MONTHLY GAS MARKET REPORT

April 2023

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Highlights

Global economy: The global GDP growth for 2023 is projected to slow to 2.8% year-on-year (y-o-y), marking a 0.1 percentage point decrease from the IMF's previous forecast. Although some positive signs exist, several uncertainties persist, causing a potential downside to the outlook. Global inflation is expected to gradually subside to 7% in 2023, from 8.7% in 2022. In March, major central banks raised their interest rates, albeit at a less aggressive pace.

Gas consumption: In March 2023, the EU gas consumption recorded a 13% y-o-y decline, reaching 34.1 bcm. Factors contributing to the drop in the demand for gas in the EU include warmer than normal temperatures, windier weather conditions, and a year-extension of the implementation of the EU regulation on the voluntary gas demand reduction by 15% until March 2024. In contrast, apparent Chinese gas demand rose by 4.6% y-o-y to 31 bcm. According to the CNPC Research Institute, the country's gas demand would expand by 19 bcm, or 5.1% in 2023, totalling 386.5 bcm.

Gas production: Europe's gas production decreased by 3.3% y-o-y to stand at 15.3 bcm in February 2023, primarily due to lower output from the Netherlands and UK. Norway's production remained steady despite technical issues in certain gas fields. Conversely, gas production from the seven major US shale gas/oil regions rose by 7% y-o-y in March 2023 reaching 84.5 bcm. The global gas rig count declined by 7 units m-o-m but rose by 61 units y-o-y in March 2023, reaching a total of 410 units. February 2023 recorded the lowest monthly discovered volumes since May 2021.

Gas trade: In March 2023, EU pipeline gas imports rose by 14% month-on-month (m-o-m) to reach 13.7 bcm. Global LNG imports increased slightly by 2.7% y-o-y to 35.0 Mt driven primarily by stronger imports in Europe and, to a lesser degree, in Latin America and the Caribbean (LAC) and North America. In contrast, LNG imports decreased in the Asia Pacific and Middle East and North Africa (MENA) regions. Lower pipeline gas imports in Europe continued to support the increased LNG imports while, Asia Pacific's y-o-y gain in LNG imports reversed from the previous month. Mild winter weather and high LNG inventories led to reduced LNG imports in Japan and South Korea, contributing to an overall decline in imports in the Asia Pacific region.

Gas storage: In March 2023, underground gas storage levels in the EU reached an average of 59.1 bcm, representing 57% of the region's capacity. In the US, underground gas storage declined to 54.3 bcm which represents just 41% of capacity. The combined LNG in storage in Japan and South Korea was estimated at 9.2 bcm. Storage withdrawals have been lower this winter as a result of milder than normal weather conditions.

Energy prices: Gas and LNG spot prices in Europe and Asia continued to decrease for the third consecutive month. In March 2023, TTF and NEA LNG spot prices averaged $13.87/MMBtu and $13.35/MMBtu, falling by 17% and 16% m-o-m, respectively, and representing a 65% decrease y-o-y. Despite lower LNG sendout in the region, European spot prices maintained their bearish trend. Likewise, weak market fundamentals in Asia continued to put pressure on prices. Moreover, the spread between spot prices and oil-indexed LNG prices in both regions has significantly narrowed in comparison to previous months.

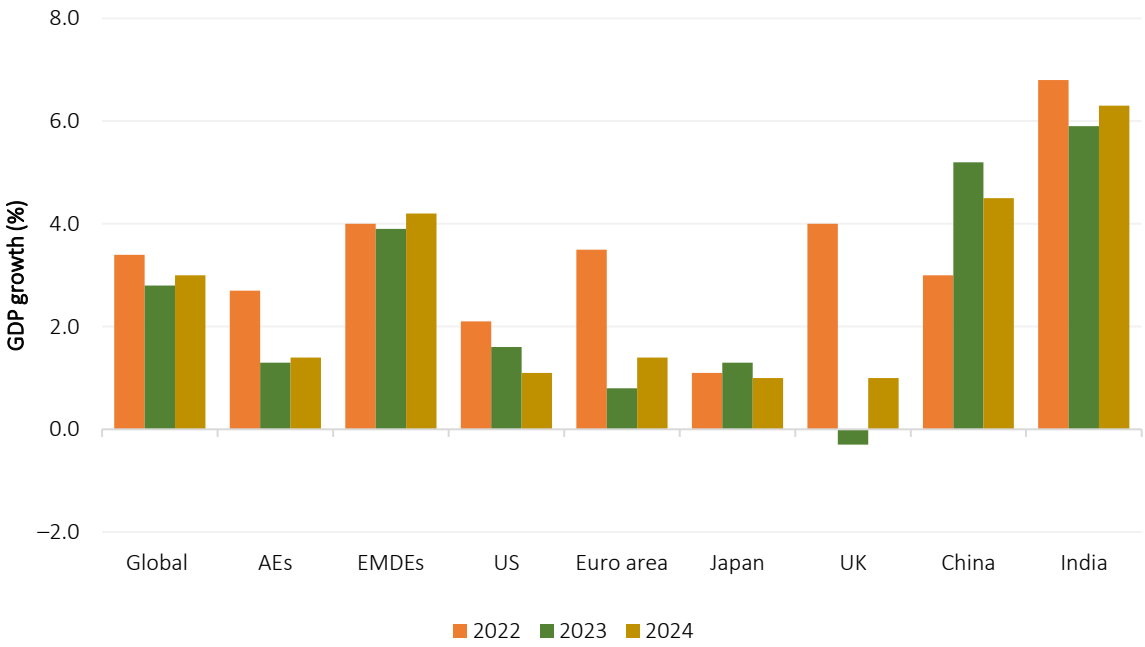
1 Global Economy

The global economy continues to grapple with challenges such as multi-year high inflation, stringent financial conditions, geopolitical spillover effects, and the recent vulnerabilities in financial markets. The International Monetary Fund (IMF), in its April 2023 World Economic Outlook (WEO) report, revised its 2023 global GDP growth forecast downward to 2.8%, from 2.9% in January 2023 report (Figure 1). Some positive factors, such as a gradual decline of inflation in some countries, softening commodity prices and easing supply-chain disruptions, have influenced the global economy. However, the outlook remains skewed to the downside, driven by expectations of further monetary tightening to curb inflation and weaker performance in major economies.

GDP growth in Advanced Economies (AEs) is expected to decelaerate substantially from 2.7% in 2022 to 1.3% in 2023, and to slightly rebound to 1.4% in 2024. The US GDP growth is forecast to decrease from 2.1% in 2022 to 1.6% in 2023, while the Euro area's growth is expected to slow down significantly, from 3.5% in 2022 to 0.8% in 2023. In addition, the IMF lowered its 2023 growth forecast for Japan by 0.5 percentage points to 1.3%. Conversely, the UK's GDP growth prospects are somewhat more optimistic, with a smaller contraction of -0.3% anticipated in 2023.

Emerging Markets and Developing Economies (EMDEs) are projected to witness a slight decline in GDP growth from 4% in 2022 to 3.9% in 2023, followed by a rebound to 4.2% in 2024. China's GDP growth is expected to accelerate from 3% in 2022 to 5.2% in 2023 before decelerating to 4.5% in 2024. Furthermore, the IMF reduced its 2023 forecast GDP growth for India by 0.2 percentage points to 5.9% in 2023.

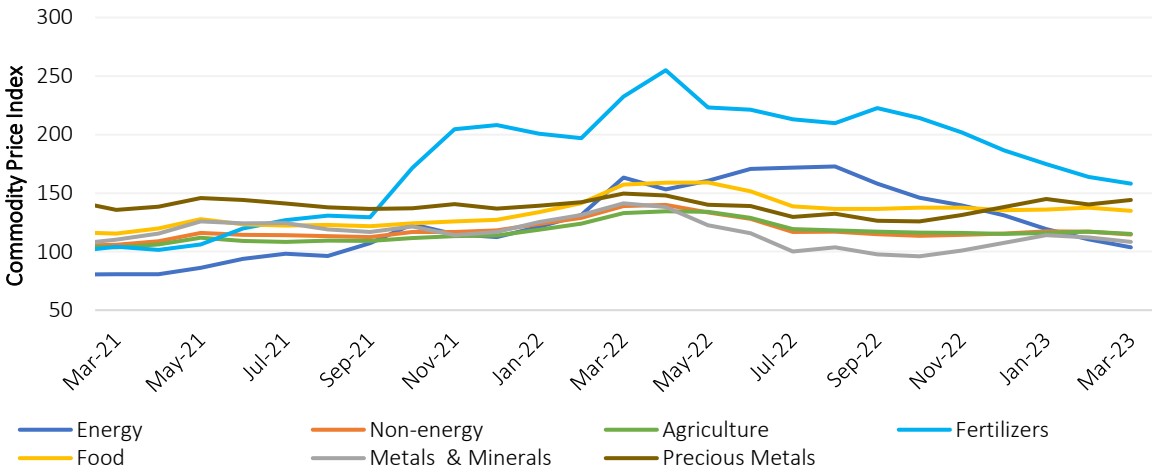
Figure 1: GDP growth forecast



Source: GECF Secretariat based on data from IMF World Economic Outlook April 2023

Regarding commodity prices in March 2023, the energy price index fell by 6% month-on-month (m-o-m) and was 37% lower year-on-year (y-o-y), with soft market fundamentals continuing to weigh on global energy prices. The non-energy price index also declined by 2% m-o-m and was 18% lower y-o-y. With regard to non-energy sectors, the agriculture price index dipped by 2% m-o-m, while the metals and minerals price index decreased by 3% m-o-m. Moreover, the fertilizer price index experienced its sixth consecutive month of decline, dropping by 4% m-o-m and standing 32% lower y-o-y (Figure 2).

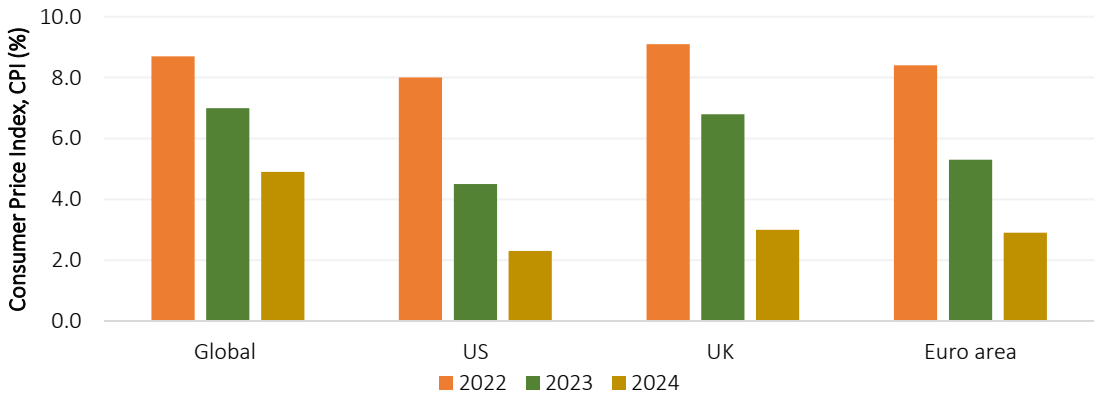
Figure 2: Monthly commodity price indices



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%).

Inflation in several major economies has started to gradually decrease in 2023. According to the IMF's WEO April 2023, global inflation is projected to decline from 8.7% in 2022 to 7% in 2023, followed by a further reductionto 4.9% in 2024. The US is forecasted to experience inflation averaging 4.5% in 2023, followed by a decline to 2.3% in 2024 . In the UK, inflation is anticipated to average 6.8% in 2023, with a subsequent drop to 3% in 2024. Meanwhile, in the Euro area, inflation is forecast to average 5.5% in 2023, with a thereafter decline to 2.9% in 2024 (Figure 3).

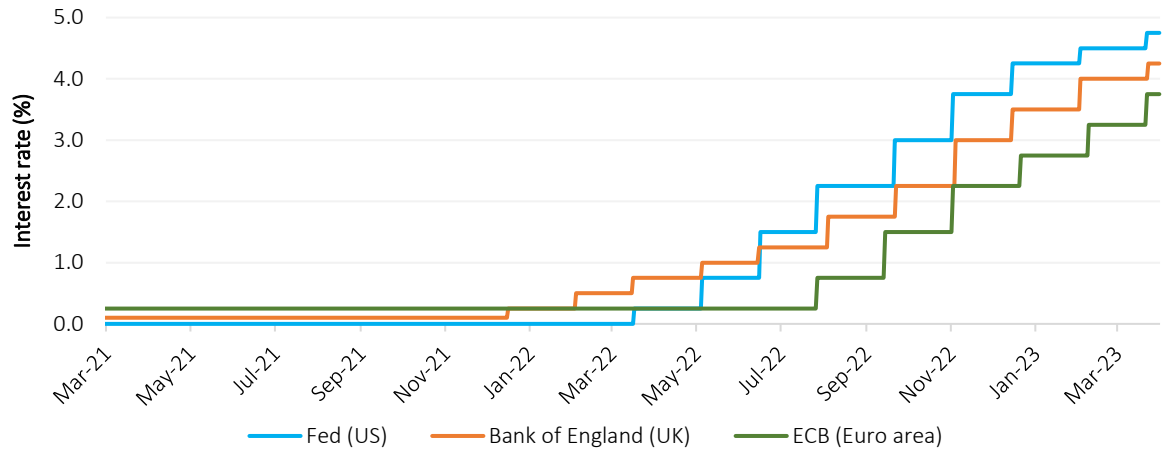
Figure 3: Inflation rates



Source: GECF Secretariat based on data from IMF World Economic Outlook April 2023

In March 2023, US Federal Reserve (Fed), Bank of England (BOE) and European Central Bank (ECB) continued to raise their respective interest rates. On March 22, 2023, the FED announced an increase of its interest rates by 0.25 percentage points, bringing its benchmark interest rate into the range of 4.75 – 5.00%, the highest level in 15 years. Similarly, on March 23, 2023, the BOE raised its interest rate by 0.25 percentage points, setting its benchmark interest rate at 4.25%. The ECB announced the most aggressive hike, raising its key interest rates by 0.5 percentage points on March 22, 2023. This brought its interest rates on the main refinancing operations, marginal lending facility and deposit facility to 3.5%, 3.75% and 3%, respectively (Figure 4).

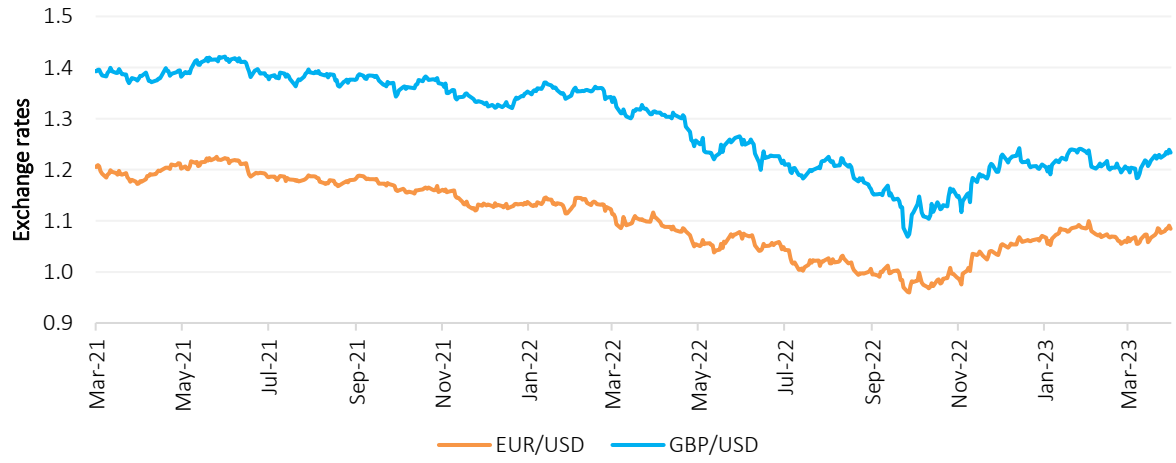
Figure 4: Interest rates in major central banks



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

In March 2023, the British pound expetioenced a slight appreciation against the US dollar, while the euro remained relative stability compared to the previous month. The euro was valued at an average of $1.0714, representing a 3% decline y-o-y. Meanwhile, the British pound was valued at an average of $1.2146, reflecting a 1% increase m-o-m, but an 8% decrease y-o-y (Figure 5). Inflation in the Euro area continued its downward trend, averaging an estimated 6.9% in March 2023, compared to 8.5% in February 2023.

Figure 5: Exchange rates



Source: GECF Secretariat based on data from Refinitiv Eikon

2 Gas Consumption

2.1 Europe

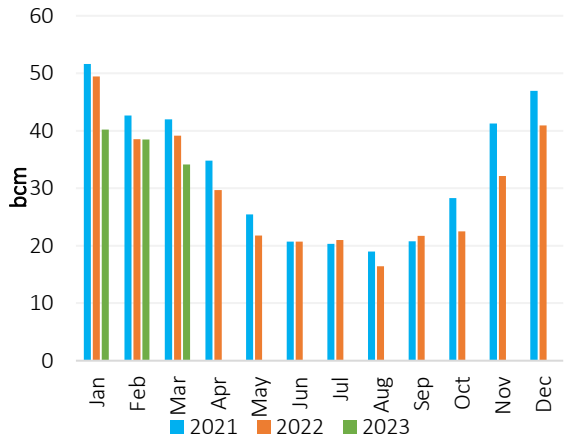
2.1.1 European Union

In March 2023, total European Union (EU) gas consumption recorded a drop of 13% y-o-y decrease, to reach 34.1 bcm (Figure 6). Warmer than normal temperatures across Europe contributed to the reduced gas demand for heating in the residential sector. Temperatures in March were 0.8 degree higher than the 1991-2020 average. In addition, the extension of the EU regulation on the voluntary gas demand reduction by 15% for an additional year until March 2024 impacted gas consumption in Europe during the month. Moreover, windier weather condition reduced the demand for gas in the power generation sector and hence decrease the use of gas in the EU power generation sector. The combination of these factors drove down gas consumption during the March 2023. However, the drop in spot gas prices in Europe also led to a slight recovery in gas consumption in the industrial sector..

Th EU's electricity production from gas declined by 18% y-o-y, while total electricity production decreased by 3% y-o-y to reach 220 TWh. The decline in gas-fired power generation in March 2023 was driven by an increase in wind and hydro power output amounting to 39% and 13% y-o-y respectively. Furthermore, lower generation from nuclear (6% y-o-y) (3.3 TWh) and coal (30% y-o-y) (13 TWh) was recorded (Figure 7). Renewables constituted the largest share of the power mix at 34%, followed by nuclear (23%), gas (18%), coal (14%) and hydro (11%).

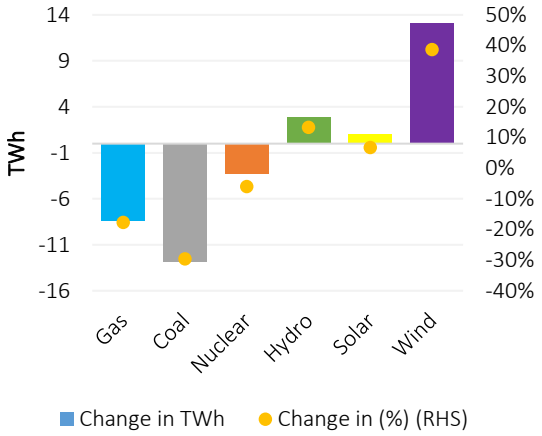
For the first quarter 2023, total gas consumption in EU decreased by 14% y-o-y to reach 113 bcm.

Figure 6: Gas consumption in the EU



Source: GECF Secretariat based on data from Enstool and McKinsey

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

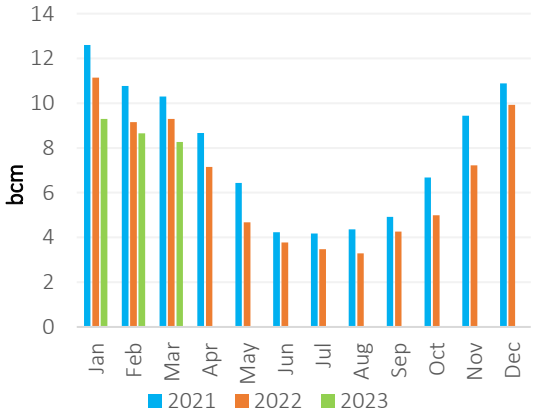


Source: GECF Secretariat based on data from Ember

2.1.1.1 Germany

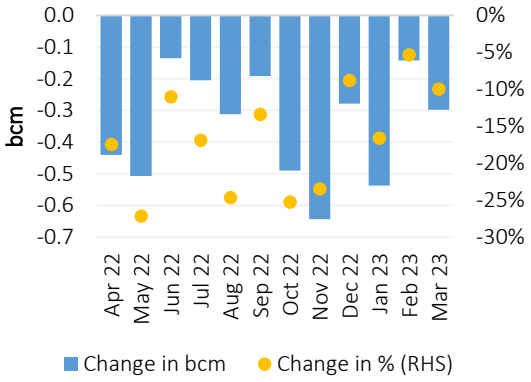
In March 2023, Germany's gas consumption decreased by 11% y-o-y to reach 8.3 bcm, driven by the ongoing implementation of EU policies to reduce gas consumption by 15% between August 2022 and March 2023, higher wind output, and above normal temperatures during the month (Figure 8). In the industrial sector, gas consumption conrinued to be impacted by relatively high gas prices, resulting in a 10% decline compared to the previous year (Figure 9). Consumption in the residential/commercial and industrial/power generation sectors dropped by 7.5% and 14% y-o-y, respectively, representing declines of 0.3 bcm and 0.7 bcm, respectively.

Figure 8: Gas consumption in Germany



Source: GECF Secretariat based on data from Retinitiv

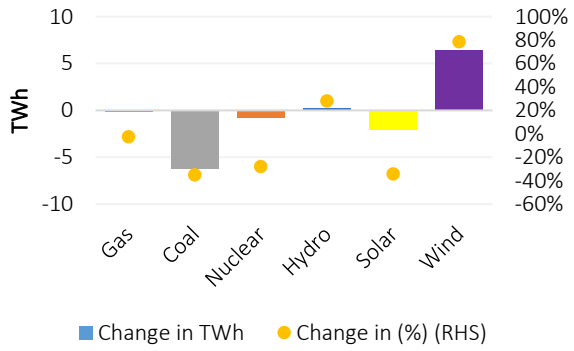
Figure 9: Trend in gas consumption in the industrial sector Apr 22 – Mar 23 (y-o-y change)



Source: GECF Secretariat based on data from refinitiv

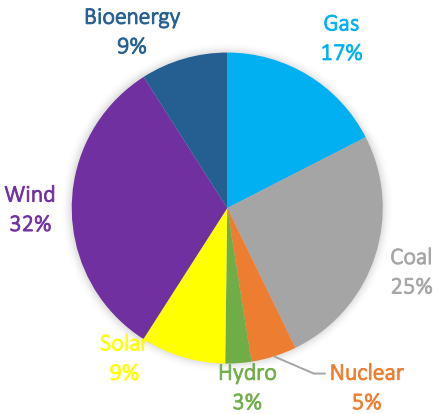
Germany's electricity production from gas decreased by 2.5% y-o-y, while total electricity production i decreased by 4.7% y-o-y to reach 45.5 TWh. Higher generation from wind (79%), and hydro (28%) were recorded during the month. However, electricity production from coal, nuclear and solar declined by 35%, 28% and 34%, respectively (Figure 10). Renewables were the dominant energy source in the power mix with a share of 50% followed by coal (25%), gas (17%), nuclear (5%) and hydro (3%) (Figure 11).

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



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 11: German electricity mix in March 2023



Source: GECF Secretariat based on data from Refinitiv and Ember

For the first quarter 2023, total gas consumption in Germany decreased by 10% y-o-y to reach 26 bcm.

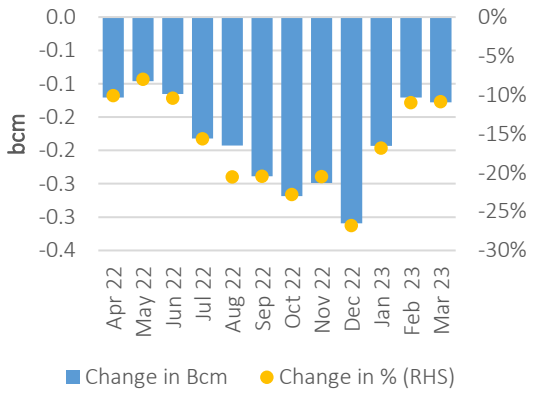
2.1.1.2 Italy

In March 2023, Italy's gas consumption recorded a huge decline of 25% y-o-y to 6 bcm (Figure 12). The power generation, industrial and residential sectors were down by 26%, 11% and 27% to 1.7 bcm, 1 bcm and 3 bcm, respectively. The decline in gas consumption was driven by average temperatures that were higher than the seasonal normal by 2.4°C and a high wind output during the month. For the 15th month in a row, gas consumption in the industrial sector declined on a monthly basis compared to the previous year, due mainly to high gas prices (Figure 13).

