GECF

MONTHLY GAS MARKET REPORT

May 2023

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Highlights

Global economy: The global GDP growth for 2023 is projected to slow to 1.9% year-on-year (y-o-y), according to Oxford Economics. The global economy has shown resilience, with some positive momentum from the gradual easing of inflationary pressures, softening of commodity prices and economic recovery in China. However, downside risks persist, particularly with concerns about the banking sector. Furthermore, global inflation is expected to gradually subside to 5.7% in 2023. During the G7 Ministers' Meeting on Climate, Energy and Environment 2023, the ministers acknowledged the crucial role of investment in the gas industry in order to prevent supply shortages and market shocks.

Gas consumption: Total gas consumption in the European Union (EU) dropped by 7% y-o-y to reach 28 bcm in April 2023. The decline was driven by warmer-than-normal temperatures and the implementation of the EU regulation on voluntary gas demand reduction. Despite the drought, less windy weather conditions, and a decline in coal output during the month in the EU, gas consumption in the power generation sector recorded a decline of 8% y-o-y in April 2023. In contrast, gas consumption in the US is estimated to have grown by 1.6% y-o-y to 67 bcm, with the power generation sector being the main driver of the growth with an increase of 13% (3 bcm) y-o-y.

Gas production: Europe's gas production declined by 2.2% in March 2023 compared to the same period of last year, with a total output of 16.4 bcm, mainly due to a decrease in production from the Netherlands. The UK and Norway maintained their production levels. On the other hand, gas production in the seven key US shale oil and gas regions increased by 6% y-o-y in April 2023, reaching 82.2 bcm. Although there was a monthly decrease of 2 units, the global gas rig count increased by 75 units y-o-y in April 2023, reaching a total of 408 units. Cumulative discovered volumes in Q1 2023 stood at around 1 billion boe, the lowest in decades.

Gas trade: Pipeline gas imports to the EU increased by 3% month-on-month, to reach 14.0 bcm in April 2023. Global LNG imports surged by 10% y-o-y to 34.4 Mt, setting a new record high for imports in the month of April. The increase was driven by stronger LNG imports across all regions, especially in the Asia Pacific and Europe. In Europe, the rise in LNG imports continues to compensate for the lower pipeline gas imports into the region. Meanwhile, the rebound in gas consumption in China, opportunistic buying in India due to lower spot LNG prices, and declining gas production and pipeline gas imports in Thailand contributed to the increase in the Asia Pacific's LNG imports. Furthermore, Philippines joined the ranks of LNG importers in April 2023.

Gas storage: As of April 2023, the restocking of gas storage sites has commenced. In the EU, the average level of gas in underground storage was 59.4 bcm, which amounts to 57% of the region's storage capacity. In the US, the level of underground gas storage increased to 55.6 bcm, representing 42% of its capacity. A slower stockbuild is expected in both the EU and US this summer due to the high levels of gas already in storage. The combined LNG in storage in Japan and South Korea was estimated at 9.8 bcm.

Energy prices: Gas and LNG spot prices in Europe and Asia continued their downward trend for the fourth consecutive month. In April 2023, the TTF and NEA LNG spot prices averaged $13.69/MMBtu and $12.10/MMBtu, respectively, representing a 1% and 9% decrease compared to the previous month. The TTF spot price was 57% lower y-o-y, while the NEA LNG spot price experienced a decline of 58% y-o-y. With the arrival of the shoulder season, the market witnessed a decrease in tightness as a result of ample storage levels and strong LNG supply. However, in Asia, there was some emerging buying activity in anticipation of the summer season, which helped limit the decline in spot LNG prices.

1 Global Perspectives

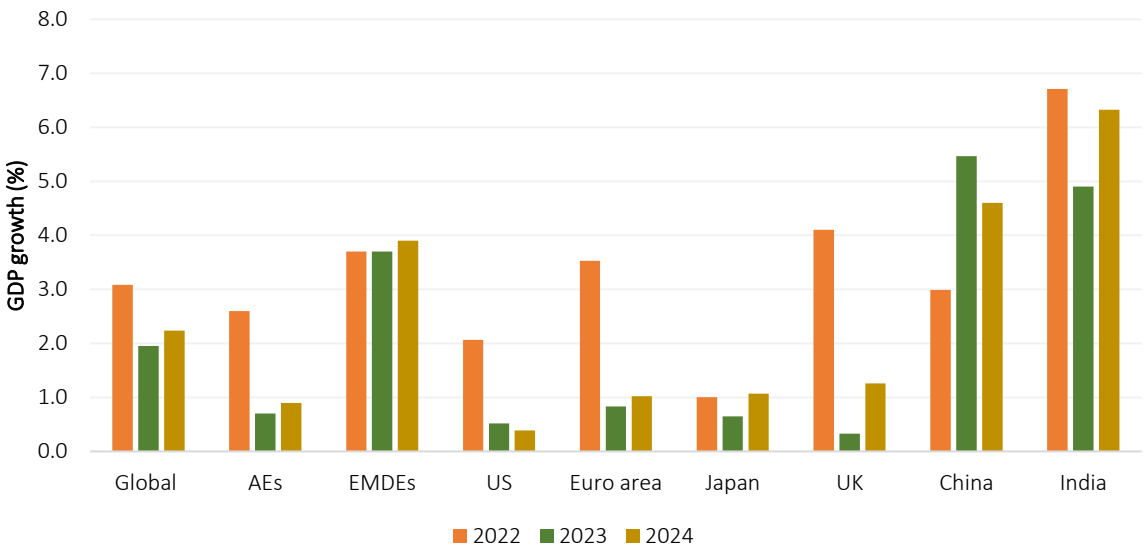
1.1 Global Economy

The global economy has shown resilience in the first quarter of 2023, with an estimated global GDP growth of 0.7% compared to the previous quarter. This can be attributed to factors such as gradual easing of inflationary pressures, softening commodity prices and economic recovery in China. However, preliminary data for April 2023 in China, revealed lower imports and slower export growth than expected, adding some concern for the economic outlook. In addition, concerns about the banking system remain a downside risk. In its World Economic Prospects May 2023 report, Oxford Economics has maintained its global GDP growth forecast of 1.9% for 2023. Furthermore, it estimates global GDP growth to rebound slightly to 2.2% in 2024 (Figure 1).

GDP growth in Advanced Economies (AEs) is expected to decelerate substantially from 2.6% in 2022 to 0.7% in 2023, and to slightly rebound to 0.9% in 2024. The US GDP growth is forecast to slow significantly from 2.1% in 2022 to 0.5% in 2023. The US economy is expected to weaken during the rest of 2023, with the possibility of a mild recession in the second half of the year, as elevated interest rates and tight financial conditions limit activity. The Euro area's growth is expected to slow significantly, from 3.5% in 2022 to 0.8% in 2023, and to slightly rebound to 1% in 2024. In the first quarter of 2023, there was divergence in growth across the region with Italy and Spain experiencing strong growth, while Germany remained relatively flat. Additionally, the UK's GDP growth forecast was estimated at 0.3% in 2023, a positive sign after previous expectations of economic contraction.

GDP growth in Emerging Markets and Developing Economies (EMDEs) is expected to remain relatively the same as the previous year, with projections of 3.7% in 2023, followed by a rebound to 3.9% in 2024. China's GDP growth is expected to accelerate from 3% in 2022 to 5.5% in 2023, before decelerating to 4.6% in 2024. China's economic growth will be supported by a strong rebound in consumer spending and a better labour market. Additionally, India's GDP growth was estimated at 4.9% in 2023.

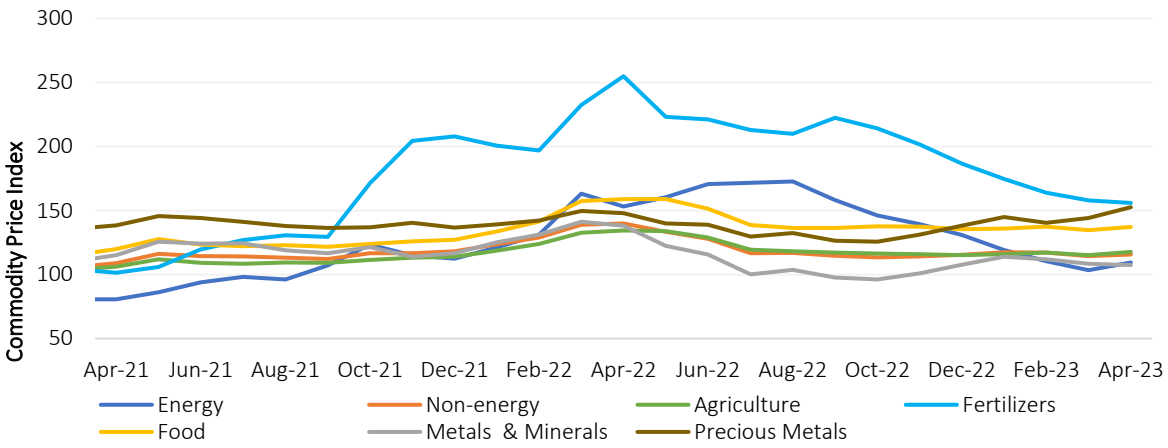
Figure 1: GDP growth forecast



Source: GECF Secretariat based on data from Oxford Economics

Regarding commodity prices in April 2023, the energy price index increased by 6% month-on-month (m-o-m), although it remained 29% lower year-on-year (y-o-y). This upward movement was primarily driven by higher oil prices, while gas and coal prices continued their decline. The non-energy price index increased by 1% m-o-m, but was 17% lower y-o-y. In the non-energy sectors, the agriculture price index increased by 2% m-o-m, while the metals and minerals price index decreased further by 1% m-o-m. Moreover, the fertilizer price index continued to slide, declining by 1% m-o-m and standing 39% lower y-o-y (Figure 2).

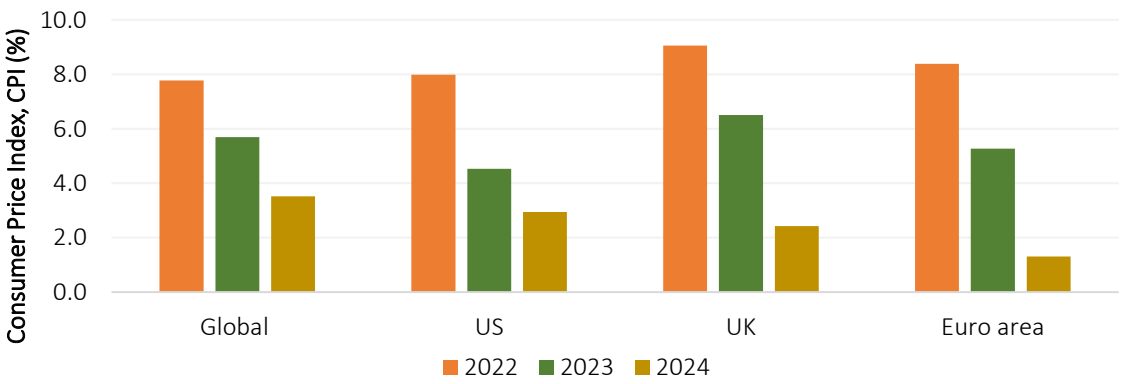
Figure 2: Monthly commodity price indices



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%).

Inflationary pressures in many countries have been easing as a result of tighter monetary policies. According to the latest forecast from Oxford Economics, global inflation is expected to decline from 7.8% in 2022 to 5.7% in 2023, followed by a further reduction to 3.5% in 2024. In the US, inflation is projected to average 4.5% in 2023, with a decline to 2.9% in 2024. The UK is anticipated to experience inflation averaging 6.5% in 2023, followed by a decrease to 2.4% in 2024. In the Euro area, inflation is forecasted to average 5.3% in 2023, with a subsequent decline to 1.3% in 2024 (Figure 3).

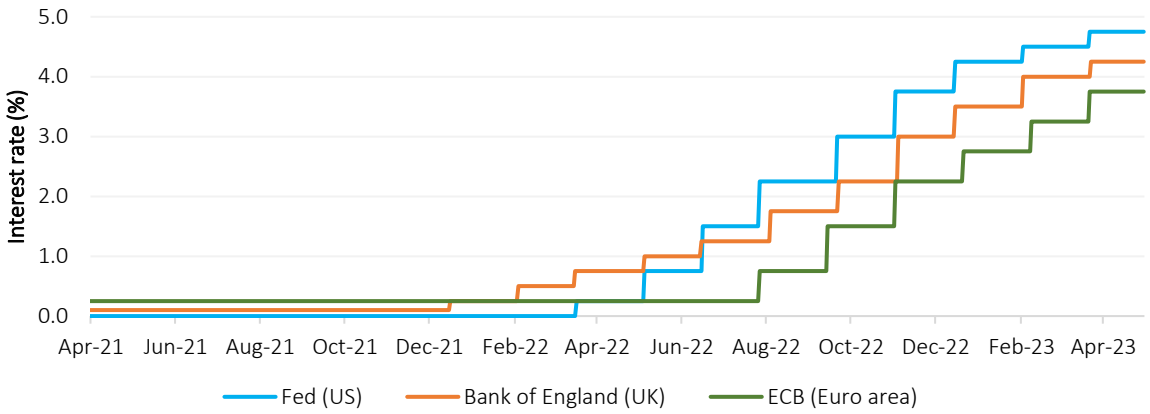
Figure 3: Inflation rates



Source: GECF Secretariat based on data from Oxford Economics

In April 2023, US Federal Reserve (Fed), Bank of England (BOE) and European Central Bank (ECB) maintained their respective interest rates. The US Fed's benchmark lending rate at the end of April 2023 remained in the range of 4.75 – 5.00%, which was the highest level in 15 years. Similarly, the UK's BOE benchmark interest rate was 4.25%. The ECB's key interest rates on the main refinancing operations, marginal lending facility and deposit facility was 3.5%, 3.75% and 3%, respectively. Additionally, it is worth noting that at the beginning of May, all three central banks announced further interest rate hikes, increasing their benchmark interest rates by 0.25 percentage points. However, the Fed has signaled that it may maintain rates at the current level in the upcoming months (Figure 4).

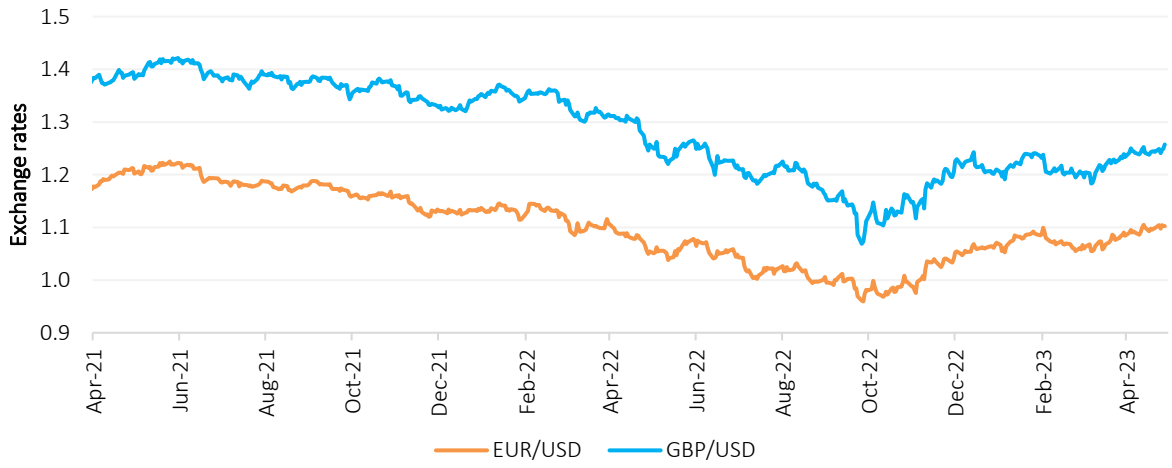
Figure 4: Interest rates in major central banks



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

In April 2023, both the euro and British pound showed appreciation against the US dollar compared to the previous month. The euro was valued at an average of $1.0967, representing a 2% increase m-o-m and y-o-y. Meanwhile, the British pound was valued at an average of $1.2452, reflecting a 3% increase m-o-m, but a 4% decrease y-o-y (Figure 5). Inflation in the Euro area is estimated to have increased slightly in April after several months of decline, averaging an estimated 7% in April 2023, compared to 6.9% in March 2023.

Figure 5: Exchange rates



Source: GECF Secretariat based on data from Refinitiv Eikon

1.2 Other Developments

The G7 Ministers' Meeting on Climate, Energy and Environment 2023 took place in Sapporo, Japan on April 15-16, 2023. Japan holds the G7 Presidency for 2023, and will pass it to Italy in 2024.

The European Union participated in the discussions as a guest, represented jointly by the President of the European Council and the President of the European Commission Additionally, Indonesia, as the chair of the Association of Southeast Asian Nations, India as the president of the G20, and the UAE, as the host of the 28th Conference of the Parties to the UN Framework Convention on Climate Change (COP28), attended the meeting.

The G7 ministers reaffirmed their shared goals of achieving net-zero emissions by 2050 and striving to limit the temperature rise to 1.5°C. While recognizing that each country may pursue a unique pathway, the ministers emphasized the importance of addressing energy security concerns, climate change, and geopolitical risks. The G7 Climate, Energy and Environment Ministers' Communique emphasized on *"the importance of realizing simultaneously safety, energy security, economic efficiency, and environment (S+3E). In addition to this, we emphasize the importance of countering geopolitical risks, including with respect to critical minerals, for the clean energy transition. To this end, we commit to holistically address energy security, the climate crisis and geopolitical risks."*

With regard to the gas industry, the G7 ministers acknowledged the crucial role of investment in the gas industry in order to prevent supply shortages and market shocks. The Communique stated that, *"investment in the gas sector can be appropriate to help address potential market shortfalls provoked by the crisis, subject to clearly defined national circumstances, and if implemented in a manner consistent with our climate objectives and without creating lock-in effects."*

This meeting of the G7 ministers was one of several meetings in the lead up to the G7 Hiroshima Summit, scheduled to take place in Hiroshima, Japan on May 19-21, 2023. In addition to G7 leaders, the leaders of Australia, Brazil, Comoros for the African Union, Cook Islands for the Pacific Forum, India, Indonesia, South Korea and Vietnam were invited. Various international organizations including the UN, IEA, IMF, OECD, WB, WHO, and WTO are also among the invited participants.

2 Gas Consumption

2.1 Europe

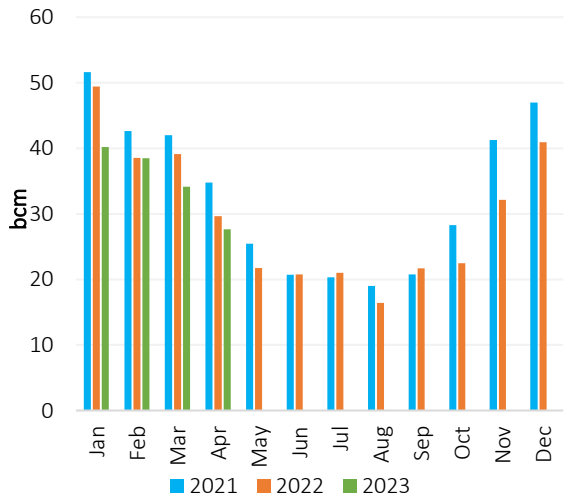
2.1.1 European Union

In April 2023, total European Union (EU) gas consumption recorded a 7% year-on-year decrease to reach 28 bcm (Figure 6). Warmer than normal temperatures across Europe contributed to the reduced gas demand for heating in the residential sector. Temperatures in April were 0.3 degrees higher than the 1991-2020 average. Moreover, the implementation of the EU regulation on voluntary gas demand reduction by 15% impacted gas consumption in Europe during the month. Despite the drought, less windy weather conditions, and a decline in coal output during the month in the EU, gas consumption in the power generation sector recorded an 8% year-on-year decline. The combination of these factors drove down gas consumption during April 2023. However, the drop in spot gas prices in Europe also led to a slight recovery in gas consumption in the industrial sector.

The EU's electricity production from gas declined by 8% year-on-year, while total electricity production decreased by 5% year-on-year to reach 193 TWh. The decline in gas-fired power generation in April 2023 was driven by an increase in nuclear and solar power output amounting to 1% and 19% year-on-year, respectively. Furthermore, lower generation from wind (7% year-on-year) (2.5 TWh) and coal (26% year-on-year) (8.6 TWh) was recorded (Figure 7). Renewables constituted the largest share of the power mix at 34%, followed by nuclear (25%), gas (16%), coal (13%), and hydro (12%).

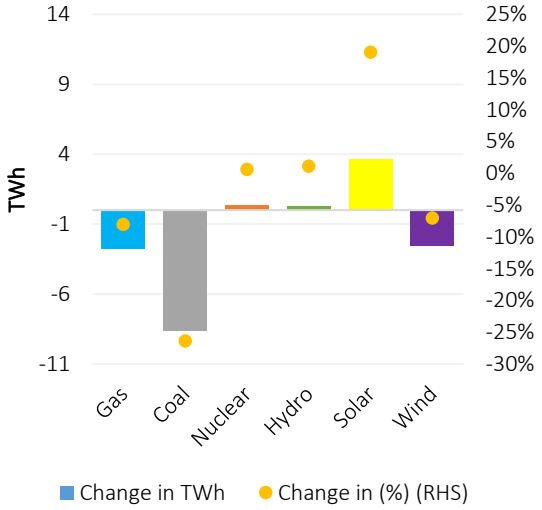
For the period of January to April 2023, total gas consumption in the EU decreased by 10% year-on-year to reach 141 bcm.

Figure 6: Gas consumption in the EU



Source: GECF Secretariat based on data from Entsog and McKinsey

Figure 7: Trend in electricity production in the EU in April 2023 (y-o-y change)



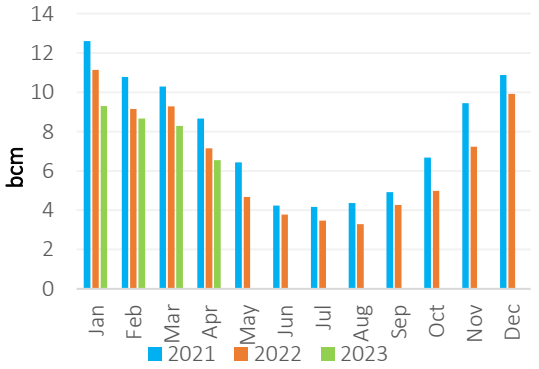
Source: GECF Secretariat based on data from Ember

2.1.1.1 Germany

In April 2023, Germany's gas consumption decreased by 8.5% year-on-year to reach 6.5 bcm, driven by the ongoing implementation of EU policies to reduce gas consumption by 15% between August 2022 and March 2023, and above-normal temperatures during the month (Figure 8). In the industrial sector, gas consumption continued to be impacted by relatively high gas prices, resulting in a 9% decline compared to the previous year (Figure 9). Consumption in the residential/commercial and industrial/power generation sectors dropped by 7% and 10% year-on-year, respectively, representing declines of 0.2 bcm and 0.4 bcm, respectively.

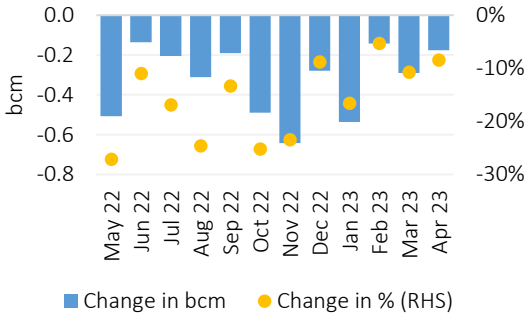
In April 2023, the German Cabinet approved a proposal to prohibit new installations of gas boilers in residential areas by 2024, and all new systems must operate using at least 65% renewable energy. This will likely have an impact on gas consumption in the residential sector in the future. By contrast, in April 2023, Germany shut down all three of its remaining nuclear plants, representing 6% of total electricity production in Germany, which will imply higher demand for natural gas in the coming months to substitute the nuclear output.

Figure 8: Gas consumption in Germany



Source: GECF Secretariat based on data from Refinitiv

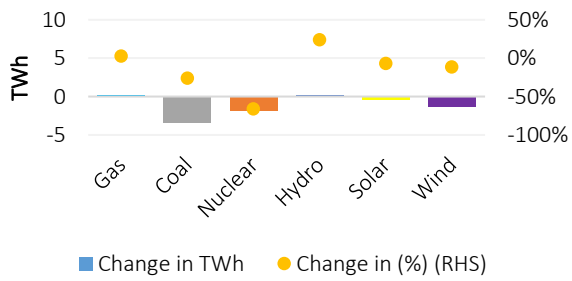
Figure 9 Trend in gas consumption in the industrial sector in Germany (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

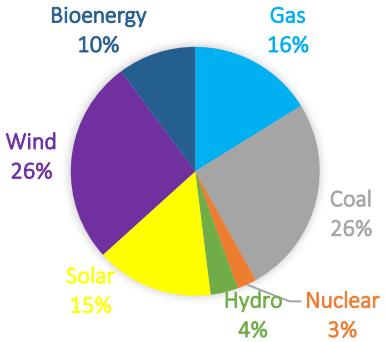
Germany's electricity production from gas increased by 2.7% year-on-year, while total electricity production decreased by 14% year-on-year to reach 38 TWh. Higher generation from hydro (24%) was recorded during the month. However, electricity production from coal, nuclear, wind, and solar declined by 26%, 66%, 12%, and 17%, respectively (Figure 10). Renewables were the dominant energy source in the power mix with a share of 52%, followed by coal (26%), gas (16%), nuclear (3%), and hydro (4%) (Figure 11).

Figure 10: Trend in electricity production in Germany in April 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 11: German electricity mix in April 2023



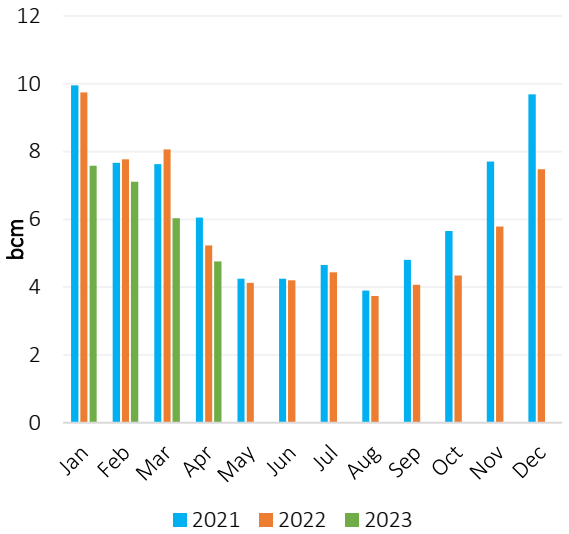
Source: GECF Secretariat based on data from Refinitiv and Ember

For the period January-April 2023, total gas consumption in Germany decreased by 11% year-on-year to reach 33 bcm.

