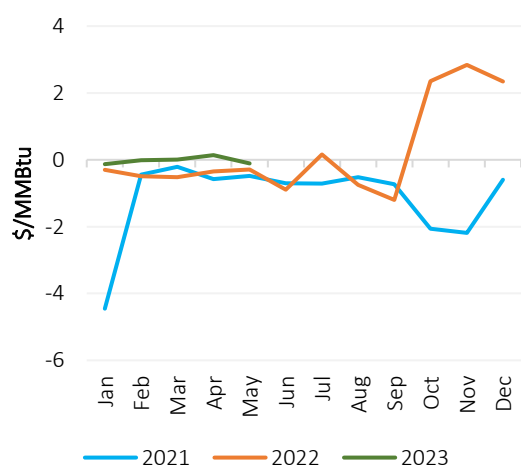


Figure 115: NEA-HH price spread

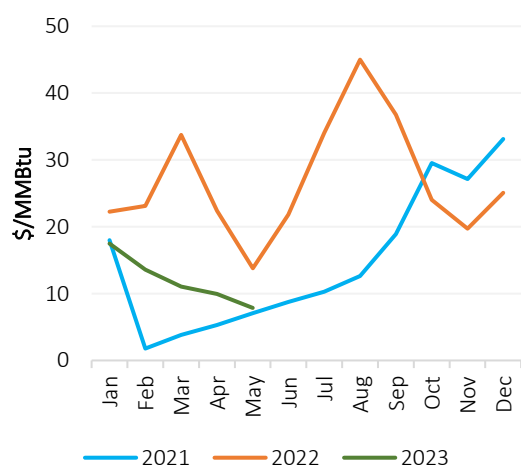
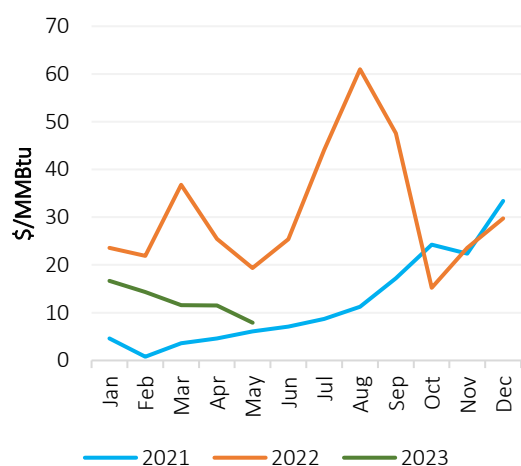


Figure 116: TTF-HH price spread



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

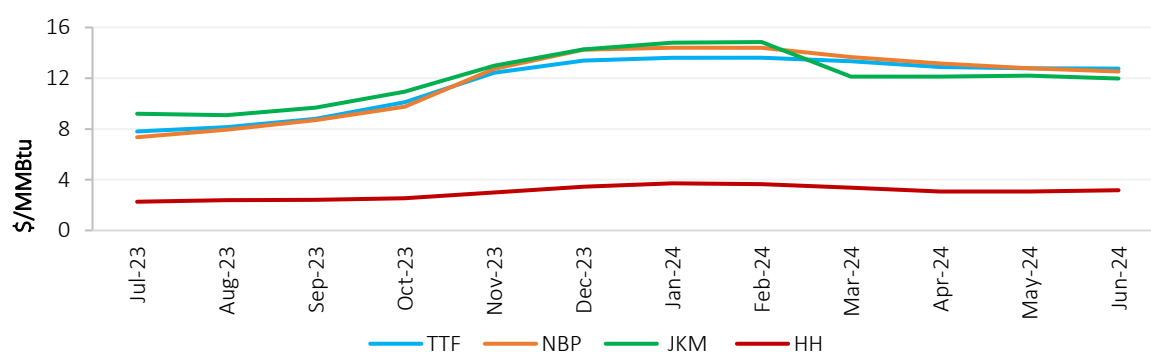
7.1.4 Gas & LNG Futures Prices

The JKM-TTF futures price spread for the rest of 2023 has turned positive, suggesting that Asian LNG prices may maintain a small premium over European spot prices in the coming months, creating some arbitrage opportunities. In the second half of 2023, JKM is expected to trade at an average premium to TTF of \$0.9/MMBtu. Subsequently, in January and February 2024, the JKM-TTF spread is expected to remain positive and widen to around \$1.2/MMBtu. However, in March 2024, the JKM futures prices drop-off and TTF gains a slight premium of \$1.2/MMBtu. (Figure 117).

With regard to the disparity between the TTF and NBP spot prices, NBP is expected to persistently trade at a discount to TTF, albeit at a narrow discount of -\$0.3/MMBtu in the third quarter of 2023. Subsequently, in November 2023, the spread is expected to turn slightly positive, with NBP gaining a slight premium of around \$0.3/MMBtu.