Figure 12: Gas consumption in Italy

Source: GECF Secretariat based on data from Snam

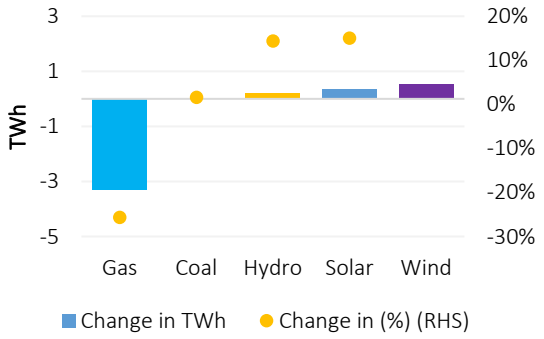
Figure 13: Trend in gas consumption in the industrial sector Apr 22 – Mar 23 (y-o-y change)



Source: GECF Secretariat based on data from Snam

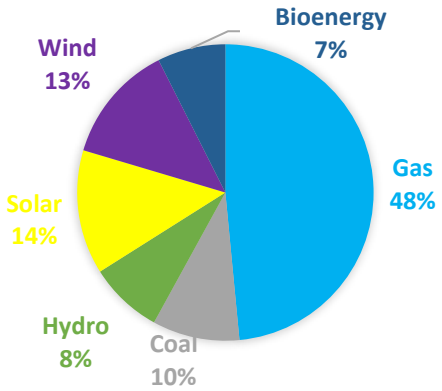
Italy's electricity production from gas declined by 26% y-o-y, while total electricity production decreased by 10% y-o-y to reach 19.8 TWh. Higher generation from coal (2% y-o-y), hydro (14%), solar (15%) and wind (25%) was recorded during the month (Figure 14). Gas was the dominant fuel in the power mix with a share of 48% followed by renewables (34%), coal (10%) and hydro (8%) (Figure 15). It is worth mentioning that hydro production is recording very low output, near the record low of 2022, caused by a large shortfall in precipitation in the first quarter, compared to the yearly average level.

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



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 15: Italian electricity mix in March 2023



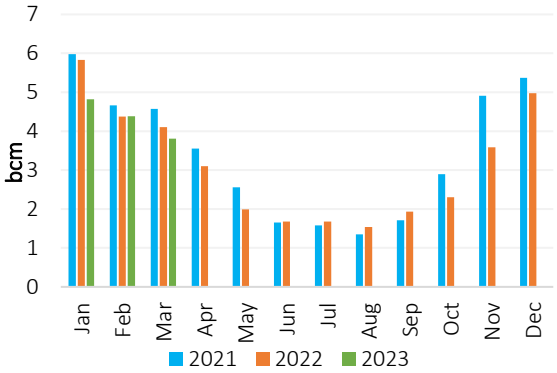
Source: GECF Secretariat based on data from Refinitiv and Ember

For the first quarter 2023, total gas consumption in Italy decreased by 19% y-o-y to reach 21 bcm.

2.1.1.3 France

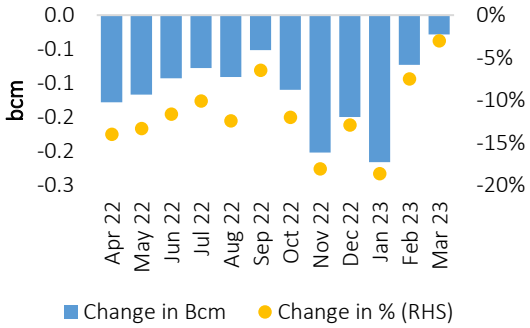
In March 2023, France's gas consumption decreased by 7.2% y-o-y to reach 3.8 bcm after a rebound in gas consumption in the previous month (Figure 16). The decline of gas consumption was driven by lower use in the power generation sector, as a result of higher wind and solar output. The residential sector recorded a decline of 2.4% y-o-y, as above normal temperatures reduced the demand for heating. Gas consumption in the industrial sector declined by 3% y-o-y (Figure 17), caused by high gas prices induced shutdown or reduction of output in some energy intensive industries, such as fertilizers and cements industries.

Figure 16: Gas consumption in France



Source: GECF Secretariat based on data from GRTgaz

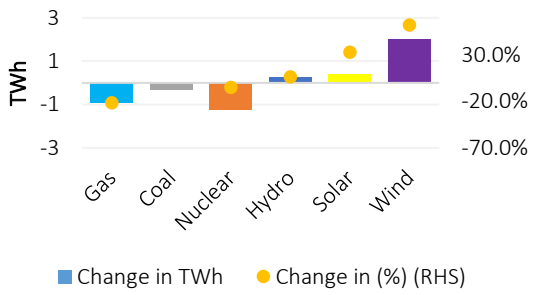
Figure 17: Trend in gas consumption in the industrial sector in France (y-o-y change)



Source: GECF Secretariat based on data from GRTgaz

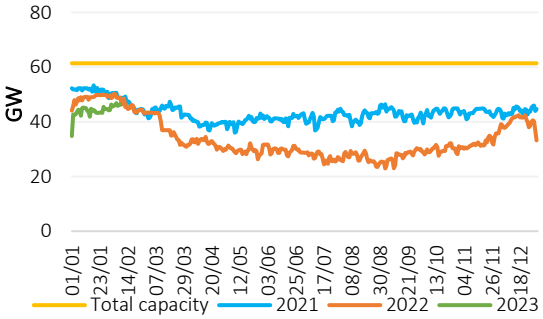
France's electricity production from gas declined by 41% y-o-y, while total electricity production increased by 0.5% y-o-y, reaching 40 TWh. The month saw a significant increase in electricity generation from wind (+62% y-o-y) and solar (+47%) as compared to the previous year. However, electricity production from nuclear and coal declined by 5% and 73% y-o-y respectively (Figure 18). During the month, nuclear capacity availability declined by 13% m-o-m, but increased by 1.4% compared to the same period last year (Figure 19). The nuclear availability in France could decline in the coming months after the discovery, by EDF, the French utility company, of new corrosion cases in their nuclear fleet. Nuclear remained the dominant fuel in the power mix with a share of 63% followed by renewables (18%), hydro (10%) and gas (9%).

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



Source: GECF Secretariat based on data from Ember

Figure 19: French nuclear capacity availability



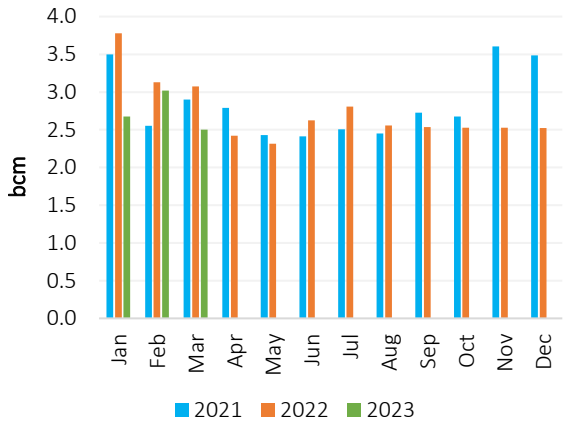
Source: GECF Secretariat based on data from Refinitiv and RTE

For the first quarter 2023, total gas consumption in France decreased by 9% y-o-y to reach 13 bcm.

2.1.1.4 Spain

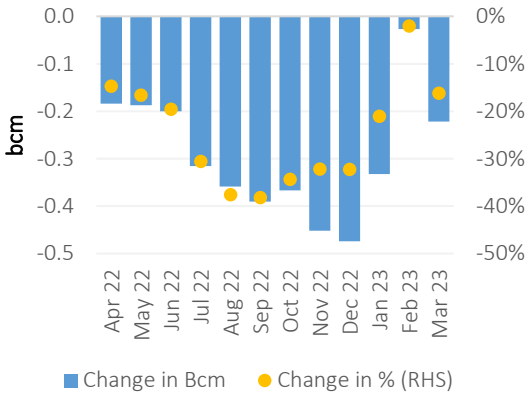
In March 2023, Spain's gas consumption decreased by 19% y-o-y to reach 2.5 bcm, driven by a decline of 16% and 17% in the industrial/residential and power generation sectors, respectively, due to above norm temperatures during the month, higher solar and wind output, lower electricity exports to France and relatively high gas prices (Figure 20). Gas consumption in the industrial sector declined by 16% y-o-y for the 13th consecutive month, albeit at a lower in the context of low gas prices environment (Figure 21).

Figure 20: Gas consumption in Spain



Source: GECF Secretariat based on data from Enagas

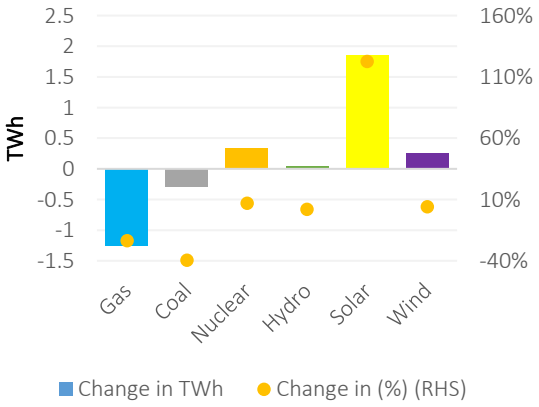
Figure 21: Trend in gas consumption in the industrial sector in Spain (y-o-y change)



Source: GECF Secretariat based on data from Enagas

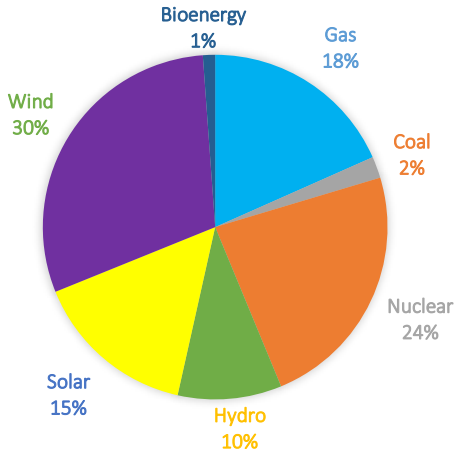
Spain's electricity production from gas declined by 24% y-o-y, while total electricity production increased by 3.8% y-o-y to reach 21.8 TWh. Higher generation was recorded from solar (+123% y-o-y), wind (4%), hydro (2%) and nuclear (7%) , while electricity production from coal declined by 40% (Figure 22). Renewables are the dominant energy source in the power mix with a share of 46% followed by nuclear (24%), gas (18%), hydro (10%) and coal (2%) (Figure 23).

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



Source: GECF Secretariat based on data from Ember and Ree

Figure 23: Spanish electricity mix March 2023



Source: GECF Secretariat based on data from Ember and Ree

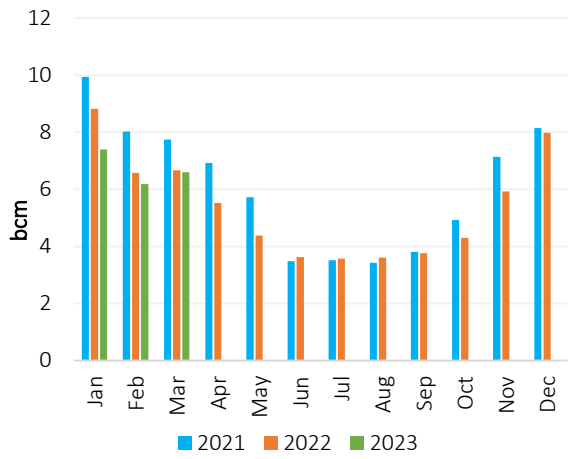
As per the forecast established by the Spanish TSO (Enagas), gas consumption in April 2023 is forecast to reach 2.3 bcm, which represents a decline of 13% and 1% y-o-y respectively.

For the first quarter 2023, gas consumption in Spain recorded a decline of 18% y-o-y.

2.1.2 United Kingdom

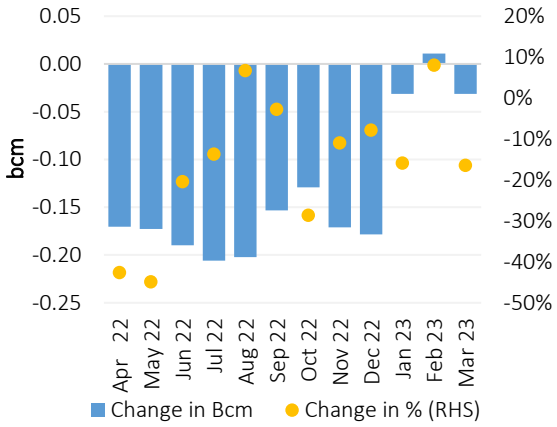
In March 2023, the UK's gas consumption decreased by 1% y-o-y, reaching 6.6 bcm (Figure 24).The decline was driven by high wind output in the UK power generation mix and a decline in the industrial sector, which recorded a 16% y-o-y decrease after rebounding last month. In addition, gas in the power generation sector significantly declined due to high wind speeds, which played against gas use in the power generation mix (Figure 25). However, cold weather was recorded in UK during the month, increasing the heating demand in the residential sector, which grew by 2.1% y-o-y to reach 5.1 bcm.

Figure 24: Gas consumption in the UK



Source: GECF Secretariat based on data from Refinitiv

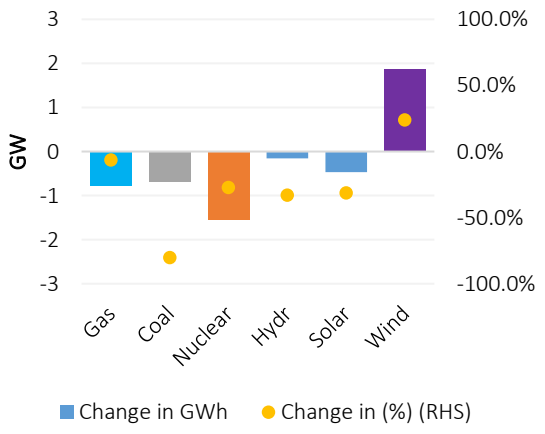
Figure 25: Trend in gas consumption in the industrial sector in the UK (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

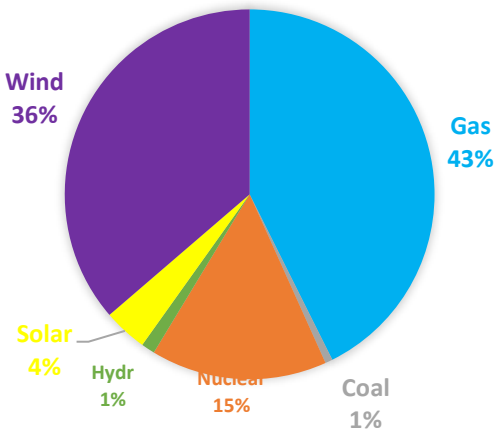
The UK's electricity production from gas decreased by 6.4% y-o-y, while total electricity production decreased by 6.2% y-o-y to reach 26.8 TWh. Higher generation from wind (+24% y-o-y) was recorded during the month. However, electricity production from coal, nuclear, hydro and solar declined by 80%, 27%, 33% and 31% y-o-y, respectively (Figure 26). Gas became the dominant energy source in the power mix with a share of 43% followed by renewables (40%), nuclear (15%), coal (1%) and hydro (1%) (Figure 27).

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



Source: GECF Secretariat based on data from Refinitiv

Figure 27: Spanish electricity mix March 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

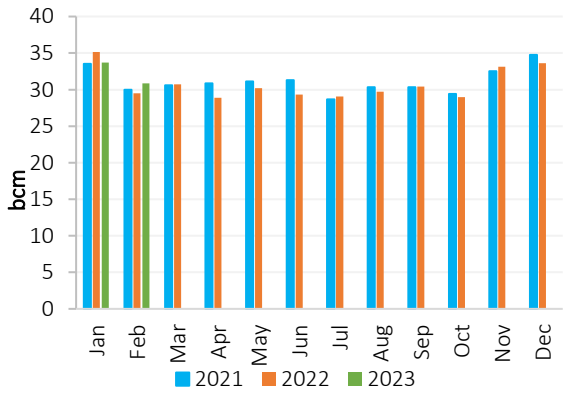
2.2.1 China

In February 2023, China's apparent gas demand (including pipeline imports, LNG imports and national production) increased by 4.6% y-o-y to 31 bcm, primarily due to the easing of COVID-19 lockdown measures and cold weather during the month (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.

The CNPC Research Institute also forecasted a rise in the gas consumption in the industrial sector, driven mainly by the steel and glass manufacturing industries, as a result of the expanding construction sector. Regarding the residential/commercial sector, the Institute expects a slow recovery after the removal of COVID-19 restrictions. In addition, the use of gas in the power generation sector is expected to record a slight increase in 2023.

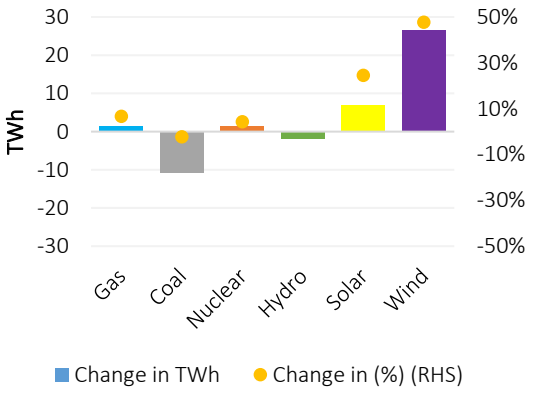
Electricity production from gas rose by 7% y-o-y, while total electricity production increased by 6.3% y-o-y to reach 709 TWh. Higher generation from nuclear (4%), hydro (97%), solar (25%) and wind (48%) was recorded during the month (Figure 29). In contrast, electricity production from coal decline by 2% y-o-y. Coal remained the dominant fuel in the power mix with a share of 64% followed by renewables (19%), hydro (10%), nuclear (5%) and gas (3%).

Figure 28: Gas consumption in China



Source: GECF Secretariat based on data from Refinitiv

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



Source: GECF Secretariat based on data from Ember

China's total apparent gas consumption for the period of January to February 2023 was 64.5 bcm, which is the same as the level of consumption for the same period in the previous year.

2.2.2 India

In February 2023, for the second consecutive month, India's gas consumption increased by 4.2% y-o-y to reach 4.5 bcm (Figure 30). The share of regasified LNG in India's gas supply dropped to 44%. In terms of the share of gas consumption by sector, the fertilizer sector maintained its dominant share of 36%, followed by city gas (21%), power generation (13%), refining (6%) and the petrochemical sector (3%) (Figure 31). The rise in gas consumption in India was driven by the recovery of fertiliser sector with an increase of 0.4 bcm (31% y-o-y) compared to February 2022. This sector was also helped by the decline in LNG spot prices prevalent during the beginning of the year.

Figure 30: Gas consumption in India

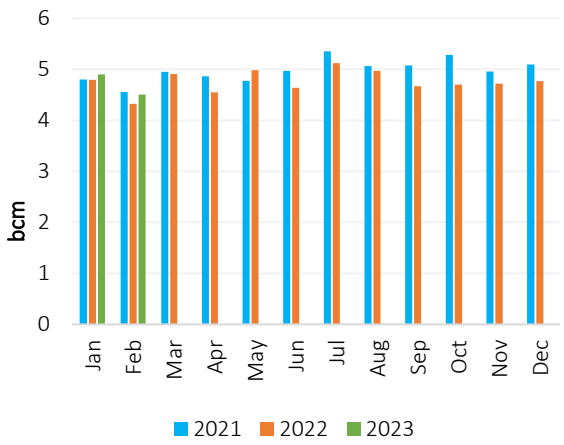
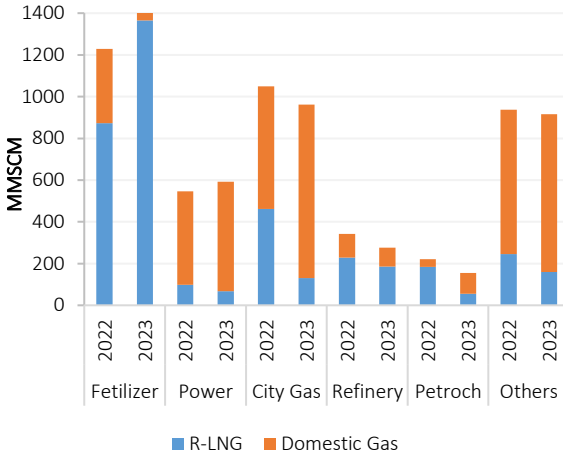


Figure 31: India's gas consumption by sector



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

The start of two new urea production facilities in Sindri and Barauni in East India, with a combined capacity of 1.3 Mt/year, has led to a boost in gas consumption in the country. This, coupled with the decline in gas prices, is likely to result in further expansion of gas usage. Additionally, the Indian government's plan to end urea imports by 2025 and rely solely on domestic production could also contribute to the growth of gas consumption in the coming years.

The recent introduction of an emergency rule by the Indian Power Ministry to address an anticipated shortfall in electricity output during peak power demand in April, May and June is expected to boost gas demand in the power generation sector. The directive mandates that gas-fired based power plants operate at full production capacity during this period. With hotter temperatures forecasted by the India Meteorological Department from March to May 2023, demand for gas in the power generation sector for cooling purposes is likely to be even higher than in the previous year.

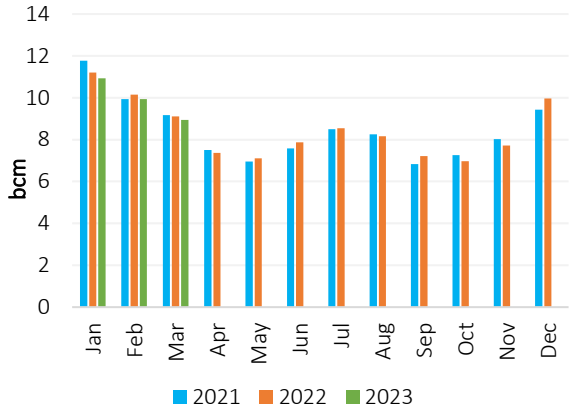
As part of India's vision for the use of gas in a diversified energy mix, Prime Minister Narendra Modi declared, during Indian Energy Week, that gas will play a strong role in the country's energy mix in the coming years.

2.2.3 Japan

In March 2023, gas consumption in Japan declined by 1.9% y-o-y, reaching 9 bcm (Figure 32), due to mild weather and the impact of the energy-saving policy that ended on March 31. The city gas sector was particularly affected, with gas consumption declining by 3.5% y-o-y. In the power generation sector, gas consumption declined by 0.7% y-o-y, driven by higher coal and nuclear output in the power mix. Nuclear availability during the month was higher by 89% compared to the same period of last year. Additionally, Japan's Heating Degree Days (HDD) during the month averaged 4.3, down by 27% y-o-y (Figure 33).

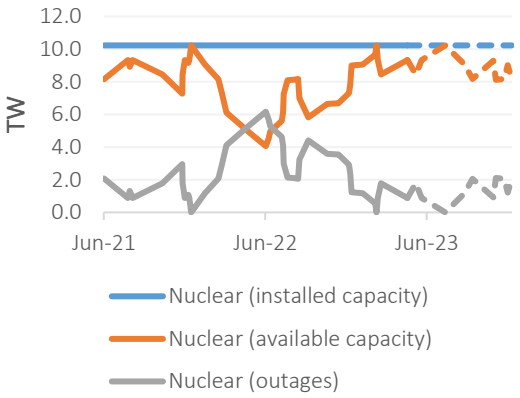
For the first quarter 2023, total gas consumption in Japan decreased by 2.2% y-o-y to reach 30 bcm.

Figure 32: Gas consumption in Japan



Source: GECF Secretariat based on data from Refinitiv

Figure 33: Nuclear availability in Japan

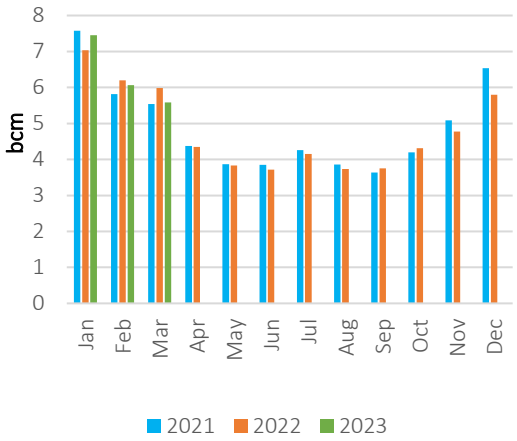


Source: GECF Secretariat based on data from Refinitiv

2.2.4 South Korea

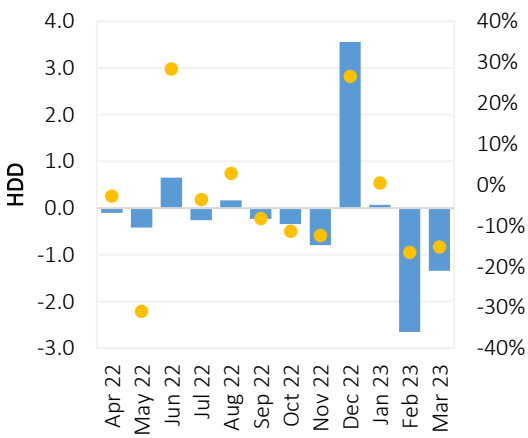
In March 2023, gas consumption in South Korea declined by 6.8% y-o-y, reaching 5.6 bcm, driven mainly by lower gas utilization in the residential sector as above normal temperatures were recorded during the month. The residential sector alone declined by 5.1% y-o-y to 2.7 bcm. Gas consumption in the power generation mix also decreased by 4.1% y-o-y due to higher nuclear and coal-based output during the month (Figure 34). South Korea's nuclear power availability has recovered in March 2023 compared to the same period of last year, representing a growth of 10% of the total Korean nuclear production during the month. Korea's HDD during the month averaged 7.5, down by 15% y-o-y, which strongly 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

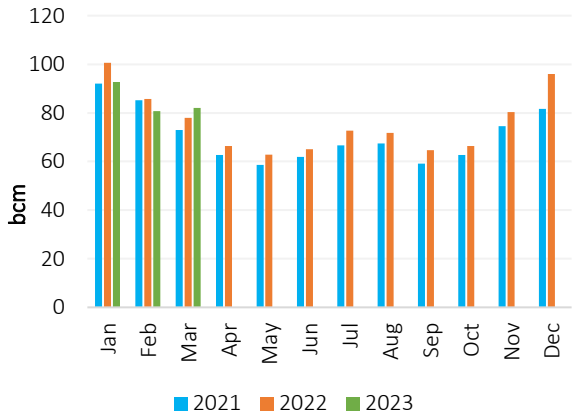
2.3.1 US

In March 2023, gas consumption in the US was estimated to have grown by 5.3% y-o-y to 82 bcm (Figure 36). The power generation, residential and commercial sectors were the main

drivers of the growth with an increase of 18.5% (4 bcm), 0.7% (0.2 bcm) and 2.5% (0.3 bcm) y-o-y, respectively. 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 solar output during the month.