2.1.1.2 Italy

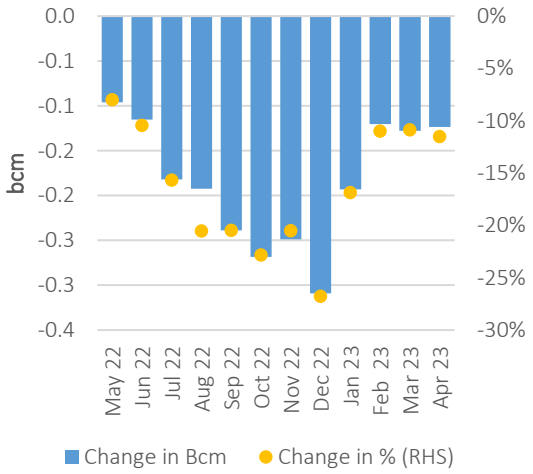
In April 2023, Italy's gas consumption recorded a decline of 9% year-on-year to 4.8 bcm (Figure 12). The power generation, industrial, and residential sectors were down by 11.3%, 11.5%, and 11.5% to 1.6 bcm, 1 bcm, and 1.9 bcm, respectively. Even though the average temperature during the month was similar to last year, natural gas consumption declined in the residential sector. For the 16th month in a row, gas consumption in the industrial sector declined on a monthly basis compared to the previous year, mainly due to high gas prices. (Figure 13).

Figure 12: Gas consumption in Italy



Source: GECF Secretariat based on data from Snam

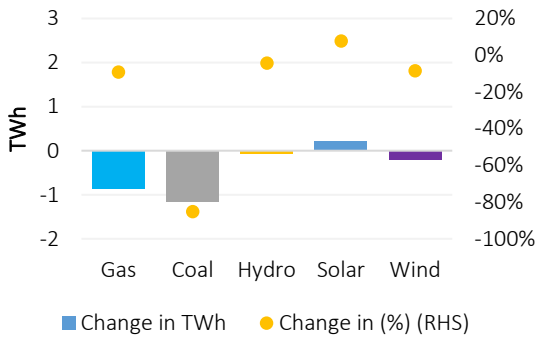
Figure 13: Trend in gas consumption in the industrial sector in Italy (y-o-y change)



Source: GECF Secretariat based on data from Snam

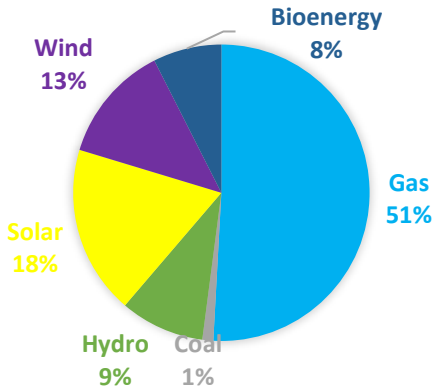
Italy's electricity production from gas declined by 9.3% y-o-y, while total electricity production decreased by 12% y-o-y to reach 16.7 TWh. Lower generation from coal (85% y-o-y), hydro (4%), and wind (9%) was recorded during the month (Figure 14). Gas remained the dominant fuel in the power mix with a share of 51%, followed by renewables (39%), coal (1%), and hydro (9%) (Figure 15). The drought situation in Italy continues to be drastic. To address Italy's severe water crisis, the government has implemented a new drought decree that involves the appointment of a special national commissioner responsible for overseeing emergency interventions. This situation will impact hydroelectric production, which is already recording very low output levels and could benefit from the use of natural gas in the Italian power generation mix in the coming months.

Figure 14: Trend in electricity production in Italy in April 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 15: Italian electricity mix in April 2023

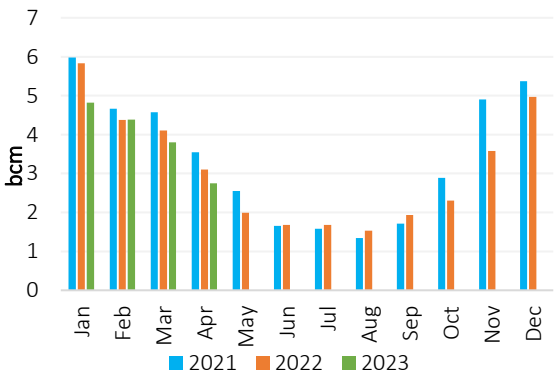


Source: GECF Secretariat based on data from Refinitiv and Ember

2.1.1.3 France

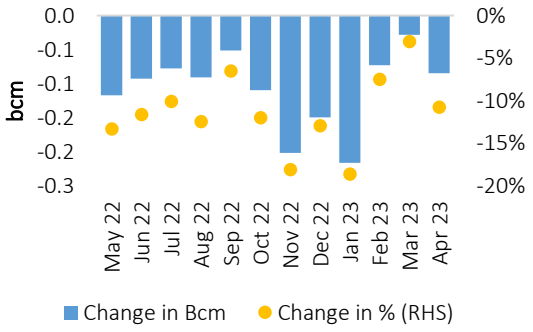
In April 2023, France's gas consumption decreased by 11% y-o-y, reaching 2.7 bcm, marking the second consecutive decline after the rebound in gas consumption noticed in February 2023 (Figure 16). The decline in gas consumption was driven by lower usage in the power generation sector due to higher nuclear output compared to last year. The residential sector recorded a decline of 6% y-o-y due to above-normal temperatures that reduced the demand for heating. Gas consumption in the industrial sector declined by 11% y-o-y (Figure 17) due to high gas prices, which induced shutdown or reduction of output in some energy-intensive industries such as fertilizers and cement.

Figure 16: Gas consumption in France



Source: GECF Secretariat based on data from GRTgaz

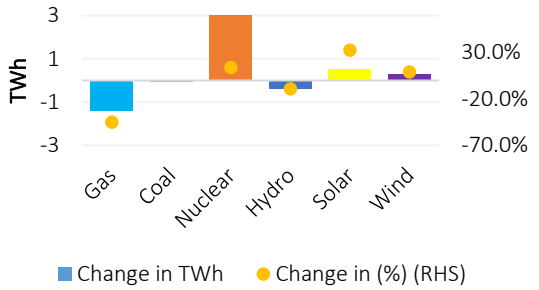
Figure 17: Trend in gas consumption in the industrial sector in France (y-o-y change)



Source: GECF Secretariat based on data from GRTgaz

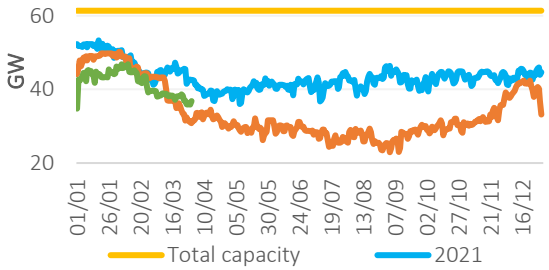
France's electricity production from gas declined by 45% y-o-y, while total electricity production increased by 6% y-o-y, reaching 36 TWh. The month saw a rebound in electricity generation from nuclear by 14% y-o-y. In addition, higher electricity production from wind (+9% y-o-y) and solar (33%) was recorded compared to the previous year. However, electricity production from coal and hydro declined by 71% and 9% y-o-y, respectively (Figure 18). During the month, nuclear capacity availability increased by 15% y-o-y but declined by 6% compared to the previous month (Figure 19). The nuclear availability in France is forecasted to increase in the coming months as announced by the French utility EDF, even though new corrosion cases were discovered in their nuclear fleet. Nuclear remained the dominant fuel in the power mix with a share of 68%, followed by renewables (16%), hydro (11%), and gas (5%).

Figure 18: Trend in electricity production in France in April 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

Figure 19: French nuclear capacity availability



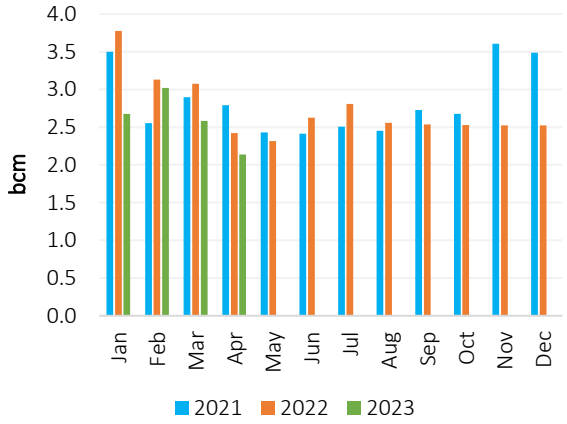
Source: GECF Secretariat based on data from Refinitiv and RTE

For the period Jan-Apr 2023, total gas consumption in France decreased by 9% y-o-y to reach 16 bcm.

2.1.1.4 Spain

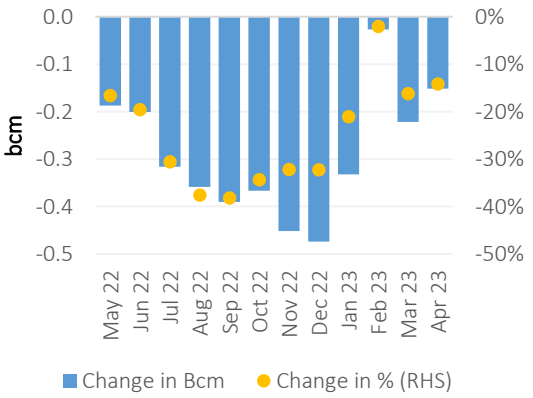
In April 2023, Spain's gas consumption decreased by 12% year-on-year to reach 2.1 bcm, driven by a decline of 14% and 12% in the industrial/residential and power generation sectors, respectively. This was due to the extreme heat recorded during the month, higher solar and nuclear output, lower electricity exports to France, and relatively high gas prices (Figure 20). Gas consumption in the industrial sector declined by 14% year-on-year for the 14th consecutive month, albeit at a lower rate in the context of a low gas price environment (Figure 21).

Figure 20: Gas consumption in Spain



Source: GECF Secretariat based on data from Enagas

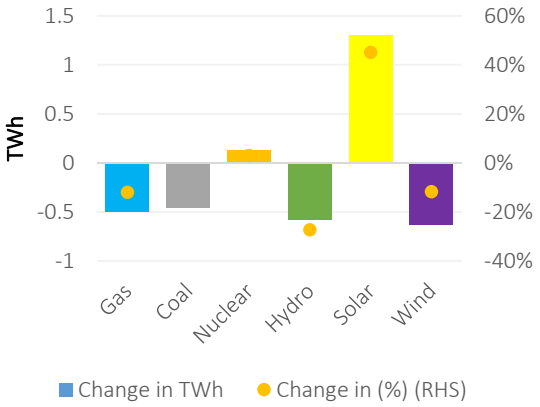
Figure 21: Trend in gas consumption in the industrial sector in Spain (y-o-y change)



Source: GECF Secretariat based on data from Enagas

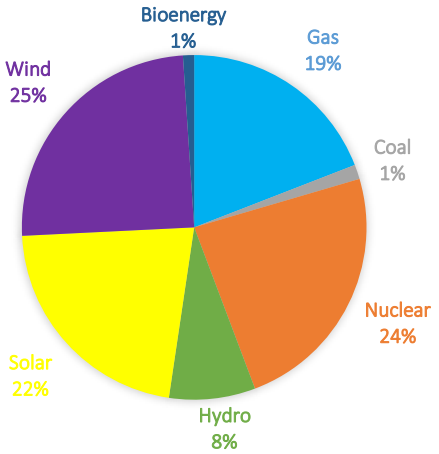
Spain's electricity production from gas declined by 12% YoY, while total electricity production decreased by 4.5% YoY to reach 19 TWh. Higher generation was recorded from solar (+45% YoY) and nuclear (3%), while electricity production from coal, wind, and hydro declined by 63%, 12%, and 27% respectively (Figure 22). Renewables are the dominant energy source in the power mix with a share of 48%, followed by nuclear (24%), gas (19%), hydro (8%), and coal (1%) (Figure 23).

Figure 22: Trend in electricity production in Spain in April 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember and Ree

Figure 23: Spanish electricity mix April 2023



Source: GECF Secretariat based on data from Ember and Ree

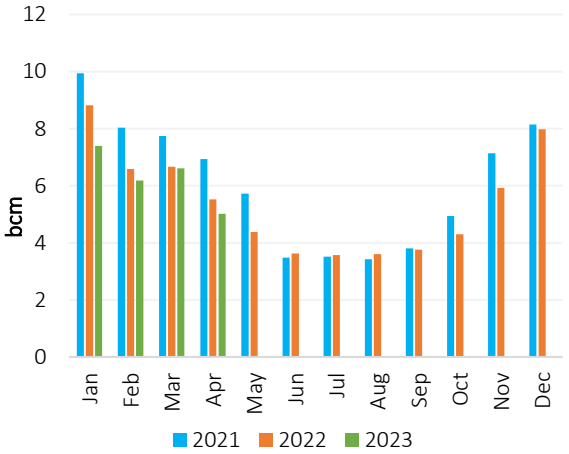
According to the forecast established by the Spanish TSO (Enagas), gas consumption in May 2023 is expected to reach 2.3 bcm, representing a decline of 9% y-o-y.

For the period Jan-Apr 2023, gas consumption in Spain recorded a decline of 16% y-o-y.

2.1.2 United Kingdom

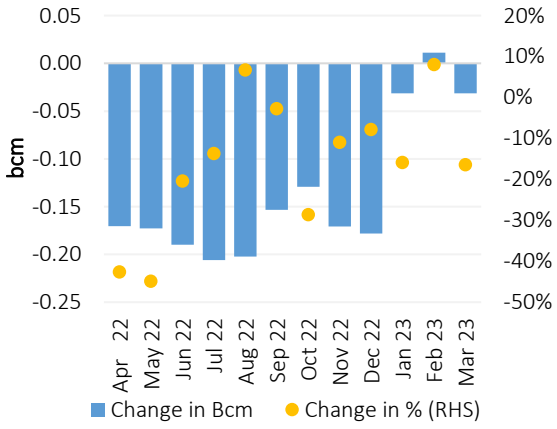
In April 2023, the UK's gas consumption decreased by 9% Y-o-Y, reaching 5 bcm (Figure 24). The decline was driven by warmer temperatures during the month, which offset the gas consumption in the residential sector, which declined by 3% Y-o-Y to reach 3.6 bcm. Moreover, gas consumption in the industrial sector recorded a drop of 30% Y-o-Y. Despite the sharp decrease in wind speeds in the UK during the month, natural gas consumption in the power generation sector recorded a decline of 18% Y-o-Y (Figure 25).

Figure 24: Gas consumption in the UK



Source: GECF Secretariat based on data from Refinitiv

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

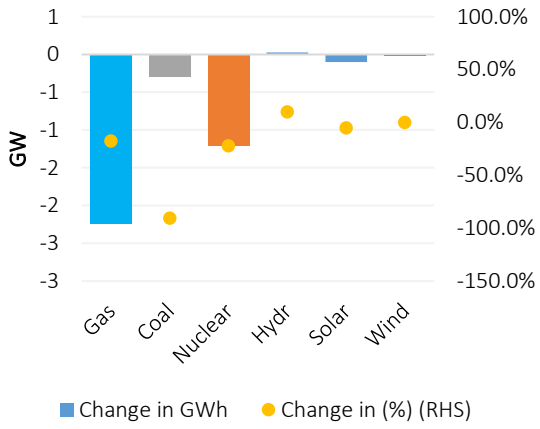


Source: GECF Secretariat based on data from Refinitiv

The UK's electricity production from gas decreased by 18% YoY, while total electricity production decreased by 14% YoY to reach 24.4 TWh. Higher generation from hydro (+10% YoY) was recorded during the month. However, electricity production from coal, nuclear, wind, and solar declined by 90%, 22%, 0.2%, and 5% YoY, respectively (Figure 26). Gas became

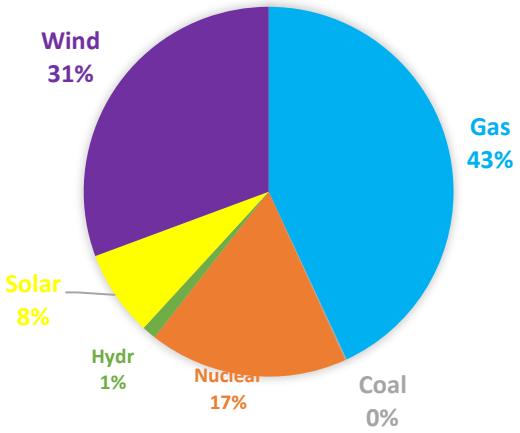
the dominant energy source in the power mix with a share of 43%, followed by renewables (39%), nuclear (17%), coal (0.1%), and hydro (1%) (Figure 27).

Figure 26: Trend in electricity production in UK in April 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

Figure 27: UK electricity mix April 2023



Source: GECF Secretariat based on data from Refinitiv

For the first quarter 2023, gas consumption in the UK declined by 1.9 bcm, or 9% y-o-y.

2.2 Asia

2.2.1 China

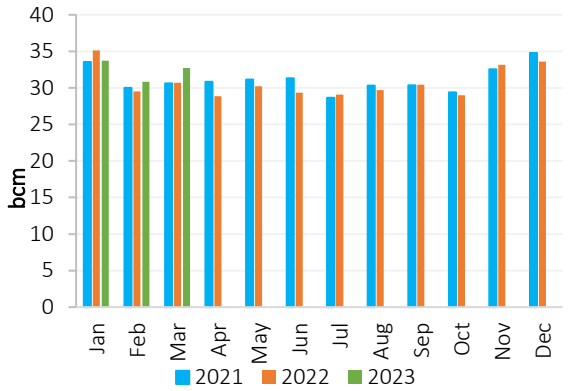
In March 2023, China's apparent gas demand (including pipeline imports, LNG imports, and national production) increased by 6.5% y-o-y to 33 bcm, mainly due to the easing of COVID-19 lockdown measures (Figure 28). According to the CNPC Research Institute, the country's gas demand is expected to expand by 19 bcm in 2023, a 5.1% increase from 2022, reaching 386.5 bcm.

Electricity production from gas rose by 10% y-o-y, while total electricity production increased by 2.7% y-o-y to reach 758 TWh. Higher generation from coal (10% y-o-y), nuclear (5%), hydro (85%), solar (30%), and wind (13%) was recorded during the month (Figure 29). Coal remained the dominant fuel in the power mix with a share of 63%, followed by renewables (20%), hydro (9%), nuclear (5%), and gas (3%).

China aims to boost the share of non-fossil fuels in China's energy mix to 18.3% this year, compared to 16.6% in 2022. China intends to reach 20% of the total share by 2025, which is expected to be achieved earlier than anticipated. Additionally, non-fossil fuels are expected to account for over half of installed power generation capacity for the first time, making up 52% of total capacity this year, up from 49.6% in the previous year.

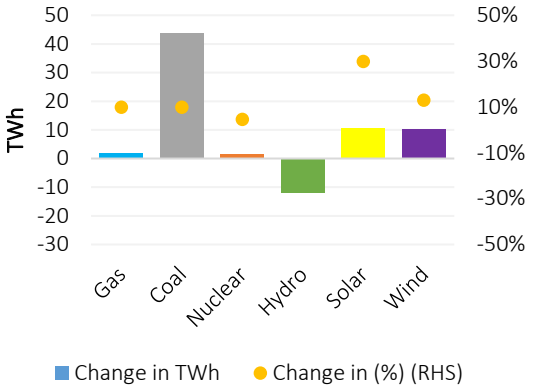
In Q1 2023, China's apparent gas consumption, including pipeline imports, LNG imports, and national production, increased by 2% Y-o-Y to reach 97.2 bcm. This growth was higher compared to the previous quarter, which saw a Y-o-Y decline of 1%.

Figure 28: Gas consumption in China



Source: GECF Secretariat based on data from Refinitiv

Figure 29: Trend in electricity production in China in in March 2023 (y-o-y change)

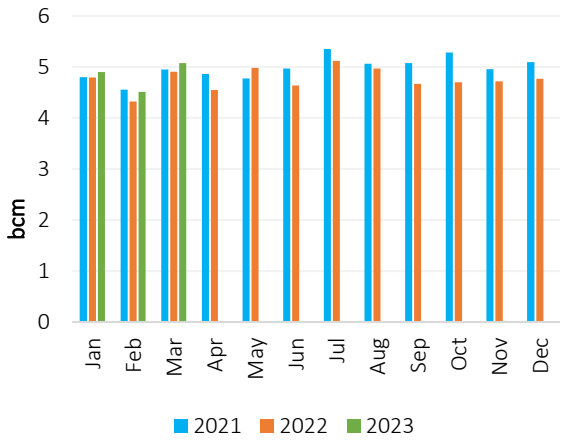


Source: GECF Secretariat based on data from Ember

2.2.2 India

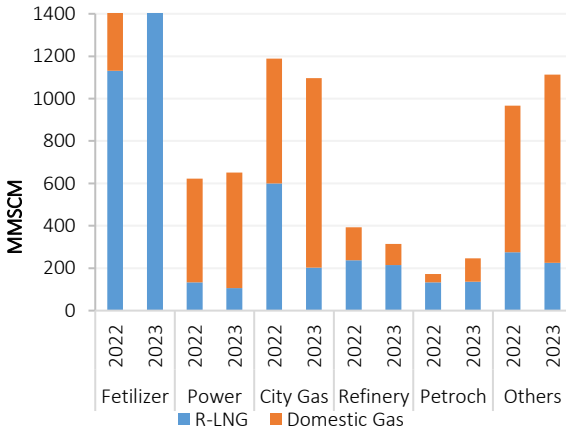
In March 2023, India's gas consumption increased for the third consecutive month, rising by 3.4% YoY to reach 5.1 bcm (Figure 30). The share of regasified LNG in India's gas supply dropped to 45%. The fertilizer sector maintained its dominant share of 33% in terms of the share of gas consumption by sector, followed by city gas (22%), power generation (13%), refining (6%), and the petrochemical sector (5%) (Figure 31). The increase in gas consumption in India was driven by the recovery of the fertiliser sector, which grew by 5.6% compared to March 2022. This sector was also helped by the decline in LNG spot prices prevalent during the first quarter of 2023.

Figure 30: Gas consumption in India



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

Figure 31: India's gas consumption by sector



Due to the recent heatwave in India, which boosted the cooling demand in the country, it is forecasted that the share of natural gas in the electricity mix will grow in the coming months. This is due to the Indian Power Ministry's introduction of an emergency rule to address an anticipated shortfall in electricity output during peak power demand in May and June. The directive mandates that gas-fired power plants operate at full capacity during this period.

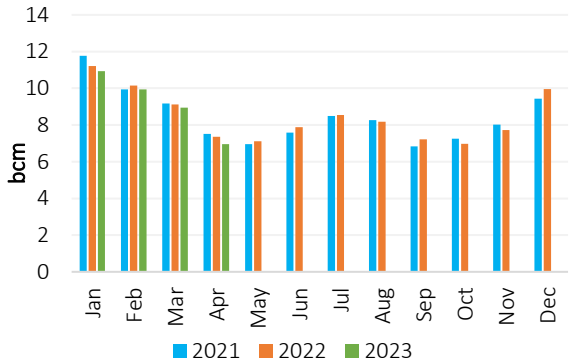
For the first quarter of 2023, India's total gas consumption increased by 3.3% YoY to reach 14.5 bcm.

2.2.3 Japan

In April 2023, Japan's gas consumption decreased by 5.4% YoY, reaching 7 bcm (Figure 32), due to milder weather. The average temperature in Japan was around 0.3 degrees higher compared to the same period last year. The city gas sector was particularly affected, with gas consumption declining by 9% YoY. In the power generation sector, gas consumption declined by 2% YoY, driven by higher coal and nuclear output in the power mix. Nuclear availability during the month was 93% higher compared to the same period last year. Additionally, Japan's Heating Degree Days (HDD) averaged 1.9 during the month, down by 24% YoY (Figure 33).

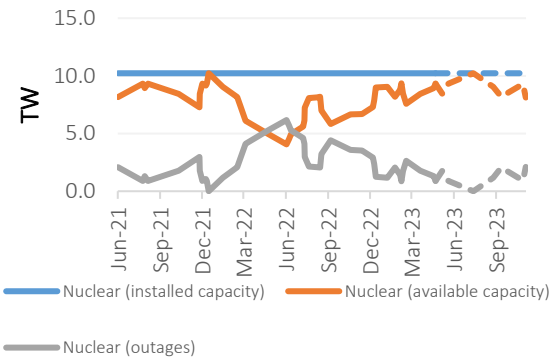
In Jan-Apr 2023, gas consumption in Japan decreased by 2.9% YoY to reach 37 bcm.

Figure 32: Gas consumption in Japan



Source: GECF Secretariat based on data from Refinitiv

Figure 33: Nuclear availability in Japan

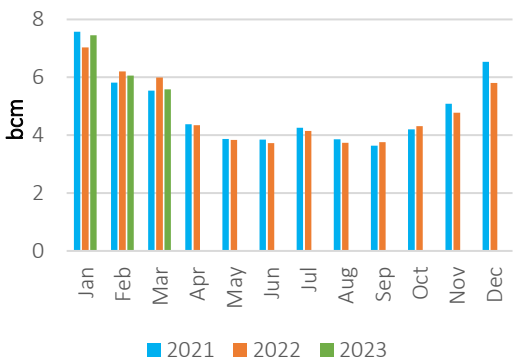


Source: GECF Secretariat based on data from Refinitiv

2.2.4 South Korea

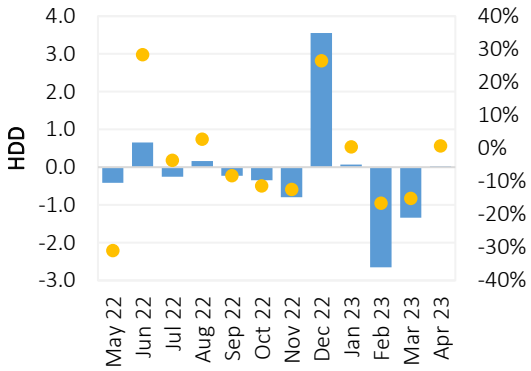
In April 2023, gas consumption in South Korea declined by 6.8% y-o-y to reach 4.1 bcm, driven mainly by lower gas utilization in the residential sector as above-normal temperatures were recorded during the month. Gas consumption in the power generation sector decreased by 8% y-o-y due to higher nuclear and coal-based output during the month (Figure 34). The South Korean Ministry unveiled the 15th edition of its long-term plan for natural gas supply and demand for the next ten years. This plan forecasts a decline of 5% per year in the power generation sector, a rise of 1% per year in the city gas demand, and an increase of 2.6% per year in the industrial sector. Korea's HDD during the month averaged 3.6, down by 0.7% y-o-y, which affects the heating demand in the country (Figure 35).