As of June 7, 2023, for the 6-month period from July to December 2023, gas and LNG futures prices for TTF, NBP and JKM were all lower than the expectations of the futures prices considered on May 7, 2023 (as reported in the GECF MGMR May 2023). The average futures prices for TTF, NBP and JKM during this period were \$10.11/MMBtu, \$10.12/MMBtu and \$11.03/MMBtu, respectively. Meanwhile, the average HH futures price was \$2.67/MMBtu, which was slightly higher than previous expectations (Figure 118).

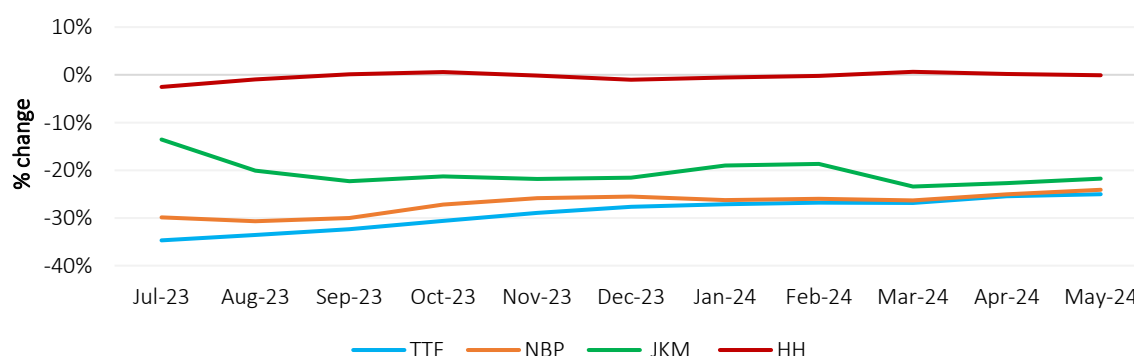
Figure 117: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Note: Futures prices as of June 7, 2023.

Figure 118: Variation in gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Note: Comparison with the futures prices as of May 7, 2023 as reported in GECF MGMR May 2023.

7.2 Cross Commodity Prices

7.2.1 Oil Prices

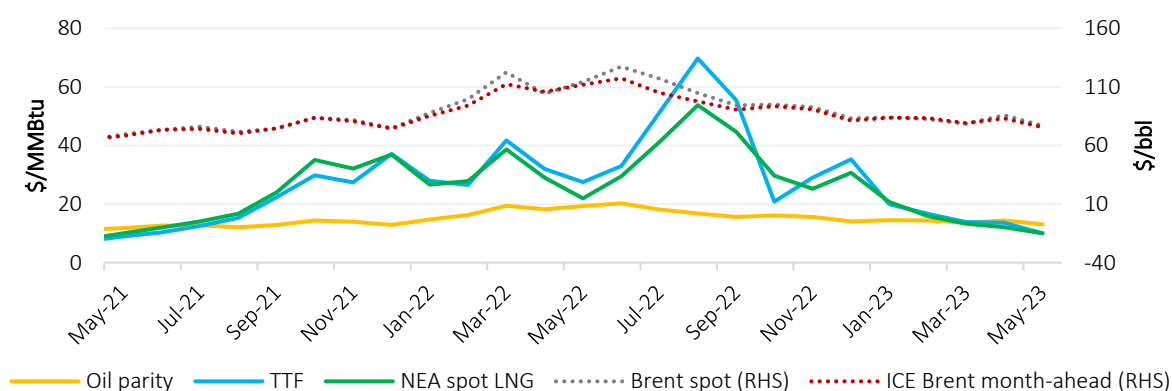
In May 2023, the average Brent spot price was \$76.95/bbl, indicating a 10% m-o-m decrease, and a 33% y-o-y decrease (Figure 119). The Brent month-ahead price averaged \$75.69/bbl, marking a 9% decrease m-o-m, and a 32% decrease y-o-y.

Uncertainty surrounding oil demand in the two largest consuming countries, the US and China, coupled with macroeconomic risks, continued to exert downward pressure on oil prices. The potential effects of a US debt default on the global economy, alongside slower-than-anticipated industrial activity in China raised concerns about global oil demand. However, the implementation of OPEC+ production cuts as well as reduced production from Canada due to wildfires helped contain the losses.

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

From January to May 2023, the average Brent spot price was \$81.69/bbl, representing 21% decrease y-o-y. Similarly, the average Brent month-ahead price was \$81.14/bbl, representing an 18% decrease y-o-y.