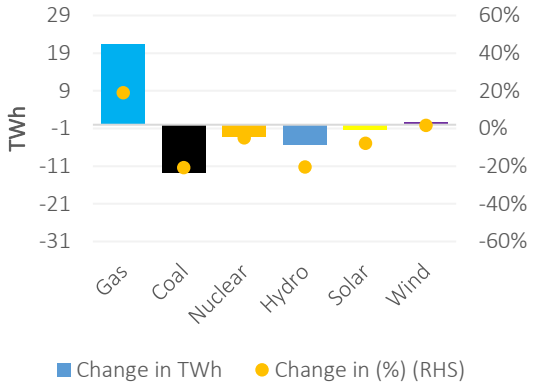
Electricity production from gas rose by 19% y-o-y, while total electricity production decreased by 0.1%. Higher y-o-y generation from wind (2%) was offset by a decline in generation from coal, nuclear, hydro and solar by 21%, 5%, 20% and 8%, respectively (Figure 37). Gas remained the dominant fuel in the power mix with a share of 38% followed by nuclear (20%), renewable (17%), coal (16%) and hydro (7%).

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 March 2023 (y-o-y change)

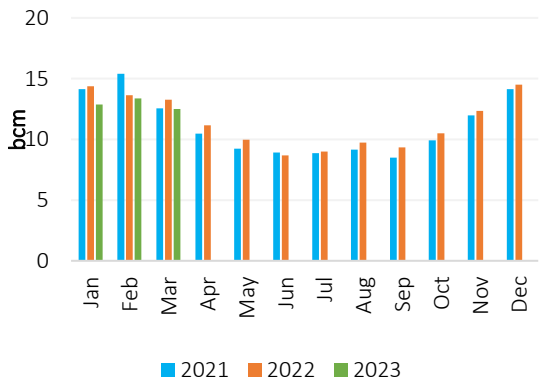


Source: GECF Secretariat based on data from Ember and Refinitiv

2.3.2 Canada

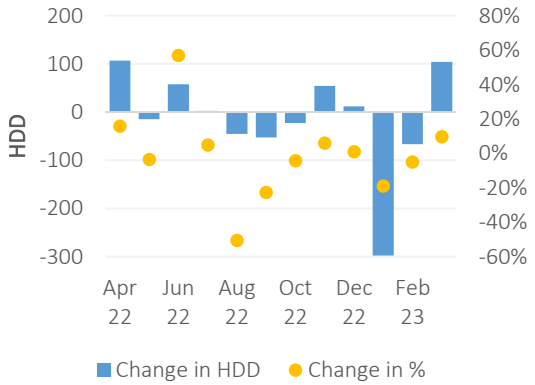
In March 2023, Canada's gas consumption declined by 6% y-o-y, driven by a decrease in gas consumption in the industrial/power generation and commercial sectors, which fell by 9% and 15.5% y-o-y, respectively (Figure 38). By contrast, the residential sector recorded a growth in gas consumption of 16.5% y-o-y driven by colder weather during March 2023 compared to March 2022, with an average of 104 HDD, which is 9.5% higher 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

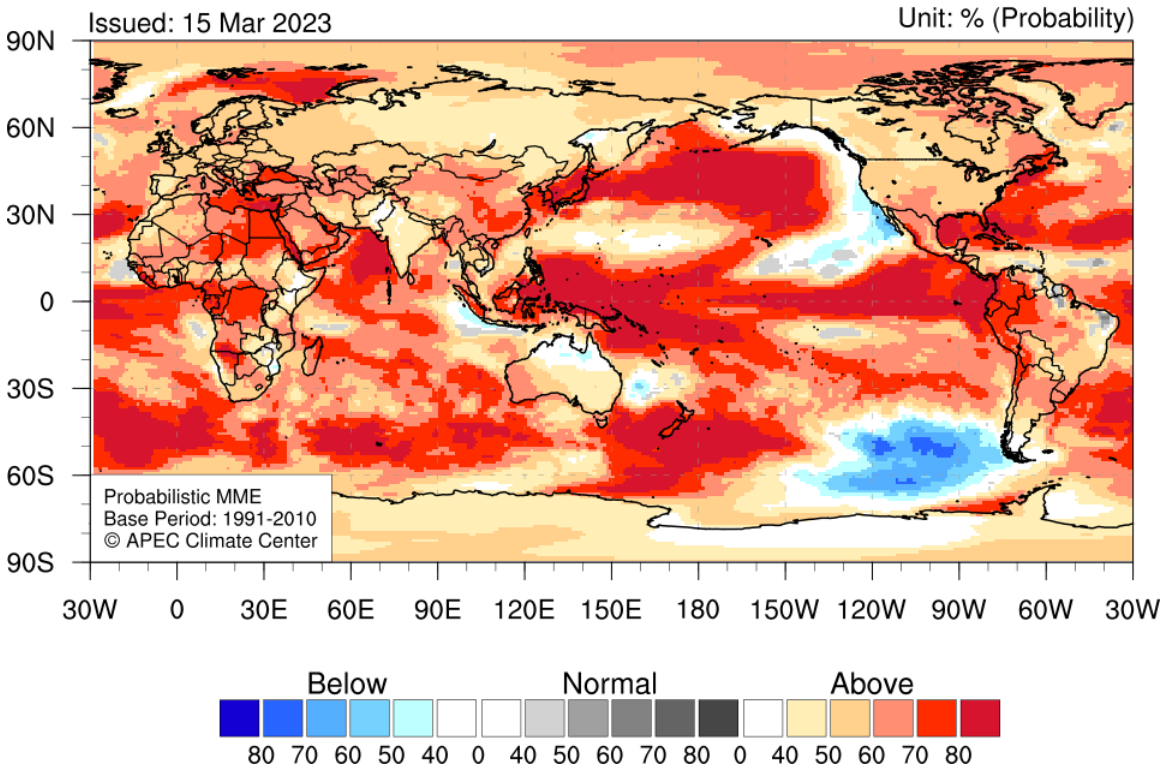
Weather and precipitation conditions have significant impact on gas consumption. Below normal temperatures in winter and above normal temperatures in summer boost heating and cooling demand respectively, while below normal precipitation leads to lower hydro output, which may trigger higher gas demand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



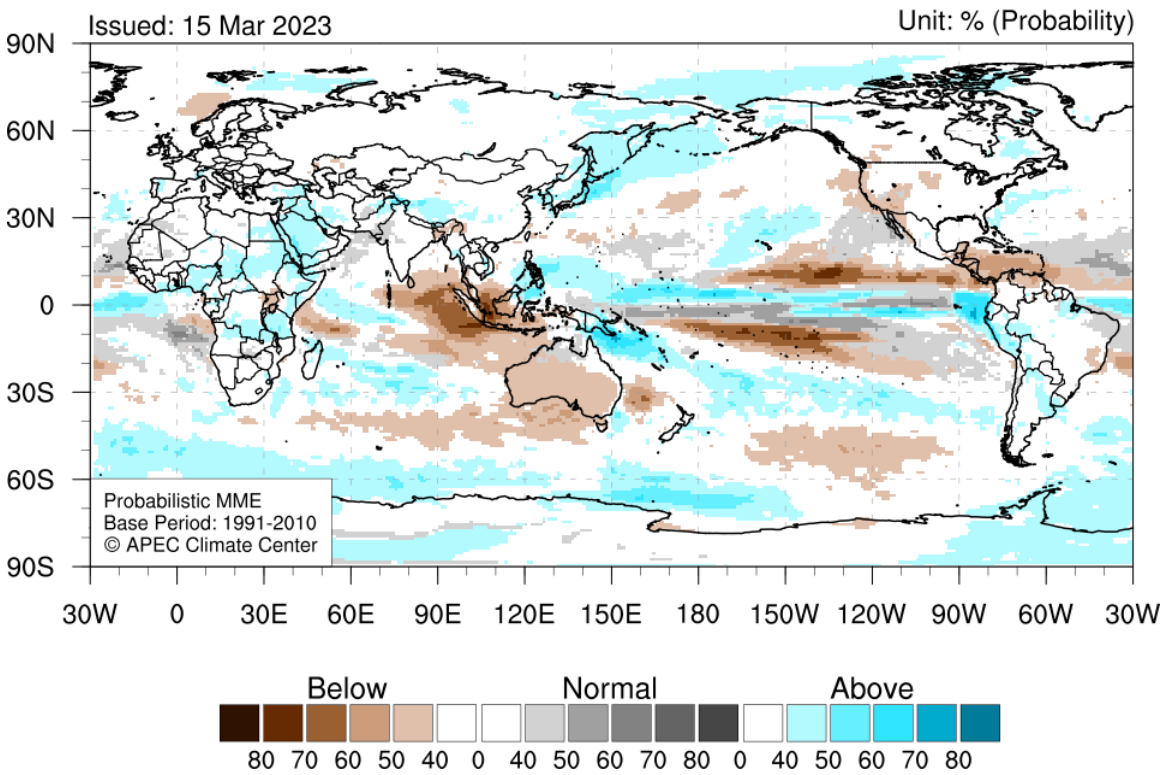
Source: APEC Climate Center

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



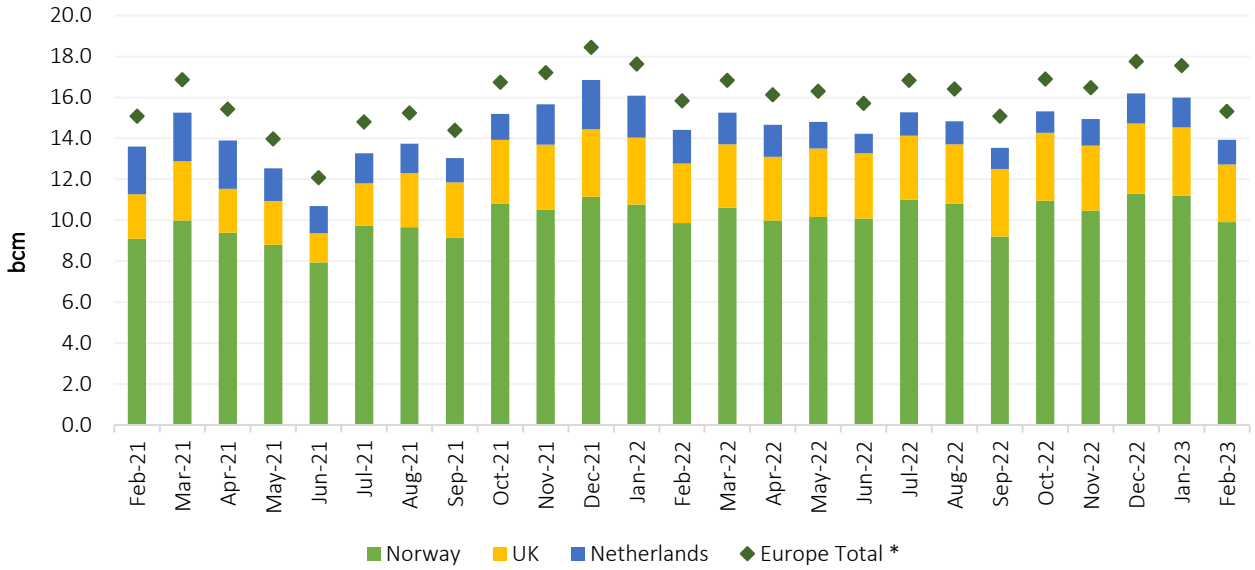
Source: APEC Climate Centre

3 Gas Production

3.1 Europe

In February 2023, Europe's gas production declined by 3.3% to reach 15.3 bcm, compared to the production levels from the same month the previous year (Figure 42). Production in the Netherlands and UK decreased by 26% and 3%, respectively, compared to the previous year, with output standing at 1.2 bcm and 2.8 bcm, respectively. Meanwhile, unexpected technical issues at two key Norwegian gas fields affected the country's gas production for the month. However, Norway's total gas output for the month remained unchanged compared to February of the previous year. In addition, Turkiye is scheduled to begin utilising the gas it discovered in the Black Sea, according to the Country's Energy and Natural Resources Minister, Fatih Donmez. The short-term projection for Europe's gas production has been slightly revised upwards for this year, compared to the previous forecast, primarily due to updated gas production data from Norway.

Figure 42: Europe's monthly gas production



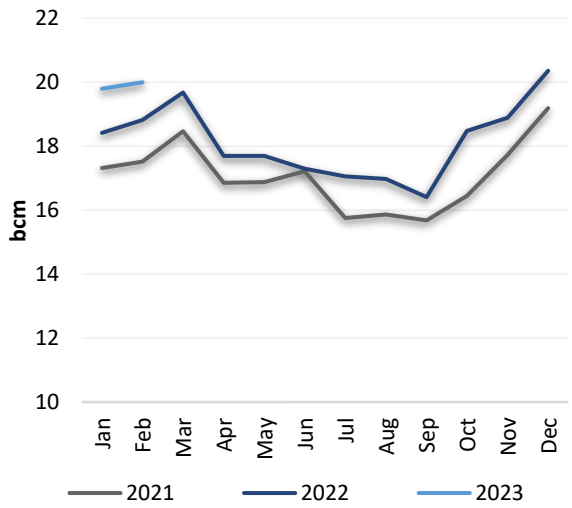
Source: GECF Secretariat based on data from Refinitiv, JODI Gas, Norwegian Petroleum Directorate
*Europe's production: UK, the Netherlands, Norway, Germany, Italy, Poland, Denmark, Austria, and Romania

3.2 Asia

In February 2023, China's gas production increased by 6% y-o-y to reach 20 bcm (Figure 43). Cumulative gas production for the first two months of 2023 stood at 39.8 bcm, representing a 7% y-o-y increase. In addition, China's cumulative coal-bed-methane (CBM) production in January and February 2023 was 1.035 bcm. The forecast for China's gas production in 2023 has been revised upwards due to anticipated increases in supply from one deep-water gas field in the South China Sea and another gas field in the Tarim region. The National Energy Administration (NEA) of China predicts that the country's gas output will increase by 6 bcm in 2023.

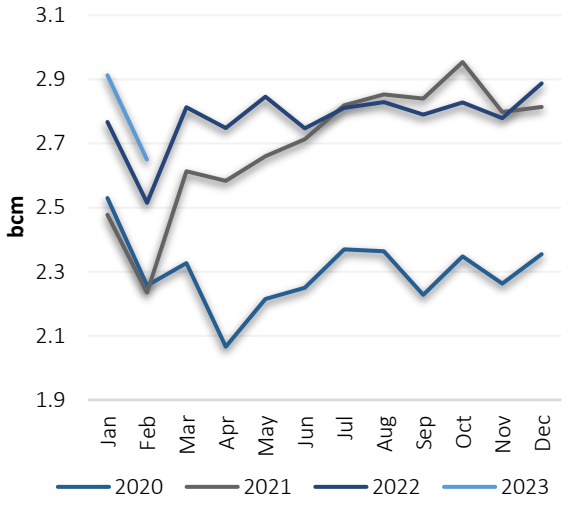
India's gas production increased by 5% y-o-y in February to reach 2.65 bcm (Figure 44). Cumulative gas production in 2023 (January and February) stood at 5.56 bcm, representing a 5% y-o-y increase.

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



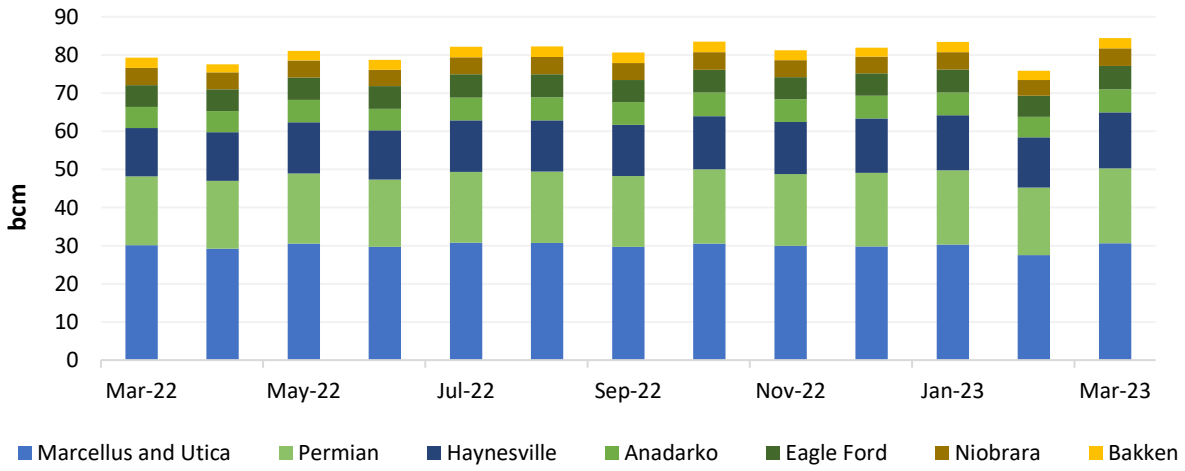
Sources: GECF Secretariat based on data from Refinitiv, Ministry of Petroleum (India)

3.3 North America

In March 2023, the seven major shale gas/oil regions (Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara, and Permian) produced 84.5 bcm of shale gas, a 7% increase from the previous year (Figure 45). The Appalachian region, which includes the Marcellus and Utica shale plays, was the top shale gas producer, accounting for 36% of the total output. In addition, the Permian shale oil field experienced a significant rise in associated gas production, which reached 19.7 bcm, or 23% of the total shale gas production, a 9% increase from the previous year.

US gas production is projected to rise by about 33 bcm this year, according to the latest forecast by Rystad Energy. Most of this growth will come from associated gas. However, a recent energy survey conducted by Dallas Fed found that soaring costs have put downward pressure on gas production in the US in the first quarter of this year.

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

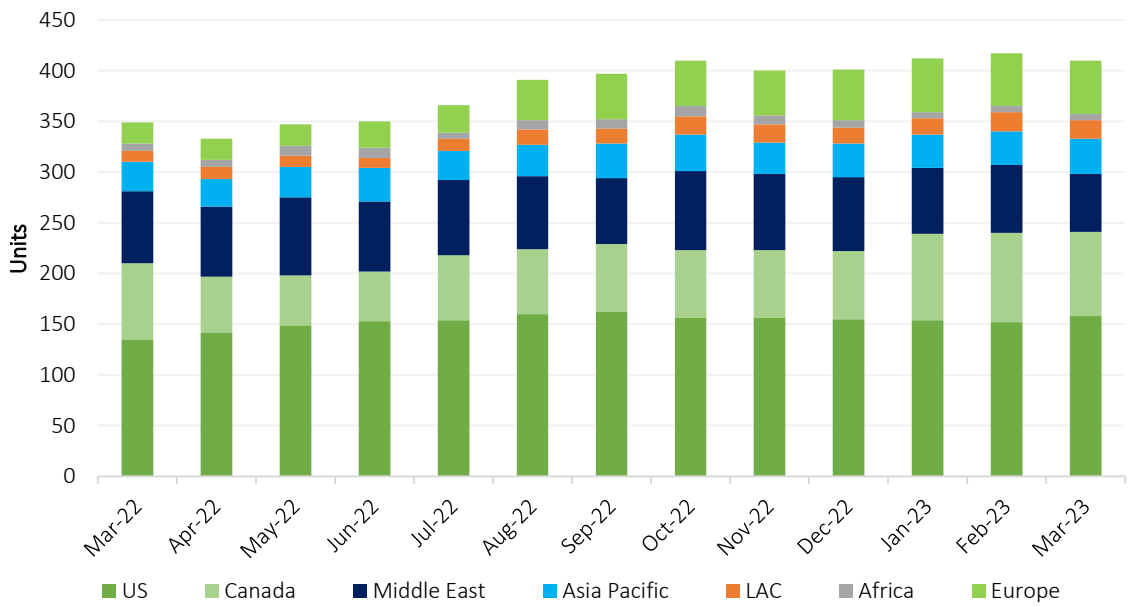
In March 2023, the global gas rig count, a measure of upstream activity, dropped by 7 units m-o-m and rose by 61 units y-o-y, reaching a total of 410 units (Figure 46). The Middle East, Canada, and LAC saw a decrease in active gas rigs by 10, 5, and 1 unit, respectively, while other regions saw an increase in gas rig count.

In February 2023, the total number of oil and gas rigs in the US's seven major shale oil and gas producing regions was 693, representing a 6-unit decrease from January 2023 (the highest m-o-m decrease since July 2020). Despite the m-o-m decline, the total rig count still was up 119 units compared to February 2022 (Figure 47).

In addition, the seven key US shale oil and gas regions had 4,773 drilled but uncompleted (DUC) wells in February 2023, which was 21 more than the previous month but 332 less than the same month last year (Figure 48). Rising drilling costs encouraged drillers to complete previously DUC wells instead of drilling new ones.

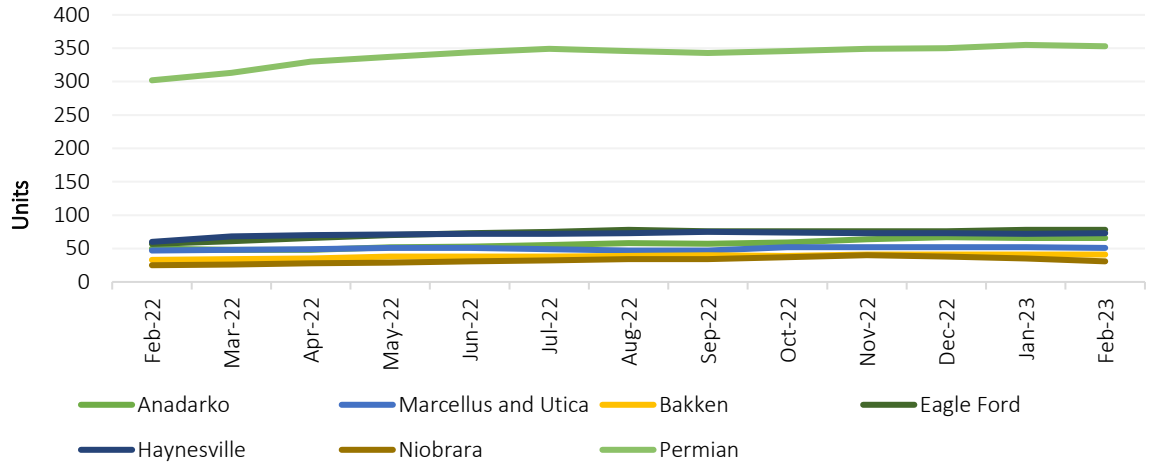
According to the EIA's Drilling Productivity Report, gas production per rig in the seven major shale oil and gas regions dropped in March 2023 to 5,343 thousand cubic feet per new well, a 1.1% m-o-m and 14.8% y-o-y decrease. (Figure 49).