Figure 34: Gas consumption in South Korea



Source: GECF Secretariat based on data from Refinitiv

Figure 35: HDD in South Korea (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

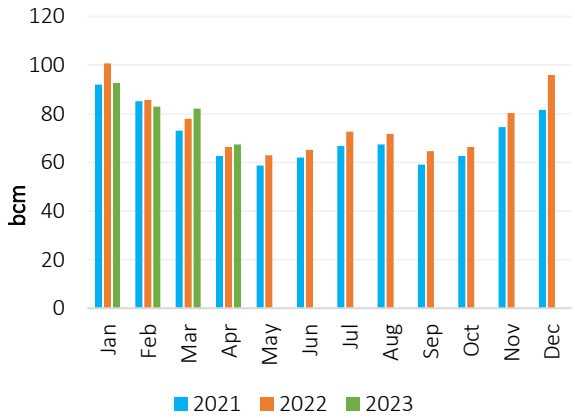
2.3 North America

2.3.1 US

In April 2023, gas consumption in the US was estimated to have grown by 1.6% y-o-y to 67 bcm (Figure 36). The power generation sector was the main driver of the growth with an increase of 13% (3 bcm) y-o-y. The rise is due to the higher utilization of gas in the power generation sector as consequence of higher coal to gas switching and lower hydro, wind and solar output during the month. by contrast, the gas consumption in the residential, commercial and industrial sectors declined by 9.5% (1 bcm), 7.8% (0.6 bcm) and 2.5% (0.5 bcm) y-o-y, respectively.

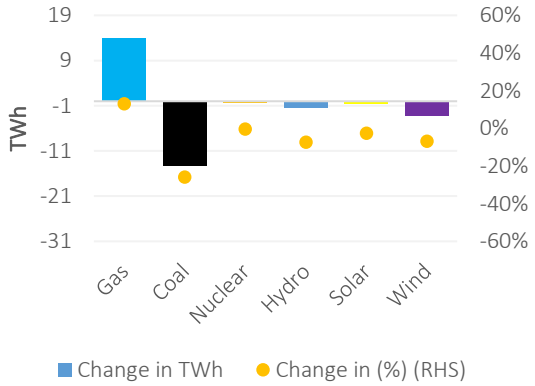
Electricity production from gas rose by 13% y-o-y, while total electricity production decreased by 2% to reach 300 TWh. Lower y-o-y generation from coal (26%), nuclear (0.5%), hydro (7%), solar (3%) and wind (7%) were recorded during the month. (Figure 37). Gas remained the dominant fuel in the power mix with a share of 40% followed by renewable (22%), nuclear (18%), coal (14%) and hydro (6%).

Figure 36: Gas consumption in the US



Source: GECF Secretariat based on data from EIA and Refinitiv

Figure 37: Electricity production in the US in April 2023 (y-o-y change)

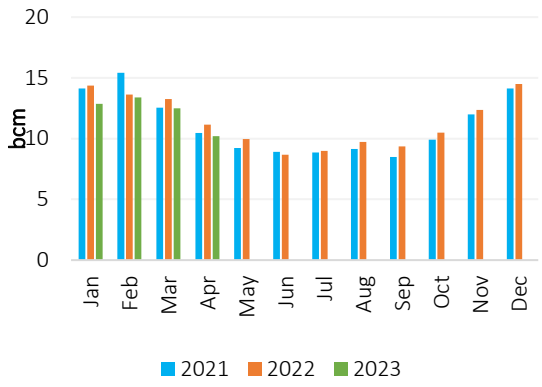


Source: GECF Secretariat based on data from Ember and Refinitiv

2.3.2 Canada

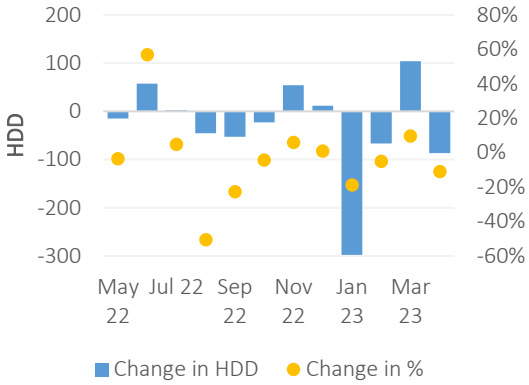
In April 2023, Canada's gas consumption declined by 7% y-o-y, mainly due to a decrease in gas consumption in the industrial/power generation, residential and commercial sectors, which fell by 4.3%, 2.2%, and 32% y-o-y, respectively (Figure 38). The decline was driven by warmer weather during April 2023 compared to April 2022, with an average of 698 HDD, which is 11% lower than the previous year (Figure 39).

Figure 38: Gas consumption in Canada



Source: GECF Secretariat based on data from Refinitiv

Figure 39: HDD in Canada (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

2.4 Weather Forecast

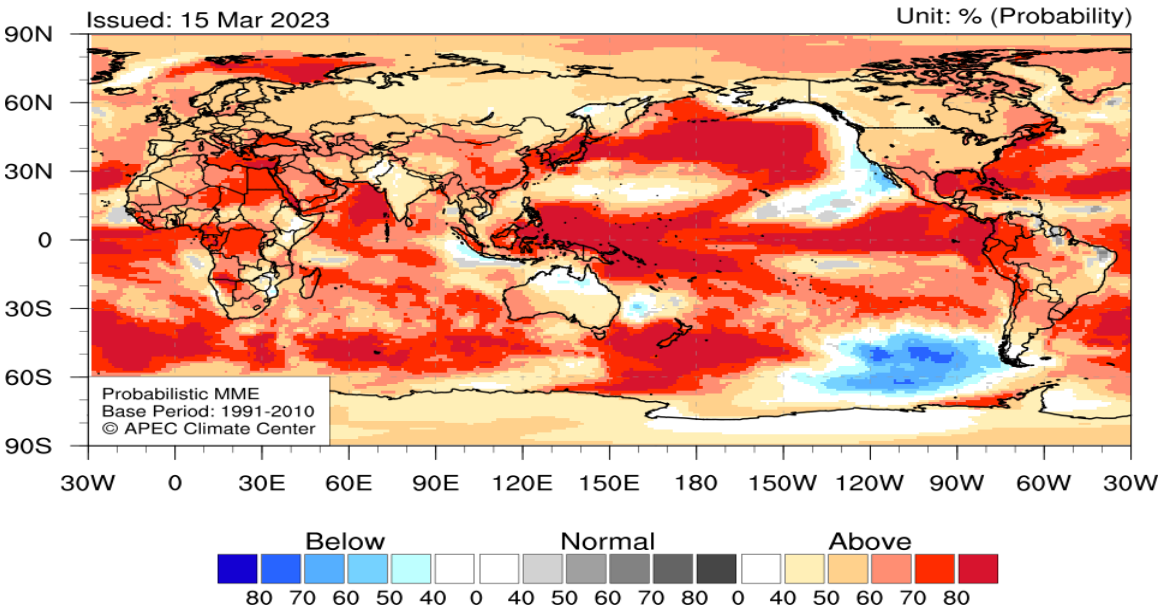
Weather and precipitation conditions have significant impact on gas consumption. Below normal temperatures in winter and above normal temperatures in summer boost heating and cooling demand respectively, while below normal precipitation leads to lower hydro output, which may trigger higher gas demand in the power generation sector.

2.4.1 Temperature Forecast for April to June 2023

According to the APEC Climate Center Climate Outlook published on March 15, 2023 (Figure 40), the weather for the period April to June 2023 is forecasted as follows:

- Above normal temperatures are expected for most of the globe (excluding South Asia, and Australia).
- Below normal temperatures are expected for the south-eastern South Pacific region.

Figure 40: Temperature forecast April to June 2023



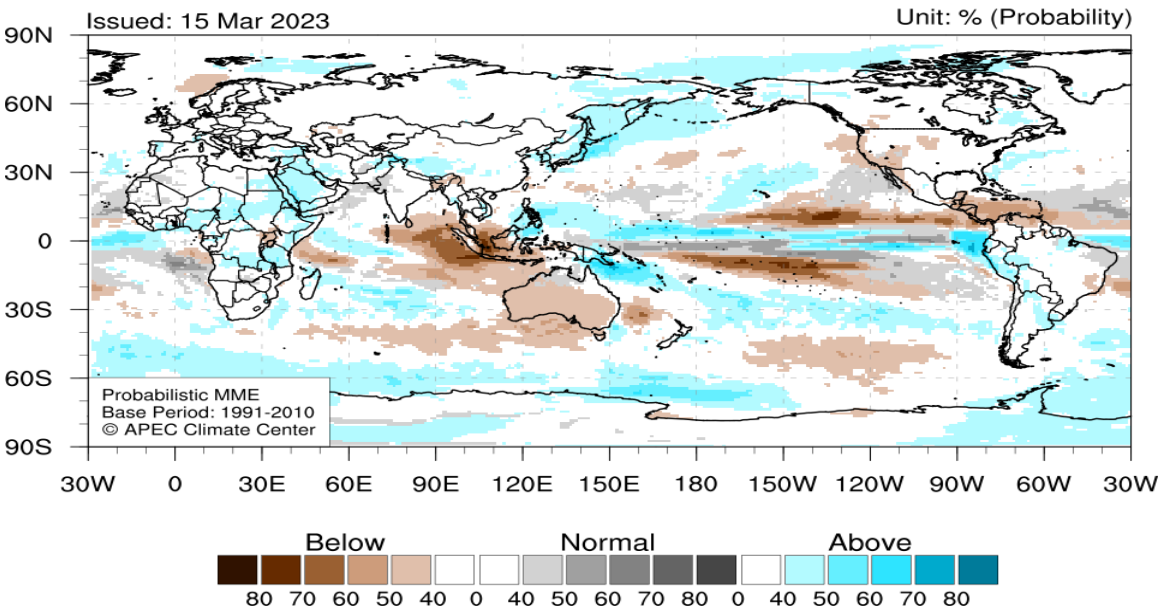
Source: APEC Climate Center

2.4.2 Precipitation Forecast for April to June 2023

According to the APEC Climate Center Climate Outlook published on March 15, 2023 (Figure 41), the precipitation prediction for the period April to June 2023 is as follows:

- Above normal precipitation is expected for the Middle East and some regions of central Africa.
- Below normal precipitation is expected for the eastern Indian Ocean, Caribbean Sea, central off-equatorial South Pacific, and the central and eastern off-equatorial North Pacific.

Figure 41: Precipitation forecast April to June 2023



Source: APEC Climate Centre

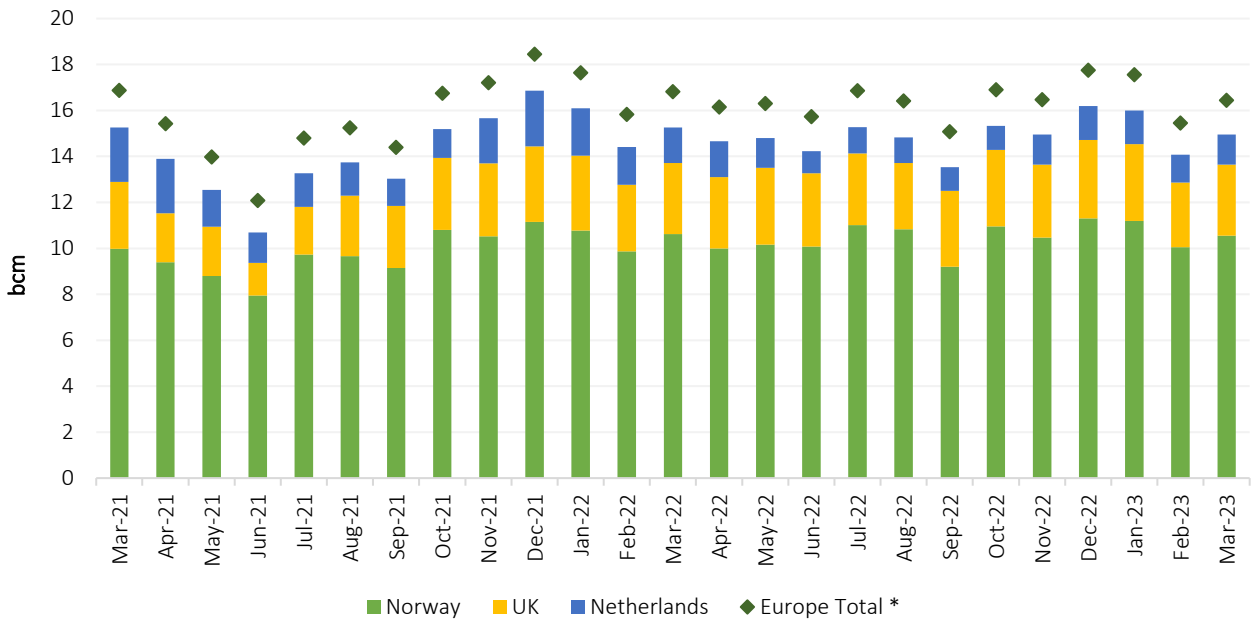
3 Gas Production

3.1 Europe

Europe's gas production in March 2023 decreased by 2.2% compared to the same period in the previous year, resulting in a total output of 16.4 bcm. The Netherlands' monthly natural gas production declined by 15% y-o-y to stand at 1.3 bcm. However, the other two major European gas producers, Norway and the UK, maintained their output levels from the previous year.

Meanwhile, in Norway, Neptune Energy and its partners have announced the commencement of production from the Fenja oil and gas field in the Norwegian Sea. The field is projected to produce 35,000 barrels of oil equivalent per day, with total reserves estimated to be between 50 and 75 million boe, of which 25% is natural gas. In addition, a large-scale strike involving 25,000 union members occurred in Norway, as they failed to reach a wage deal with employers, affecting suppliers to the oil and gas industry.

Figure 42: Europe's monthly gas production

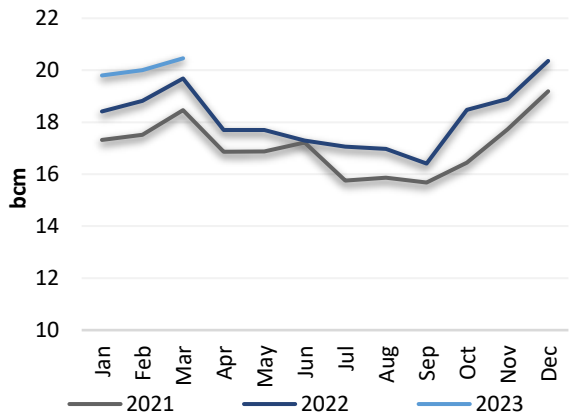


Source: GECF Secretariat based on data from Refinitiv, JODI Gas, Norwegian Petroleum Directorate
*Europe's production: UK, the Netherlands, Norway, Germany, Italy, Poland, Denmark, Austria, and Romania

3.2 Asia

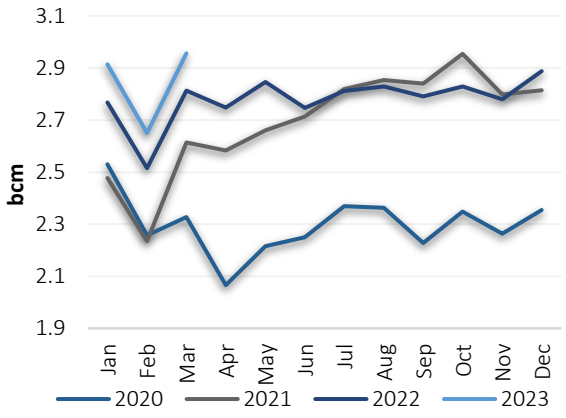
According to preliminary data from the National Bureau of Statistics of China, the country's gas production increased by 4% y-o-y to reach 20.5 bcm in March 2023 (Figure 43). For the first quarter of 2023, cumulative gas production increased by 6% y-o-y, reaching 60.3 bcm. Additionally, China produced 1.05 bcm of coal-bed methane (CBM) in March 2023. Argus reported that China's state-run energy firms, including PetroChina, Sinopec, and CNOOC, anticipate slower growth in domestic gas output this year, with total output projected to be 186 bcm, a 4% increase from the previous year. CNOOC is expected to produce around 17 bcm of gas, significantly lower than the 19.6% growth rate in gas output achieved in 2022.
India's gas production increased by 5% y-o-y in March to reach 2.95 bcm (Figure 44). Cumulative gas production in 2023 (January to March) stood at 8.5 bcm, representing a 5% y-o-y increase.

Figure 43: Trend in gas production in China



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

Figure 44: Trend in gas production in India



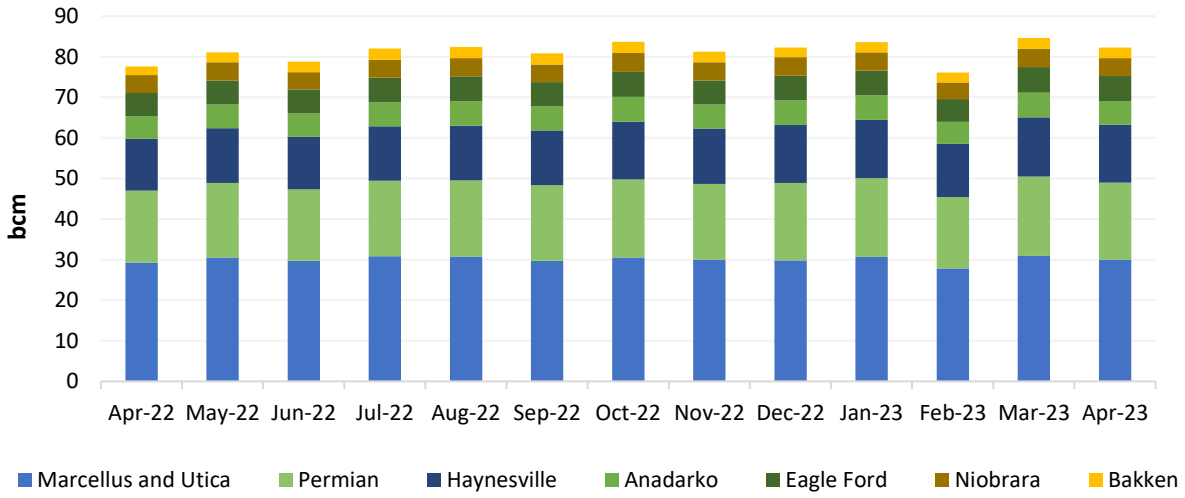
Sources: GECF Secretariat based on data from Refinitiv, Ministry of Petroleum (India)

3.3 North America

In April 2023, shale gas production in the seven major regions of Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara, and Permian increased by 6% compared to the previous year, reaching a total production of 82.2 bcm (Figure 45). The Appalachian region, which includes the Marcellus and Utica shale plays, accounted for 36% of the total production. In addition, the Permian shale oil field saw an increase in associated gas production, which reached 19 bcm or 23% of the total shale gas production, representing a 7% increase from the prior year.

Although US natural gas production increased in the first quarter of 2023 due to high prices and drilling activity in 2022, it is expected to slow down due to the recent decline in prices. The impact of high prices is expected to fade, and slower drilling activity in recent weeks will result in slower production growth before the end of 2023.

Figure 45: Trend in shale gas production in the US shale oil/gas producing regions



Source: GECF Secretariat based on data from Refinitiv, EIA

3.4 Upstream Activity Tracker

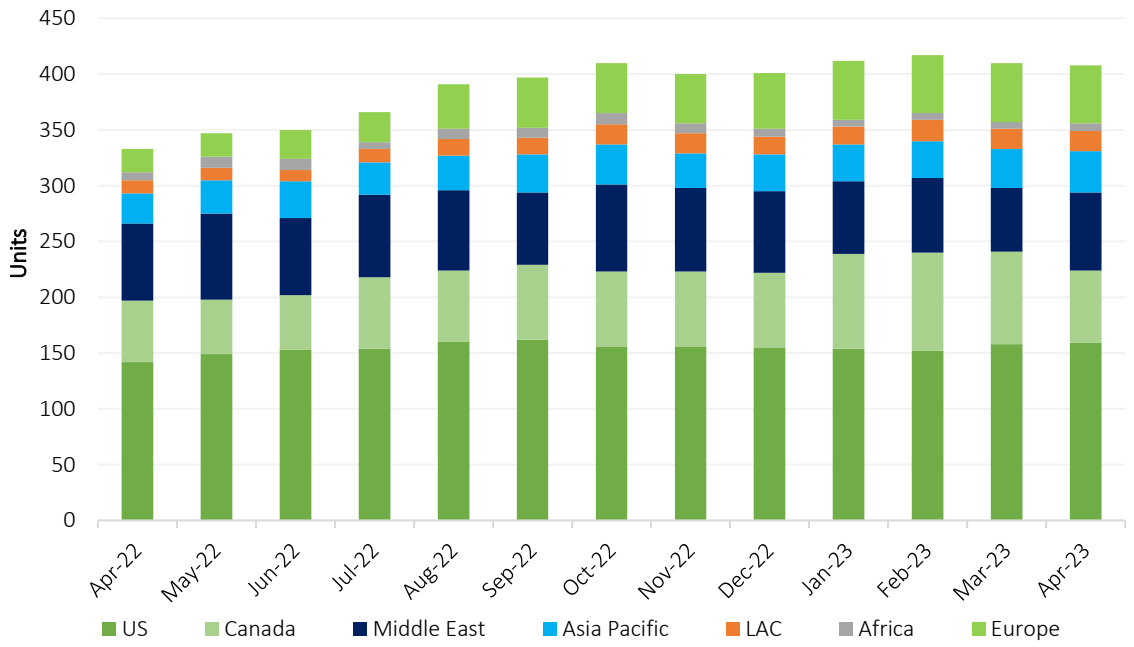
In April 2023, the global gas rig count, an indicator of upstream activity, decreased by 2 units compared to the previous month, but increased by 75 units from the same period last year, totaling 408 units (Figure 46). Canada and Europe witnessed a decline in active gas rigs, while other regions experienced an upsurge in the gas rig count.

The count of oil and gas rigs in the seven key regions of the US for shale oil and gas production was 685 in March 2023, representing a decrease of 8 units from February 2023. This decrease was the most significant m-om decline since July 2020. However, despite the decline, the total count of rigs in March 2023 remained 87 units higher than in March 2022 (Figure 47).

Additionally, the seven major US shale oil and gas regions recorded 4,676 drilled but uncompleted (DUC) wells in March 2023, which is 10 less than the previous month and 272 less than the same period last year (Figure 48). With rising drilling costs, companies have prioritized completing previously drilled wells over drilling new ones.

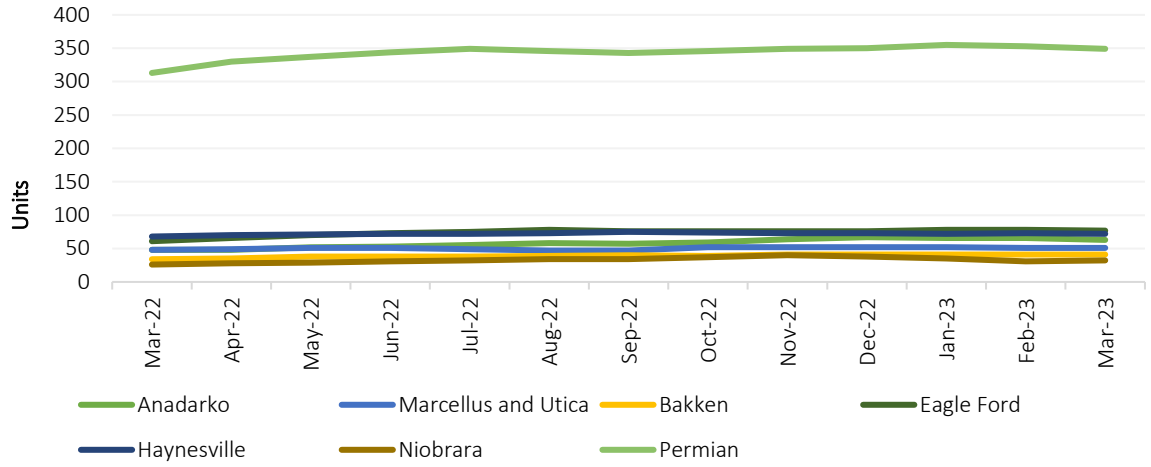
The EIA's Drilling Productivity Report showed that gas production per rig in the seven primary shale oil and gas producing regions decreased in April 2023, reaching 5,299 thousand cubic feet per new well. This indicates a 0.8% decrease from the previous month and a 14.9% decrease from the same period in the previous year, as illustrated in (Figure 49).