Figure 119: 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

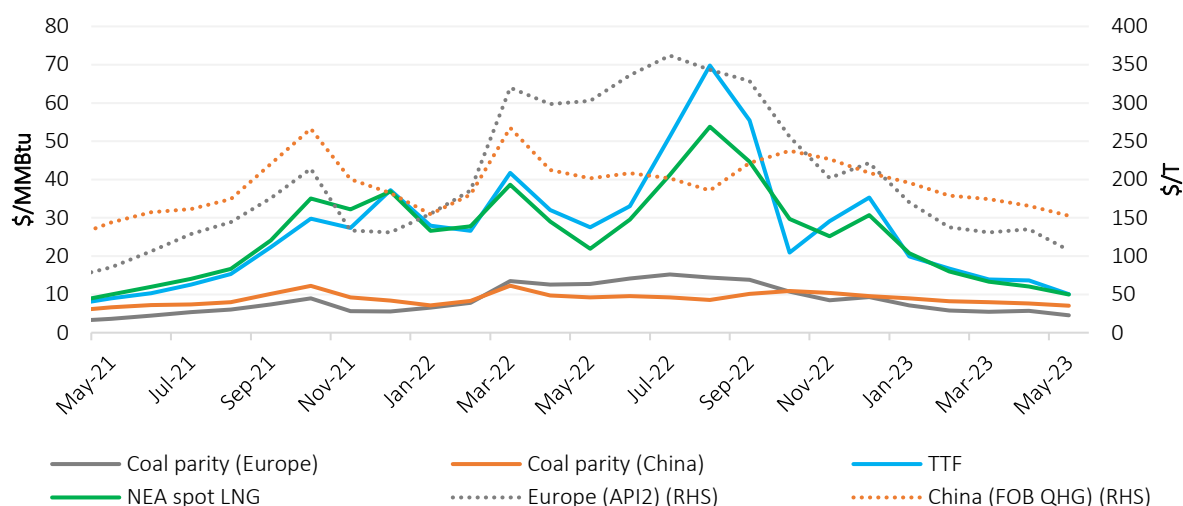
In May 2023, the European coal price (API2) experienced a 21% m-o-m decrease, averaging \$107.50/T, but was 65% lower y-o-y. Meanwhile, in China, the QHG coal price marker decreased by 8% m-o-m, averaging \$152.82/T, and was 24% lower y-o-y (Figure 120). Both coal prices reached its lowest levels since June 2021.

Coal prices in Europe declined as lower TTF gas prices incentivized coal-to-gas switching which ultimately lowered demand for coal. In addition, lower electricity demand during the shoulder season weighed on coal prices.

The premium of TTF spot price over the API2 parity price decreased to around \$5.5/MMBtu in May 2023, representing a 31% decrease m-o-m. Additionally, the premium of NEA spot LNG price over the QHG parity price narrowed to \$3/MMBtu, reflecting a 34% m-o-m decrease.

From January to May 2023, the European API2 averaged \$136.27/T, representing a 46% decrease y-o-y. Meanwhile, the Chinese QHG price averaged \$203.39/T, which was 15% lower y-o-y.

Figure 120: 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.

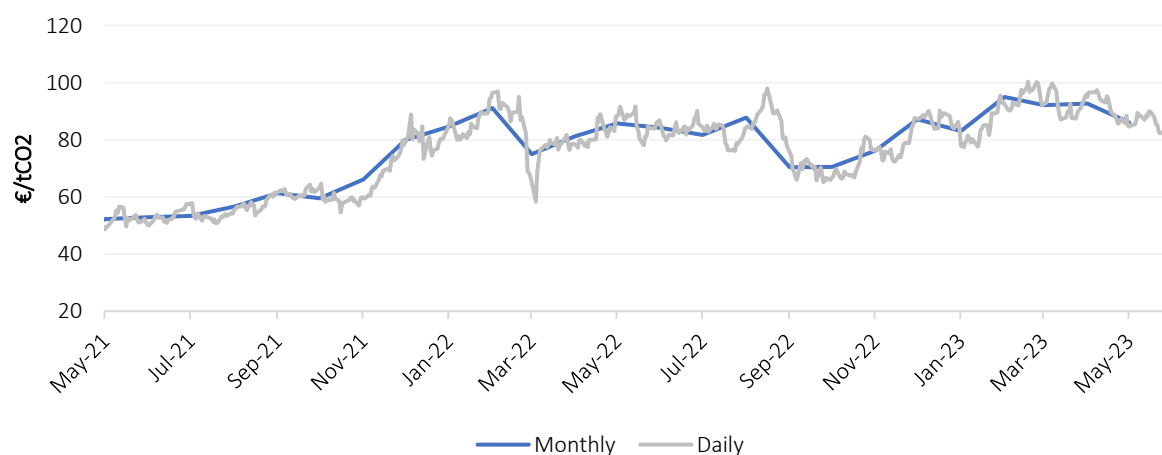
7.2.3 Carbon Prices

In May 2023, EU carbon prices averaged €86.04/tCO₂, indicating a 7% m-o-m decrease but remaining relatively stable compared to the previous year (Figure 121).