Figure 46: Trend in monthly global gas rig count



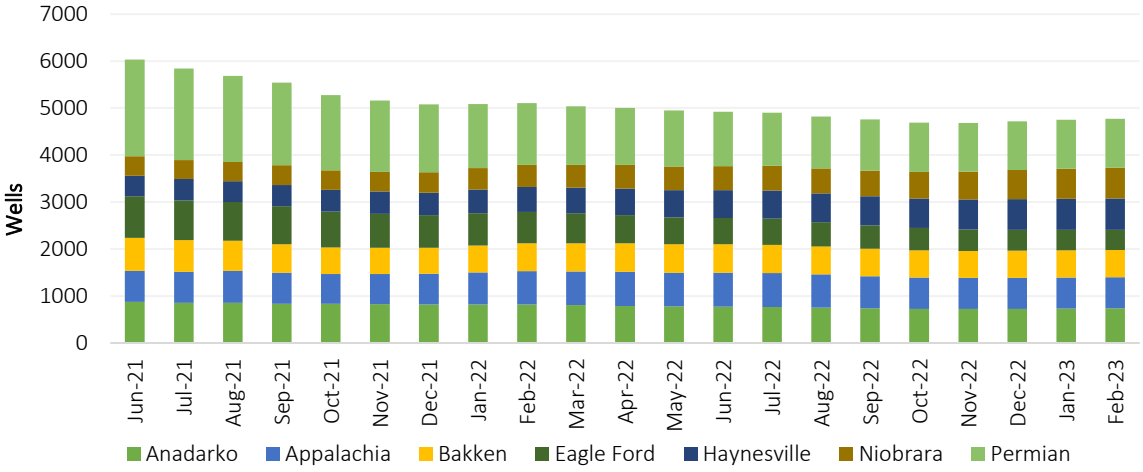
Source: GECF Secretariat based on data from Baker Hughes
Note: Excludes data for CIS and Iran

Figure 47: US shale region oil and gas rig count



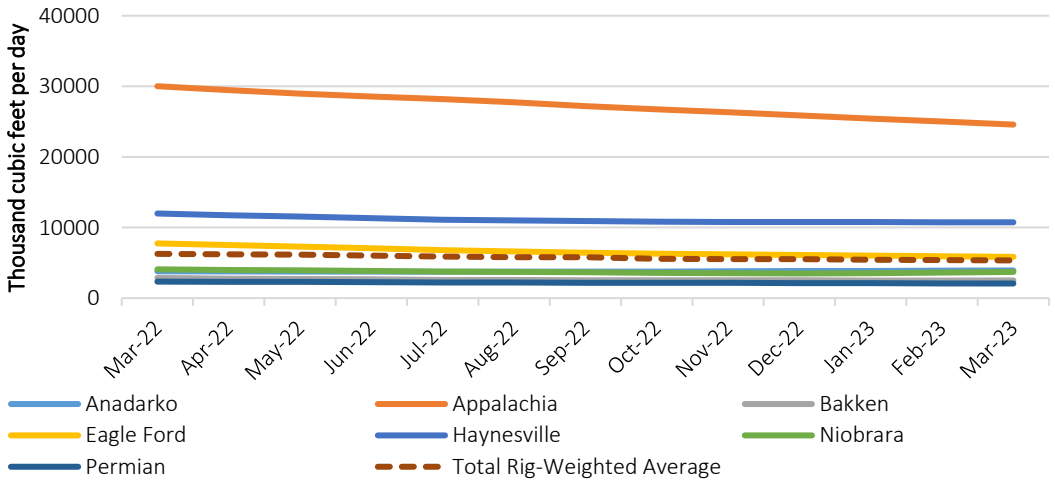
Source: GECF Secretariat based on data from Refinitiv

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

Gas and liquids volumes discovered in February 2023 totalled 127 million barrels of oil equivalent (boe), of which 16% (3.4 bcm) is gas, while the remaining 84% (107 million boe) is oil. This was a decrease compared to the 381 million boe discovered in January 2023 and 1039 million boe discovered in February 2022, bringing the average monthly discovered volumes in 2023 to 260 million boe (Figure 50). It is worth mentioning that February 2023 recorded the lowest monthly discovered volumes since May 2021.

Out of the five new discoveries in February 2023, four were offshore and one was onshore, with Asia Pacific and Europe accounting for 55% and 36% of the discovered volumes, respectively. There were no significant discoveries in Africa, LAC, North America and the Middle East (Figure 51).

Sinopec's Wei 10 offshore discovery in the Weizhou Block of the South China Sea was the largest discovery announced in February. The discovery well was deemed to have met reserves expectations and flowed commercial volumes. The operator aims to produce around 100,000 barrels per day (bpd) of oil from the Weizhou Block, however, the area lacks the necessary infrastructure and the discovery has yet to be appraised, in order to finalize development plans.

In Rover South, Norway, the most significant gas discovery in February 2023 was made by drilling wildcat well 31/1-3 S and appraisal well 31/1-3 A within the license, which was awarded during the APA 2017 round. Rystad Energy reported that approximately 80m of gas column and 50m of oil column were encountered, with approximately 32 million boe of recoverable resources.

In March, Shell reportedly continued its successful campaign in the Orange Basin, offshore Namibia, announcing a discovery in the Jonker-1X exploration well, with planned appraisal drilling for evaluation of the recoverable potential. The company announced its first discovery at the Graff field in early 2022.

Figure 50: Monthly gas and liquids discovered volumes

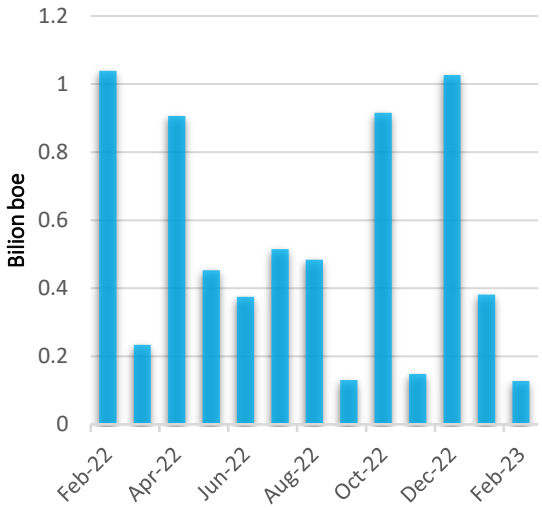
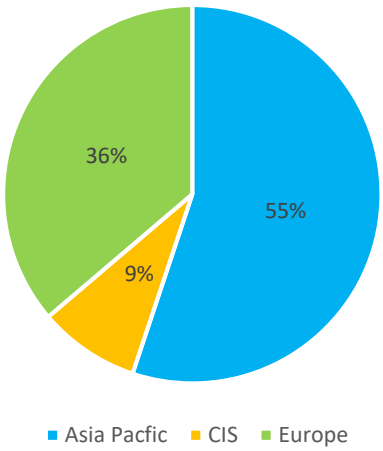


Figure 51: Discovered volumes in February 2023 by regions



Source: GECF Secretariat based on Rystad Energy Ucube

3.6 Other Developments

According to preliminary estimates, global gas production declined by 0.4% to 4029 bcm in 2022, mainly due to lower output in the CIS. High prices and geopolitical tensions dampened gas demand and production (Table 1). However, gas production rose in North America, the Middle East, Europe and Asia Pacific regions by 51, 11, 8 and 3 bcm, respectively. The global gas figures for 2022 have been revised downwards from the previous month's estimates because of lower production in the Middle East, North America and Asia Pacific.

The forecasts for 2023 show a modest recovery of 1% in global gas production as some regions increase their output. North America, LAC, the Middle East, and Africa are expected to lead the production growth, while production remains stable or declines in other regions. Non-GECF countries are projected to boost their gas production by 2.3% to 2417 bcm, with the US accounting for most of the increase with 33 bcm more than in 2022.

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

Region	2021	2022	2022 Revision*	2023	2023 Revision*
Africa	265	260	0.4%	265	0.4%
Asia Pacific	665	668	-0.5%	656	-1.2%
CIS	899	814	-0.4%	791	-0.5%
LAC	155	156	1.2%	164	1.9%
Europe	224	231	1.8%	225	2.9%
Middle East	671	682	-1.7%	706	-1.5%
North America	1166	1217	-0.6%	1263	-2.1%
World	4045	4029	-0.44%	4071	-0.9%
GECF	1755	1666	0.6%	1654	0.7%
non-GECF	2290	2363	-1.2%	2417	-2.1%

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

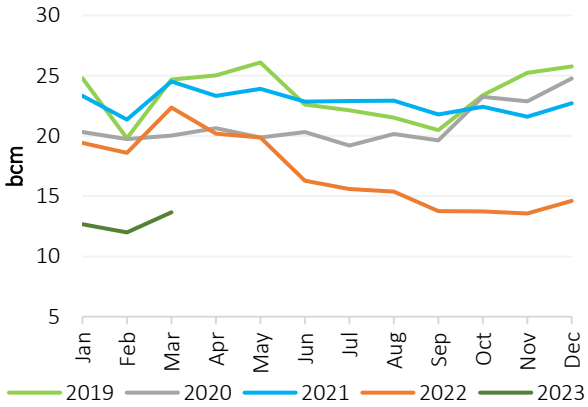
4 Gas Trade

4.1 Pipeline Gas (PNG) Trade

4.1.1 Europe

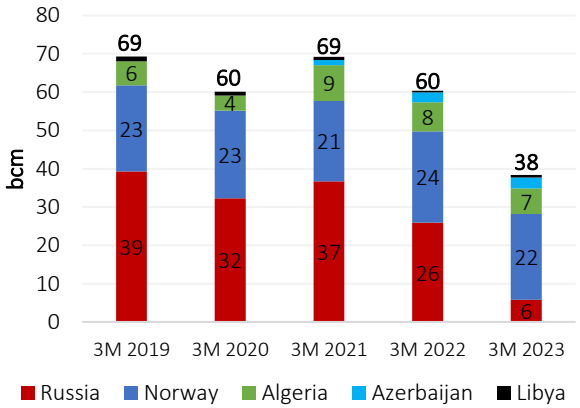
In March 2023, there were 13.7 bcm of PNG imports to the EU, which was 14% higher than the previous month, but 39% lower than one year ago (Figure 52). Thus far in 2023, the EU's cumulative pipeline gas supply for the first three months decreased by 37% y-o-y to 38.3 bcm (Figure 53). This was driven by decreases in imports from Russia, Norway and Algeria, while there was a rise in imports from both Azerbaijan and Libya. The pipeline import by supplier and month in 2023 is shown in Figure 54.

Figure 52: Monthly PNG imports to the EU



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 53: Year-to-date EU PNG imports by supplier

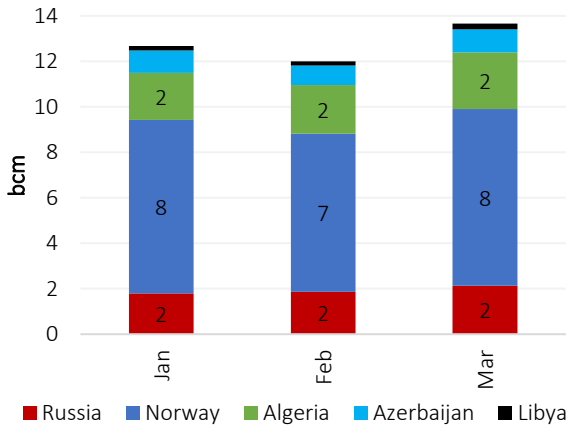


Source: GECF Secretariat based on data from McKinsey and Refinitiv

In 2023 so far, Norwegian supply has declined by 6% y-o-y to reach 22 bcm, while imports from Russia decreased by 78% y-o-y to reach 6 bcm. During 2023, Norway thus far has accounted for 58% of total supply to the EU, compared with Russia at 15%.

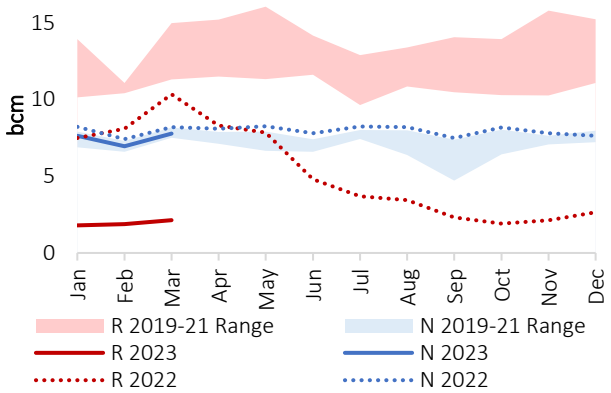
Norway's PNG exports to the EU averaged 7.4 bcm per month in 2023, compared with 7.9 bcm per month in 2022, and 7.3 bcm per month during 2019-2021 (Figure 55). In comparison, Russia's PNG exports to the EU averaged 1.9 bcm per month in 2023, compared with 5.2 bcm per month in 2022, and 12.5 bcm per month from 2019-2021.

Figure 54: Monthly EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 55: EU PNG supply from Russia and Norway

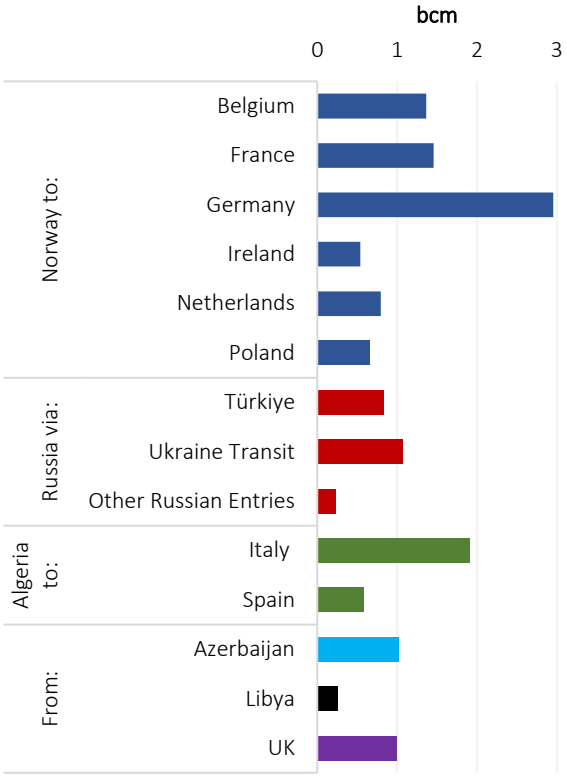


Source: GECF Secretariat based on data from McKinsey and Refinitiv

Looking at the EU's PNG imports on a more granular level, Figure 56 shows the flows to the region via the major import supply routes in March 2023. Norway exported most of its volumes (38%) to Germany, followed by France (19%) and Belgium (18%). For Russia, the main active supply routes were the Ukraine transit pipelines, which accounted for 50% of its EU exports, and the Turkstream pipeline, which accounted for 39%. Algeria supplied 77% of its volumes to Italy. With the continued influx of LNG imports to the UK, 1.0 bcm of PNG entered the EU via the interconnectors in March.

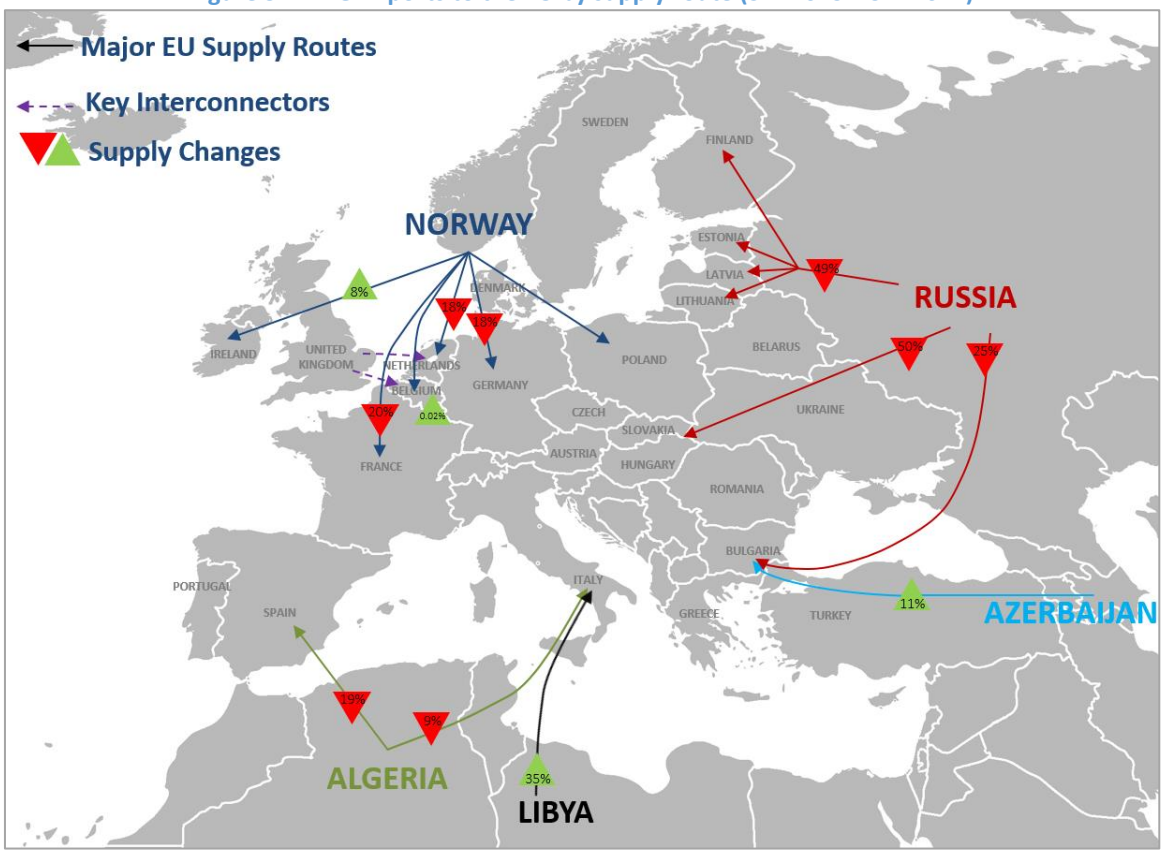
Figure 57 shows the EU PNG imports via the major supply routes in the first three months of 2023 versus the same period in the previous year. Russian and Algerian PNG flows have recorded decreases through all routes. Quantities from Norway to Germany declined by 18%, as gas is redistributed to Poland via Denmark.

Figure 56: EU PNG imports by supply route, in March 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 57: PNG imports to the EU by supply route (3M 2023 v 3M 2022)

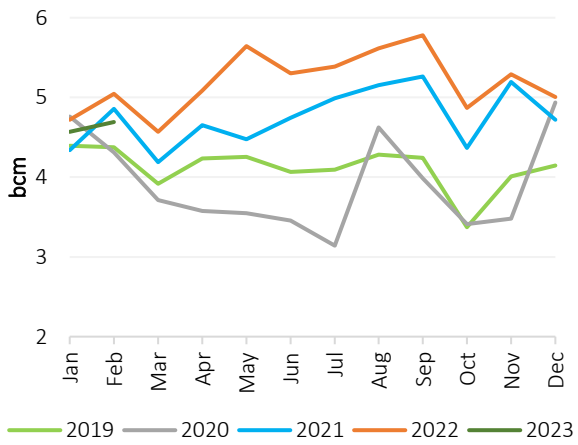


Source: GECF Secretariat based on data from McKinsey and Refinitiv

4.1.2 Asia

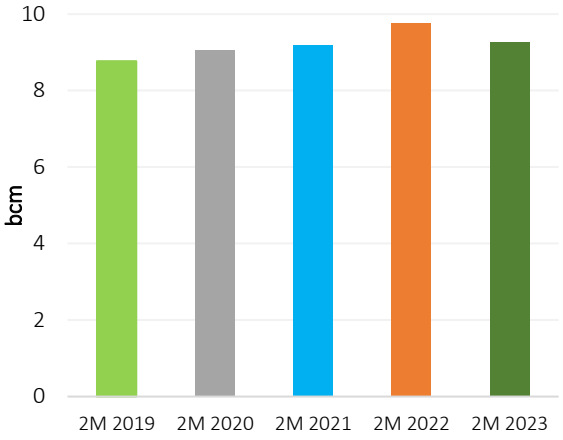
In February 2023, there were 4.7 bcm of PNG imports to China, which was 3% higher than the previous month, but 7% lower y-o-y (Figure 58). As China continues its post-lockdown rebound, the expectation is for an increase in gas imports via pipelines and LNG cargoes. The average monthly PNG imports in the first two months of 2023 was 4.6 bcm, compared with 4.9 bcm during the same period in 2022, which is a decrease of 5% (Figure 59).

Figure 58: Historical PNG imports in China



Source: GECF Secretariat based on data from Refinitiv

Figure 59: Monthly PNG imports in China

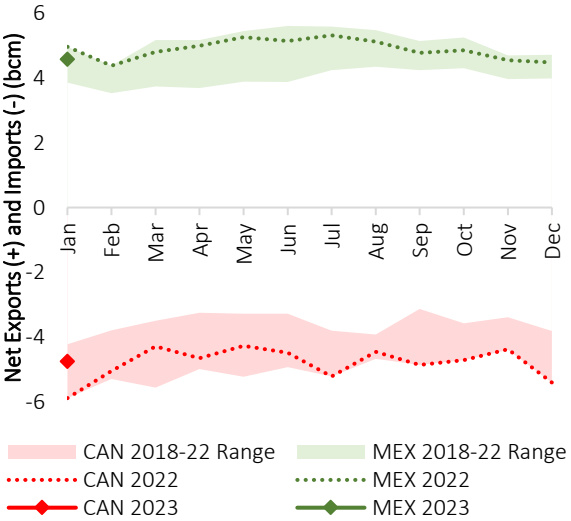


Source: GECF Secretariat based on data from Refinitiv

4.1.3 North America

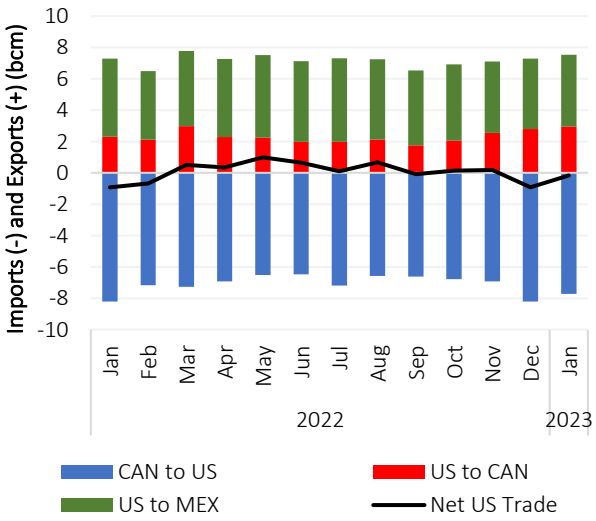
In January 2023, there were 4.8 bcm of net PNG imports from Canada to the US, which was 12% lower than the previous month, and 19% lower y-o-y (Figure 60). During the same month, there were 4.6 bcm of net PNG exports from the US to Mexico, which was 2% higher m-o-m, but 8% lower y-o-y. These PNG flows resulted in a small quantity of net pipeline imports into the US from Canada (Figure 61). During 2022, average monthly flows in the region were: CAN to US – 7.1 bcm, US to CAN – 2.3 bcm, and US to MEX – 4.9 bcm.

Figure 60: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 61: PNG trade in North America



Source: GECF Secretariat based on data from US EIA

4.1.4 Other Developments

Further gas pipeline integration in South America: Argentina is planning the construction of new gas pipeline infrastructure, which will spur domestic consumption, as well as facilitate exports to neighbouring Brazil. The expansion of the Nestor Kirchner gas pipeline will occur in phases. Currently phase 1 will expand the line by over 570 km from the Vaca Muerta hub to Buenos Aires. Commissioning of this phase is expected by June 2023. The upcoming phase 2 then extends the line by a further 520 km, bringing supply to Brazil.

Brazil to increase internal gas pipeline infrastructure: Brazil's Ministry of Energy has launched the "Transport Gas Pipeline Plan 2022-2026", which outlines the country's plans to massively upgrade the domestic gas capacity and connectivity. The scheme will focus on the construction of five new gas pipelines, which will link key demand centres with existing and future LNG import terminals, as well as from indigenous production. The total scope of this investment is expected to be in the range of around $4 billion.

Planned maintenance on the Power of Siberia pipeline: At the end of March, Russia's energy provider Gazprom announced a week-long shutdown of the Power of Siberia gas pipeline to China, for scheduled maintenance activity. During this time, gas flows along the line will be halted. The Power of Siberia pipeline is gradually ramping up its flows to the designed maximum of 38 bcma by 2025.

New gas pipeline in Guyana: ExxonMobil, the US-based gas producer currently operating in Guyana's upstream sector, has commenced construction on a new gas-to-shore pipeline to facilitate the project in the South American country. The new 215 km line will have a maximum rate of 120 mmscfd, and is expected to cost one billion dollars. The pipeline will bring gas supply to a power plant and an NGL facility.

4.2 LNG Trade

4.2.1 LNG Imports

In March 2023, global LNG imports stood at 35.04 Mt (Figure 62), which represents a y-o-y growth of increased by 2.7% (0.94 Mt). However, the y-o-y growth during the month was slower that the pace of growth recorded in February. Higher LNG imports in Europe offset weaker imports in Asia Pacific and LAC (Figure 63). The cumulative global LNG imports from January to March 2023 increased by 2.7% (2.79 Mt) to 105.95 Mt supported by stronger LNG imports in Europe and Asia Pacific which offset lower imports in LAC and MENA region.