Figure 46: Trend in monthly global gas rig count



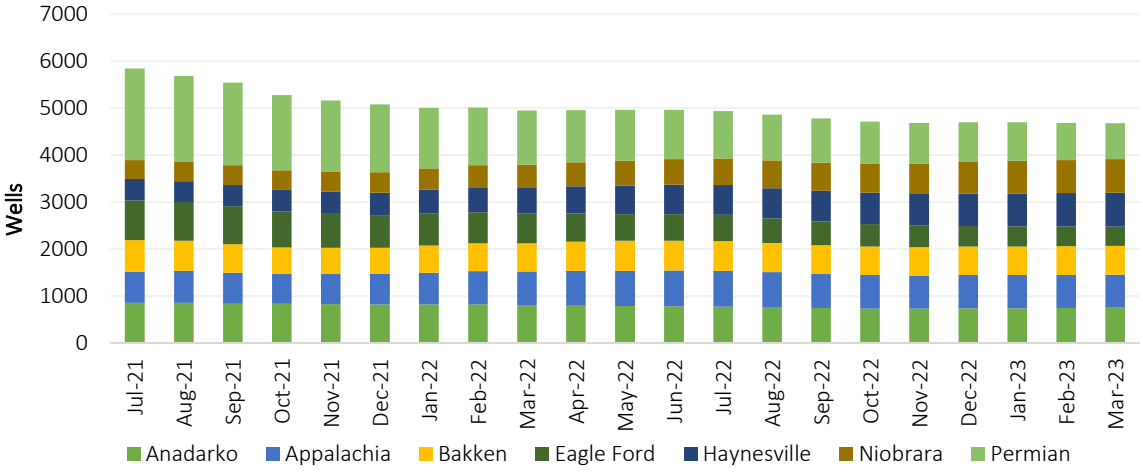
Source: GECF Secretariat based on data from Baker Hughes
Note: Excludes data for CIS and Iran

Figure 47: US shale region oil and gas rig count



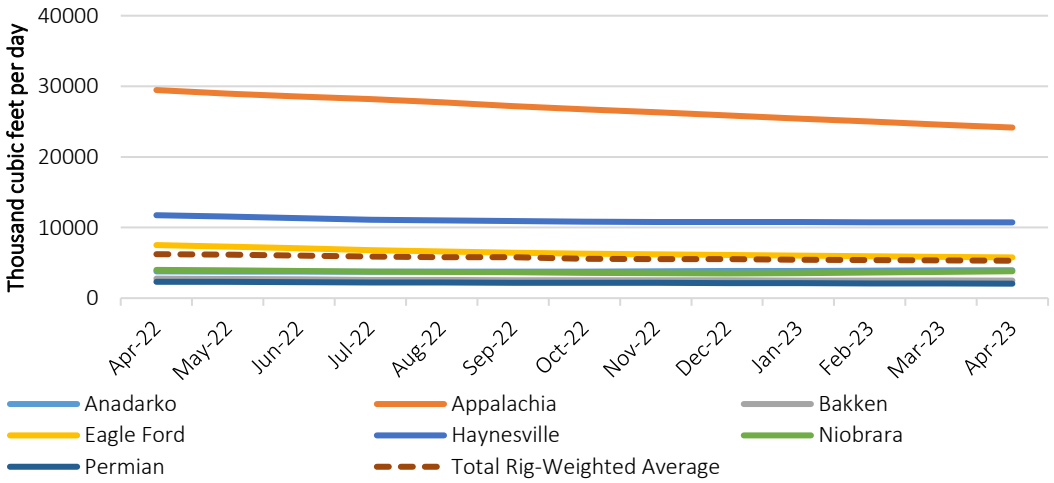
Source: GECF Secretariat based on data from Refinitiv

Figure 48: Drilled but uncompleted well (DUCs) counts in the US



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

Figure 49: New-well gas production per rig



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

3.5 Discoveries

In March 2023, the total volume of gas and liquids discovered amounted to 425 million barrels of oil equivalent (boe). Of this, gas accounted for 8% (6 bcm), while oil made up the remaining 92% (391 million boe). This marked an increase compared to the 127 million boe discovered in February 2023 and the 234 million boe discovered in March 2022, resulting in an average monthly discovery of 320 million boe in 2023 (Figure 50). These new discoveries brought the cumulative volume of discoveries in Q1 2023 to approximately 1 billion boe. The majority of the new volumes in Q1 2023 were liquids, accounting for around 70%. Additionally, offshore discoveries dominated the newly discovered volumes in Q1 2023, representing approximately 79%.

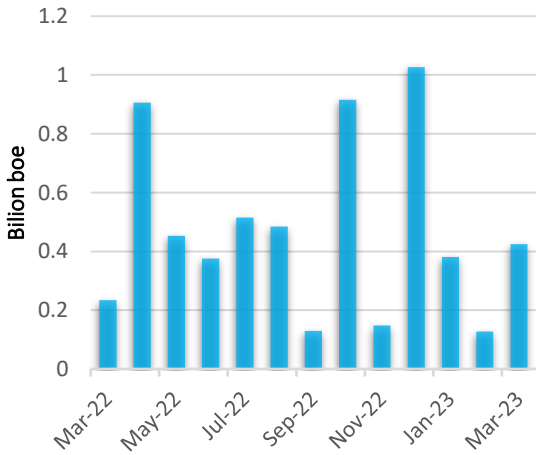
Out of the five new discoveries in March 2023, four were offshore and one was onshore, with Africa, North America and Europe accounting for 70%,14% and 14% of the discovered volumes, respectively. There were no significant discoveries reported in Asia Pacific and the Middle East (Figure 51)

It is worth mentioning that 2023 has witnessed the lowest first-quarter discovered volumes in decades. Namibia, Guyana, and Norway continue to dominate the new exploration success, with approximately 300 million boe, 200 million boe, and 160 million boe discovered, respectively.

Shell's Jonker discovery, offshore Namibia, was the largest discovery announced in March 2023. It is situated in the Orange Basin, positioned between TotalEnergies' Venus oil discovery to the west and Shell's Graff and La Rona oil discoveries to the east. This marks the company's third consecutive discovery, following two previous discoveries in 2022. According to Rystad Energy, the discovery is estimated to hold approximately 300 million boe of recoverable resources

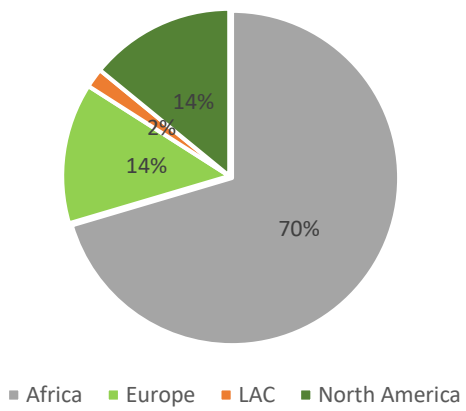
Heisenberg oil and gas discovery, located offshore Norway, represented the most significant gas discovery in March 2023. The estimated reserves of the discovery amount to approximately 60 million boe, with gas constituting about 43% and the remaining portion being oil. Plans are underway to appraise the field in 2024, utilizing the existing infrastructure in the North Sea for its development.

Figure 50: Monthly gas and liquids discovered volumes



Source: GECF Secretariat based on Rystad Energy Ucube

Figure 51: Discovered volumes in March 2023 by regions



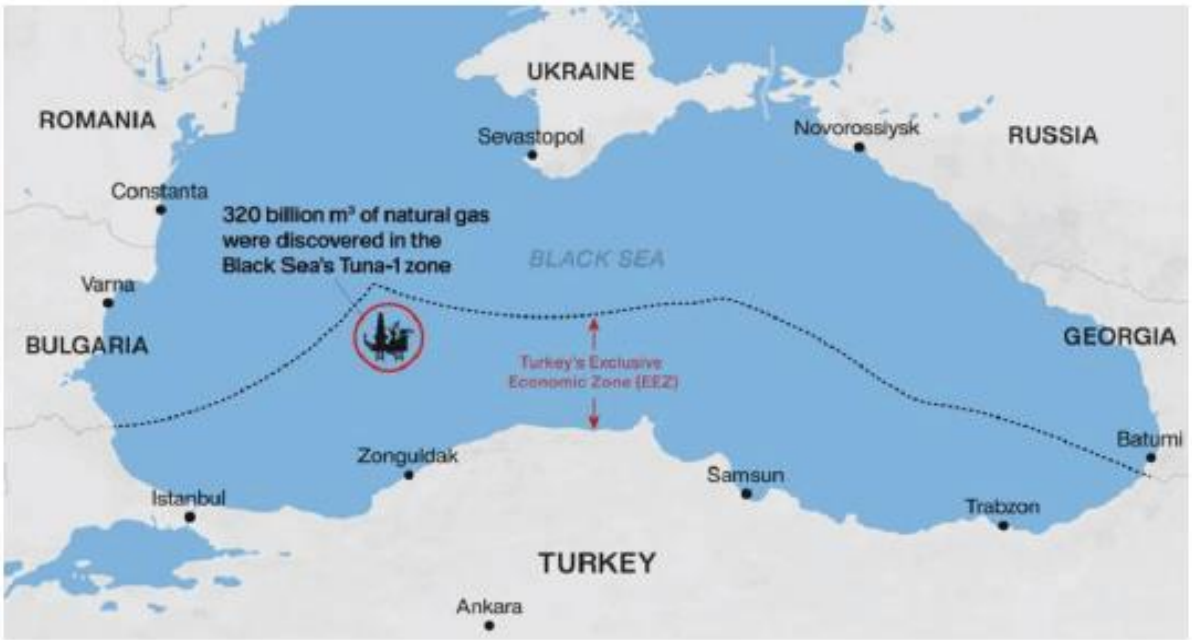
Source: GECF Secretariat based on Rystad Energy Ucube

In the same context, Turkey delivered its first gas from the Sakarya gas field in the Black Sea in April 2023. The field was discovered in August 2020, with the Tuna-1 well drilled at a water depth of 2115 meters. It is located in the western part of Turkiye's Exclusive Economic Zone (EEZ) in the Black Sea (Figure 52), approximately 165 km off the coast of Turkey. Based on the results from Tuna-1, Sakarya was estimated to hold 320 billion cubic meters (bcm) of gas. Further exploration and appraisal of the Sakarya field led to two new discoveries: The Amsara-1 well in June 2021 and the Caycuma-1 well in December 2022. These discoveries increased Turkish gas reserves in the Black Sea to 710 bcm, according to the Turkish Minister of Energy and Natural Resources.

The development project for the Sakarya gas field is planned in two phases. Phase 1 aims to achieve an annual gas production level of 3.65 bcm/year, while phase 2 targets an increase in gas production to 15 bcm/year. The gas will be produced through subsea production facilities at a water depth of 2,200 meters and transported via a 165 km subsea pipeline to an onshore processing facility in Filyos. From there, it will be connected to the Turkish national gas grid.

The peak gas production from the Sakarya field in 2028 is estimated to meet approximately 30% of Turkey's current annual gas consumption. This project holds significant importance for Turkey as it will help meet domestic demand, reduce imports, enhance energy security, and improve the domestic economy and foreign currency balance.

Figure 52: Sakarya gas field location



Source: Daily Sabah newspaper

3.6 Global Gas Supply

Based on preliminary estimates, global gas production decreased by 0.2% to 4035 bcm in 2022, primarily due to a drop in output in the CIS region, as shown in (Table 1). High prices and geopolitical tensions suppressed gas demand and also gas production. However, North

America, the Middle East, Europe, and the Asia Pacific regions recorded an increase in gas production of 51, 11, 7, and 6 bcm, respectively. The global gas figures for 2022 from the previous month have been revised upwards due to an increase in production growth in the Middle East, CIS, and Africa.

Global gas production is expected to experience a modest recovery of 0.2% in 2023, with some regions anticipated to increase their output. LAC, the Middle East, and North America are predicted to lead the production growth, while other regions are expected to maintain stable or decreasing production levels. Non-GECF countries are projected to boost their gas production by 1.6% to 2,384 bcm, with the US being the primary contributor, with an increase of 16 bcm from the previous year.

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

Region	2021	2022	2022 Revision*	2023	2023 Revision*
Africa	265	261	0.3%	263	-1.0%
Asia Pacific	651	657	-1.6%	645	-1.7%
CIS	908	829	1.8%	801	1.2%
LAC	154	154	-1.7%	159	-3.0%
Europe	224	231	-0.1%	224	-0.5%
Middle East	676	687	0.7%	706	0.0%
North America	1165	1216	-0.1%	1246	-1.4%
World	4044	4035	0.14%	4044	-0.7%
GECF	1769	1687	1.2%	1660	0.3%
non-GECF	2275	2348	-0.6%	2384	-1.4%

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

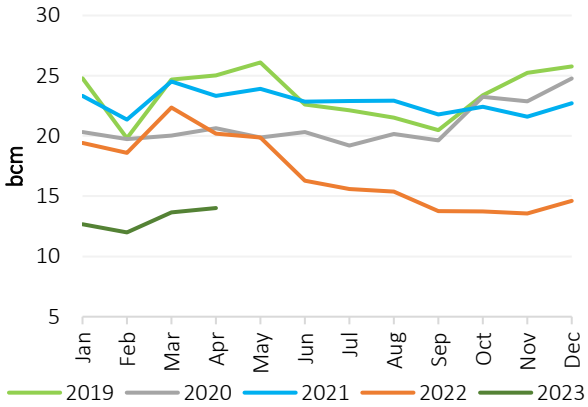
4 Gas Trade

4.1 Pipeline Gas (PNG) Trade

4.1.1 Europe

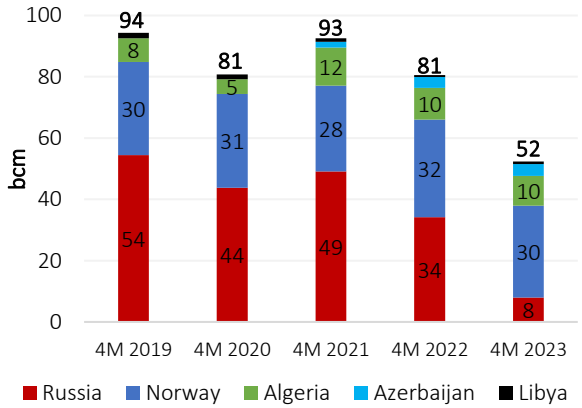
In April 2023, the imports of PNG to the EU increased by 3% from the previous month, reaching 14.0 bcm (Figure 53). However, this quantity was 31% lower than during the same month one year ago. So far in 2023, the EU's cumulative pipeline gas supply for the first four months has decreased by 35% year-on-year to 52.4 bcm (Figure 54). This decrease was driven by reductions in imports from Russia, Norway, and Algeria, while imports from both Azerbaijan and Libya increased. The pipeline imports by supplier and month in 2023 are shown in Figure 55.

Figure 53: Monthly PNG imports to the EU



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 54: Year-to-date EU PNG imports by supplier

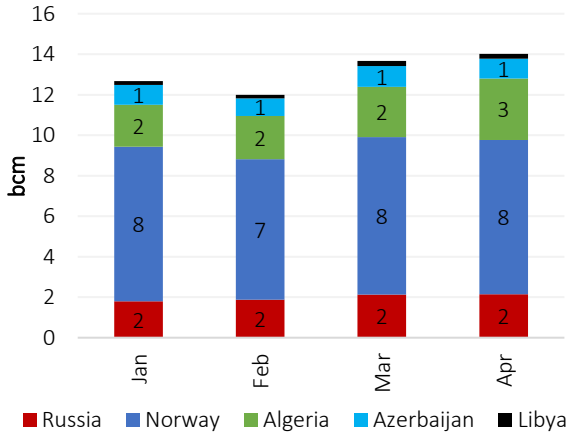


Source: GECF Secretariat based on data from McKinsey and Refinitiv

So far in 2023, the Norwegian supply has declined by 6% y-o-y to reach 30 bcm, while imports from Russia decreased by 77% y-o-y to reach 7.9 bcm. During 2023, Norway has accounted for 57% of the total supply to the EU, followed by Algeria at 19% and Russia at 15%.

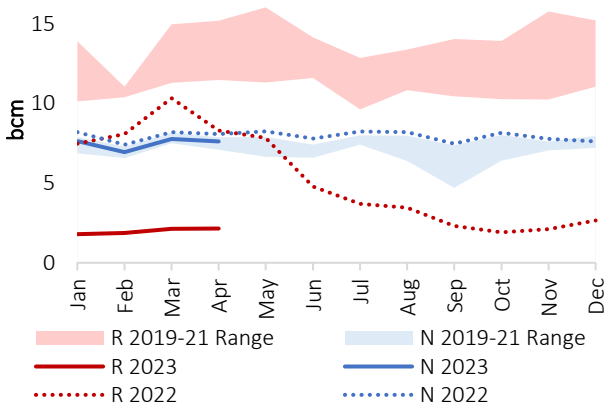
In the first four months of 2023, Norway's PNG exports to the EU averaged 7.5 bcm per month, compared with 8.0 bcm per month during the same period in 2022, and 7.4 bcm per month during the same period in 2019-2021 (Figure 56). In comparison, during the same period, Russia's PNG exports to the EU averaged 2.0 bcm per month, compared with 8.5 bcm per month in 2022 and 12.3 bcm per month in 2019-2021.

Figure 55: Monthly EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 56: EU PNG supply from Russia and Norway

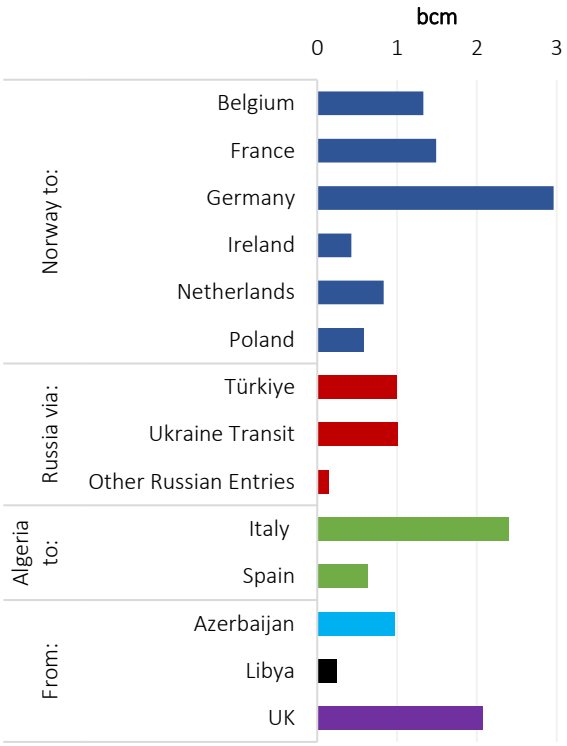


Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 57 shows the flows to the region via the major import supply routes in April 2023. Norway continued to export most of its volumes (39%) to Germany, followed by France (20%) and Belgium (17%). Russia supplied around 1.0 bcm each through the Ukraine transit pipelines and the Turkstream pipeline. Algeria supplied four-fifths of its exports to Italy. In April, there were 2.1 bcm of PNG flows to the EU via the two interconnectors from the UK, making it the third-largest supply route to the region during the month.

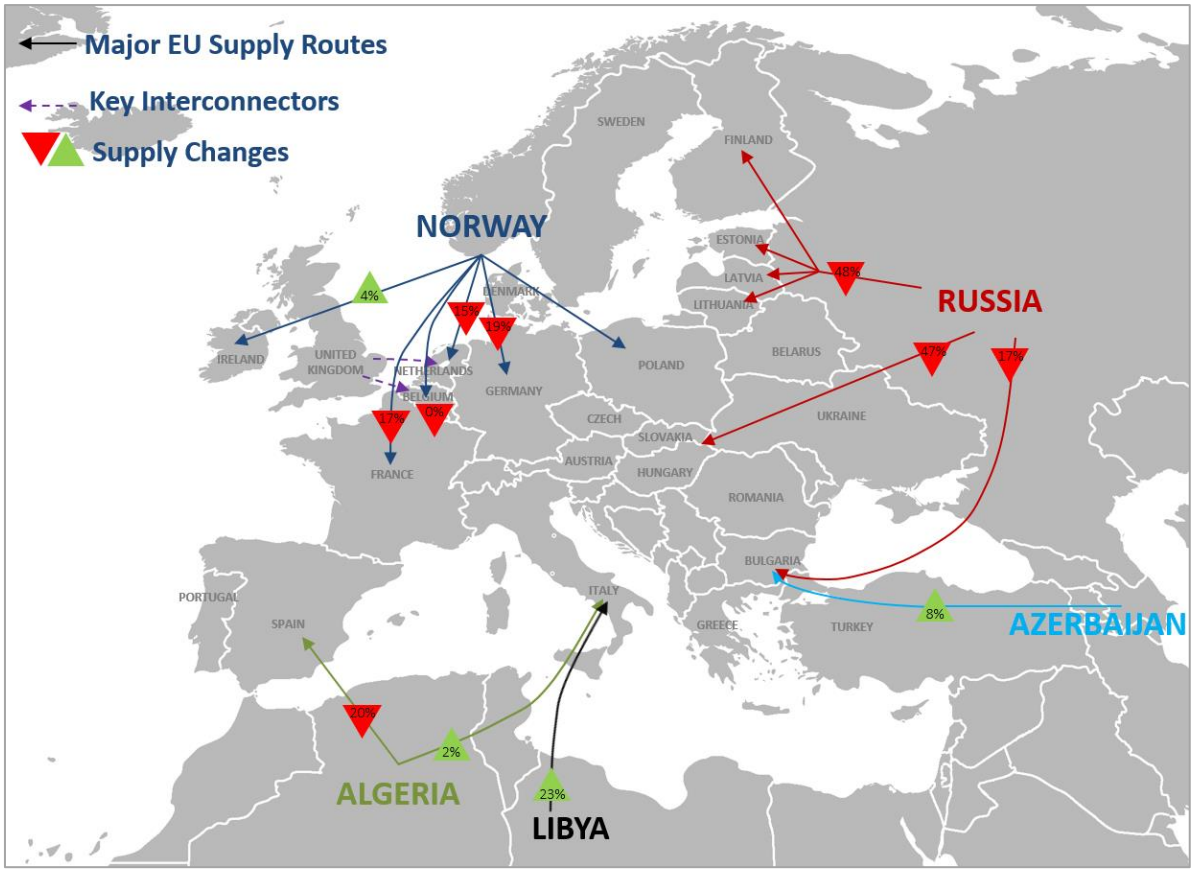
Figure 58 shows the EU's PNG imports via the major supply routes in the first four months of 2023, compared to the same period in the previous year. Algerian PNG exports to Italy increased by 2%, while Norway's flows to Germany in 2023 are being scaled back in favor of exports to Poland. Net PNG imports to the region from the UK increased by 41%.

Figure 57: EU PNG imports by supply route, in April 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 58: PNG imports to the EU by supply route (4M 2023 v 4M 2022)

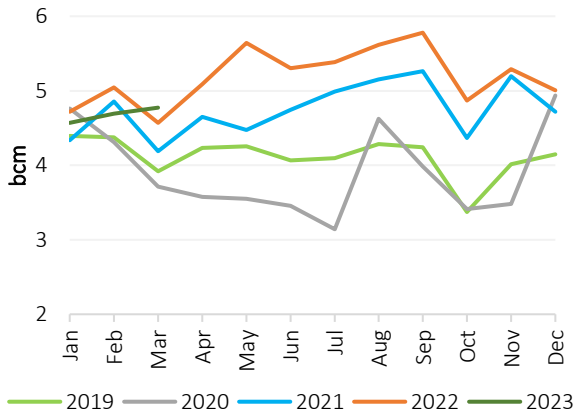


Source: GECF Secretariat based on data from McKinsey and Refinitiv

4.1.2 Asia

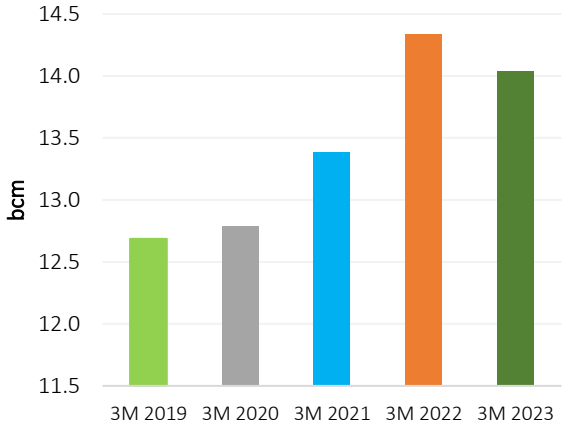
In March 2023, there were 4.8 bcm of PNG imports to China, which was 2% higher than the previous month and 4% higher y-o-y (Figure 59). China has been slowly ramping up its gas imports via pipelines and LNG cargoes, as it restarts manufacturing in this post-lockdown period. The average monthly PNG imports during the first three months of 2023 were 4.7 bcm, compared to 4.8 bcm during the same period in 2022, which is a decrease of 2% (Figure 60).

Figure 59: Monthly PNG imports in China



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

Figure 60: Year-to-date PNG imports in China

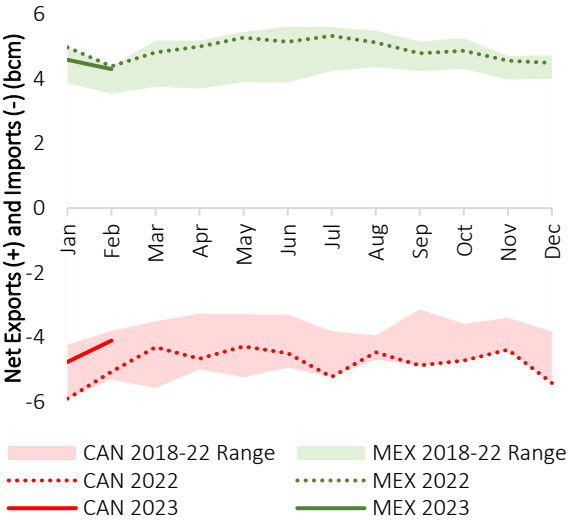


Source: GECF Secretariat based on data from Refinitiv and General Administration of Customs China

4.1.3 North America

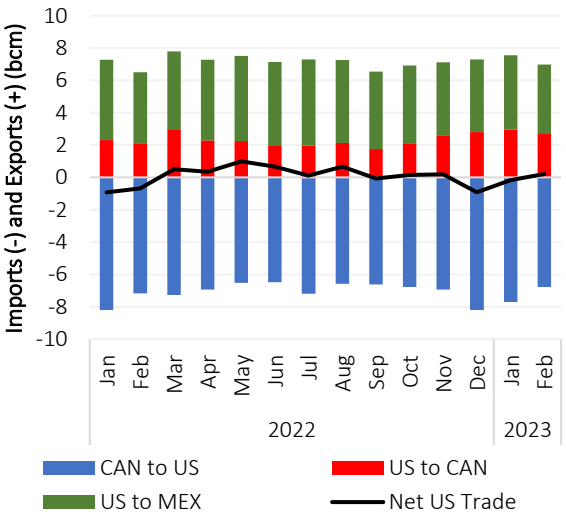
In February 2023, net PNG imports from Canada to the US were 4.1 bcm, which was a 14% decrease from the previous month and a 19% decrease from the same period last year (Figure 61). During the same month, net PNG exports from the US to Mexico were 4.3 bcm, which was a 6% decrease from the previous month and a 2% decrease y-o-y. These PNG flows resulted in a small quantity of net pipeline exports from the US into Mexico (Figure 62). Thus far in 2023, the average monthly flows in the region were 7.2 bcm from Canada to the US, 2.8 bcm from the US to Canada, and 4.4 bcm from the US to Mexico.