The decline in coal-fired generation due to lower gas prices, combined with robust renewable output, weakened the fundamentals and exerted downward pressure on EU carbon prices.

From January to May 2023, EU carbon prices averaged €89.77/tCO₂, representing a 7% increase y-o-y.

Figure 121: EU carbon prices



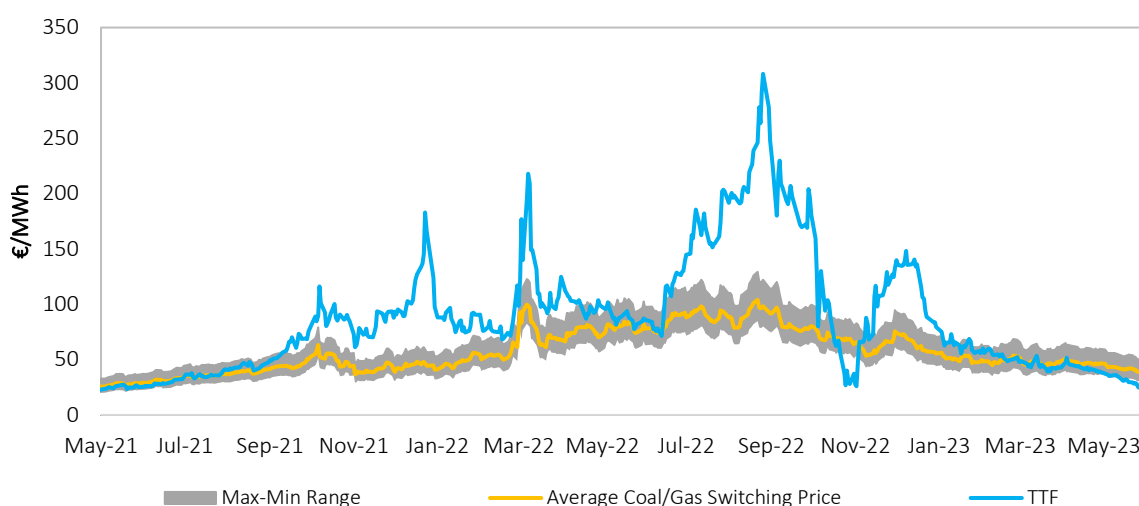
Source: GECF Secretariat based on data from Refinitiv Eikon

7.2.4 Fuel Switching

In May 2023, daily TTF spot prices fell below the range suitable for coal-to-gas switching, with an average coal-to-gas switching price of €41.44/MWh, marking a 12% m-o-m decrease. The average monthly spread between the TTF spot price and the coal-to-gas switching price remained negative and widened to approximately -€10/MWh (Figure 122).

Looking ahead to Q3 2023, it is expected that the TTF spot price will remain slightly below or within the coal-to-gas switching range. Relatively low gas spot prices will continue to support coal-to-gas switching in Europe.

Figure 122: Daily TTF vs coal-to-gas switching prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Note: Coal-to-gas switching price is the price of gas at which generating electricity with coal or gas is equal. The estimate takes into consideration coal prices, CO₂ emissions prices, operation costs and power plant efficiencies. The efficiencies considered for gas plants are max: 56%, min: 46%, avg: 49.13%. The efficiencies considered for coal plants are max: 40%, min: 34%, avg: 36%.

7.3 Other Developments

In South Korea, gas-fired generation became more profitable than coal-fired generation in April 2023, marking the first time since June 2022. This shift in profitability is attributed to the higher efficiency of gas plants (51%) to coal plants (38%). Privately-owned gas-fired power plant operators in South Korea typically rely more on spot purchases in their LNG portfolio, while state-owned gas importer KOGAS plays a significant role in supplying gas for power generation in the domestic market. The lower LNG import price in South Korea is largely a reflection of lower Asian LNG prices and also by lower oil prices, as oil-linked LNG contracts are affected. Forward spot LNG prices indicate that gas-fired power plants are expected to remain more profitable than coal-fired plants throughout the rest of the second quarter of 2023, according to Argus' assessment.

Following the implementation of a new gas pricing mechanism in India, its domestic gas price was set at \$8.27/MMBtu (10% of the monthly average Indian crude basket). This reflected an increase of 4.4% from the previous month. India aims to expand its domestic gas consumption to reduce its carbon emissions.

8 Abbreviations

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

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

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

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Gas Exporting Countries Forum (GECF)

GECF Headquarters

P.O.Box 23753, Tornado Tower

47th & 48th Floors, West Bay, Doha

www.gecf.org

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