Figure 62: Trend in global monthly LNG imports

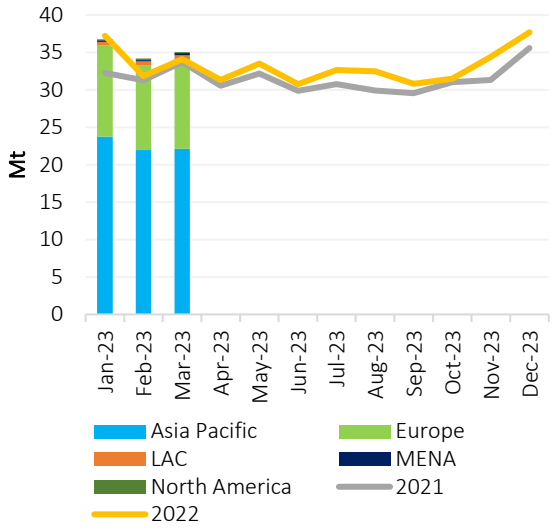
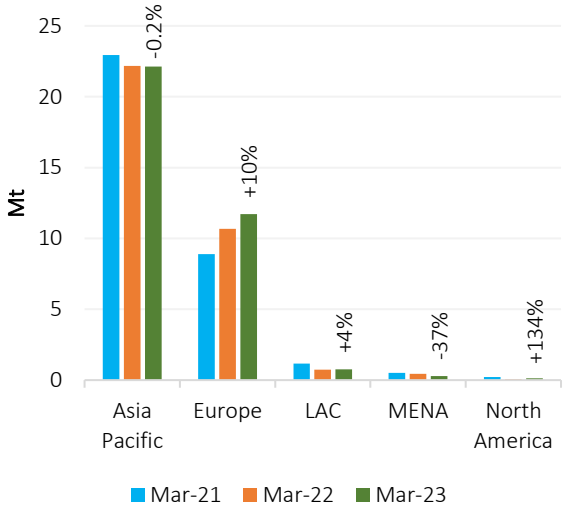


Figure 63: Trend in regional LNG imports in March 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.1 Europe

In March 2023, Europe's LNG imports grew by 10% (1.03 Mt) y-o-y to 11.71 Mt (Figure 64), which also represents a slowdown in the pace of growth from the previous month. The weaker pipeline gas imports from Russia supported the increase in LNG imports into Europe. Belgium, Germany, Italy, Lithuania, the Netherlands, Spain and the UK drove the increase in European LNG imports and offset lower imports in France and Türkiye (Figure 65). The cumulative European LNG imports for the first three months of the year rose by 9.2% (2.95 Mt) y-o-y to 35.19 Mt.

The surge in Belgium's LNG imports was driven by higher gas consumption and stronger pipeline gas exports to Germany amidst the decline in imports of Russian pipeline gas. In Germany, Italy and Lithuania, the jump in LNG imports was attributed to the decrease in imports of Russian pipeline gas in both countries. Meanwhile, lower gas production and a drop in pipeline gas imports from Norway, coupled with an uptick in pipeline gas exports to German,y boosted LNG imports in the Netherlands. In Spain, the uptick in LNG imports was supported by weaker pipeline gas imports from Algeria and stronger pipeline gas exports to Morocco and Portugal. Furthermore, the fall in pipeline gas imports from Norway and the increase in pipeline gas exports to mainland Europe through the IUK pipeline led to the increase in UK LNG imports. On the other hand, the slump in French LNG imports was due to strike actions at all the LNG import terminals in the country during the month of March. Finally, a sharp decline in LNG imports from the US drove Türkiye's LNG imports lower.

Figure 64: Trend in Europe's monthly LNG imports

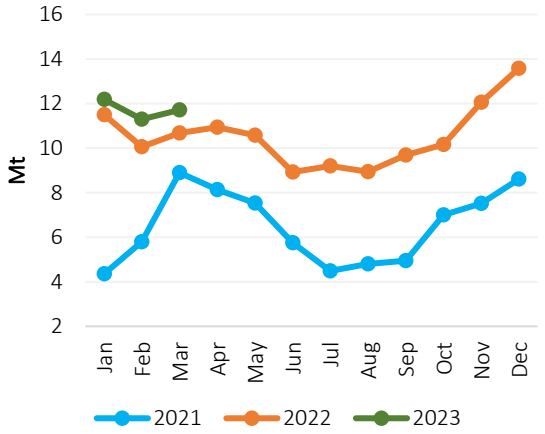
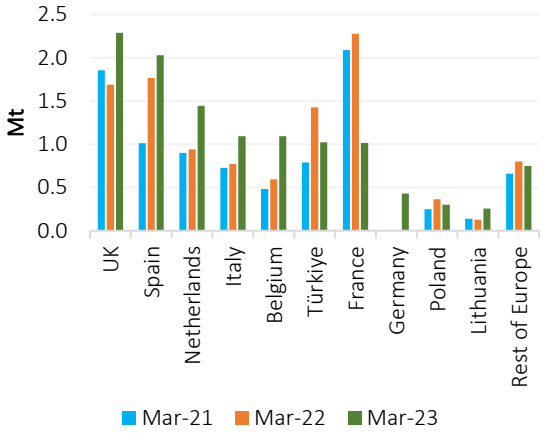


Figure 65: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.2 Asia

In March 2023, Asia Pacific's LNG imports declined slightly by 0.2% (0.04 Mt) y-o-y to 22.14 Mt (Figure 66), reversing the recovery recorded in February 2023. Japan and South Korea drove the decline in the region's LNG imports but it was partially offset by higher imports in China, Indonesia and Thailand (Figure 67). Asia Pacific's cumulative LNG imports for the first three months of the year was 67.84 Mt, a1.2% (0.77 Mt) increase y-o-y.

The drop in Japan's LNG imports was driven by warmer-than-usual weather in March 2023, reducing the electricity demand for heating and hence curbing gas consumption and LNG imports. Similarly, a decline in electricity demand in South Korea, amidst a warmer-than-usual winter season, contributed to lower gas demand and LNG imports in the country. High LNG inventories also led to the drop in LNG imports in Japan and South Korea. In contrast, despite the warmer-than-usual weather in China in March, the post-COVID-19 recovery in industrial and economic activity boosted LNG imports in the country. In Indonesia, stronger intra-country LNG trade supported the higher LNG imports. Finally, weaker domestic gas production and declining pipeline gas imports from Myanmar drove Thailand's LNG imports higher.

Figure 66: Trend in Asia's monthly LNG imports

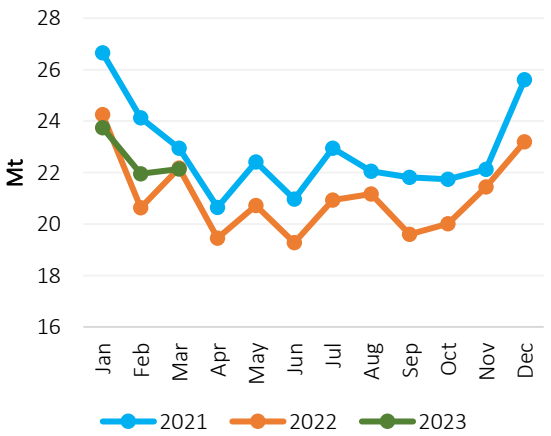
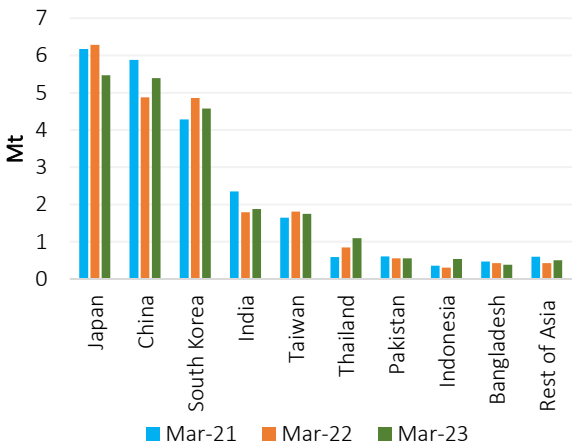


Figure 67: Top LNG importers in Asia



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.3 Latin America & the Caribbean (LAC)

In March 2023, LAC's LNG imports increased by 4.4% (0.03 Mt) y-o-y to 0.77 Mt (Figure 68). The uptick in LNG imports was supported by higher imports in El Salvador, Jamaica and Puerto Rico, which offset a slump in imports in Brazil (Figure 69). The cumulative LNG imports in LAC, from January to March 2023, fell by 25% (0.60 Mt) y-o-y to 1.83 Mt.

In El Salvador, LNG imports in the country continue to rise following the start-up of the Acajutla FSRU in April 2022. The increase in Jamaica's LNG imports was driven by stronger imports from Trinidad and Tobago. Since January 2023, Puerto Rico's LNG imports have increased y-o-y with New Fortress Energy supplying several small-scale LNG cargoes reloaded from Jamaica. Meanwhile, the higher hydro output led to the slump in Brazil's LNG imports.

Figure 68: Trend in LAC's monthly LNG imports

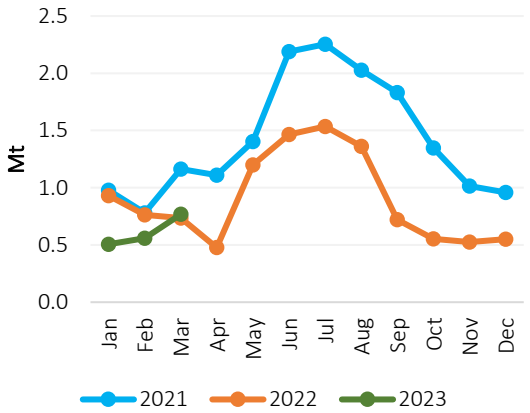
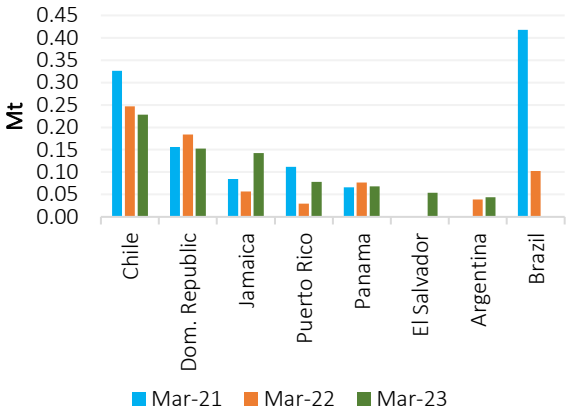


Figure 69: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.4 MENA

In March 2023, the MENA region's LNG imports fell sharply by 37% (0.16 Mt) y-o-y to 0.28 Mt (Figure 70), driven mainly by weaker imports in Kuwait and Egypt (Figure 71). The MENA region's cumulative LNG imports from January to March 2023 dropped by 33% (0.33 Mt) y-o-y to 0.66 Mt. In Kuwait, higher availability of low sulphur fuel oil (LSFO) for electricity production curbed LNG imports. On the other hand, Egypt imported its last LNG cargo in March 2022, which was an intra-country LNG trade.

Figure 70: Trend in MENA's monthly LNG imports

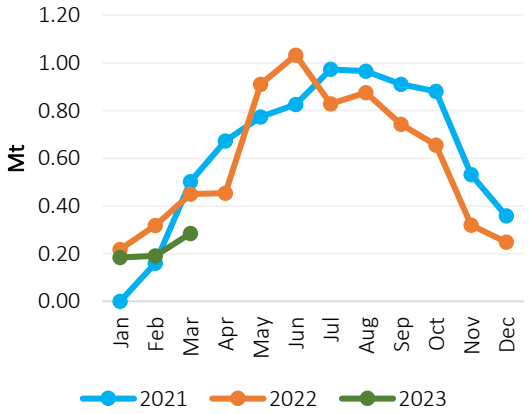
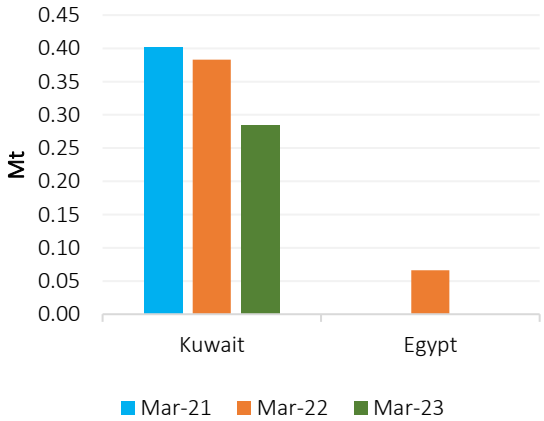


Figure 71: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2 LNG Exports

In March 2023, global LNG exports reached a record high of 36.36 Mt, representing a 6.5% (2.22 Mt) y-o-y increase (Figure 72). GECF member countries accounted for half of the incremental increase in LNG exports while non-GECF countries and LNG reloads accounted for the remaining half. Non-GECF countries were the largest LNG exporters globally with a market share of 50%, while the market shares of GECF and LNG reloads stood at 48.6% and 1.4%, respectively. In March 2022, the market share of GECF member countries and LNG reloads increased from 48.5% and 0.5%, respectively, while the share of non-GECF countries declined from 51%. At a country level, the US was the largest exporter in March 2023, followed by Australia and Qatar (Figure 73). The cumulative global LNG exports from January to March 2023 increased by 6.6% (6.51 Mt) y-o-y to 105.73 Mt.

Figure 72: Trend in global monthly LNG exports

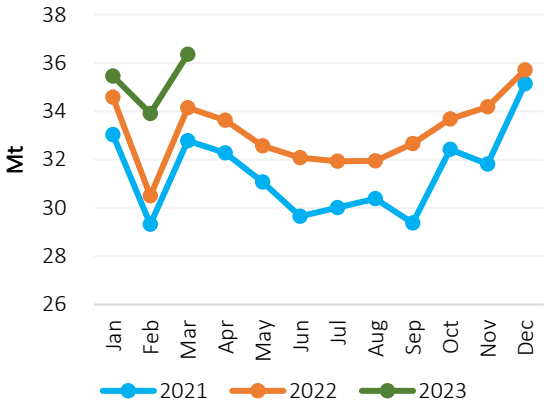
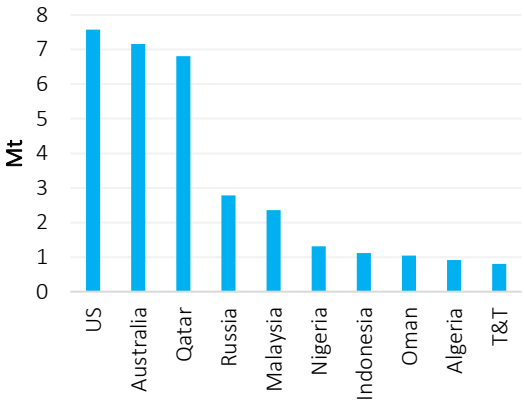


Figure 73: Top 10 LNG exporters in Mar 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.1 GECF

In March 2023, the LNG exports of GECF member countries and observers continued to expand, with y-o-y growth of 6.7% (1.11 Mt) to reach 17.66 Mt (Figure 74). The growth was primarily driven by Qatar (+0.62 Mt), Norway (+0.44 Mt), Mozambique (+0.30 Mt), Trinidad and Tobago (+0.15 Mt), Nigeria (+0.09 Mt), the UAE (+0.05 Mt), Algeria (+0.02 Mt) and Peru (+0.02 Mt) (Figure 75). In contrast, LNG exports declined in Egypt (-0.22 Mt), Malaysia (-0.13 Mt), Russia (-0.12 Mt), Angola (-0.07 Mt) and Equatorial Guinea (-0.05 Mt). Between January and February 2023 combined, GECF's LNG exports grew by 5.6% (1.79 Mt) y-o-y to reach 34.10 Mt.

The increase in Qatar's LNG exports was due to lower maintenance activity compared to the previous year. The continued ramp-up in production from the Hammerfest LNG facility, which restarted in June 2022, supported higher LNG exports from Norway. Similarly, the ramp-up in production from the Coral South FLNG facility drove Mozambique's LNG exports higher. In Trinidad and Tobago, lower maintenance activity and higher feed gas availability contributed to the uptick in LNG exports. Likewise, an increase in feed gas availability led to an uptick in Nigeria's LNG exports.

In contrast, lower feed gas availability to the Damietta and Idku LNG facilities contributed to the decline in Egypt's LNG exports. Meanwhile,the lower LNG exports in Malaysia came from the PFLNG 1 and PFLNG 2 facilities. Finally, weaker LNG exports from the Sakhalin 2 and Vysotsk LNG facilities drove the decline in Russia's LNG exports.

Figure 74: Trend in GECF monthly LNG exports

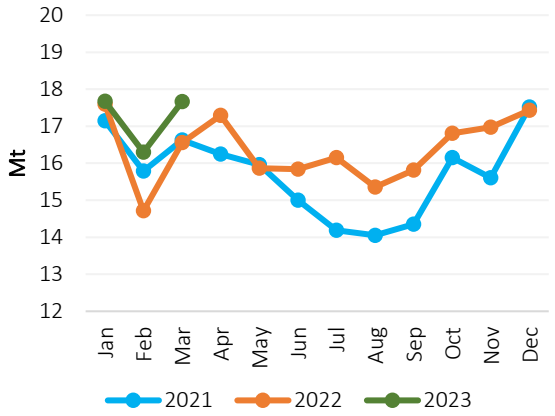
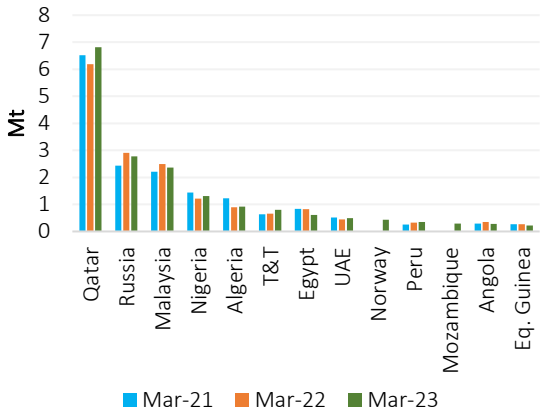


Figure 75: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.2 Non-GECF

In March 2023, non-GECF countries reached a record high in LNG exports with 18.17 Mt, representing a growth of 4.3% (0.75 Mt) y-o-y (Figure 76). The increase in exports was driven by Australia (+0.61 Mt), the US (+0.23 Mt), Oman (+0.10 Mt) and Cameron (+0.05 Mt), which offset declines in Indonesia (-0.14 Mt), Brunei (-0.08 Mt) and Papua New Guinea (-0.03 Mt) (Figure 77). The cumulative non-GECF's LNG exports from January to March 2023 increased by 5.5% (2.74 Mt) y-o-y to 52.26 Mt.

The jump in Australia's LNG exports was attributed to stronger exports from the Gorgon, Ichthys, North West Shelf, Prelude and Wheatstone LNG facilities, which offset lower production from Darwin and QCLNG facilities. The higher LNG exports from Prelude was due to lower maintenance activity while the drop in LNG exports from QCLNG was a result of higher maintenance activity. In the case of Darwin, lower feed gas availability curbed LNG exports from the facility. Meanwhile, US LNG exports were boosted by the continued ramp-up in production at the Calcasieu Pass LNG facility and higher exports from the Corpus Christi and Elba Island LNG facilities despite lower exports from Freeport LNG. The stronger LNG exports from Corpus Christi was due to lower maintenance activity. On the other hand, the lower exports from Freeport LNG was attributed to its gradual restart of export in February. In contrast, weaker exports from the Tangguh LNG facility drove the decline in Indonesia.

Figure 76: Trend in non-GECF monthly LNG exports

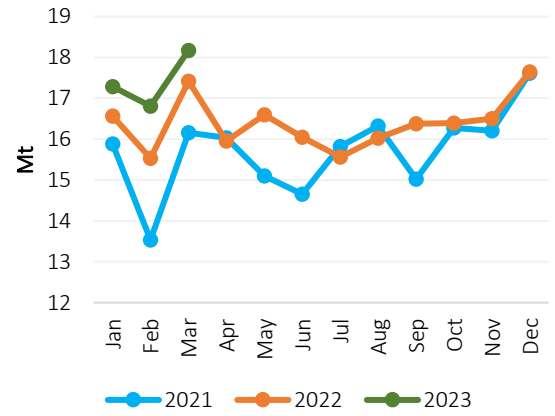
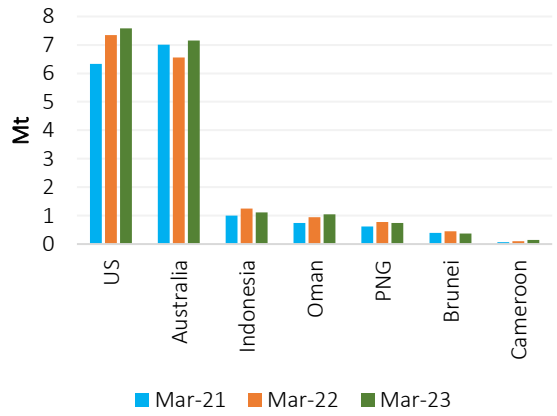


Figure 77: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.3 Global LNG Reloads

In March 2023, global LNG reloads skyrocketed by 221% (0.36 Mt) y-o-y to 0.53 Mt (Figure 78). Spain continued to be the largest contributor to the increase in global LNG reloads with an additional 0.14 Mt followed by China (+0.11 Mt), Malaysia (+0.07 Mt), Singapore (+0.05 Mt), Indonesia (+0.03 Mt) and Jamaica (+0.02 Mt). This increase in LNG reloads offset the decline in South Korea (-0.06 Mt) (Figure 79). The cumulative global LNG reloads from January to March 2023 surged by 120% (1.00 Mt) y-o-y to 1.84 Mt.

Strong LNG demand in Italy supported the higher reloading activity in Spain. All of Spain's LNG reloads in March 2023 were exported to Italy, mainly to the Panigaglia LNG terminal. Meanwhile, robust spot LNG demand in Asian countries boosted LNG reloads from China. China reloaded two LNG cargoes in March and exported them to Bangladesh and South Korea. In Singapore and Indonesia, the utilisation of LNG storage and reloading services supported the uptick in LNG reloads from both countries. Finally, New Fortress Energy increased small-scale LNG reloads from Jamaica for export to Puerto Rico.

Figure 78: Trend in global monthly LNG reloads

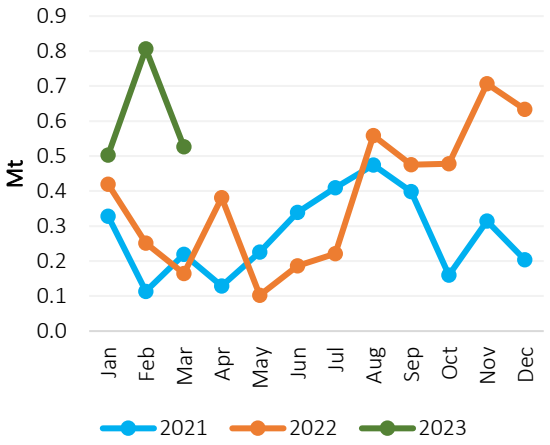
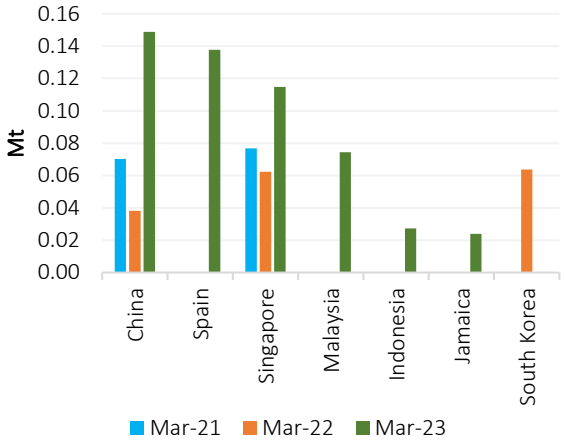


Figure 79: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.4 Arbitrage Opportunity

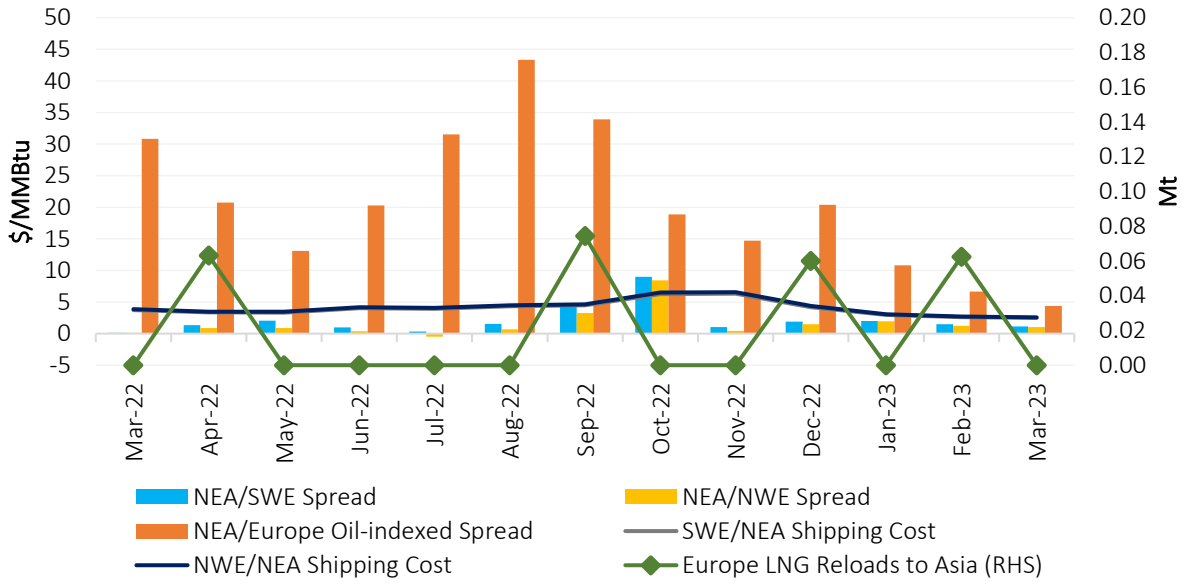
In March 2023, the arbitrage opportunity for LNG reloads from Europe to Asia Pacific, based on the spot LNG price differential between both markets, was unprofitable. The spot shipping costs from Europe to Asia held a significant premium over the spot LNG price differentials between both markets (Figure 80). Meanwhile, the arbitrage opportunity based on the spot LNG price in Asia and oil-indexed price in Europe was profitable. The NEA/SWE and NEA/NWE price spreads continued to slide by 24% ($0.35/MMBtu) and 18% ($0.22/MMBtu) m-o-m to $1.12/MMBtu and $1.02/MMBtu, respectively. The stronger decrease in the NEA spot LNG price compared to the decreases in the European spot LNG prices led to the tighter price spreads. Likewise, the price spread between the spot LNG price in Asia and the oil-indexed price in Europe fell by 34% ($2.25/MMBtu) m-o-m to $4.39/MMBtu.