Figure 61: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 62: Monthly US PNG trade



Source: GECF Secretariat based on data from US EIA

4.1.4 Other Developments

Turkmenistan eyes pipeline gas exports to Europe: Turkmenistan's president recently announced an initiative to develop pipeline gas infrastructure to facilitate exports to the European region. The proposed route would involve a new pipeline link through the Caspian Sea, transiting through Turkiye for entry into southern Europe. No prospective timeline has been given for the project thus far. Turkmenistan, which is reported to have the world's fourth-largest natural gas reserves, is currently the largest supplier of pipeline gas to China.

Azerbaijan-European Union high-level energy dialogue: The Energy Minister of Azerbaijan participated in a high-level energy dialogue with the Commissioner for Energy of the European Union in Brussels, Belgium. Topics discussed included the potential to expand pipeline gas trade from Azerbaijan through the Southern Gas Corridor. In 2022, Azerbaijan increased pipeline gas exports to the EU by 3 bcm to 11.5 bcm. It was previously reported that the parties were contemplating ramping up supply to 20 bcm by 2027.

Planned maintenance on the Turkstream pipeline: Grid operators in Belgium and Serbia have reported supply interruptions attributed to the annual maintenance schedule of the Turkstream gas pipeline from Russia to southeast Europe. Flows are expected to be impacted during the period of June 5 to 12, 2023.

Restart of the gas pipeline project between Iran and Oman: The Energy Minister of Oman has announced that the governments of Iran and Oman have established a team to assess the technical progress of a pipeline project between the nations. It is reported that the Iran Gas Engineering and Development Company has commenced construction of the pipeline, which will transport supply from the Iranian port of Jask, under the sea to Oman. The 10 bcma link may increase activity in downstream industries in Oman, including LNG exports, as well as the manufacturing of petrochemicals or hydrogen.

4.2 LNG Trade

4.2.1 LNG Imports

In April 2023, global LNG imports surged by 10% (3.04 Mt) y-o-y to 34.35 Mt(Figure 63), marking the strongest incremental growth since November 2022. This also set a new record high for imports in the month of April. The increase in LNG imports was mainly driven by stronger demand across all markets, particularly in the Asia Pacific and Europe (Figure 64). As a result, global LNG imports rose significantly. From January to April 2023, cumulative global LNG imports increased by 4.7% (6.31 Mt) y-o-y to 140.77 Mt, led by a surge in LNG imports in Asia Pacific and Europe, which offset weaker imports in other markets.

Figure 63: Trend in global monthly LNG imports

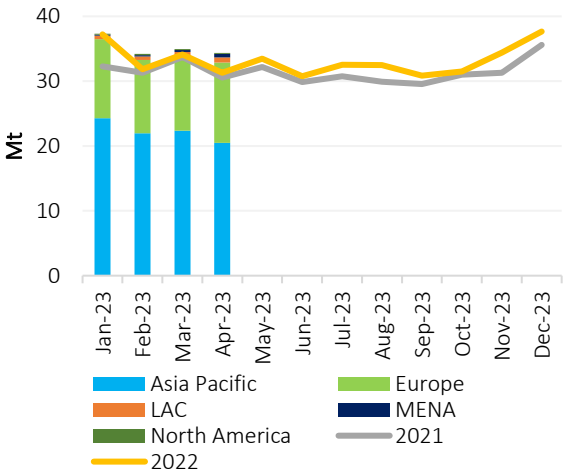
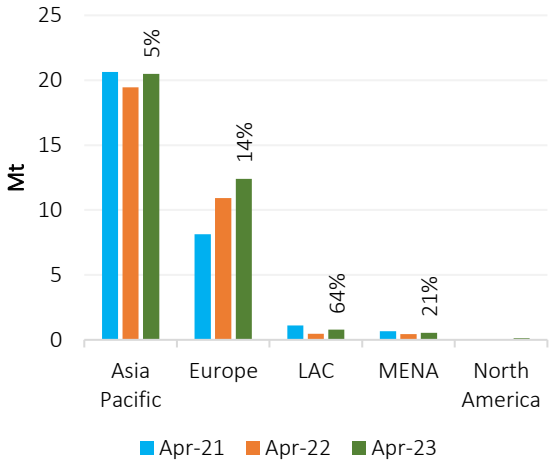


Figure 64: Trend in regional LNG imports in



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.1 Europe

In April 2023, Europe experienced a 14% (1.47 Mt) y-o-y expansion in LNG imports, reaching 12.40 Mt (Figure 65), the highest monthly imports since December 2022. This increase compensated for the continued year-on-year decline in pipeline gas imports from Russia. The Netherlands, Germany, Belgium, Türkiye, and Italy contributed to Europe's higher LNG imports, offsetting lower imports in France and Spain (Figure 66). Cumulative European LNG imports from January to April 2023 grew by 10% (4.11 Mt) y-o-y, reaching 47.28 Mt.

In the Netherlands, stronger pipeline gas exports to Germany and a decline in domestic gas production supported the stronger LNG imports. Germany's LNG imports via the three FSRUs continued to ramp up to compensate for lower pipeline gas imports from Russia. Meanwhile, the increase in Belgium's LNG imports was driven by higher gas consumption and an increase in pipeline gas exports to France, Germany, and the Netherlands. Stronger LNG imports from Algeria, Russia, and the US fueled the increase in Türkiye's LNG imports. Furthermore, the Saros FSRU in Türkiye began operating in February 2023 and continues to ramp up imports. In Italy, weaker pipeline gas imports from Russia and domestic gas production, coupled with stronger pipeline gas exports to Slovenia, contributed to the uptick in LNG imports.

On the other hand, the French LNG terminals experienced a strike action that continued during the first half of April, reducing LNG imports compared to the previous year. In Spain, lower gas consumption and high LNG inventory also curbed LNG imports in the country.

Figure 65: Trend in Europe's monthly LNG imports

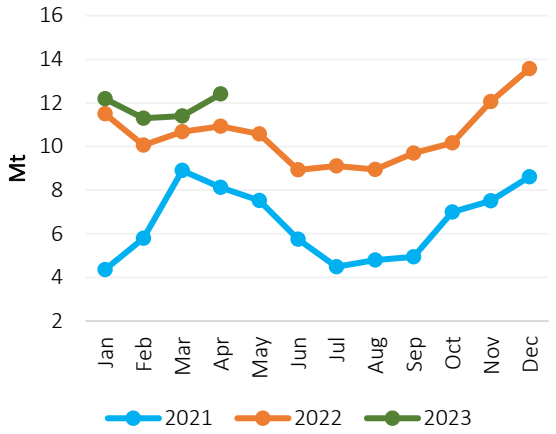
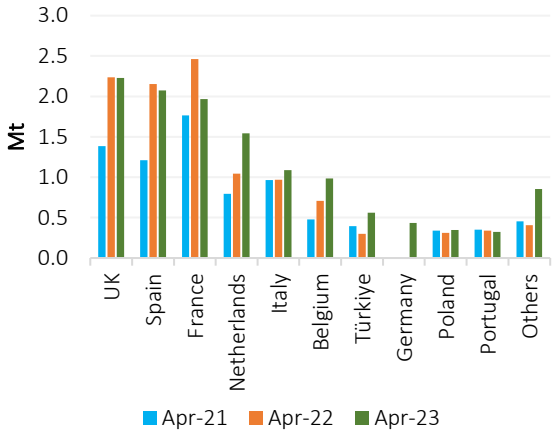


Figure 66: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.2 Asia

In April 2023, Asia Pacific's LNG imports continued to recover and increased by 5% (1.05 Mt) y-o-y to 20.50 Mt, which was slightly lower than the imports in April 2021 (Figure 67). China, India, Thailand, and Pakistan contributed to the bulk of the incremental increase in LNG imports and offset weaker imports in Japan (Figure 68). Asia Pacific's cumulative LNG imports from January to April 2023 rose by 3.0% (2.60 Mt) y-o-y to 89.12 Mt.

China's LNG imports continued to recover in April and recorded the highest year-on-year increase since September 2021. The rebound in economic and industrial activity boosted gas consumption, driving LNG imports higher. In India, the stronger LNG imports were driven by higher imports from Mozambique, Qatar, and the US. The weakening of spot LNG prices supported the jump in imports. Similarly, an uptick in LNG imports from Qatar contributed to the increase in Pakistan's LNG imports. The jump in Thailand's LNG imports compensated for lower domestic gas production and pipeline gas imports from Myanmar, with stronger LNG supplies coming mainly from Australia. In contrast, high storage levels and weaker gas consumption in the electricity sector, amidst warmer than usual weather and higher nuclear availability, curbed LNG imports in Japan.

Figure 67: Trend in Asia's monthly LNG imports

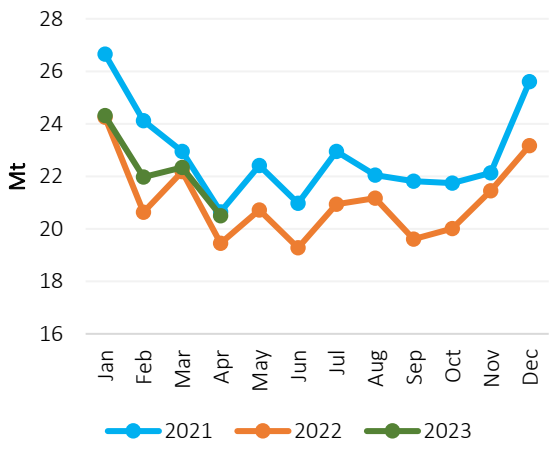
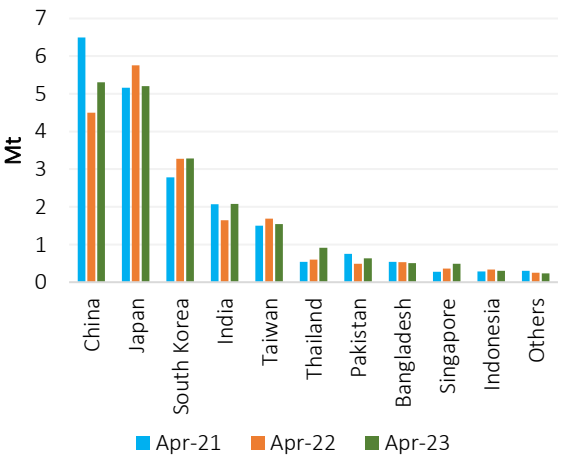


Figure 68: Top LNG importers in Asia



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.3 Latin America & the Caribbean (LAC)

In April 2023, LNG imports in Latin America and the Caribbean (LAC) surged to 0.78 Mt, representing a 64% (0.30 Mt) y-o-y increase (Figure 69). The bulk of the incremental increase in LAC's LNG imports came from Jamaica and Brazil, while imports in Puerto Rico, Chile, and the Dominican Republic grew to a lesser extent (Figure 70). Cumulative LNG imports in LAC between January and April 2023 dropped by 10% (0.28 Mt) y-o-y to 2.63 Mt.

Jamaica's LNG imports rose sharply in April 2023, supported by higher demand for reloading activity to Puerto Rico. New Fortress LNG, which has capacity rights at the Portland Bight terminal in Jamaica, has accelerated LNG reloads from the country for exports to Puerto Rico. The Jones Act in the US prevents New Fortress from exporting LNG cargoes from the US to Puerto Rico. Meanwhile, stronger LNG imports from the US boosted Brazil's imports.

Figure 69: Trend in LAC's monthly LNG imports

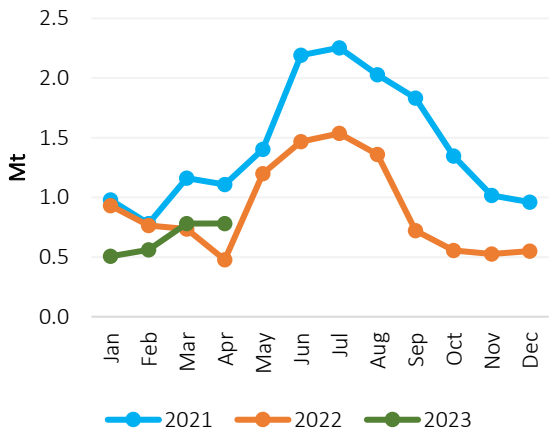
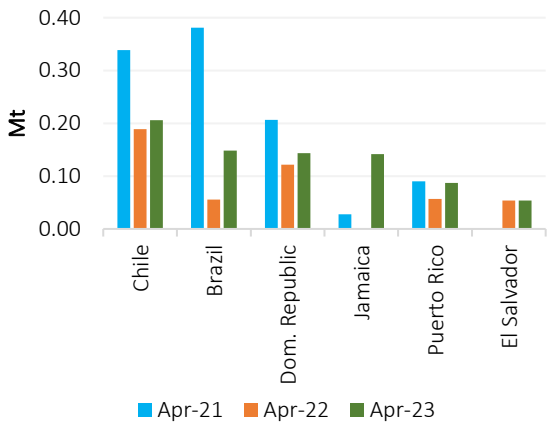


Figure 70: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.4 MENA

In April 2023, LNG imports in the MENA region expanded by 21% (0.09 Mt) y-o-y to 0.55 Mt (Figure 71), driven by Kuwait (Figure 72). The MENA region's cumulative LNG imports from January to April 2023 declined by 16% (0.23 Mt) y-o-y to 1.21 Mt. The uptick in Kuwait's LNG imports was driven by higher imports from Equatorial Guinea and the US.

Figure 71: Trend in MENA's monthly LNG imports

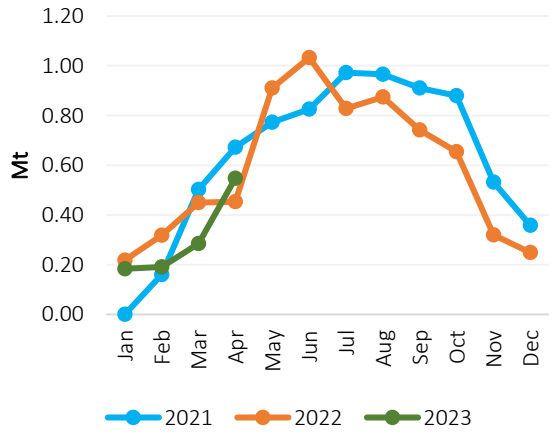
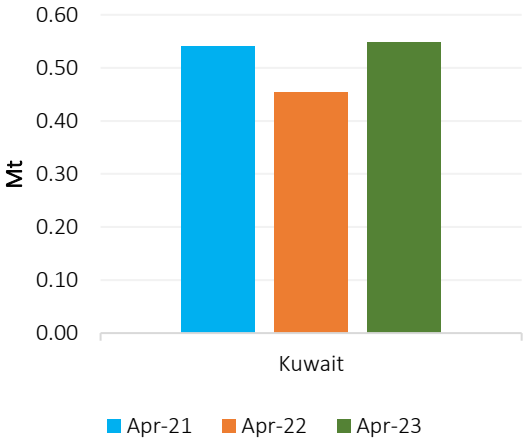


Figure 72: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2 LNG Exports

In April 2023, global LNG exports increased sharply by 6% (1.95 Mt) y-o-y to 35.58 Mt (Figure 73). The increase was driven by non-GECF countries, while exports from GECF member countries grew to a lesser extent. In contrast, global LNG reloads declined during the month. Non-GECF countries were the largest LNG exporter in April 2023, with a market share of 50.2%, representing an increase from 47.5% in April 2022. In contrast, the market shares of GECF member countries and LNG reloads declined from 51.4% and 1.1% a year earlier to 48.9% and 0.9%, respectively. Cumulative global LNG exports between January and April 2023 increased by 7% (8.74 Mt) y-o-y to 141.59 Mt. At a country level, the US was the largest exporter in April 2023, followed by Qatar and Australia (Figure 74).

Figure 73: Trend in global monthly LNG exports

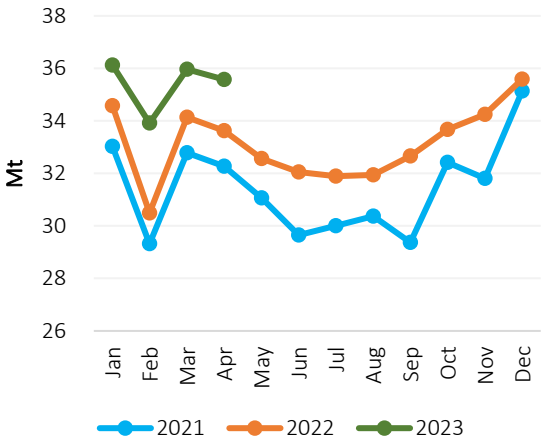
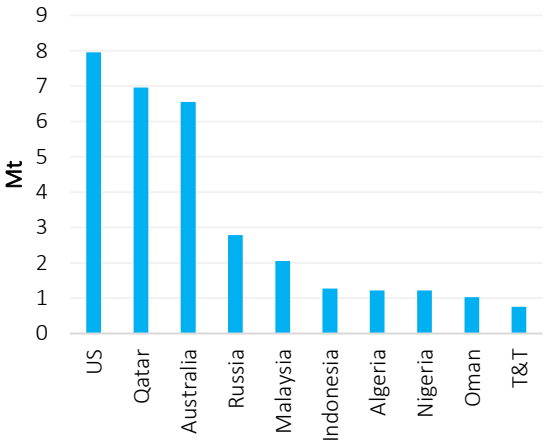


Figure 74: Top 10 LNG exporters in Apr 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.1 GECF

In April 2023, LNG exports from GECF member countries and observers reached 17.40 Mt, representing a slight increase of 0.6% (0.10 Mt) y-o-y (Figure 75). The slight increase was primarily driven by Norway (+0.36 Mt), Algeria (+0.33 Mt), Trinidad and Tobago (+0.22 Mt), Mozambique (+0.22 Mt), the United Arab Emirates (+0.06 Mt), and Angola (+0.06 Mt) (Figure 76). However, LNG exports fell in Qatar (-0.38 Mt), Egypt (-0.35 Mt), Equatorial Guinea (-0.16 Mt), Malaysia (-0.15 Mt), Peru (-0.06 Mt), and Nigeria (-0.05 Mt). The cumulative LNG exports from GECF member countries between January and April 2023 increased by 5% (3.37 Mt) y-o-y to 69.53 Mt.

The increase in LNG exports from Norway was due to the continued ramp-up in production from the Hammerfest LNG facility, which restarted in June 2022. In Algeria, lower maintenance activity at the Arzew LNG facility compared to April 2022 boosted the country's LNG exports. Meanwhile, an increase in feedgas availability supported the expansion of Trinidad and Tobago's LNG exports. In Mozambique, the higher LNG exports were attributed to the ramp-up in production from the Coral South FLNG facility.

In contrast, Qatar's monthly LNG exports stood at 7 Mt in April 2023, down from its monthly record high of 7.33 Mt in April 2022. This indicates a small decline in the utilization rate of the LNG facility from a year earlier. In Egypt, Equatorial Guinea, and Malaysia, lower feedgas availability drove LNG exports lower in the three countries. The gas pipeline to the MLNG Dua facility in Malaysia, which is under force majeure, has impacted feedgas supply.

Figure 75: Trend in GECF monthly LNG exports

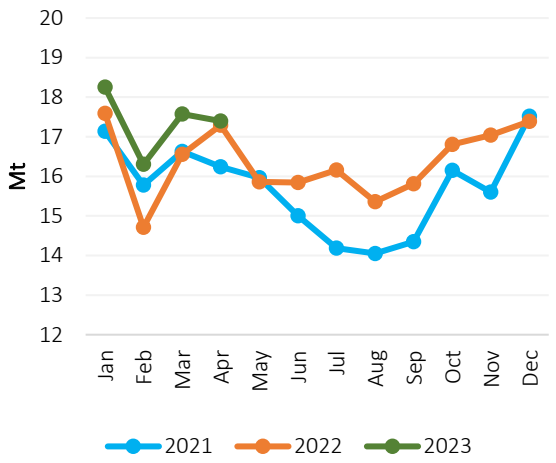
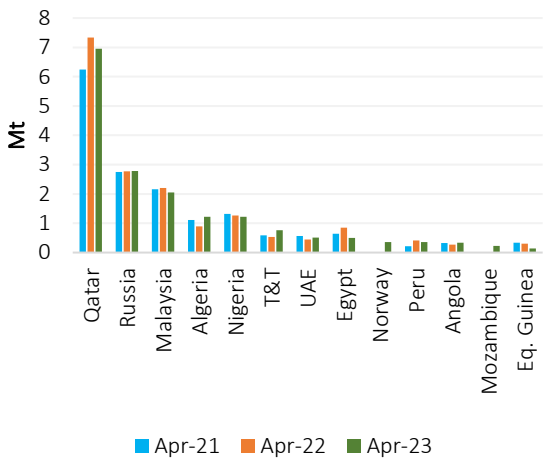


Figure 76: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.2 Non-GECF

In April 2023, LNG exports from non-GECF countries rose by 12% (1.92 Mt) y-o-y to 17.88 Mt, breaking the previous monthly record set in March 2023 (Figure 77). The stronger LNG exports came mainly from the US (+1.29 Mt), Australia (+0.37 Mt), Indonesia (+0.30 Mt), Oman (+0.08 Mt), and Papua New Guinea (+0.02 Mt), more than offsetting weaker exports from Brunei (-0.11 Mt) and Cameroon (-0.02 Mt) (Figure 78). The cumulative LNG exports from non-GECF countries between January and April 2023 increased by 7% (4.43 Mt) y-o-y to 69.91 Mt.

The continued ramp-up in production at the Calcasieu and Sabine Pass LNG train 6 facilities, coupled with lower maintenance activity at the Freeport LNG facility, boosted LNG exports from the US. In Australia, higher LNG exports from the Wheatstone and Prelude LNG facilities, which more than offset lower exports from the Gorgon LNG facility, supported the increase in LNG exports from the country. Lower maintenance activity at the Wheatstone LNG and the ramp-up in production from the Prelude LNG, following its restart in April 2022, drove the increase in exports from both facilities. The lower exports from Gorgon LNG were attributed to planned maintenance activity in April 2023. Meanwhile, a decline in maintenance activity at the Tangguh LNG facility, compared to a year earlier, drove Indonesia's LNG exports higher.

Figure 77: Trend in non-GECF monthly LNG exports

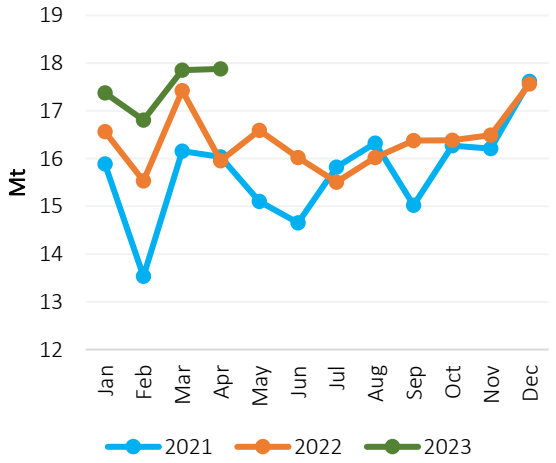
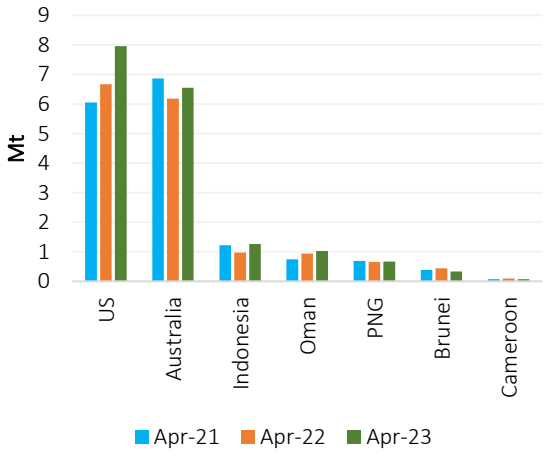


Figure 78: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.3 Global LNG Reloads

In April 2023, global LNG reloads recorded their first y-o-y decline since July 2022, falling by 20% (0.08 Mt) y-o-y to 0.30 Mt(Figure 79). This is the lowest monthly LNG reloads since July 2022. The slowdown in LNG reloads was driven by Indonesia (-0.12 Mt), Malaysia (-0.07 Mt), and Spain (-0.04 Mt), which were partially offset by higher reloading activity in Singapore (+0.11 Mt) and Jamaica (+0.04 Mt) (Figure 80). The cumulative global LNG reloads between January and April 2023 expanded sharply by 77% (0.94 Mt) y-o-y to 2.16 Mt.

The drop in Indonesia's LNG reloads was attributed to lower reloading activity from the Arun facility, which some major portfolio players use for LNG storage and reloading activity, as well as a decline in intra-country LNG trade. On the other hand, the jump in LNG reloads for export to China and Japan boosted reloading activity in Singapore. Like the Arun LNG facility, some major portfolio players have an agreement for LNG storage and reloading activity in Singapore. In Jamaica, New Fortress Energy continues to reload small-scale LNG cargoes for export to Puerto Rico. As previously mentioned, the Jones Act in the US restricts New Fortress Energy from exporting LNG from the US to Puerto Rico.

