



GECF

# MONTHLY GAS MARKET REPORT

February 2023

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## Highlights

**Global economy:** Global GDP growth for 2023 is expected to slow to 2.9% y-o-y, an upward revision of 0.2 percentage points compared to the IMF's previous forecast. Global inflation is expected to gradually decline to 6.6% in 2023, as major central banks are persistent with increases to their benchmark interest rates, although at a less aggressive rate.

**Gas consumption:** EU gas consumption decreased by 19% y-o-y to 40 bcm in January 2023, driven by the above-normal temperatures, which affected demand for heating in the residential sector, as well as by the implementation of the EU regulation on coordinated gas demand-reduction measures. The U.S. gas consumption declined by 8.8% y-o-y driven by warmer temperatures and a slowdown in the industrial activity.

**Gas production:** Total dry natural gas production in the lower 48 states of the US increased by 5% y-o-y to reach 86.3 bcm in January 2023. Europe's gas production dropped by 5% y-o-y to reach 17.6 bcm, while China's gas production rose by 6% y-o-y to reach 20.4 bcm in December 2022.

**Gas trade:** Pipeline natural gas imports into the EU continued the downward trend, which was established over the previous months, recording a decline of 35% y-o-y to 12.7 bcm in January 2023. Global LNG imports dropped by 1.4% y-o-y to 36.7 Mt, driven by weaker LNG imports across all regions except Europe. This represents the first y-o-y decline in global LNG imports since February 2021. Europe's LNG imports increased by 6% y-o-y to 12.2 Mt to compensate for lower pipeline gas imports. Meanwhile, Asian LNG imports fell by 2% y-o-y to 23.8 Mt, driven by weaker LNG imports in China, despite easing of the Zero-COVID policy.

**Gas storage:** Underground gas storage levels in the EU reached 82.5 bcm in January 2023, representing 79% of the region's capacity. On the other hand, a high winter withdrawal in the US brought the storage level down to 78.1 bcm. Europe and North America were at historically high levels at the start of the winter of 2022/23, which have caused gas stocks in these regions to remain elevated going into the new year.

**Energy prices:** Gas and LNG spot prices in Europe and Asia declined sharply and experienced relatively lower volatility compared to previous months. In January 2023, TTF and NEA LNG spot prices averaged \$19.9/MMBtu and \$20.7/MMBtu decreasing by 44% and 32% m-o-m respectively. The bearish movement in spot prices was largely a result of mild temperatures, healthy storage levels and sufficient supply. In Europe, the continued influx of LNG cargoes and higher wind generation also weighed on prices. Meanwhile in Asia, buying activity remained soft in spite of lower spot prices.

## 1 Global Economy

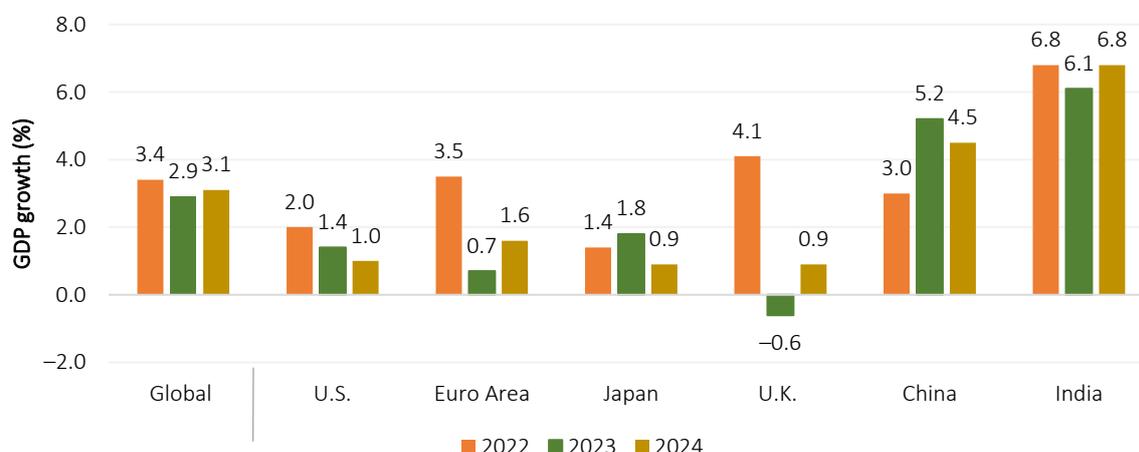
Global GDP growth for 2023 is expected to slow further to 2.9% compared to 2022, based on the IMF World Economic Outlook (WEO) January 2023. While this reflected an upward revision of 0.2 percentage points compared to the IMF's previous forecast of 2.7% in its WEO October 2022, the global economic outlook is skewed to the downside. There are several downside influential factors including the risk of further escalation of geopolitical tensions, the continued battle against inflation and tight financial conditions. However, there are some upside risks including the anticipated economic recovery in China and slower inflation. The global economy is projected to rebound in 2024 with global GDP growth expected to be 3.1% (Figure 1).

The global economic slowdown in 2023 largely reflects the declining growth in advanced economies (AEs). GDP growth in advanced economies is expected to slow significantly from 2.7% in 2022 to 1.2% in 2023. In the US, GDP growth is forecast to slow from 2% in 2022 to 1.4% in 2023. While the US economy performed better than expected in Q3 and Q4 2022, tight fiscal and monetary policies and high borrowing costs are likely to weigh on growth in 2023. Similarly, in the euro area, GDP growth is expected to slow significantly from 3.5% in 2022 to 0.7% in 2023. Further interest rates hikes, albeit at a slower pace, to bring inflation down to targeted levels by major central banks, are expected to weigh on economic growth prospects in 2023. However, GDP growth in AEs is expected to rebound to 1.4% in 2024.