Looking at the spot shipping costs, the NEA/SWE and NEA/NWE spot shipping costs moved slightly lower by 4.7% ($0.13/MMBtu) m-o-m each to $2.49/MMBtu and $2.57/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 unprofitable arbitrage opportunity discouraged spot LNG reloads from Europe to Asia.

Meanwhile, the NEA/SWE and NEA/NWE price surged by 918% ($1.01/MMBtu) and 827% ($0.91/MMBtu) y-o-y, respectively. On the other hand, the price spread between the NEA spot LNG and European oil-indexed gas price dropped by 86% ($26.43/MMBtu) y-o-y. Finally, the NEA/SWE and NEA/NWE spot shipping costs were down m-o-m by 34% ($1.28/MMBtu) each.

Figure 80: 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

Plaquemines LNG Phase 2 reached FID – on March 13, 2023, the second phase of the Plaquemines LNG facility, with a capacity of 8.77 Mtpa, reached a final investment decision (FID). The project, which is being developed by Venture Global, is the first US LNG export project to reach FID in 2023. The cost for the second phase of the project is estimated at $7.8 billion and is expected to start operations in 2024. The combined liquefaction capacity of Phases 1 and 2 is 20 Mtpa with a total investment of $21 billion.

Port Arthur LNG Phase 1 reached FID – on March 20, 2023, project developer Sempra took FID on Phase 1 of its Port Arthur LNG facility. Phase 1 of the project has a capacity of 13 Mtpa and is estimated to cost $13 billion to construct. This is the second US LNG export project to reach FID this year. More than 80% of the LNG offtake from the facility has been contracted under long-term agreements and the facility is expected to become operational in 2027.

Regasified LNG starts flowing from Elbehafen FSRU – on March 22, 2023, regasified LNG from Germany's third floating storage and regasification unit (FSRU), Elbehafen LNG in Brunsbüttel, started flowing into the German gas grid. The FSRU has a capacity of 2.5 Mtpa and is expected to start regular operations in April 2023.

First LNG trade transacted in Chinese yuan – on March 28, 2023, TotalEnergies and CNOOC completed an LNG cargo transaction on China's Shanghai Petroleum & Natural Gas Exchange

(SHPGX), making it the first ever LNG transaction to be completed in Chinese yuan. TotalEnergies will supply the LNG cargo from its offtake at the Das Island LNG facility in the United Arab Emirates.

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

Table 2: New LNG sale agreements signed in March 2023

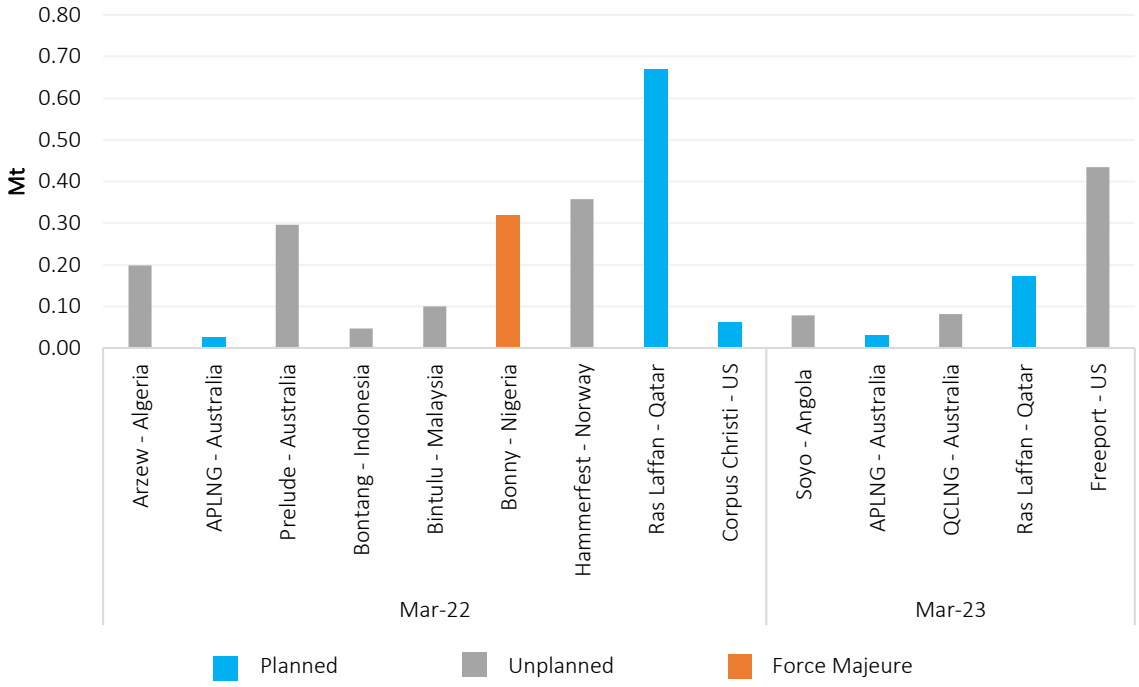
Contract Type	Exporting Country	Project	Seller	Importing Country	Buyer	Volume (Mtpa)	Duration (Years)
HOA	US		Chesapeake	Portfolio	Gunvor	2	15
SPA	Mexico	Seguaro Energia LNG	Mexico Pacific	Portfolio	Shell	1.1	20

Source: GECF Secretariat based on Project Updates and News

4.2.6 Maintenance Activity at LNG Liquefaction Facilities

In March 2023, both planned and unplanned outages affected 0.80 Mtpa of global liquefaction capacity. This represents a significant decrease from 2.07 Mtpa in March 2022 (Figure 81). The APLNG facility in Australia and Qatar's LNG facility underwent planned maintenance activity during the month, while the Soyo LNG facility in Angola, QCLNG facility in Australia and Freeport LNG facility in the US encountered unplanned outages.

Figure 81: Maintenance activity at LNG liquefaction facilities during March (2022 and 2023)



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

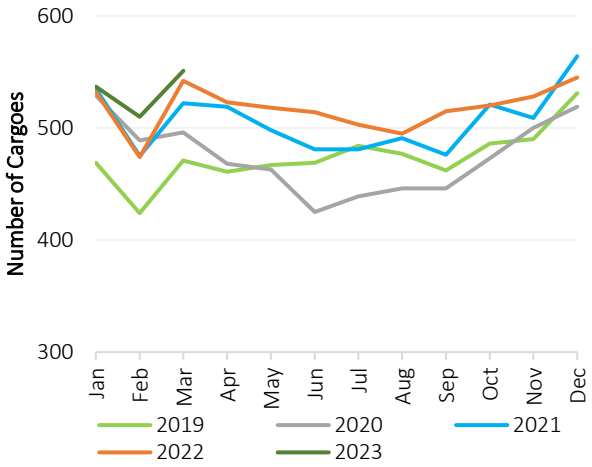
4.2.7 LNG Shipping

In March 2023, the total number of LNG export cargoes increased by 8% m-o-m to 551 (Figure 82).

The total number of LNG shipments for the first three months of 2023 reached 1598, which is 3% (or 50 more cargoes) than during the same period in 2022 (Figure 83). The US, Australia, and Qatar lead the number of LNG shipments in 2023 thus far.

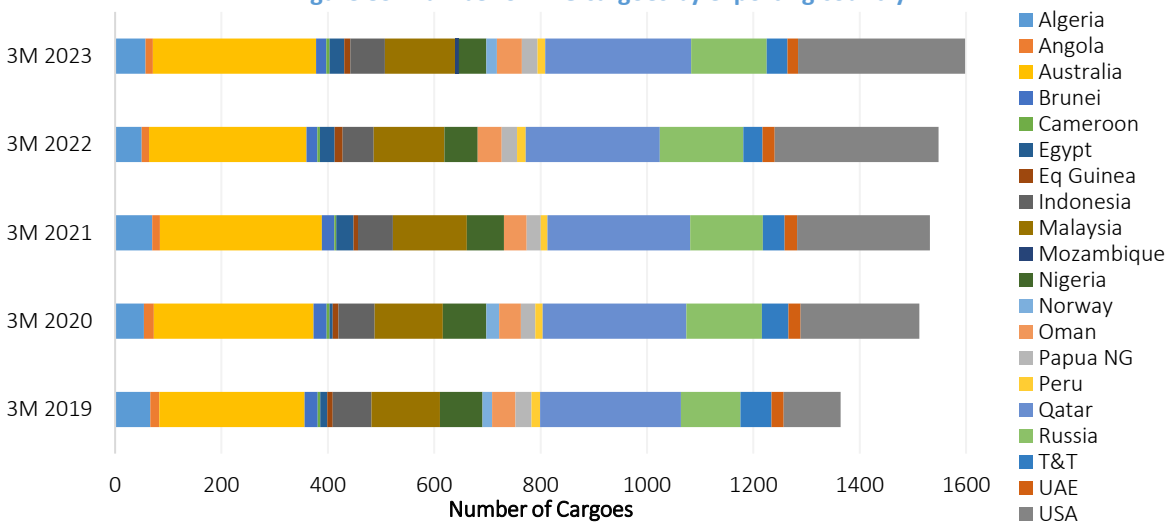
Compared with one year ago, Qatar delivered 22 more cargoes in 2023 thus far, while Norway delivered 20 more cargoes (Figure 84).

Figure 82: Number of LNG export cargoes



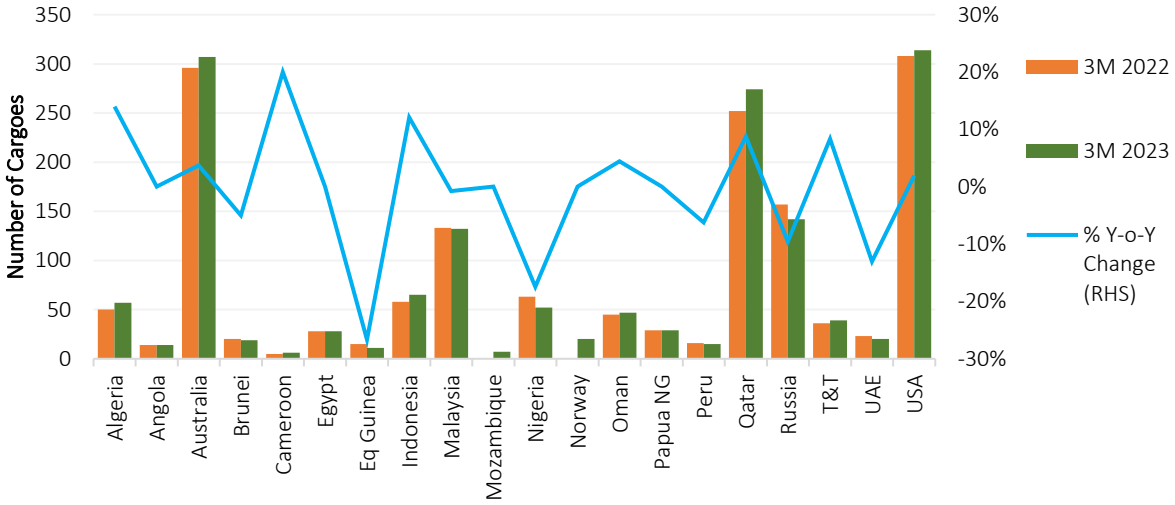
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 83: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 84: Changes in LNG cargo exports

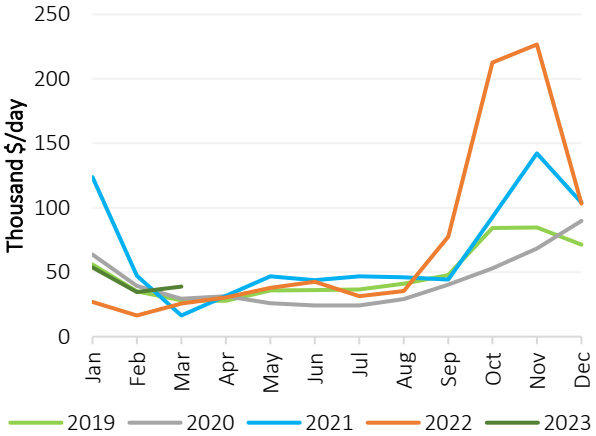


Source: GECF Secretariat based on data from ICIS LNG Edge

In March 2023, the LNG spot charter rate for steam turbine carriers averaged $38,800 per day, which was 12% higher m-o-m, and 50% higher y-o-y (Figure 85). The spot charter rate in 2023 has generally been following the seasonal trend, hovering around the five-year average. During the majority of March, charter rates held steady at the same levels as the end of February 2023, until they declined during the final third of the month. This meant that although the average monthly rate increased m-o-m, March concluded with the daily rate actually reaching the lowest level recorded since August 2022. Charter rates softened at the end of the month as a result of reduced tightness in the market, attributed to increased Atlantic Basin deliveries, rather than intra-basin flows.

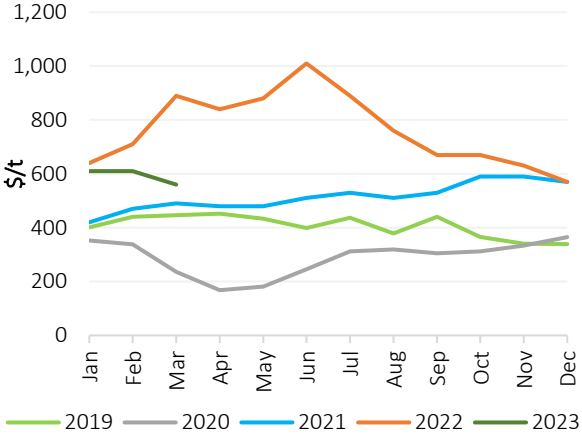
The average price of the leading shipping fuels in March 2023 was $560 per tonne, which was 8% lower than the previous month, and 37% lower y-o-y (Figure 86).

Figure 85: Average LNG spot charter rate



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

Figure 86: 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 March 2023 is shown in Table 3.

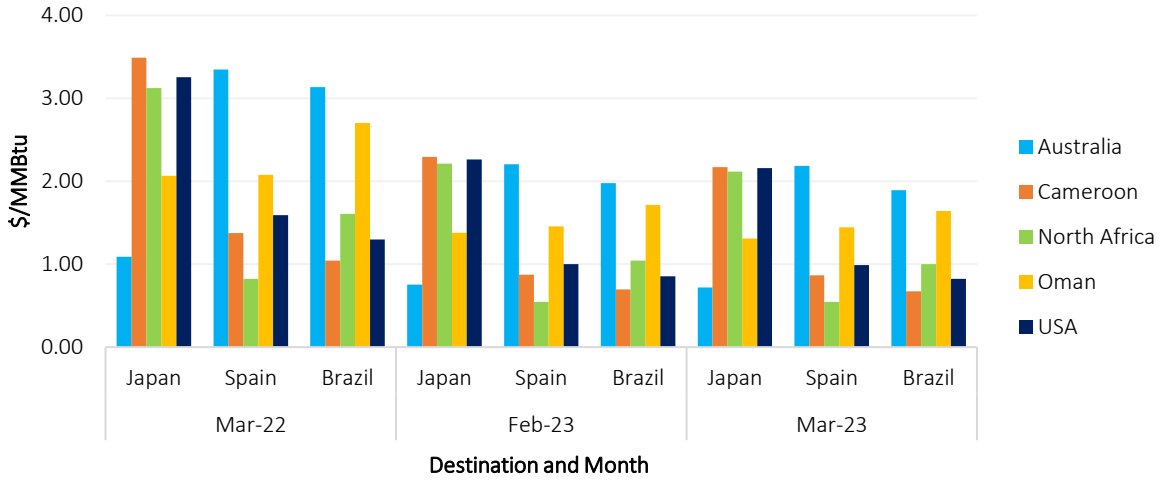
Table 3: Shipping costs for LNG spot cargoes from selected regions ($/MMBtu) – March 2023

		Destination						
LNG Supplier	To / From	Japan	China	India	UK	Spain	Argentina	Brazil
	Spot LNG delivered price	13.28	13.28	12.82	12.08	12.27	14.83	12.56
	Australia	0.72	0.76	0.87	2.25	2.18	1.79	1.89
	Cameroon	2.17	2.14	1.43	0.94	0.86	1.05	0.67
	North Africa	2.11	2.10	1.18	0.62	0.54	1.48	1.00
	Oman	1.31	1.22	0.28	1.51	1.44	1.72	1.64
	USA	2.16	2.37	2.30	1.02	0.99	1.41	0.82

Source: GECF Shipping Cost Model

In March 2023, the impact of the rise in LNG spot charter rates was offset by decreases in the cost of LNG shipping fuels and the delivered spot LNG prices, resulting in a net decrease in the LNG shipping cost, by up to $0.12/MMBtu compared with the previous month (Figure 87). When compared with the same month one year ago, charter rates were higher in March 2023, but fuel prices and delivered spot LNG prices were significantly lower than in 2022, resulting in LNG shipping costs up to $1.32/MMBtu lower.

Figure 87: LNG spot shipping costs for steam turbine carriers



Source: GECF Shipping Cost Model

LNG carrier coalition to reduce carbon intensity: The Methane Abatement in Maritime Innovation Initiative (MAMII) was established in September 2022 to promote technological solutions for monitoring and mitigating methane emissions in the maritime industry. In March 2023, seven LNG carrier firms joined the initiative: Capital Gas, Celsius Tankers, CoolCo, Global Meridian Holdings, Mitsui OSK Lines (MOL), TMS Cardiff Gas and United Overseas Management. Earlier signatories included Knutsen Group, Maran Gas Maritime and Shell.

Possibilities for "dual-use shipping" for LNG carriers: Researchers at the University of Houston investigated the potential to utilize LNG carriers to transport liquefied CO2 cargo. Through this "dual-use shipping" – transporting LNG on the forward voyage and CO2 on the return leg – ship owners may benefit from additional income, whilst also decreasing the cost of CO2 transportation. The team notes that current carriers would have to be retrofitted in order to handle the technical characteristics of transporting CO2.

HSD Engine signs maintenance contract with Nakilat: Nakilat, Qatar's Gas Transport company, has entered into a long-term arrangement with HSD Engine for maintenance and services of their wholly-owned LNG carriers' engines. Nakilat is the owner of the largest LNG fleet in the world, comprising 69 carriers (29 wholly-owned, 40 jointly-owned).

Hyundai LNG Shipping seeking new ownership: South Korea's leading shipping company, Hyundai LNG Shipping, has issued a preliminary tender for a change in ownership. According to industry sources, the new owners are expected to be foreign, possibly based in Denmark, Greece, the United Kingdom or the United States. The current market valuation of the company is estimated to be in the range of $460M to $540M.

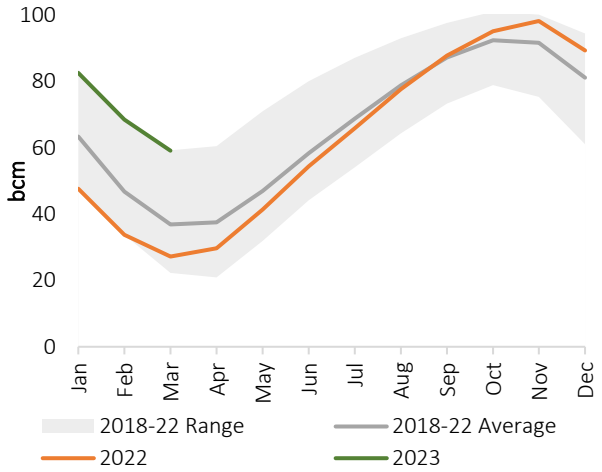
5 Gas Storage

5.1 Europe

The total working capacity for underground gas storage (UGS) sites in the EU stands at 104 bcm. Storage levels in the region continue to trend well above the recent historical levels, due to the impact of gas consumption reduction measures and milder than normal winter conditions. This is in addition to already high gas storage levels at the start of the winter season.

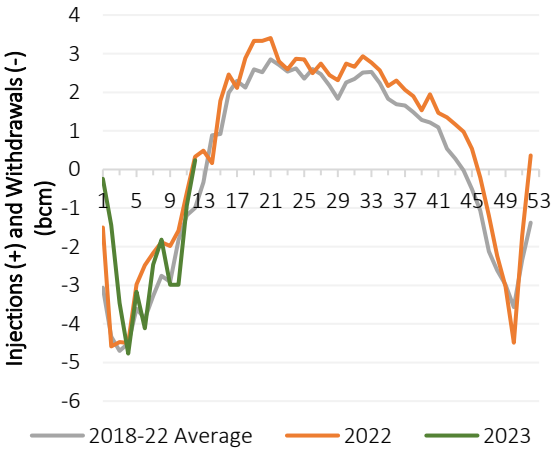
In March 2023, the average daily amount of gas in storage decreased to 59.1 bcm from 68.5 bcm in the previous month (Figure 88). The amount of gas in storage was 31.9 bcm higher than in the same month one year ago and 22.2 bcm higher than the 5-year historical average. The average UGS capacity utilization fell to 57%. In March, gas injection to UGS amounted to 2.1 bcm, while gas withdrawal reached 7.8 bcm.

Figure 88: Underground gas storage in the EU



Source: GECF Secretariat based on data from AGSI+

Figure 89: Weekly rate of EU UGS level changes



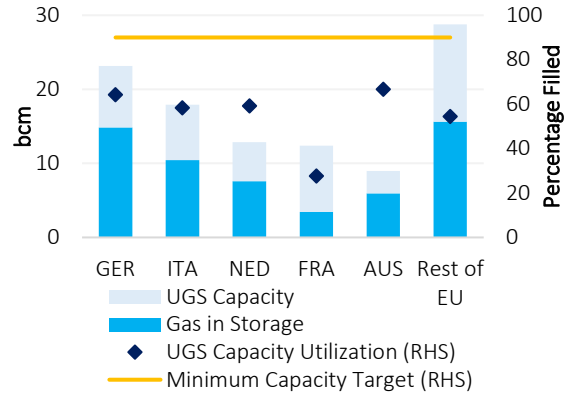
Source: GECF Secretariat based on data from AGSI+

In March 2023, net gas withdrawals were still being observed as the winter season draws to a close. The average withdrawal rate during the month was 1.7 bcm/week, which is greater than the 1.0 bcm/week in 2022, and similar to the 1.7 bcm/week for the 5-year average (Figure 89).

In June 2022, the EU implemented gas storage regulations for its member states, with a target to fill UGS sites to at least 80% of capacity by November 1, 2022, and to at least 90% of capacity by November 1, 2023. In 2022, many EU countries exceeded this target, which ensured that storage levels remained high throughout the winter season. Austria (67%) and Germany (64%), in particular, ended March 2023 with over three-fifths of their UGS sites filled (Figure 90). However, France experienced a significant storage withdrawal due to ongoing strikes at their LNG import terminals.

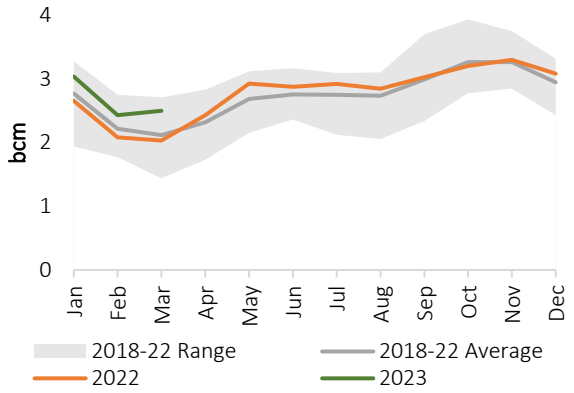
The EU currently has around 4.7 bcm of LNG storage capacity. The majority of this storage is located in Spain (43%) and France (17%). Total LNG storage levels in the region stood at 2.5 bcm in March 2023, which was 3% higher m-o-m, and 23% higher y-o-y (Figure 91). LNG storage levels, like UGS storage levels, have been higher than expected due to the healthy pre-winter stocking and the milder winter conditions. Additionally, the EU has recently commissioned new regasification capacity to counter the anticipation of lower PNG imports.