Figure 79: Trend in global monthly LNG reloads

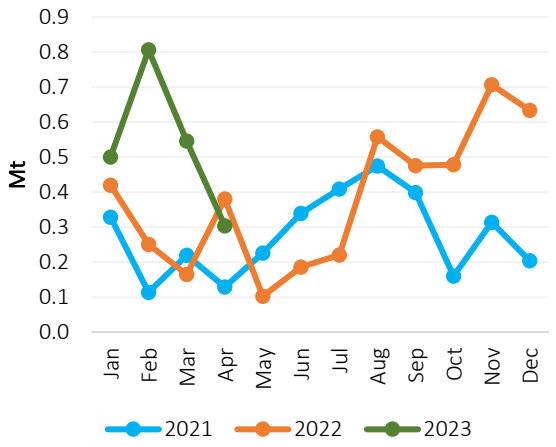
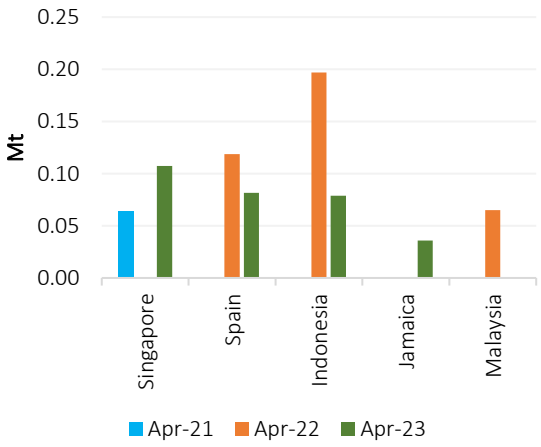


Figure 80: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.4 Arbitrage Opportunity

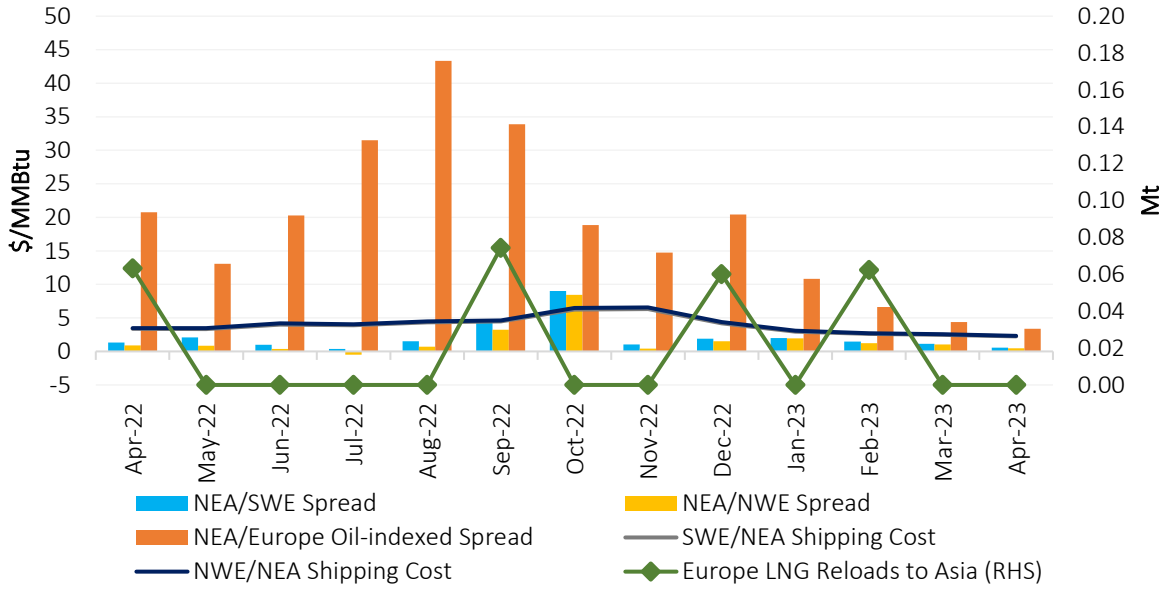
In April 2023, the arbitrage opportunity for LNG reloads from Europe to Asia Pacific, based on the spot LNG price differential between both markets, continued to be out-of-the-money. The spot shipping costs from Europe to Asia retained a significant premium over the spot LNG price differentials between both markets (Figure 81). In contrast, the arbitrage opportunity based on the spot LNG price in Asia and oil-indexed price in Europe was in-the-money. The NEA/SWE and NEA/NWE price spreads tightened in April and recorded m-o-m declines of 51% ($0.57/MMBtu) and 56% ($0.57/MMBtu) to $0.55/MMBtu and $0.45/MMBtu, respectively. The NEA spot LNG price fell sharply compared to European spot LNG prices, which supported the tightening in the spot LNG price spreads between both markets. The price spread between the spot LNG price in Asia and the oil-indexed price in Europe also declined by 23% ($1.02/MMBtu) m-o-m to $3.37/MMBtu.

Regarding shipping costs, the NEA/SWE and NEA/NWE spot shipping costs fell by 10% ($0.25/MMBtu) m-o-m each to $2.24/MMBtu and $2.32/MMBtu, respectively. However, it

should be noted that the shipping cost with vessels under medium and long-term charters might be lower than the spot shipping costs. The absence of the arbitrage opportunity discouraged spot LNG reloads from Europe to Asia in April 2023.

Furthermore, the NEA/SWE and NEA/NWE prices were also down y-o-y and dropped by 59% ($0.79/MMBtu) and 50% ($0.45/MMBtu), respectively. Similarly, the price spread between the NEA spot LNG and European oil-indexed gas price fell sharply y-o-y by 84% ($17.34/MMBtu). Finally, the NEA/SWE and NEA/NWE spot shipping costs were also down y-o-y by 34% ($1.14/MMBtu) each.

Figure 81: 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

India's Dhamra LNG import terminal starts operations – On April 3, 2023, India's Dhamra LNG import terminal received its commissioning LNG cargo. This is the seventh LNG import terminal in the country and the second terminal on the east coast. Developed by Adani Group and TotalEnergies, it has a capacity of 5 Mtpa. The commissioning and testing of the terminal is expected to take up to 45 days before the start of commercial operations. The commissioning LNG cargo was delivered from Ras Laffan in Qatar.

The Philippines' first LNG import terminal starts operations – On April 11, 2023, the Philippines received the commissioning cargo for its first LNG import terminal. Developed by AG&P, the onshore/offshore LNG import terminal is located in Batangas Bay and has a capacity of 5 Mtpa. The Ish floating storage unit (FSU) will receive LNG cargoes via ship-to-ship transfer and will transfer the LNG onshore for regasification. The commissioning LNG cargo was delivered from Das Island in the United Arab Emirates.

Hong Kong's first LNG import terminal arrives – On April 13, 2023, the Bauhinia Spirit floating storage and regasification unit (FSRU) arrived in Hong Kong. Developed by CLP Power and HK Electric, it is the world's largest FSRU with a capacity of 6.2 Mtpa. The commissioning LNG cargo, delivered from Ras Laffan Qatar, arrived on May 11, 2023, after a partial offload in Beihai, China.

NNPC signs MoU with Golar LNG to build FLNG terminal in Nigeria – On April 26, 2023, NNPC signed a Memorandum of Understanding (MoU) with Golar LNG to build a floating LNG (FLNG) terminal in Nigeria. NNPC stated that the development of the FLNG terminal would support the expansion of Nigeria's domestic gas supply and enhance gas exports. This is the second FLNG planned in Nigeria, with the first FLNG being developed by UTM offshore.

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

In terms of LNG agreements, two contracts were signed in March 2023 and the details are shown in below.

Table 2: New LNG sale agreements signed in March 2023

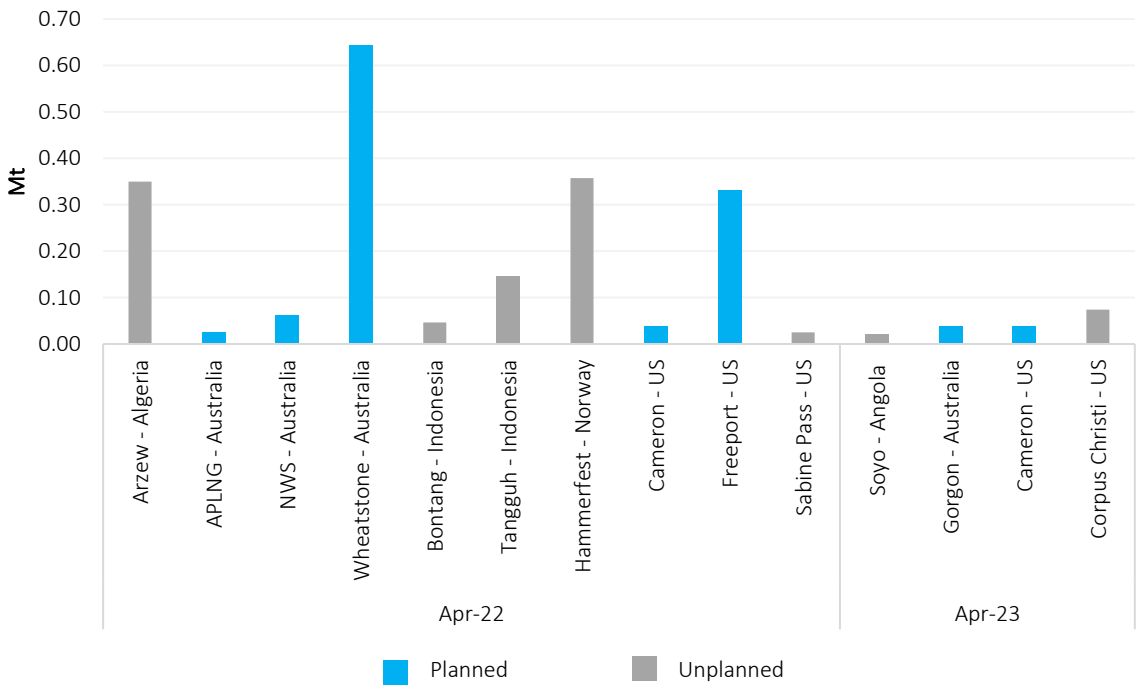
Contract Type	Exporting Country	Project	Seller	Importing Country	Buyer	Volume (Mtpa)	Duration (Years)
SPA	Malaysia		Petronas	China	PetroChina		
SPA	US	Delfin LNG	Delfin LNG	UK/ Portfolio	Hartree Partners	0.6	20
SPA	US	Calcasieu Pass 2	Venture Global	Japan/ Portfolio	JERA	1	20

Source: GECF Secretariat based on Project Updates and News

4.2.6 Maintenance Activity at LNG Liquefaction Facilities

In April 2023, the planned and unplanned outages of global liquefaction capacity were 0.17 Mtpa, significantly lower than the 2.02 Mtpa of global liquefaction capacity outages a year earlier (Figure 82). The Gorgon LNG facility in Australia and the Cameron LNG facility in the US had planned maintenance activity in April 2023, while the Soyo LNG facility in Angola and the Corpus Christi LNG facility in the US were affected by unplanned outages.

Figure 82: Maintenance activity at LNG liquefaction facilities during April (2022 and 2023)



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

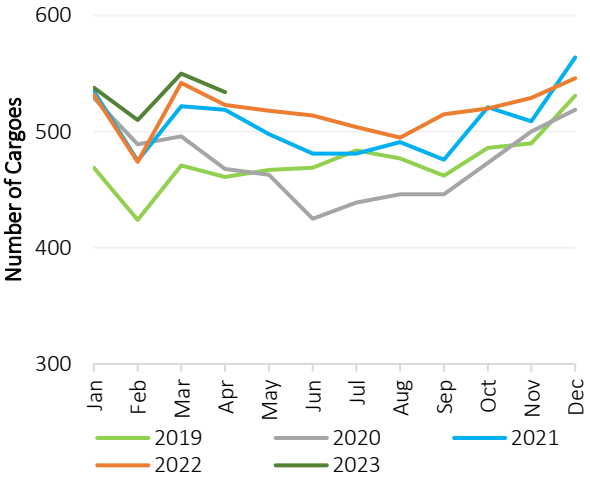
4.2.7 LNG Shipping

In April 2023, the total number of LNG export cargoes decreased by 3% m-o-m to 534 (Figure 83).

The total number of LNG shipments for the first four months of 2023 reached 2,132, which is 3% (or 61 cargoes) higher than during the same period in 2022 (Figure 84).

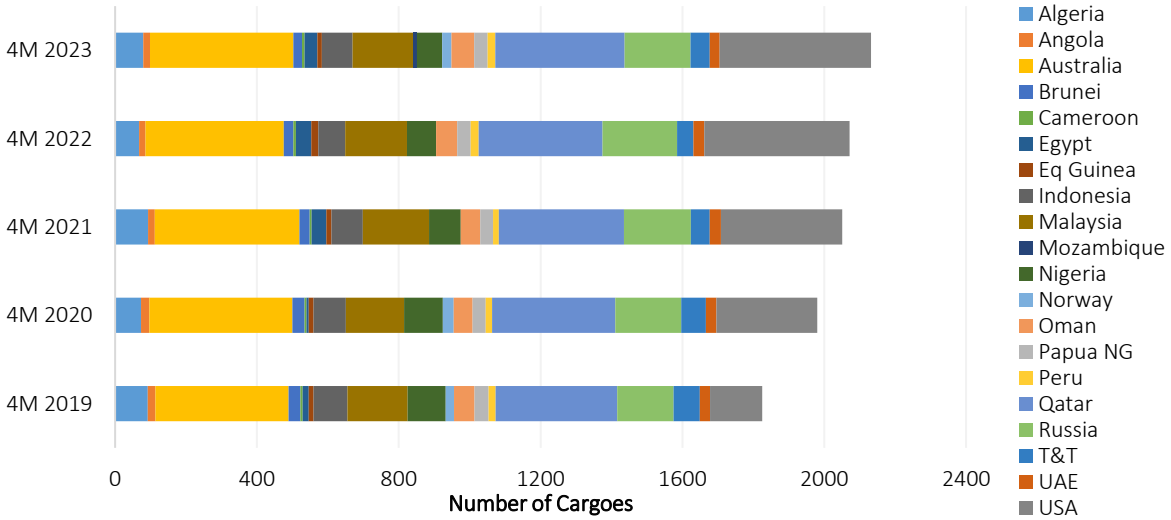
Compared to one year ago, the US delivered 18 more cargoes in 2023 thus far, while Norway delivered 27 more cargoes, although its Hammerfest terminal only restarted operations in June 2022 (Figure 85). Trinidad and Tobago has the largest relative year-to-date increase in 2023, at 17%.

Figure 83: Number of LNG export cargoes



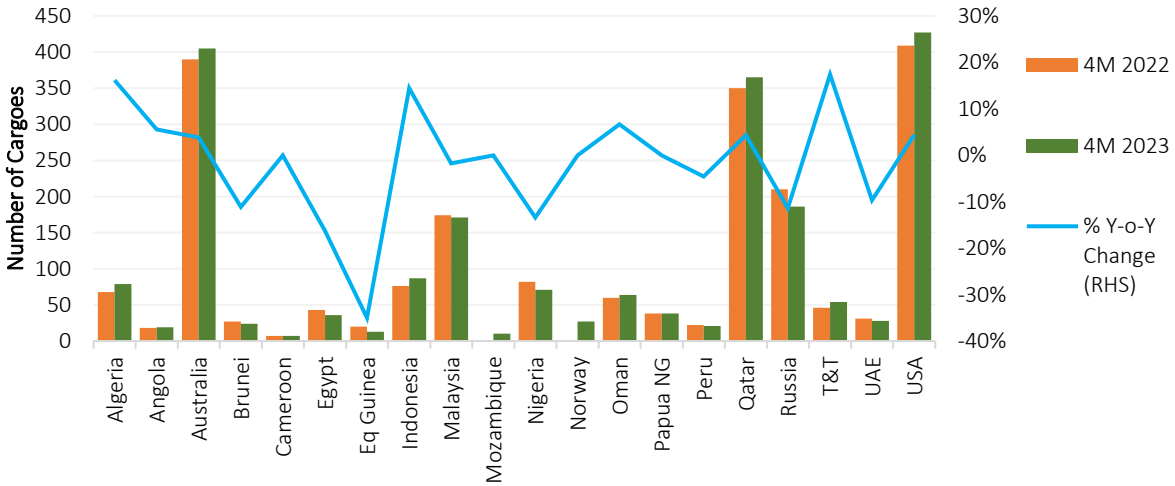
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 84: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 85: Changes in LNG cargo exports

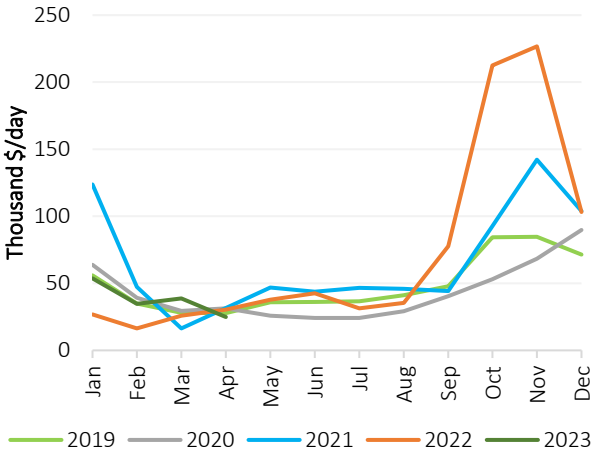


Source: GECF Secretariat based on data from ICIS LNG Edge

The spot charter rate for steam turbine LNG carriers fell throughout April 2023, reaching an average of $24,900 per day. This was a 36% drop m-o-m and an 18% decline y-o-y (Figure 86). Currently, spot charter rates are around $5,000 per day lower than the five-year average, and they have returned to a level last seen in April 2022. The charter market is presently reflecting the seasonal trend, with lower LNG demand after the end of the northern hemisphere winter. High gas stocks in Europe and Asia contributed to this lower demand, and intra-basin flows continued to decline in April. In the Pacific basin, the recent release of several carriers back into the spot market has caused a short-term oversupply, further supporting the downward trend in charter rates.

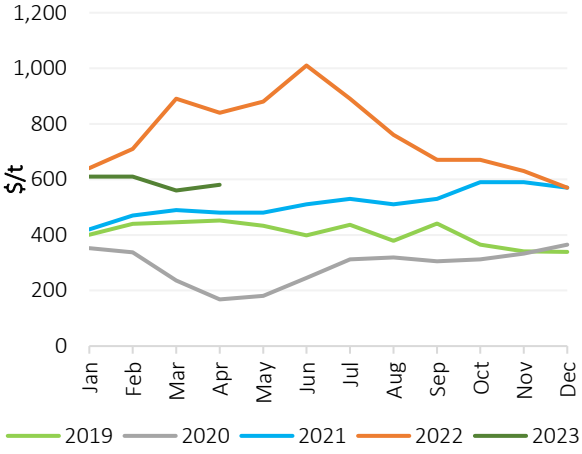
In April 2023, the average price of the leading shipping fuels was $580 per tonne, a 4% increase from the previous month, but a 31% decrease y-o-y (Figure 87).

Figure 86: Average LNG spot charter rate



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

Figure 87: Average price of shipping fuels



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

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

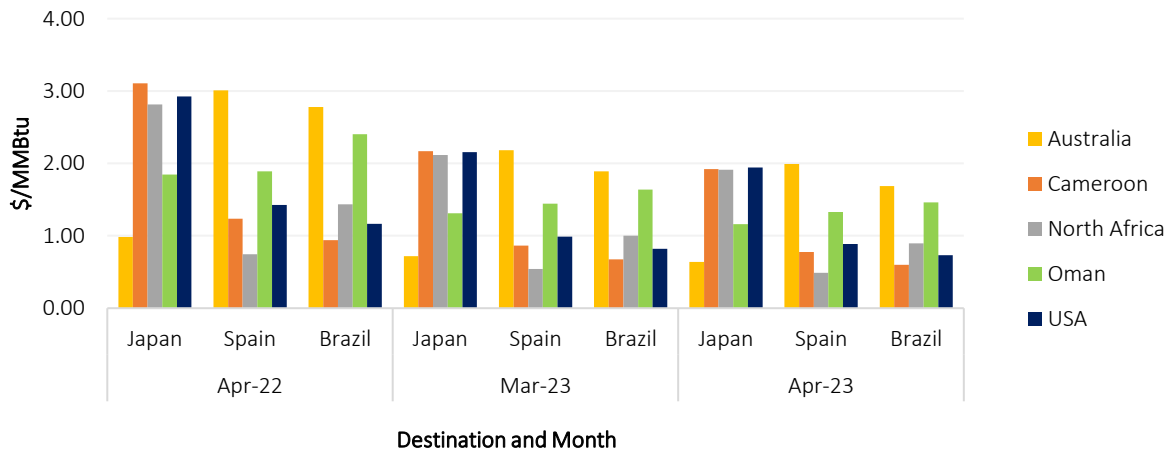
Table 3: Shipping costs for LNG spot cargoes from selected regions ($/MMBtu) – April 2023

		Destination						
LNG Supplier	To / From	Japan	China	India	UK	Spain	Argentina	Brazil
	Spot LNG delivered price	12.18	12.18	11.51	10.93	11.87	13.65	11.87
	Australia	0.64	0.68	0.77	2.03	1.99	1.59	1.69
	Cameroon	1.92	1.90	1.26	0.83	0.78	0.94	0.60
	North Africa	1.91	1.90	1.08	0.55	0.49	1.31	0.89
	Oman	1.16	1.08	0.25	1.38	1.33	1.52	1.46
	USA	1.94	2.13	2.07	0.90	0.89	1.26	0.73

Source: GECF Shipping Cost Model

In April 2023, despite a small rise in the cost of LNG shipping fuels, there were sharp decreases in the LNG carrier spot charter rate and delivered spot LNG prices. As a result, the net effect was a decrease in LNG shipping costs, by up to $0.25/MMBtu compared to the previous month (Figure 88). When compared to the same month one year ago, charter rates, fuel prices, and delivered spot LNG prices were all lower in April 2023, resulting in LNG shipping costs up to $1.18/MMBtu lower.

Figure 88: LNG spot shipping costs for steam turbine carriers



Source: GECF Shipping Cost Model

The cost of LNG carriers at South Korean shipyards remains steady: Leading South Korean shipyards, Samsung Heavy Industries (SHI) and Daewoo Shipbuilding and Marine Engineering (DSME), have recently received orders for two and one newbuild LNG carriers, respectively. The SHI orders will be delivered in November 2026 at a cost of $258.5 million each, while the DSME carrier will be built by August 2027 at a cost of $257.5 million. These costs are indicative of the contemporary range for South Korean shipyards.

Shenzhen port to incentivize new LNG carriers: The Chinese city of Shenzhen is positioning itself to become a major LNG bunkering centre in Asia. As part of this initiative, the local government is providing cash incentives to LNG carriers that are new or less than five years old, and are registered in Shenzhen. The measure is intended to encourage ship-owners to register their vessels in Shenzhen, which may reduce the cost of LNG at the hub, as the commodity will be priced on an FOB basis. Carriers with a capacity greater than 160,000 cubic metres will receive 10 million yuan per year in incentives.

Autonomous navigation systems for LNG carriers: South Korea's shipbuilding company Samsung Heavy Industries (SHI) is partnering with Norwegian technology provider Kongsberg Maritime to jointly develop a 174,000 cubic metre prototype LNG carrier with autonomous navigation systems. This initiative builds on Kongsberg's previous experience in developing a similar system for container ships. SHI expects the technology to optimise the LNG transportation industry by reducing shipping costs.

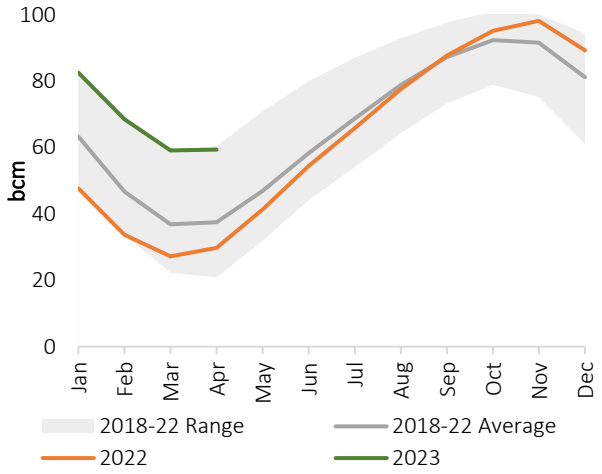
5 Gas Storage

5.1 Europe

The total working capacity for underground gas storage (UGS) sites in the EU stands at 104 bcm. The region continues to record high levels of gas in storage, especially now that the net gas injection season has begun.

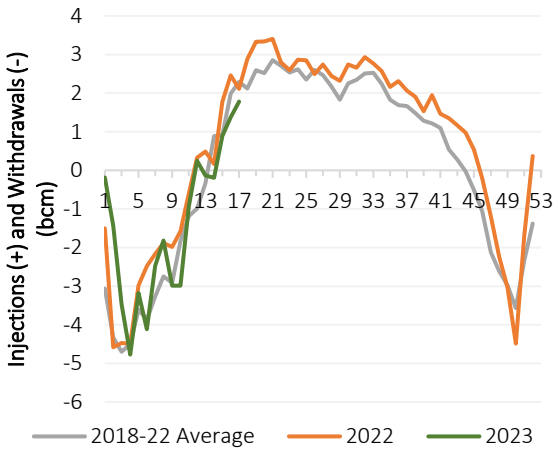
In April 2023, the average daily amount of gas in storage increased to 59.4 bcm from 59.1 bcm in the previous month (Figure 89). This volume of gas in storage was 29.6 bcm higher than in the same month one year ago and 21.9 bcm higher than the 5-year historical average. The average UGS capacity utilization in the region remained at 57%. During April, there were 6.3 bcm of gas injections into UGS, while gas withdrawal amounted to 1.9 bcm.

Figure 89: Underground gas storage in the EU



Source: GECF Secretariat based on data from AGSI+

Figure 90: Weekly rate of EU UGS level changes



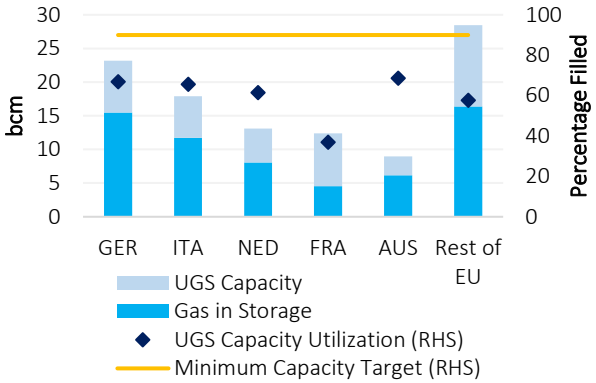
Source: GECF Secretariat based on data from AGSI+

The data confirms that the gas restocking period has started in the EU. In April 2023, the average gas injection rate during the month was 1.0 bcm/week, which is slower than the 1.6 bcm/week recorded in 2022 and the 1.5 bcm/week for the 5-year average (Figure 90). The aggressive stockbuild during 2022 was driven by the EU's gas filling regulations for its member states. The current high level of gas in storage means that much less gas needs to be injected during 2023. By April 30, 2023, the UGS level is 34.9 bcm greater than the preliminary average target for the EU member states at that time.

At the country level, Austria (69%), Germany (67%), and Italy (65%) ended April 2023 with at least 65% of their UGS sites filled (Figure 91). France is starting to rebuild its stocks from a lower point after the significant storage withdrawal in February and March, due to strikes at its LNG import terminals.