Figure 90: UGS in EU countries as of March 31, 2023



Source: GECF Secretariat based on data from AGSI+

Figure 91: Total LNG storage in the EU



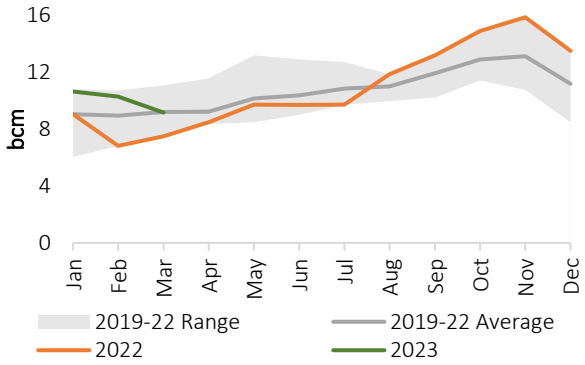
Source: GECF Secretariat based on data from ALSI

5.2 Asia

Japan and South Korea have 9.8 bcm and 6.8 bcm of LNG storage capacity, respectively.

As of March 2023, the total LNG in storage was estimated to be 9.2 bcm, which was 11% lower m-o-m, but 22% higher y-o-y (Figure 92). Of this quantity, 4.1 bcm was attributed to Japan, and 5.1 bcm to South Korea. LNG storage levels in the region are still at very high levels due to the lower gas demand than expected during this winter.

Figure 92: LNG in storage in Japan and South Korea



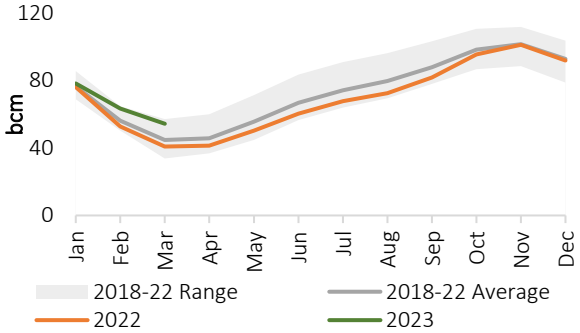
Source: GECF Secretariat based on data from Refinitiv

5.3 North America

The total working gas storage capacity in the US stands at 134 bcm, and the net gas withdrawal season is underway in the country. In March 2023, the average daily amount of gas in storage in the US decreased to 54.3 bcm from 63.3 bcm in the previous month (Figure 93). This amount was 13.5 bcm higher than in the same month the previous year, and 9.6 bcm higher than the 5-year historical average. The average UGS capacity utilization decreased to 41%.

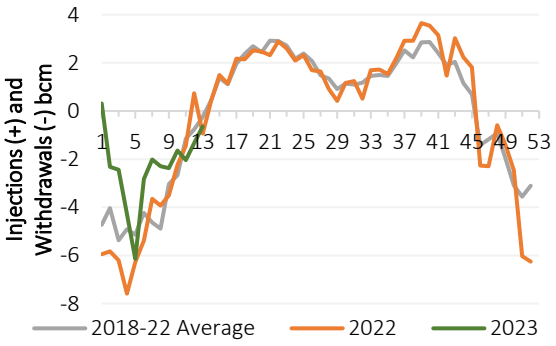
During March 2023, gas withdrawal from storage was observed at an average rate of 1.6 bcm/week, compared with 1.5 bcm/week in 2022, and 1.6 bcm/week for the 5-year average (Figure 94).

Figure 93: Underground gas storage in the US



Source: GECF Secretariat based on data from US EIA

Figure 94: Weekly rate of UGS changes in the US



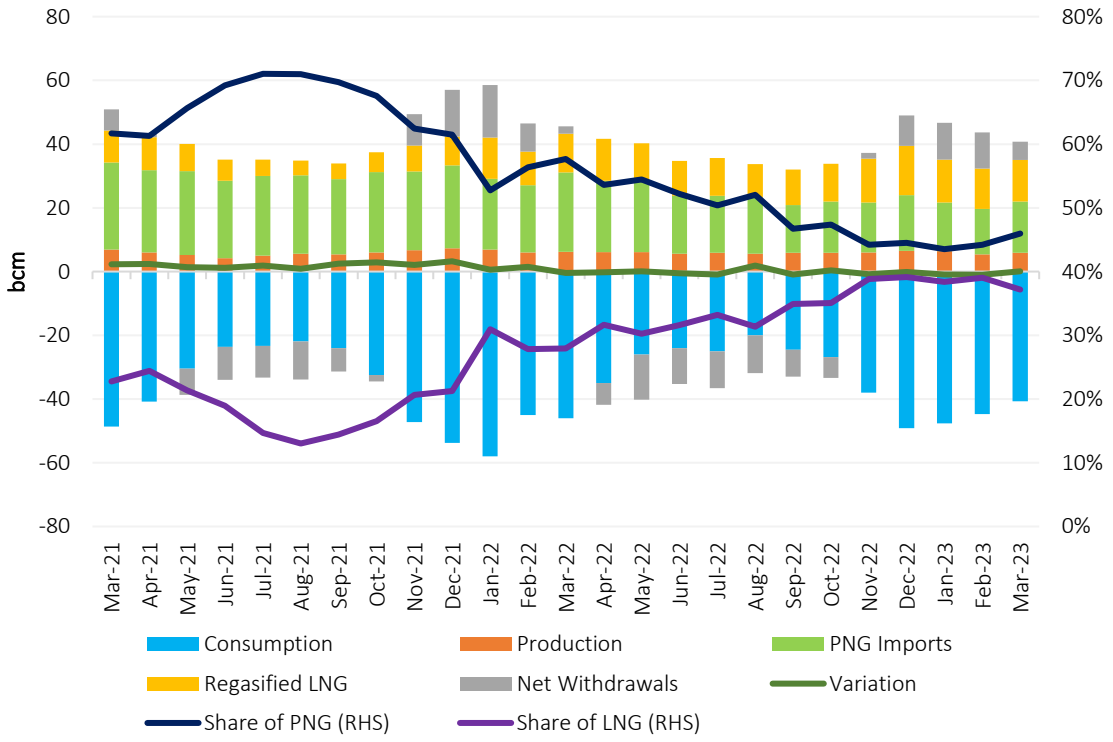
Source: GECF Secretariat based on data from US EIA

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 March 2023, the share of regasified LNG in the EU + UK's gas supply decreased slightly m-o-m to 37%, which still represents an increase of 9 percentage points from March 2022 (Figure 95). On the other hand, the share of PNG in EU + UK's gas supply increased m-o-m to 46% in February 2023, but was down by 12 percentage points from a year earlier. The lower m-o-m share of regasified LNG in EU + UK's gas supply was due to a strong m-o-m increase in gas pipeline gas imports. The shifting reliance from PNG to LNG imports in the EU + UK was driven by the EU's targeted reduction in PNG from Russia.

Figure 95: 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 December 2022.

Table 4: OECD's gas supply/demand balance for December 2022 (bcm)

	2021	Dec-21	Dec-22	2021	2022	Change* y-o-y	Change** 2022/2021
(a) OECD Gas Consumption	**1820.4**	**188.8**	**191.4**	**1820.4**	**1804.2**	**1.4%**	**-0.9%**
(b) OECD Gas Production	**1582.1**	**140.1**	**142.2**	**1582.1**	**1650.7**	**1.5%**	**4.3%**
Difference (a) - (b)	**238.3**	**48.8**	**49.2**	**238.3**	**153.5**	**0.9%**	**-35.6%**
OECD LNG Imports	**282.5**	**27.9**	**34.5**	**282.5**	**346.9**	**23.8%**	**22.8%**
LNG Imports from GECF	148.5	13.4	16.4	148.5	161.8	22.5%	9.0%
LNG Imports from Non-GECF	134.0	14.5	18.1	134.0	185.1	24.9%	38.1%
OECD LNG Exports	**209.5**	**19.5**	**19.8**	**209.5**	**223.2**	**1.5%**	**6.5%**
Intra-OECD LNG Trade	**106.8**	**11.6**	**14.7**	**106.8**	**152.7**	**26.3%**	**43.0%**
OECD Pipeline Gas Imports	**738.3**	**64.2**	**48.1**	**738.3**	**630.4**	**-25.0%**	**-14.6%**
OECD Pipeline Gas Exports	**585.0**	**51.2**	**45.1**	**585.0**	**561.3**	**-12.0%**	**-4.0%**
Stock Changes and losses	**-12.1**	**-27.5**	**-31.5**	**-12.1**	**39.3**	**14.6%**	**-425.9%**

Source: GECF Secretariat based on data from ICIS LNG Edge and IEA Monthly Gas Statistics
(*): y-o-y change for Dec 2022 compared to Dec 2021
(**): y-o-y change for 2022 compared to 2021

6.3 India

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

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

	2022	Feb-22	Feb-23	YTD-2022	YTD-2023	Change* y-o-y	Change** 2022/2021
(a) India Gas Demand	**60.96**	**4.40**	**4.56**	**9.25**	**9.50**	**3.6%**	**2.7%**
(b) India Gas Production	**33.46**	**2.52**	**2.60**	**5.38**	**5.51**	**3.2%**	**2.5%**
Difference (a) - (b)	**27.50**	**1.89**	**1.96**	**3.87**	**4.00**	**4.2%**	**3.1%**
India LNG Imports	**28.07**	**2.11**	**1.81**	**4.55**	**3.82**	**-14.6%**	**-16.0%**
LNG Imports from GECF	22.15	1.82	1.61	4.07	3.37	-11.5%	-17.2%
LNG Imports from Non-GECF	5.92	0.29	0.20	0.48	0.45	-33.3%	-5.9%
Stock Changes and losses	**0.57**	**0.23**	**-0.16**	**0.68**	**-0.17**	**-169.0%**	**-125.7%**

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

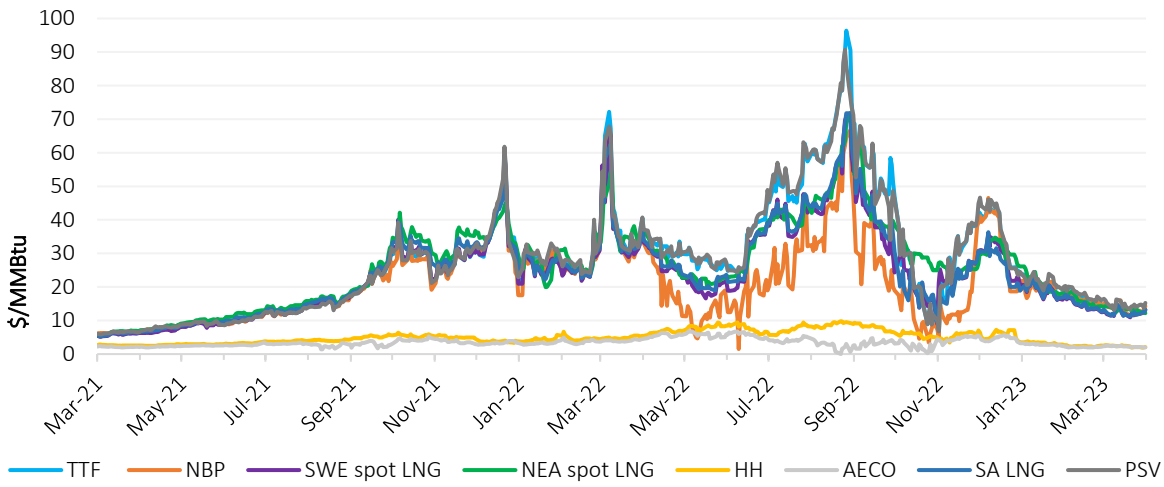
7 Energy Prices

7.1 Gas Prices

7.1.1 Gas & LNG Spot Prices

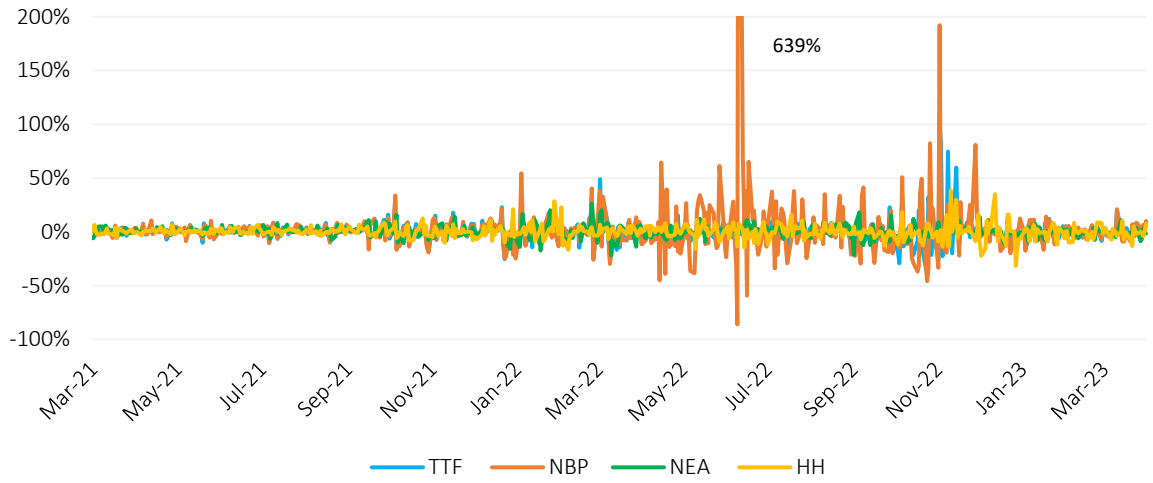
In March 2023, gas and LNG spot prices in Europe and Asia continued to slide, declining for the third consecutive month and converging to around $13/MMBtu. In addition, spot prices recorded relatively low volatility during the month (Figure 96 and Figure 97). European spot prices continued their bearish trend, despite lower LNG sendout in the region. Similarly, in Asia, soft market fundamentals continued to weigh on prices. Moreover, the spread between spot prices and oil-indexed LNG prices in both regions have significantly narrowed compared to previous months.

Figure 96: 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 97: Daily variation of spot prices

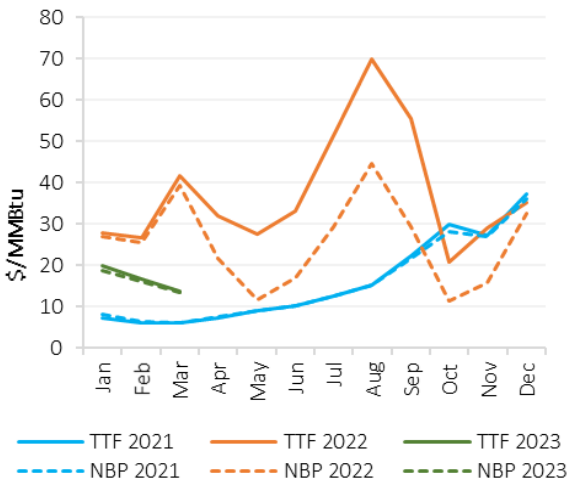


Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

7.1.1.1 European Spot Gas and LNG Prices

In March 2023, TTF and NBP spot gas prices averaged $13.87/MMBtu and $13.37/MMBtu, both declining sharply by 17% m-o-m (Figure 98). Furthermore, both TTF and NBP spot prices were 67% lower y-o-y. The SWE spot LNG prices averaged $12.23/MMBtu in March 2023, 16% lower m-o-m and 68% lower y-o-y. The PSV spot price averaged $14.63/MMBtu in March 2023, 17% lower m-o-m and 64% lower y-o-y.

Figure 98: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

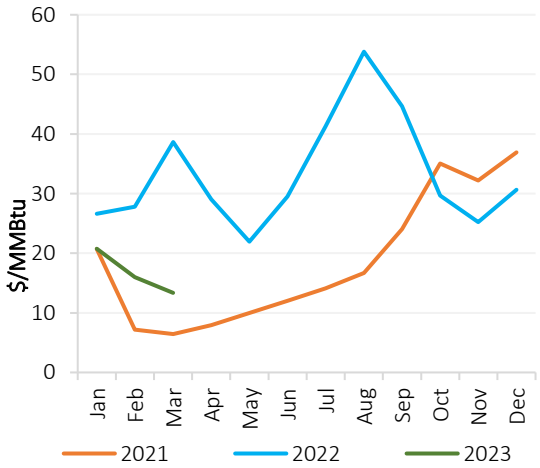
European gas and LNG spot prices continued to decline, despite lower LNG sendout from France due to strike action, which started on March 6, 2023. Three of its four LNG import terminals, namely Fos Cavaou, Fos Tonkin and Montoir have been offline since the start of the strike action, with more than twenty LNG cargoes being diverted. The terminals were expected to resume operations on April 11, 2023. Meanwhile, France's Dunkirk LNG terminal resumed operations on March 17, 2023. Bearish fundamentals, including mild weather, healthy storage levels and reduced gas demand, continued to dominate the market and limit any price gains. Daily TTF spot prices dropped below $13/MMBtu during the month.

For Q1 2023, NBP and TTF averaged $16.85/MMBtu and $16.13/MMBtu, and were both 47% lower y-o-y.

7.1.1.2 Asian Spot LNG Prices

In March 2023, the average North East Asia (NEA) spot LNG price declined by 16% m-o-m to average $13.35/MMBtu. In addition, it was 65% lower than the average price of $38.65/MMBtu in March 2022 (Figure 99).

Figure 99: Monthly Asian spot LNG prices



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

The Asian gas market remained well-balanced with ample supply, tepid demand and high inventory levels. Most buyers in Northeast Asia have not yet shown a strong response to lower spot prices. However, the expectation is for emerging demand in the more price-sensitive markets in Southeast Asia in the coming months. Moreover, daily NEA spot LNG prices fell below $13/MMBtu, its lowest since June 2021.

For Q1 2023, the NEA spot LNG price averaged $16.69/MMBtu, which was 46% lower y-o-y.

7.1.1.3 North American Spot Gas Prices

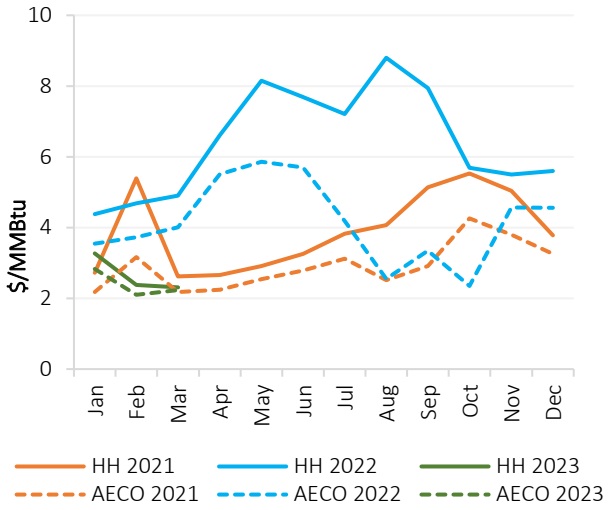
In March 2023, HH spot gas price decreased slightly by 3% m-o-m to average $2.31/MMBtu, and was 53% lower than the average of $4.90/MMBtu in March 2022 (Figure 100).

Bearish HH spot prices continued to be driven by strong US gas production and high gas storage levels, which remained above the five-year average. Furthermore, daily HH spot prices fell below $2/MMBtu, its lowest since October 2020.

Similarly, in Canada, the AECO spot price decreased by 6% m-o-m, averaging $2.23/MMBtu in March 2023, and was 44% lower y-o-y.

For Q1 2023, the HH spot price was $2.65/MMBtu and 43% lower y-o-y. Furthermore, the AECO spot price was $2.39/MMBtu and 37% lower y-o-y.

Figure 100: Monthly North American gas spot prices



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

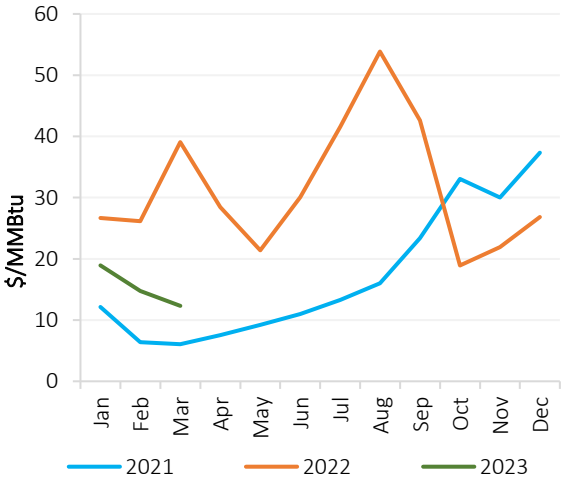
7.1.1.4 South American Spot LNG Prices

In March 2023, South American (SA) LNG price decreased by 16% m-o-m to average $12.32/MMBtu, and was 68% lower than the average of $39.06/MMBtu in March 2022 (Figure 101).

LNG spot prices in South America continued to track European and Asian spot prices. LNG delivered prices for Argentina, Brazil and Chile averaged $12.46/MMBtu, $12.08/MMBtu and $12.43/MMBtu respectively in March 2023.

For Q1 2023, the SA LNG spot price averaged $15.33/MMBtu, and was 50% lower y-o-y.

Figure 101: 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 March 2023, Oil-indexed I LNG price averaged $13.33/MMBtu decreasing by 2% m-o-m, but was 1% higher y-o-y. Similarly, the Oil-indexed II LNG price averaged $9.70/MMBtu decreasing by 1% m-o-m, but was 3% higher y-o-y (Figure 102). Furthermore, significant declines in NEA spot LNG prices saw a convergence with Oil-indexed I prices. Meanwhile, Oil-indexed II prices maintained a discount of $4/MMBtu to the average NEA spot LNG price.

In Europe, the Oil-indexed III price averaged $8.96/MMBtu in March 2023, decreasing by 6% m-o-m, but was 17% higher y-o-y (Figure 103). The average SWE LNG held a premium of $3/MMBtu over the Oil-indexed III price, which was lower compared to the previous month.

For Q1 2023, the Oil-indexed I and II LNG prices were 9% and 2% higher y-o-y respectively. Meanwhile, the Oil-indexed III LNG price was 22% higher y-o-y.

Figure 102: Asia: Spot and oil-indexed price spread

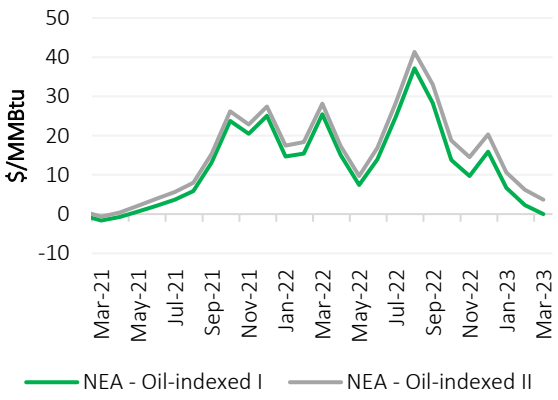
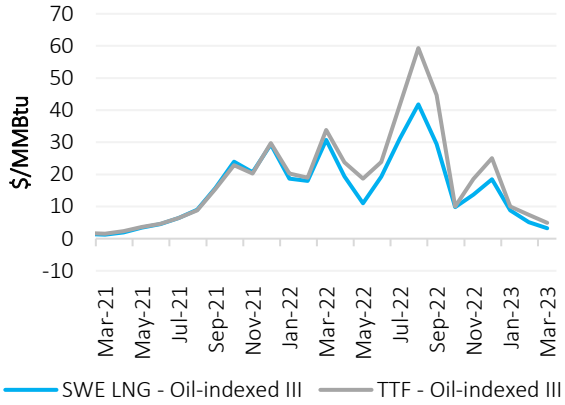


Figure 103: Europe: Spot and oil-indexed price spread



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 March 2023, the average NEA-TTF price spread remained negative, but narrowed slightly with TTF maintaining a slight premium of $0.52/MMBtu (Figure 104). Both NEA LNG and TTF spot prices continued to lose momentum during the month, but the NEA LNG spot price experienced a slightly steeper decline.

NBP traded at a discount of $0.50/MMBtu to TTF, only slightly lower than the average of $0.60/MMBtu during the previous month (Figure 105). Both TTF and NBP spot prices declined by around 17% m-o-m resulting in some convergence between both European spot prices.

Furthermore, the NWE LNG spot price trade at a narrower discount of $1.54/MMBtu to TTF (Figure 106) due to high storage levels and reduced gas demand in the region. The NWE LNG-SA LNG price spread remained negligible in March 2023 indicating a strong convergence between both prices (Figure 107).The NEA-HH and TTF-HH spreads narrowed in March 2023 to $11.04/MMBtu and $11.56/MMBtu respectively (Figure 108 and Figure 109). Thus, European and Asian spot prices held a lower premium over North American spot prices as mild weather drove weaker demand in both regions.