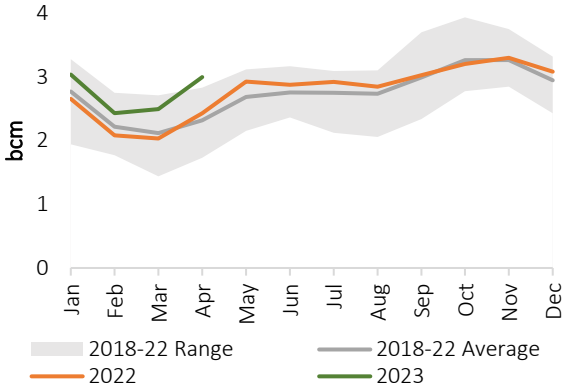
The EU currently has around 5.0 bcm of LNG storage capacity, with the majority of this storage located in Spain (40%) and France (16%). As part of the EU's recent drive to commission new regasification terminals, Germany now accounts for 6% of the LNG storage capacity in the region. The total amount of LNG in storage in the EU stood at 3.0 bcm in April 2023, which was 20% higher m-o-m and 23% higher y-o-y (Figure 92). LNG storage levels have remained high due to lower than expected withdrawals during the winter and increased LNG imports to the region.

Figure 91: UGS in EU countries as of April 30, 2023



Source: GECF Secretariat based on data from AGSI+

Figure 92: Total LNG storage in the EU

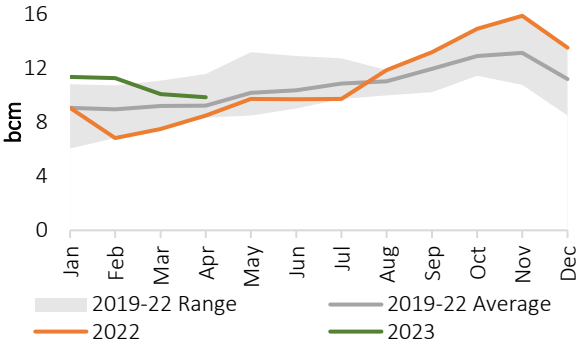


Source: GECF Secretariat based on data from ALSI

5.2 Asia

Japan and South Korea have 9.8 bcm and 6.8 bcm of LNG storage capacity, respectively. As of April 2023, the total LNG in storage was estimated to be 9.8 bcm, which was 2% lower m-o-m, but 16% higher y-o-y (Figure 93). Japan accounted for 4.3 bcm of this quantity, while 5.6 bcm was attributed to South Korea. LNG imports, and therefore storage levels, continue to reflect the lower than expected gas demand in the region in recent months.

Figure 93: LNG in storage in Japan and South Korea



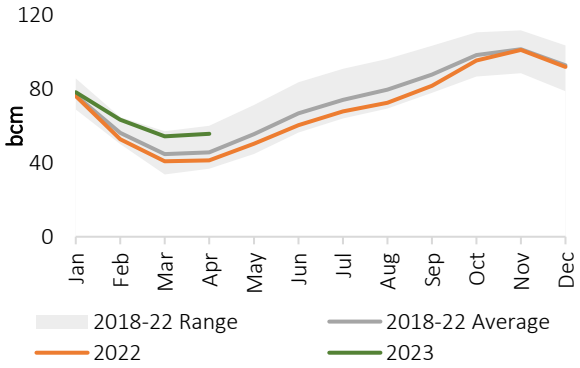
Source: GECF Secretariat based on data from Refinitiv

5.3 North America

The total working gas storage capacity in the US stands at 134 bcm. As of April 2023, the country has begun the net gas injection season, and the average daily amount of gas in storage increased to 55.6 bcm from 54.3 bcm in the previous month (Figure 94). This amount was 14.4 bcm higher than in the same month the previous year, and 10.0 bcm higher than the 5-year historical average. The average UGS capacity utilization rose to 42%.

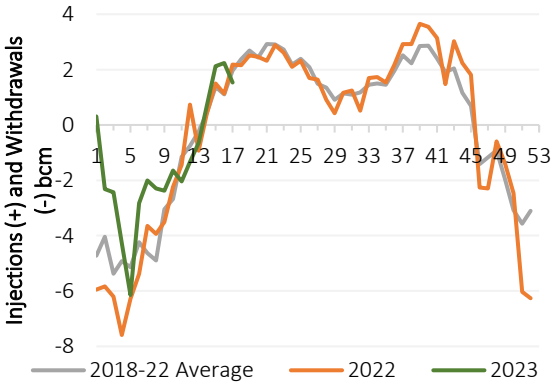
During April 2023, gas withdrawal from storage was observed at an average rate of 1.6 bcm/week, compared with 1.3 bcm/week in 2022 and 1.2 bcm/week for the 5-year average (Figure 95).

Figure 94: Underground gas storage in the US



Source: GECF Secretariat based on data from US EIA

Figure 95: Weekly rate of UGS changes in the US



Source: GECF Secretariat based on data from US EIA

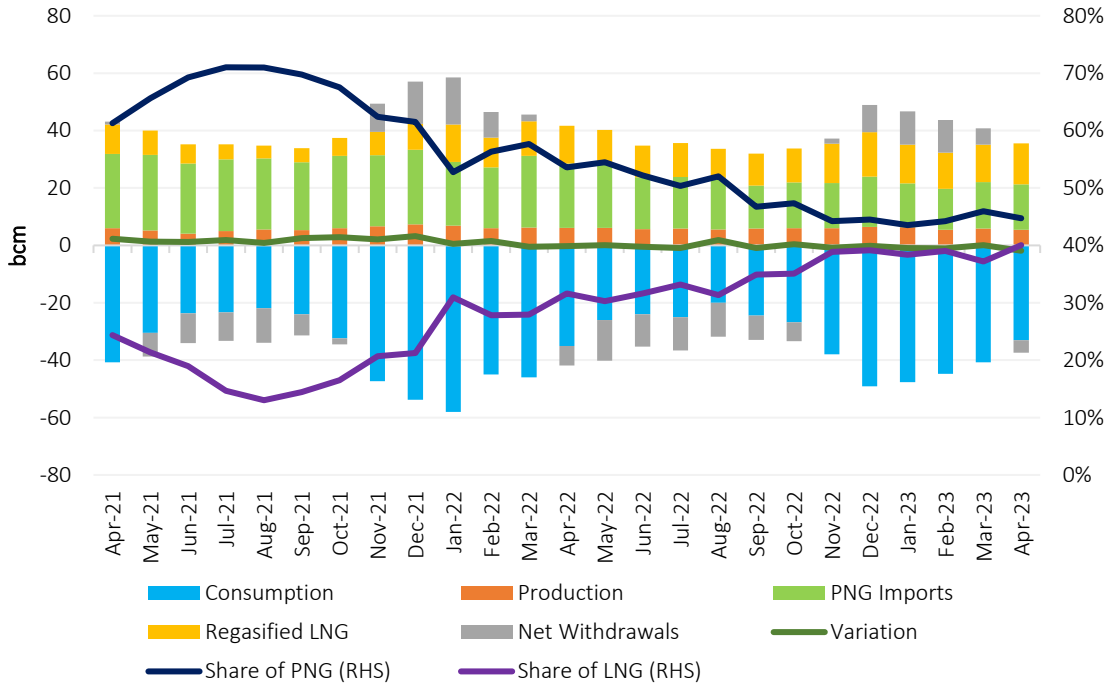
6 Gas Balance

6.1 EU + UK

In terms of the gas balance for the EU + UK, PNG imports and regasified LNG account for the bulk of gas supply (excluding storage withdrawal and injection) to the bloc of countries. Historically, PNG imports have accounted for over 50% of the pipeline gas supply to the EU + UK. However, since January 2022, the share of regasified LNG in the gas supply to these countries has risen sharply. In April 2023, the share of regasified LNG in the EU + UK's gas supply increased by three percentage points from the previous month to 40%. It also increased by eight percentage points from April 2022 (Figure 96).

Meanwhile, the share of PNG in EU + UK's gas supplies moved slightly lower to 45% in April 2023, down by nine percentage points compared to April 2022. The m-o-m increase in the share of regasified LNG in EU + UK's gas supply was supported by stronger sendout of regasified LNG while domestic gas production and pipeline gas imports declined. 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 96: 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

6.2 OECD

Table 4 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 January 2023.

Table 4: OECD's gas supply/demand balance for January 2023 (bcm)

	2022	Jan-22	Jan-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2022/2021
(a) OECD Gas Consumption	1803.4	211.4	191.7	211.4	191.7	-9.3%	-9.3%
(b) OECD Gas Production	1650.9	137.8	144.6	137.8	144.6	4.9%	4.9%
Difference (a) - (b)	152.5	73.5	47.1	73.5	47.1	-36.0%	-36.0%
OECD LNG Imports	346.9	32.1	32.0	32.1	32.0	-0.4%	-0.4%
LNG Imports from GECF	161.8	13.7	13.9	13.7	13.9	1.4%	1.4%
LNG Imports from Non-GECF	185.1	18.4	18.1	18.4	18.1	-1.7%	-1.7%
OECD LNG Exports	223.2	18.6	19.7	18.6	19.7	5.8%	5.8%
Intra-OECD LNG Trade	152.7	14.6	13.3	14.6	13.3	-9.0%	-9.0%
OECD Pipeline Gas Imports	630.2	199.5	60.3	199.5	60.3	-69.8%	-69.8%
OECD Pipeline Gas Exports	561.5	171.7	49.3	171.7	49.3	-71.3%	-71.3%
Stock Changes and losses	39.8	-32.3	-23.8	-32.3	-23.8	-26.4%	-26.4%

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

6.3 India

Table 5 below provides data on the gas supply and demand balance for India for the month of March 2023.

Table 5: India's gas supply/demand balance for March 2023 (bcm)

	2022	Mar-22	Mar-23	YTD-2022	YTD-2023	Change* y-o-y	Change** 2022/2021
(a) India Gas Demand	60.96	5.45	5.13	14.96	15.15	-5.9%	1.3%
(b) India Gas Production	33.46	2.81	2.89	8.19	8.40	2.7%	2.5%
Difference (a) - (b)	27.50	2.64	2.24	6.77	6.76	-15.2%	-0.2%
India LNG Imports	28.07	2.38	1.97	6.86	6.27	-17.3%	-8.6%
LNG Imports from GECF	22.15	2.20	1.72	6.02	5.14	-21.8%	-14.6%
LNG Imports from Non-GECF	5.92	0.18	0.25	0.84	1.12	38.4%	34.3%
Stock Changes and losses	0.57	-0.26	-0.27	0.09	-0.49	4.6%	-615.0%

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

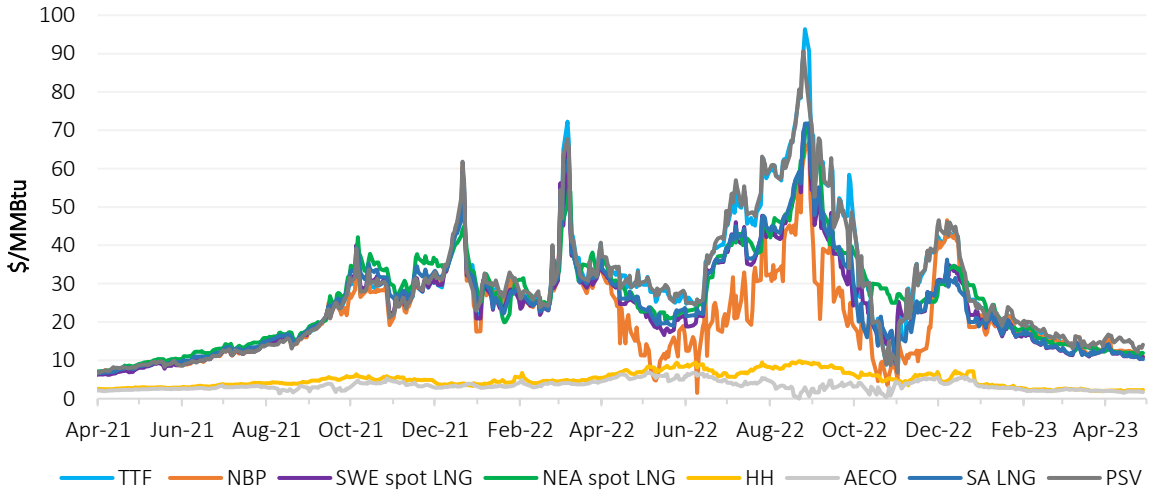
7 Energy Prices

7.1 Gas Prices

7.1.1 Gas & LNG Spot Prices

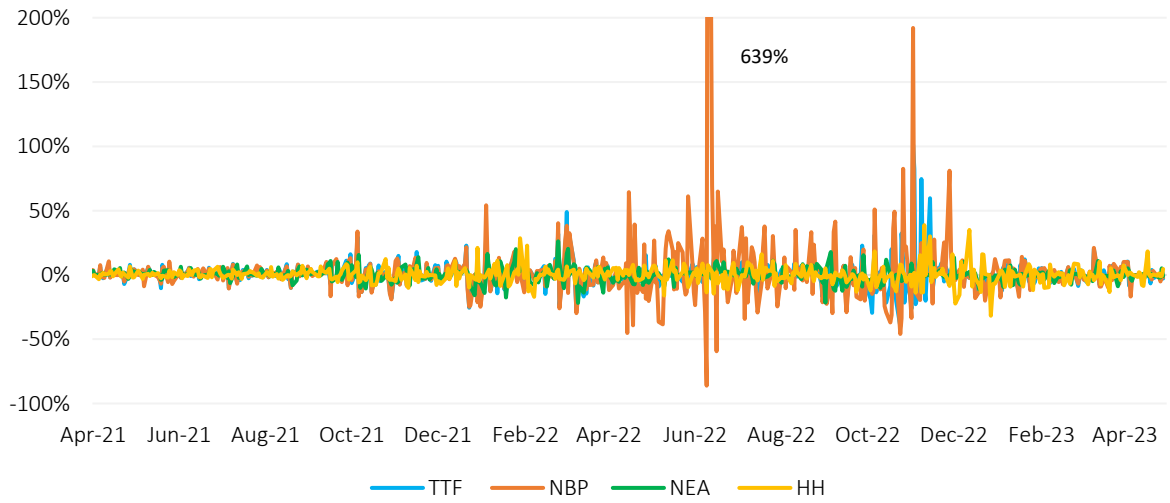
In April 2023, gas and LNG spot prices in Europe and Asia experienced a decline for the fourth consecutive month, while volatility remained relatively low (Figure 97 and Figure 98). With the arrival of the shoulder season, the market witnessed a decrease in tightness as a result of ample storage levels and strong LNG supply. This weighed on both European and Asian spot prices alike. However, in Asia, there was some emergence of buying activity in anticipation of the upcoming summer season, which limited the downside to spot LNG prices.

Figure 97: 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 98: Daily variation of spot prices

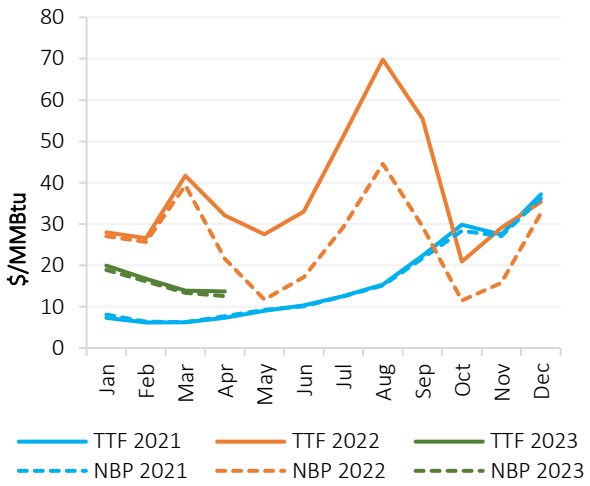


Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

7.1.1.1 European Spot Gas and LNG Prices

In April 2023, average TTF and NBP spot gas prices were $13.69/MMBtu and $12.56/MMBtu respectively, representing a 1% and 6% m-o-m decline (Figure 99). Additionally, these spot prices were 57% and 42% lower y-o-y for TTF and NBP, respectively. The SWE spot LNG prices averaged $11.55/MMBtu in April 2023, marking a 6% decrease m-o-m and a substantial 58% decrease y-o-y. As for the PSV spot price, it averaged $14.79/MMBtu in April 2023, showing a modest 1% increase m-o-m but a significant 54% decline y-o-y.

Figure 99: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

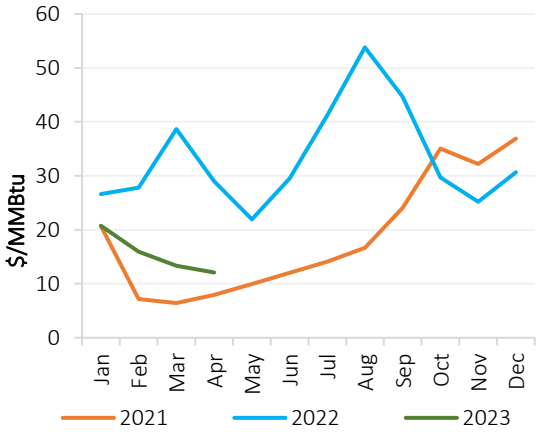
The decline in European gas and LNG spot prices persisted due to healthy storage levels and the resumption of LNG sendout from three French terminals (Fos Cavaou, Fos Tonkin and Montoir), after strike action ended on April 19, 2023. However, some bullish movement was observed during the month due to strikes in Norway and the UK, as well as lower wind generation in the region.

From January to April 2023, NBP and TTF averaged $16.06/MMBtu and $15.24/MMBtu, respectively, representing a substantial 50% and 46% y-o-y decrease.

7.1.1.2 Asian Spot LNG Prices

In April 2023, the average North East Asia (NEA) spot LNG price experienced a 9% m-o-m decline, reaching an average of $12.10/MMBtu. Furthermore, it was significantly lower, by 58%, compared to the average price of $29.01/MMBtu observed in April 2022 (Figure 100).

Figure 100: Monthly Asian spot LNG prices



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

Asian LNG prices were influenced by tepid demand, ample inventories, and robust LNG supply, particularly with the resumption of Freeport LNG supply. Moreover, increased availability of nuclear power in Japan and South Korea exerted additional downward pressure. Daily NEA spot LNG prices fell below $12/MMBtu, marking the lowest points since June 2021. However, towards the end of April, there was a noticeable emergence of buying activity in anticipation of the upcoming summer demand, which limited the downside.

From January to April 2023, the average NEA spot LNG price stood at $15.54/MMBtu, representing a substantial 49% y-o-y decrease.

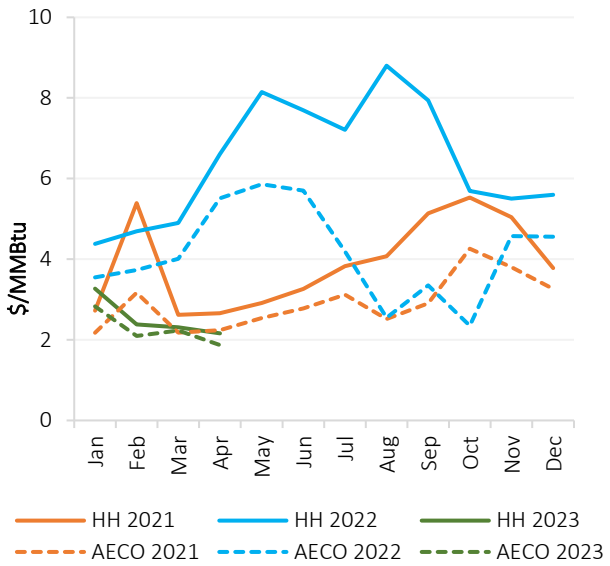
7.1.1.3 North American Spot Gas Prices

In April 2023, the HH spot gas price experienced a 6% m-o-m decrease, averaging $2.16/MMBtu. This price was significantly lower, by 67%, compared to the average of $6.61/MMBtu observed in April 2022 (Figure 101).

Strong domestic gas production, lower gas demand and high gas storage levels continued to exert downward pressure on HH spot prices. Daily HH spot prices reached their lowest point since October 2020, dipping to $1.9/MMBtu.

Similarly, in Canada, the AECO spot price declined by 16% m-o-m, averaging $1.87/MMBtu in April 2023, and was 65% lower y-o-y.

Figure 101: Monthly North American gas spot prices



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

From January to April 2023, the HH spot price averaged $2.53/MMBtu, representing a significant 51% y-o-y decrease. Furthermore, the AECO spot price averaged $2.26/MMBtu, marking a substantial 46% y-o-y decrease.

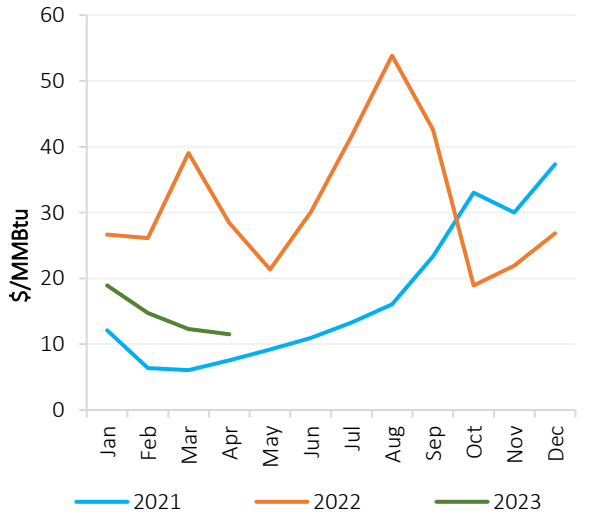
7.1.1.4 South American Spot LNG Prices

In April 2023, the South American (SA) LNG price experienced a 7% m-o-m decrease, averaging $11.51/MMBtu. Furthermore, it was significantly lower, by 60%, compared to the average price of $28.46/MMBtu observed in April 2022 (Figure 102).

LNG spot prices in South America continued to align with the trends in European and Asian spot prices. The LNG delivered prices for Argentina, Brazil and Chile averaged $11.61/MMBtu, $11.32/MMBtu and $11.60/MMBtu respectively, in April 2023.

From January to April 2023, the SA LNG spot price averaged $14.37/MMBtu, marking a substantial 52% y-o-y decrease.

Figure 102: 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 April 2023, the average Oil-indexed I LNG price was $13.07/MMBtu, representing a 2% m-o-m decrease and a 6% y-o-y decrease. Similarly, the Oil-indexed II LNG price averaged $9.65/MMBtu, showing a 1% m-o-m and an 8% y-o-y decrease (Figure 103). Additionally, the Oil-indexed I prices gained a slight premium over NEA spot LNG prices. Meanwhile, the Oil-indexed II prices maintained a discount of $2/MMBtu compared to the average NEA spot LNG prices.

In Europe, the Oil-indexed III price averaged $8.73/MMBtu in April 2023, reflecting a 4% m-o-m decrease, but an 11% y-o-y increase (Figure 104). The average SWE LNG retained a premium of $3/MMBtu over the Oil-indexed III price.

From January to April 2023, the Oil-indexed I LNG price exhibited a 5% y-o-y increase, while the Oil-indexed II LNG price demonstrated a 4% y-o-y decrease. Additionally, the Oil-indexed III LNG price for the same period experienced an 18% y-o-y increase.

Figure 103: Asia: Spot and oil-indexed price spread

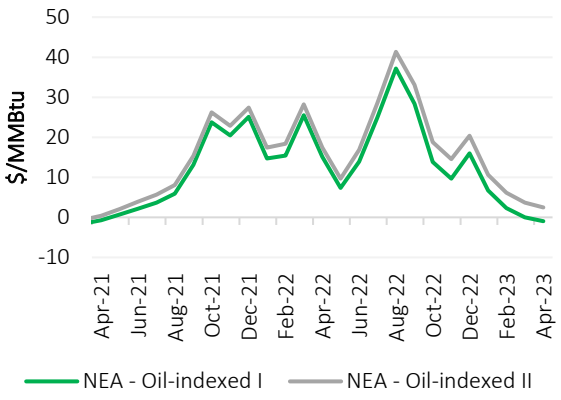
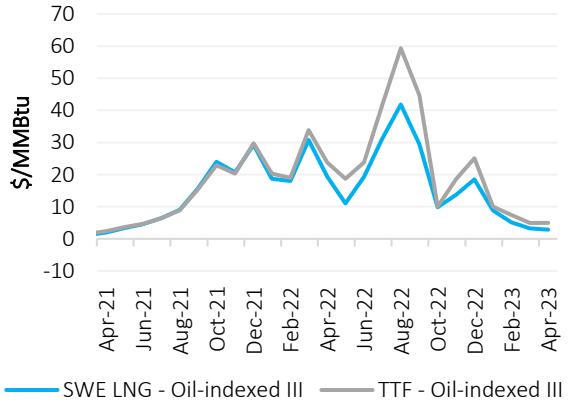


Figure 104: Europe: Spot and oil-indexed price spread



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 April 2023, the average NEA-TTF price spread remained negative, and widened to $1.59/MMBtu (Figure 105). Both NEA LNG and TTF spot prices experienced a loss of momentum during the month, but the NEA LNG spot price saw a sharper decline.

NBP traded at a discount of $1.13/MMBtu compared to TTF, which was higher than the average discount of $0.50/MMBtu in the previous month (Figure 106). The NBP-TTF spread widened due to a tighter balance in northwest Europe compared to the UK.

Furthermore, the NWE LNG spot price traded at a wider discount of $2/MMBtu compared to TTF (Figure 107) due to lower LNG sendout from France. The NWE LNG-SA LNG price spread turned slightly positive, averaging $0.14/MMBtu (Figure 108). In April 2023, the NEA-HH and TTF-HH spreads narrowed to $9.94/MMBtu and $11.53/MMBtu respectively (Figure 109 and Figure 110). Thus, European and Asian spot prices held a lower premium over North American spot prices due to soft market fundamentals in both regions.