Figure 104: NEA-TTF price spread

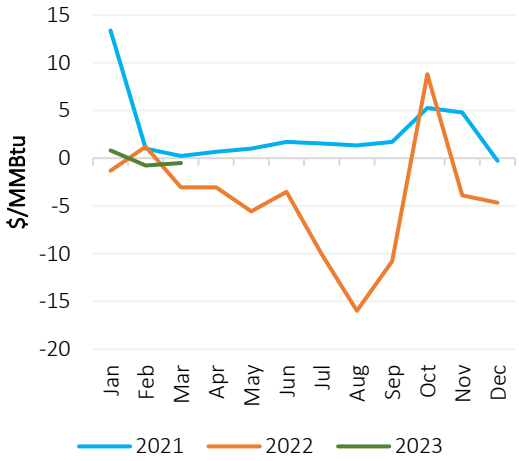


Figure 105: NBP-TTF price spread

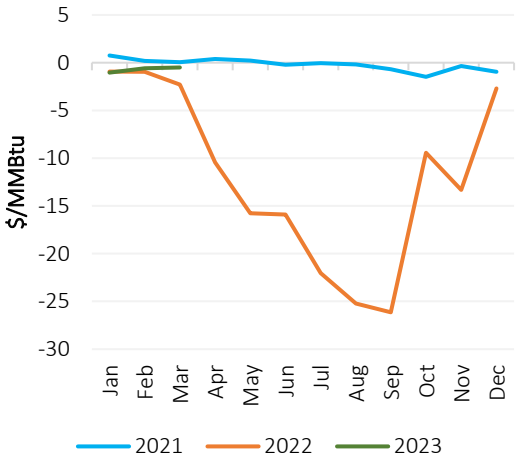


Figure 106: NWE LNG-TTF price spread

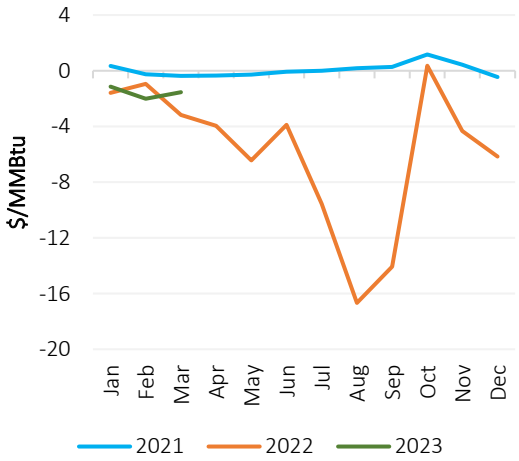


Figure 107: NWE LNG – SA LNG price spread

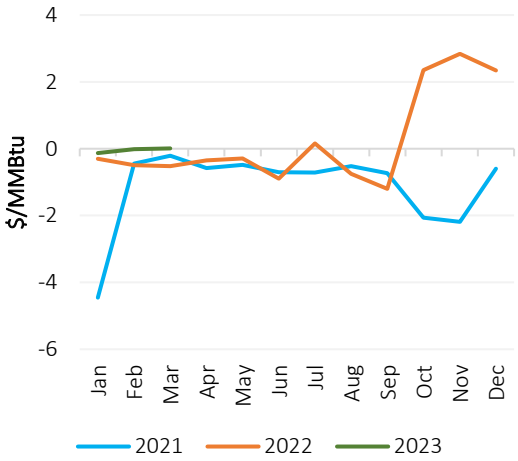


Figure 108: NEA-HH price spread

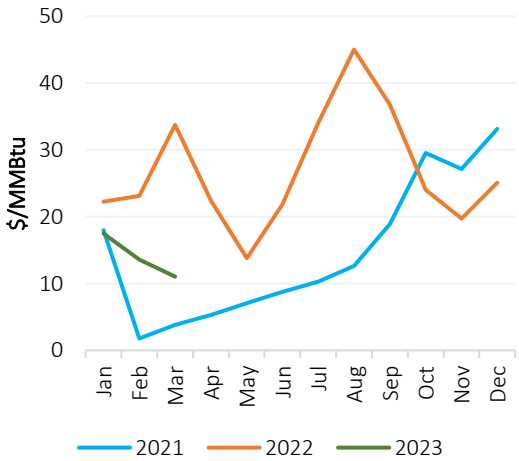
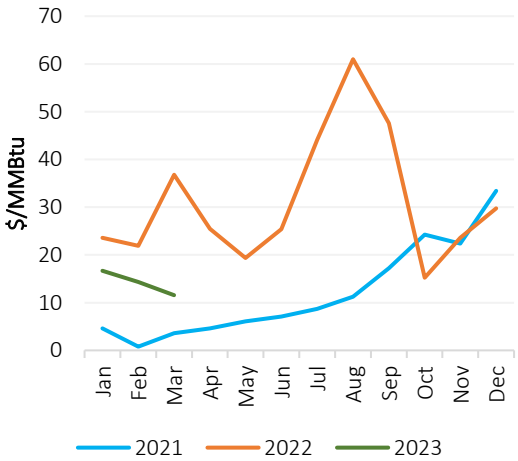


Figure 109: TTF-HH price spread



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

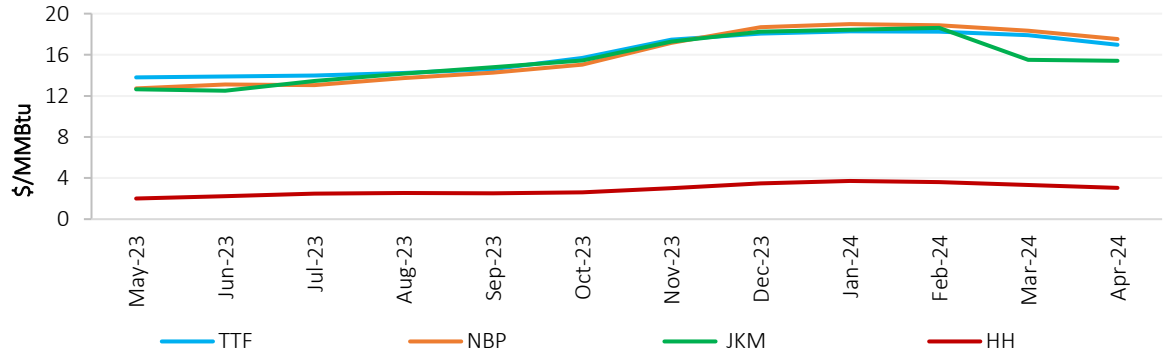
7.1.4 Gas & LNG Futures Prices

The JKM-TTF futures price spread is expected to be slightly negative in May and June 2023, indicating a premium of around $1/MMBtu of TTF prices over Asian LNG prices. Subsequently, in H2 2023, TTF is expected to trade at a lower discount to JKM of less than $1/MMBtu. However, in January 2024, the JKM-TTF spread is expected to turn slightly positive until March 2024, when the spread again turns negative at around -$2/MMBtu. (Figure 110).

With regard to the disparity between the TTF and NBP spot prices, NBP is expected to continue to trade at a discount to TTF, albeit at a very narrow discount of less than $1/MMBtu until December 2023. Then, in January 2023, the spread is expected to flip slightly positive with NBP gaining a slight premium of around $0.6/MMBtu, which continues until April 2024.

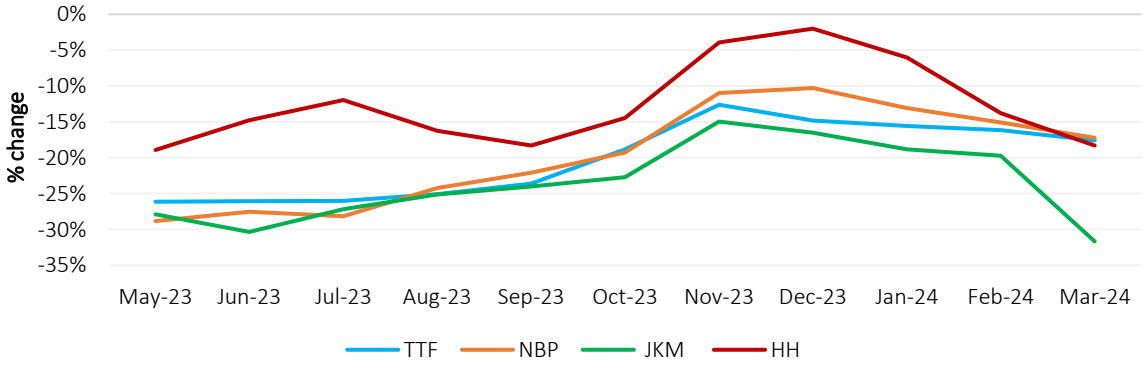
For the 6-month period from May - October 2023, as of April 10, 2023, gas and LNG futures prices for TTF, NBP and JKM were all lower than the expectations of the futures prices considered on March 1, 2023 (as reported in the GECF MGMR March 2023). The average TTF, NBP and JKM futures prices for this period were $14.36/MMBtu, $13.65/MMBtu and $13.83/MMBtu, respectively. In addition, the average HH futures price was $2.40/MMBtu, which was also lower than previous expectations (Figure 111).

Figure 110: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Futures prices as of April 10, 2023.

Figure 111: Variation in gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Comparison with the futures prices as of March 1, 2023 as reported in GECF MGMR March 2023.

7.2 Cross Commodity Prices

7.2.1 Oil Prices

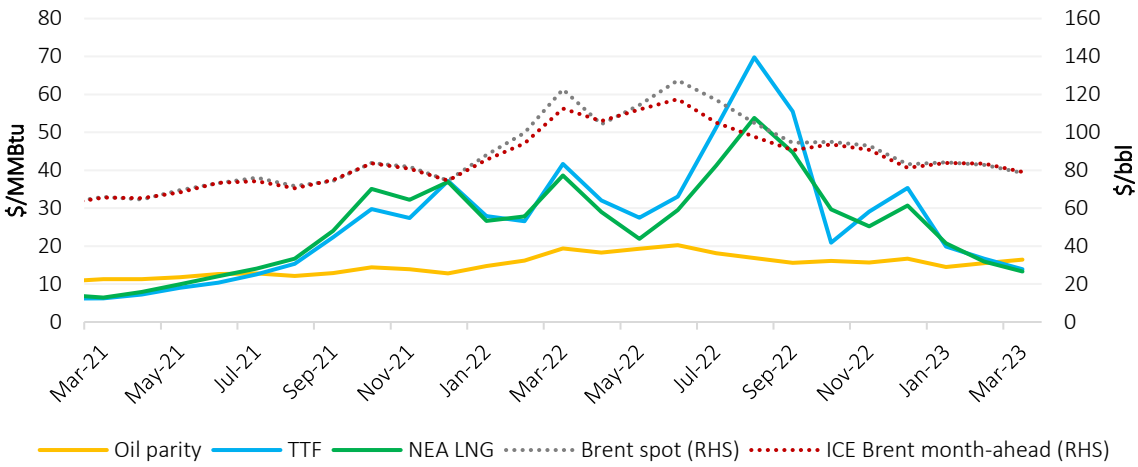
In March 2023, Brent spot averaged $78.67/bbl, a 5% m-o-m decrease and a 36% decrease y-o-y (Figure 112). Brent one month-ahead price averaged $79.21/bbl, down 5% compared to the previous month and 30% lower y-o-y.

Oil prices declined for the second consecutive month as the global economy continued to face headwinds. Additionally, there were concerns about slower-than-expected Chinese economic growth, and developments in financial markets, including the collapse of Silicon Valley Bank and troubles at Credit Suisse. These factors raised concerns about global oil demand and weighed on oil prices.

Furthermore, in March 2023, TTF and NEA LNG spot prices traded at a discount to the oil parity price of around $3/MMBtu for the first time since July 2021.

In Q1 2023, Brent spot price averaged $81.86/MMBtu, representing 21% decrease y-o-y. Meanwhile, Brent month-ahead price averaged $82.22/MMBtu, representing a 16% decrease y-o-y.

Figure 112: Monthly crude oil prices



Source: GECF Secretariat based on data from 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

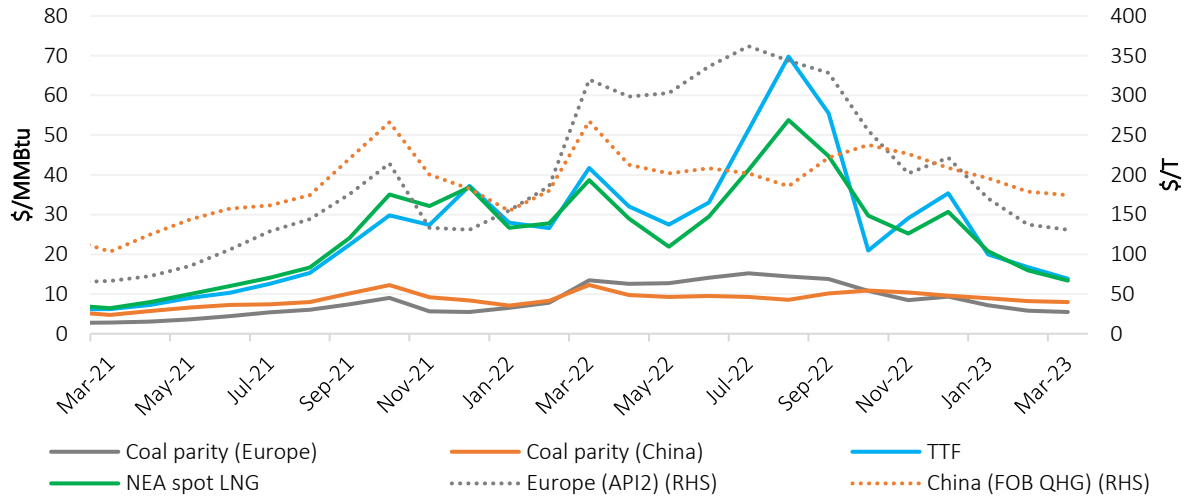
In March 2023, the European coal price (API2) declined by 5% m-o-m, averaging $130.82/T, and was 59% lower y-o-y. This was the lowest since July 2021. Meanwhile, in China, the QHG coal price marker decreased by 2% m-o-m, averaging $174.56/T. The price was also 35% lower y-o-y, reaching its lowest level since January 2022 (Figure 113).

In Europe, low gas prices continued to weigh on coal demand, and will likely remain a key driver of coal prices in the region.

The premium of TTF spot price over the API2 parity price reduced further to $8/MMBtu in March 2023, representing a 24% decrease m-o-m. In addition, the premium of NEA spot LNG price over the QHG parity price narrowed to $5/MMBtu, which is 31% lower m-o-m.

For Q1 2023, the European API2 averaged $146.21/T, representing a 34% decrease y-o-y, while the Chinese QHG price averaged $183.12/T, which is 9% lower y-o-y.

Figure 113: 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.

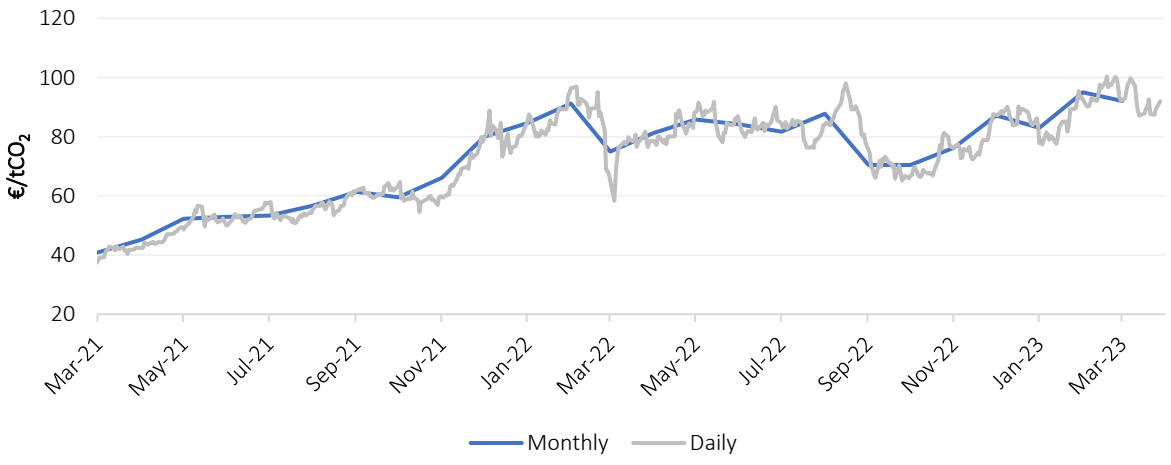
7.2.3 Carbon Prices

In March 2023, EU carbon prices averaged €92.09/tCO_2, decreasing 3% m-o-m, but was 23% higher y-o-y (Figure 114).

After recording a historic high of €100/tCO_2 in February 2023, EU carbon prices lost some momentum. The power sector showed a preference for gas over coal, leading to reduced demand for EUAs. In addition, the distribution of over 50% of free allocation allowances for the year weighed on prices. Nevertheless, EU carbon prices were supported by compliance buying.

For Q1 2023, EU carbon prices averaged €90.04/tCO_2, which represents an 8% increase y-o-y.

Figure 114: EU carbon prices



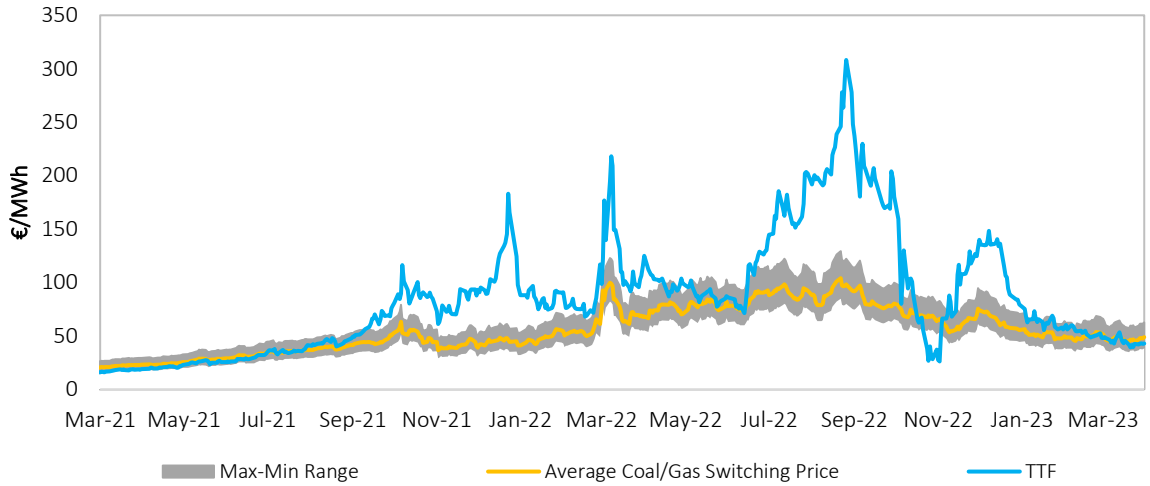
Source: GECF Secretariat based on data from Refinitiv Eikon

7.2.4 Fuel Switching

In March 2023, daily TTF spot prices remained within the coal-to-gas switching range. The coal-to-gas switching price averaged €47.22/MWh, which was 4% lower m-o-m. The average monthly spread between the TTF spot price and the coal-to-gas switching price was -€3/MWh, turning negative for the first time since June 2021 (Figure 115).

Furthermore, the TTF spot price is expected to remain within the coal-to-gas switching range in Q2 2023. Low gas spot prices will continue to support coal-to-gas switching in Europe.

Figure 115: 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

There were two key pricing developments in Europe during the month. Firstly, on March 31, 2023, the European Commission adopted the technical rules to extend the EU market correction mechanism (MCM) , to derivatives linked to virtual trading points in the EU (it was initially only applied to TTF). The extension will apply to month-ahead and year-ahead derivatives, and will take effect from May 1, 2023. The parameters for activation will be the same as for TTF (the front-month settlement price exceeds €180/MWh for three days and is €35/MWh higher than the reference price during the same period). However, based on current market conditions, it is unlikely that this mechanism will be activated in the upcoming months.

Secondly, in accordance with Council Regulation (EU) 2022/2576, the EU Agency for the Cooperation of Energy Regulators (ACER) launched its first LNG benchmark price at the end of March.. ACER gathers LNG market data, including spot transactions, bids and offers and portfolio-type contracts, from market participants via a standard reporting form. Subsequently, the LNG price assessment is determined through a data hierarchy process, which weighs different transactions. ACER's LNG price was €38.27/MWh on March 31, 2023, which represented a discount of approximately $9/MMBtu to the daily TTF spot price of €47.25/MWh.

8 Feature Article: The Impact of the EU Joint Gas Purchases on the Gas Market

Background

In April 2022, the European Commission (EC) proposed the establishment of a European Union (EU) energy platform for the common purchase of gas and LNG, and hydrogen in the future, to secure the EU's energy supply at affordable prices while diversifying its gas supply sources. According to the EC, *"the platform aims at coordinating EU action and negotiations with external upstream suppliers to prevent EU countries outbidding each other and at using the weight of the EU - as one of the biggest consumers of gas in the world - to achieve better conditions for all EU consumers"*.

The platform will ensure cooperation in demand pooling, efficient use of EU gas infrastructure and international outreach. In October 2022, the EU energy platform was endorsed by the European Council and was later adopted as an EU Council Regulation (2022/2576) in December 2022. According to the EU, the regulation *"provides a legal framework for the EU Energy Platform to support EU countries in the preparation for the winter 2023/24 and notably in the filling of their gas storage facilities"*. EU Member States are required to aggregate gas demand volumes for 15% (13 bcm) of their gas storage filling requirements. Member States may choose to purchase additional gas volumes, beyond the 15%, via the platform, but this is optional.

Structure of the EU Energy Platform

In January 2023, the EC selected Prisma for the gas demand aggregation of EU Member States and is seeking offers from gas suppliers to match the volumes. The demand aggregation and joint purchasing mechanism is called AggregateEU. Once the gas demand is matched with the potential supply, countries may voluntarily choose to agree gas purchase contracts with gas suppliers, either individually or jointly. Both gas buyers and suppliers are required to register on the platform to be able to participate in the gas trade. Registration on the platform is expected to commence in April 2023. The aim is to launch the first tender in May 2023, with first gas deliveries expected in July 2023. Gas suppliers will be ranked based on their price offers.

Participating Entities

Gas companies from all 27 EU Member States, as well as neighbouring countries of Moldova, Serbia and Ukraine, can participate as gas buyers on the platform. According to the EC, *"industrial gas users in sectors including steel, aluminium, ceramics, glass and automotive production have expressed interest in joint purchases"*. On the supplier side, the EC has stated that 50 gas suppliers have expressed interest. US LNG exporters have expressed their willingness to participate as gas suppliers on the EU energy platform. In addition, Equinor has confirmed that the company will participate as a gas supplier with the aim of signing more long-term contracts.

Impact on the Gas Market

The EU has set a target of purchasing 13 bcm of gas through the EU energy platform in 2023. In February 2023, the EU stated that the aggregated gas demand between 2023 and 2025 could be around 23-24 bcm. Considering the total EU gas imports of 295 bcm in 2022, the gas purchases in 2023 via the energy platform represent around 4-5% of total gas imports in the bloc, a relatively modest share.

As of the end of March 2023, the EU's underground gas storage (UGS) stood at 59 bcm. This indicates that the EU would need to inject an additional 36 bcm of gas into storage between April and October 2023 to reach the 90% UGS target on November 1, 2023. As such, the 13 bcm of gas to be purchased via the energy platform in 2023 represents 36% of the gas injection into storage ahead of the next winter season. In addition, the 13 bcm of gas from the joint gas purchases will be imported between July and October 2023, as the first gas delivery is expected in July.

The establishment of the EU energy platform for joint gas purchases may be viewed as a gas buyers' cartel. This is expected to reduce the price for gas imports into the bloc, as the joint purchase will reduce competition between EU gas buyers to source gas volumes. The gas price could be negotiated at a discount to the spot LNG prices and hub prices in the EU. The gas trade will be conducted via the platform and will allow bilateral negotiations, either through a single buyer and single seller or several buyers and a single seller.

Assuming that majority of the joint gas purchases are in the form of LNG, and taking into account the increasingly important role of LNG in the EU's security of gas supply, the purchase of 13 bcm of gas supply via the energy platform could reduce up to 10 Mt of spot LNG volumes from the market between July and October 2023. However, this is not expected to put upward pressure on spot LNG prices during this period, as the European spot LNG demand is expected to be lower during this period once gas supply deals are signed from the joint gas purchasing.

There are several drawbacks to joint gas purchasing on the EU energy platform. Firstly, the EU energy platform appears to establish a parallel wholesale gas market in the region, which raises the question of the necessity of such an energy platform. In the EU, the TTF is a well-established, liberalised and mature traded gas market which has effectively responded to ensure the EU's gas supply needs were met during the energy crisis, even at extremely high prices. Secondly, there are concerns regarding the compliance of the joint gas purchasing with EU competition laws.

Furthermore, the establishment of the energy platform for joint gas purchases gives more authority to the EC than individual Member States in ensuring their security of gas supply. If the joint gas purchasing does not prove to be effective, this could lead to tensions between Member States and the EC. Furthermore, some market players in the EU have also raised concerns about the creation of possible market monopolies, as the large gas buyers will purchase the gas. This could lead to possible gas imbalance in some countries. Finally, this politically-motivated decision to alter the functioning of gas markets, which comes in addition to the imposition of price corridors on the TTF gas exchange, could potentially lead to unintended consequences.

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.

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Contributors

Project Leader

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

Experts Team (In Alphabetical Order)

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

Administrative Support

- Hadia Bendeddouche, Secretary, GMAD

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

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GECF

Gas Exporting Countries Forum (GECF)
GECF Headquarters
P.O.Box 23753, Tornado Tower
47th & 48th Floors, West Bay, Doha

www.gecf.org

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