Figure 105: NEA-TTF price spread

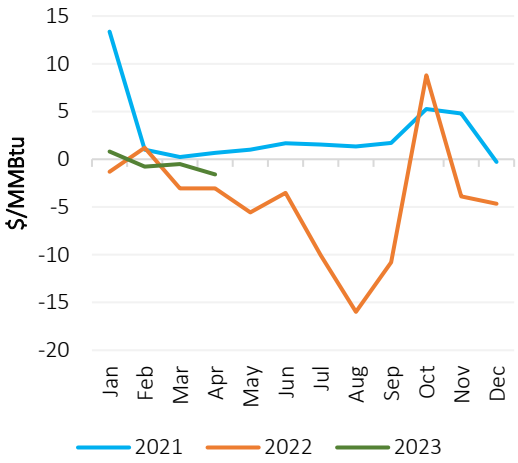


Figure 106: NBP-TTF price spread

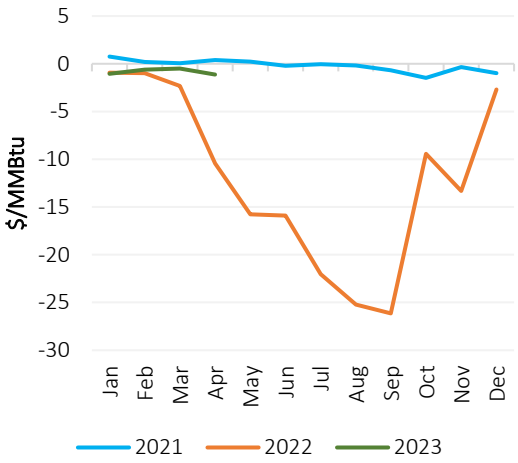


Figure 107: NWE LNG-TTF price spread

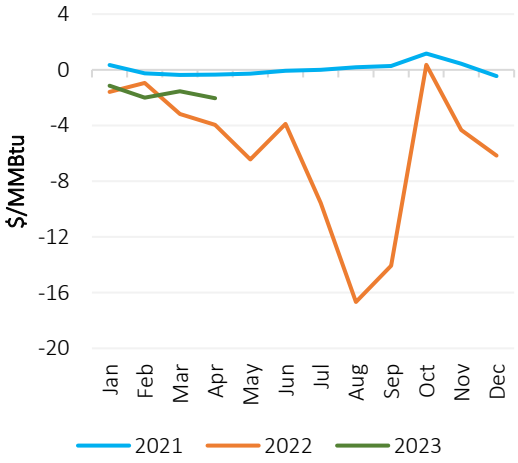


Figure 108: NWE LNG – SA LNG price spread

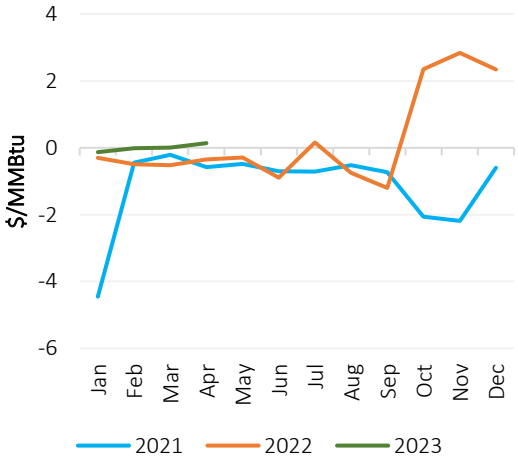


Figure 109: NEA-HH price spread

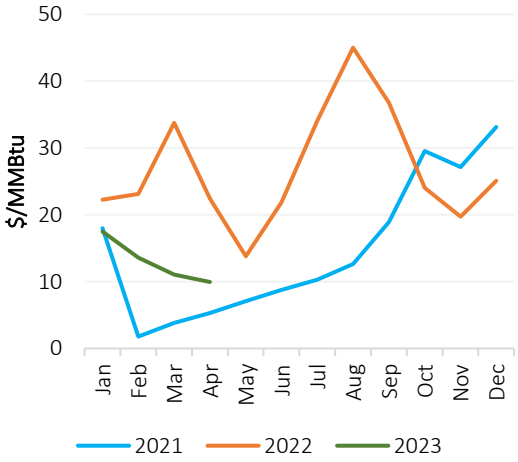
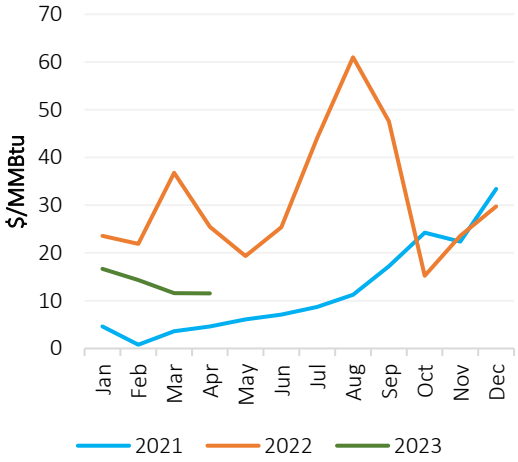


Figure 110: TTF-HH price spread



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

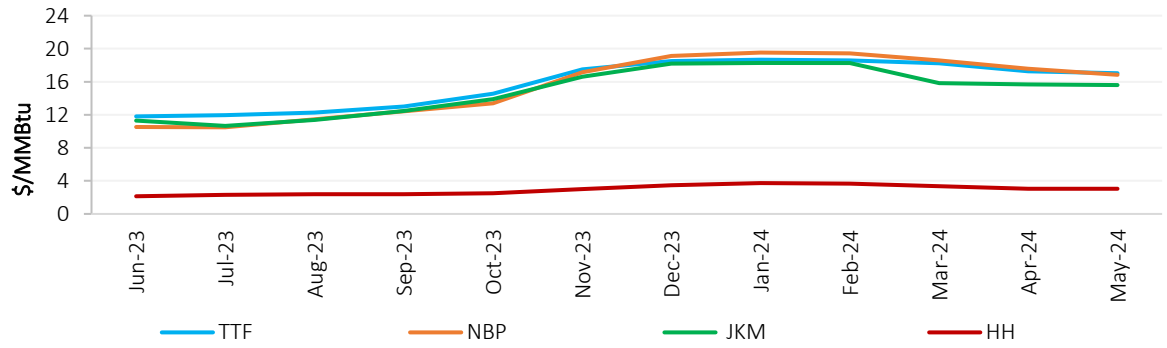
7.1.4 Gas & LNG Futures Prices

The JKM-TTF futures price spread is anticipated to remain slightly negative for the rest of 2023, suggesting that European spot prices may maintain a slight premium over Asian LNG prices in the coming months. In the second half of 2023, it is expected that JKM will trade at an average discount to TTF of $0.8/MMBtu. This trend is also projected to continue into 2024, with the JKM-TTF spread remaining negative and widening to approximately $2/MMBtu by March 2024 (Figure 111).

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 $1.3/MMBtu in June 2023. Subsequently, in the second half of 2023, the spread is expected to average around -$0.9/MMBtu, after which it becomes slightly positive, with NBP gaining a slight premium of around $0.6/MMBtu in January 2024.

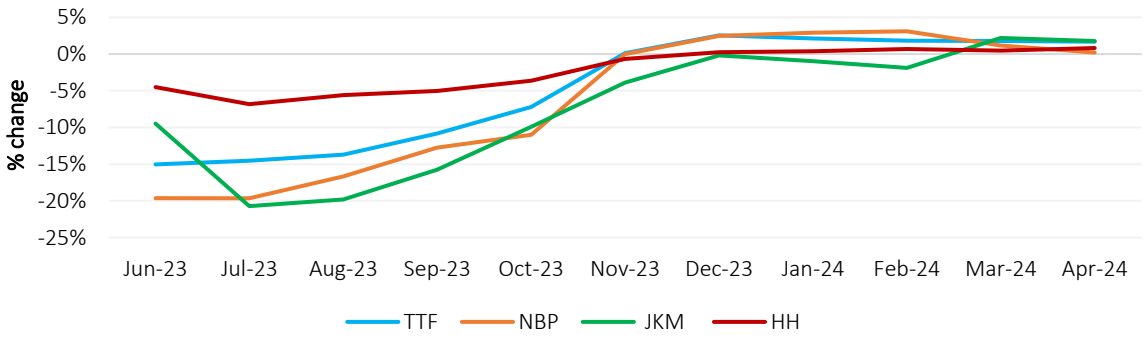
As of May 7, 2023, for the 6-month period from June to November 2023, gas and LNG futures prices for TTF, NBP and JKM were all lower than the expectations of the futures prices considered on April 10, 2023 (as reported in the GECF MGMR April 2023). The average futures prices for TTF, NBP and JKM during this period were $13.51/MMBtu, $12.57/MMBtu and $12.72/MMBtu, respectively. In addition, the average HH futures price was $2.46/MMBtu, which was slightly higher than previous expectations (Figure 112).

Figure 111: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Futures prices as of May 7, 2023.

Figure 112: Variation in gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Comparison with the futures prices as of April 10, 2023 as reported in GECF MGMR April 2023.

7.2 Cross Commodity Prices

7.2.1 Oil Prices

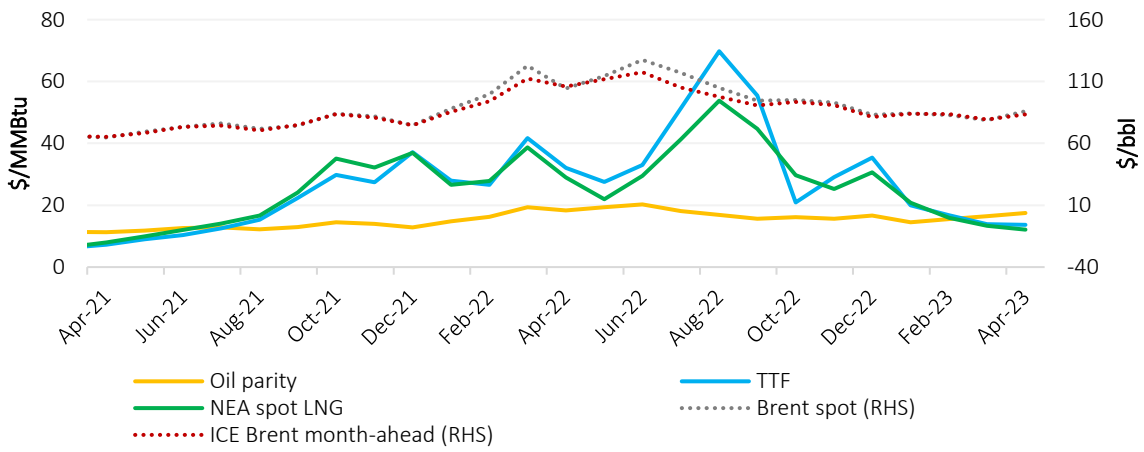
In April 2023, the average Brent spot price was $85.94/bbl, indicating a 9% m-o-m increase, but an 18% y-o-y decrease (Figure 113). The Brent one month-ahead price averaged $83.37/bbl, marking a 5% increase m-o-m, but a 21% decrease y-o-y.

Oil prices experienced a significant jump on April 3, 2023, in response to the announcement of oil production cuts by OPEC+. These cuts amounted to 1.16 million b/d and were set to begin in May and continue until the end of 2023. Saudi Arabia is expected to implement the largest production cut of 500,000 b/d. However, price gains during the month were limited due to lingering concerns about global economic growth, particularly in light of signs indicating weak manufacturing activity in China.

Furthermore, in April 2023, TTF and NEA LNG spot prices traded at a discount to the oil parity price of $4/MMBtu and $5/MMBtu respectively for the second consecutive month.

From January to April 2023, the average Brent spot price was $82.88/bbl, representing 20% decrease y-o-y. Similarly, the average Brent month-ahead price was $82.51/bbl, representing a 17% decrease y-o-y.

Figure 113: 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 April 2023, the European coal price (API2) experienced a 3% m-o-m increase, averaging $135.25/T, but was 55% lower y-o-y. Meanwhile, in China, the QHG coal price marker decreased by 5% m-o-m, averaging $165.79/T, and was 22% lower y-o-y (Figure 114).

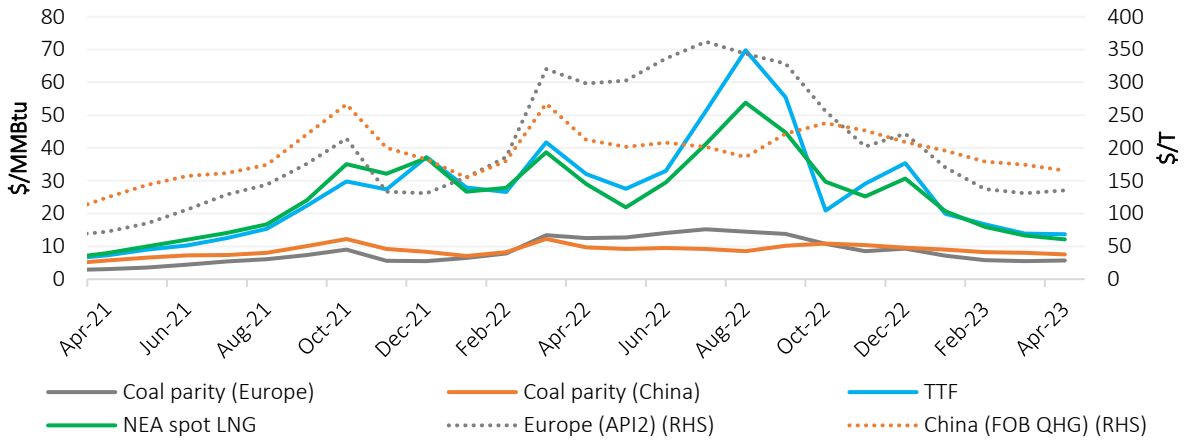
Despite lower gas prices in Europe, coal prices in the region saw a slight upward movement. This can be attributed to strike action in France, which affected nuclear availability and LNG sendout.

The premium of TTF spot price over the API2 parity price slightly decreased to around $8/MMBtu in April 2023, representing a 4% decrease m-o-m. Additionally, the premium of

NEA spot LNG price over the QHG parity price narrowed to $4.5/MMBtu, reflecting a 16% m-o-m decrease.

From January to April 2023, the European API2 averaged $143.47/T, representing a 40% decrease y-o-y. Meanwhile, the Chinese QHG price averaged $178.79/T, which was 12% lower y-o-y.

Figure 114: 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.

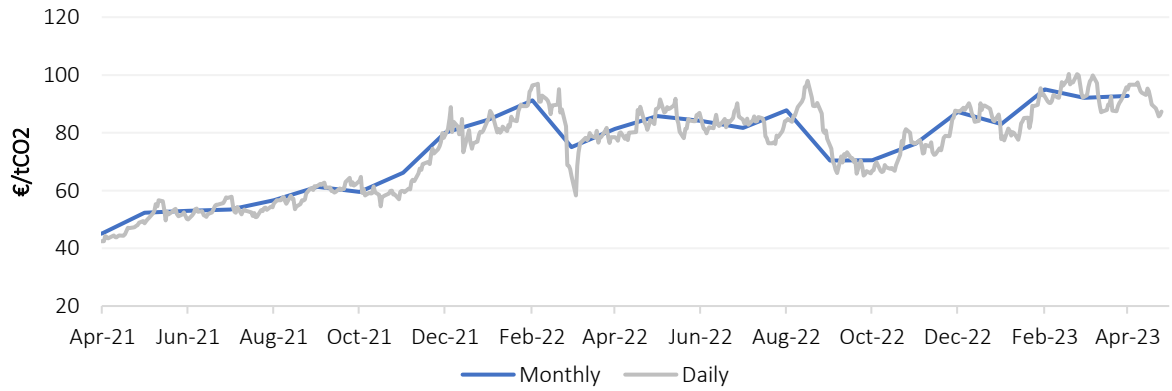
7.2.3 Carbon Prices

In April 2023, EU carbon prices averaged €92.69/tCO_2, indicating a 1% m-o-m increase, and a 14% y-o-y increase (Figure 115).

The rise in EU carbon prices was supported by strong oil prices and compliance buying in anticipation of the April 30, 2023 deadline for countries to surrender allowances. However, by the end of the month, more than 75% of free allocation allowances for the year had been delivered. In addition, gas prices continued to favour gas burn over coal in the power sector.

From January to April 2023, EU carbon prices averaged €90.70/tCO_2, representing a 9% increase y-o-y.

Figure 115: EU carbon prices



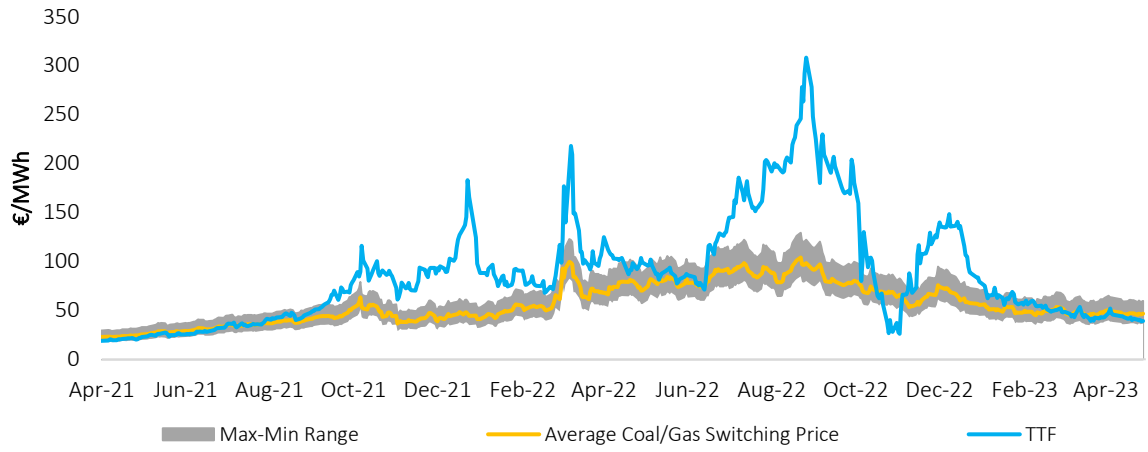
Source: GECF Secretariat based on data from Refinitiv Eikon

7.2.4 Fuel Switching

In April 2023, daily TTF spot prices stayed within the range suitable for coal-to-gas switching. The average coal-to-gas switching price was €47.16/MWh, relatively stable compared to the previous month. The average monthly spread between the TTF spot price and the coal-to-gas switching price remained negative, approximately -€4/MWh (Figure 116).

Looking ahead, it is expected that the TTF spot price will continue to remain within the coal-to-gas switching range during Q2 2023. Relatively low gas spot prices will continue to support coal-to-gas switching in Europe.

Figure 116: TTF vs coal-to-gas switching price



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

While gas prices have softened from the record highs of the previous year, they still remain relatively high and volatile. As a result, several countries, including India and Australia, have started to implement new domestic gas pricing frameworks.

In India, a new gas pricing mechanism came into effect on April 8, 2023. Under this mechanism, domestically produced gas will be benchmarked to 10% of global crude prices. The new pricing formula includes a floor price set at $4/MMBtu and a ceiling price set at $6.50/MMBtu for gas extracted from old fields, such as those operated by state-controlled ONGC and Oil India. These prices will be revised on a monthly basis. The ceiling price will remain in place for the next two years, with an annual increase of $0.25/MMBtu thereafter. The aim of this mechanism is to reduce gas prices for households, CNG vehicles, and the power sector.

In Australia, the federal government has decided to extend its domestic price caps until July 1, 2025. In December 2022, a 12-month price cap of A$12/GJ ($8/MMBtu) was introduced on domestic gas prices in eastern Australia, in order to reduce the impact of volatile international prices on households and industries. However, some market participants have warned that it may lead to reduced investment and increase the risk of gas shortages.

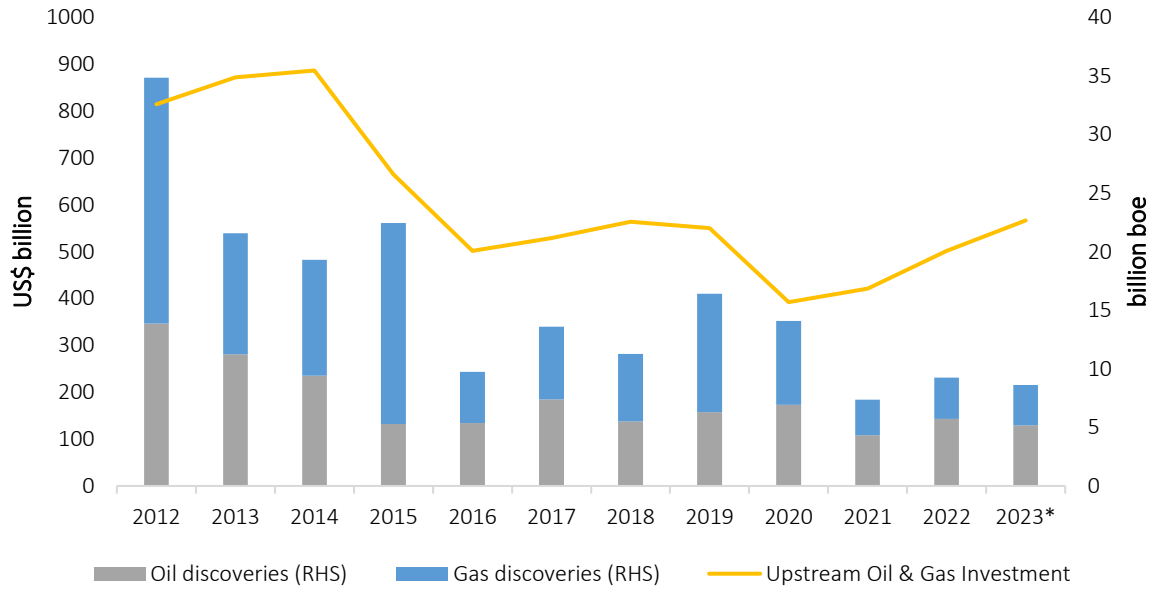
8 Feature Article: Fair pricing for sustainable investment in oil and gas industry

Investment is crucial for addressing the energy trilemma: how to ensure energy security, affordability, and sustainability. However, too low gas prices and/or a misguided narrative that gas demand will peak in the near future, cannot but undermine investment.

Despite the easing of market turbulence in recent months, the global economy remains fragile and its impact on oil and gas markets continue to reverberate. Furthermore, while recent geopolitical events have influenced market dynamics, chronic underinvestment over the past decade has been a major contributor to the recent record high prices and extreme market volatility.

Investment in the upstream oil and gas sector declined by around 40% from $814 billion in 2012 to $502 billion in 2022. Meanwhile, total oil and gas discovered volumes experienced an even steeper decline of over 70% during the same period, from 34.8 billion boe in 2012 to 9.2 billion boe in 2022. It is important to note that while investment increased by 19% y-o-y in 2022, a major share of this capital has been eroded by higher costs. This may have led to a lower than anticipated level of discovered volumes as seen in Figure 117. Similarly, in 2023, investment is expected to continue to increase; however, discoveries are likely to be slightly lower compared to the previous year due to relatively high costs. Furthermore, the GECF estimates that almost $2 trillion in upstream gas investment is expected to be required to satisfy growing natural gas demand by 2030.

Figure 117: Upstream oil and gas investment vs discovered volumes

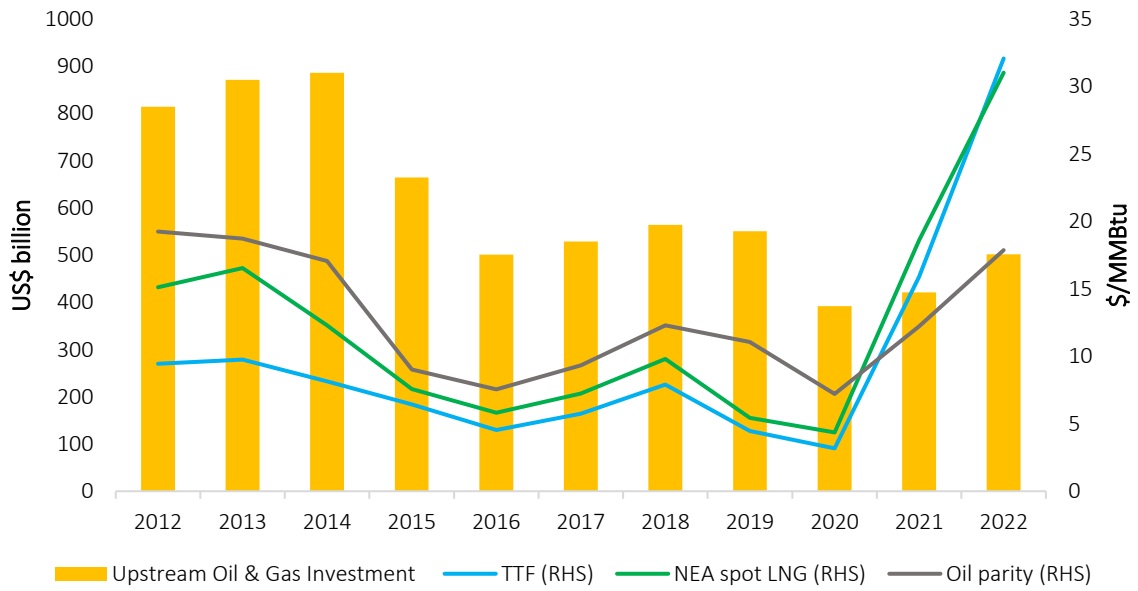


Source: GECF Secretariat based on data from Rystad Energy
**Forecast for 2023*

The oil and gas industry is cyclical by nature as the market is continuously seeking to reduce supply/demand imbalances. High oil and gas prices usually incentivize upstream investment

which increases supply in the short/medium term. This, in turn, puts downward pressure on prices which may lead to lower investment and reduced supply. Consequently, prices will tend to increase and the cycle repeats itself. Figure 118 below illustrates this relationship between upstream oil and gas investment and prices, and the cyclical nature of the industry. High prices in 2021 and 2022 boosted investment, however the level of investment was still well-below the levels of 2014. In 2023, total upstream investment is expected to surpass pre-pandemic levels. The movement in oil prices tend to have a greater impact on upstream investment, since gas only accounts for around 30% of the total upstream investment. While investment is largely driven by price movements, it is also influenced by technology, costs and government policies.

Figure 118: Upstream oil and gas investment vs prices



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

It is also worth underlining that the oil and gas industry has a natural decline rate of 4 to 5% per annum (that is, the rate at which production from an existing field naturally falls in the absence of continued interventions), according to an analysis from CERA, S&P Global Commodity Insights. Therefore, continued underinvestment can have detrimental consequences including more frequent energy price shocks, increased price volatility and exacerbated supply shortages. Such outcomes not only harm the oil and gas industry, but they can have long-lasting effects on global economic growth and sustainable development.

In this context, the GECF recognizes the importance of gas and oil market stability to provide security of demand for producers and security of supply for consumers, as well as to secure investment and reduce the potential negative impacts of market shocks. More so, the GECF Long-Term Strategy emphasizes the need to *"seek fair and stable prices on the global gas market and efficient contractual practices in the international gas trade to ensure sustainable export revenues and continued investments in the natural gas industry".*

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

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

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