In emerging markets and developing economies (EMDEs), GDP growth is forecast to rise slightly from 3.9% in 2022 to 4% in 2023. Furthermore, GDP growth in EMDEs is expected to rebound to 4.2% in 2024. GDP growth in China is projected to accelerate sharply from 3% in 2022 to 5.2% in 2023, after which it eases to 4.5% in 2024. The easing of COVID-19 restrictions, recovery in consumption and industrial activity, rebound in the property sector and accommodative monetary policies will support China's economic growth in 2023.

The relatively strong economic growth rates in some countries for 2022 is largely a reflection of the impact of easing of COVID-19 restrictions in the second half of 2021, rather than an indication of stronger performance. For instance in the UK, there was a strong GDP growth in Q1 2022, after which growth was relatively flat for the subsequent quarters.

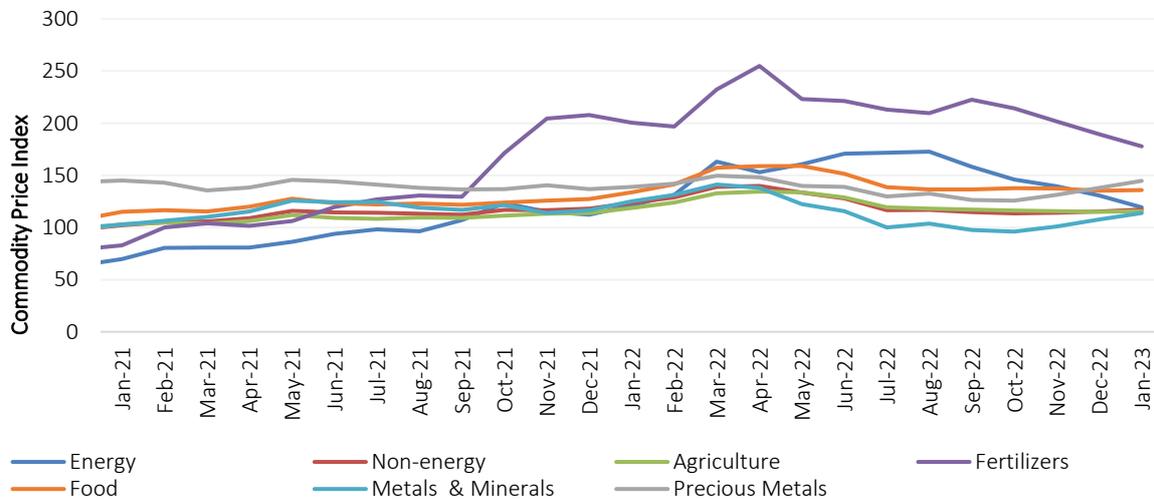
Figure 1: GDP growth forecast



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

With regard to commodity prices in January 2023, the energy price index declined by 9% m-o-m, and was 2% lower y-o-y. This was largely due to a decline in energy prices during the month. Meanwhile, the non-energy price index was 2% higher m-o-m, but 5% lower y-o-y. With regard to the non-energy sectors, the agriculture price index increased slightly by 1% m-o-m and the metals and minerals price index was 6% higher m-o-m. Meanwhile, the fertilizer price index declined by 6% m-o-m and was 11% lower y-o-y (Figure 2).

Figure 2: Monthly commodity price indices

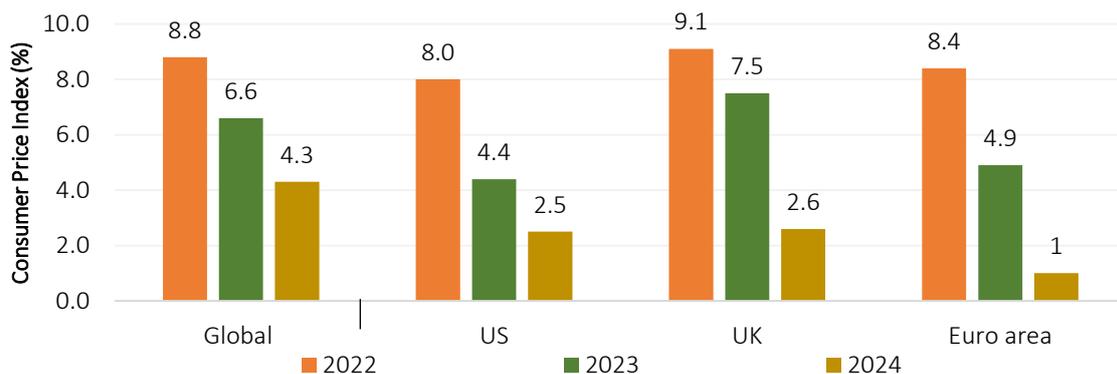


Source: GECF Secretariat based on data from World Bank Commodity Price Data

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 is expected to gradually decline in 2023, as major central banks are persistent with increases to their benchmark interest rates, although at a less aggressive rate. Global inflation is anticipated to gradually decline to 6.6% in 2023, and decline further to 4.3% in 2024. Inflation in the US is forecast to average 4.4% in 2023 and then decline to 2.5% in 2024. A similar trend is expected in the UK and euro area. In the UK, inflation is anticipated to average 7.5% in 2023, after which it drops to 2.6% in 2024. Meanwhile, in the euro area, inflation is forecast to average 4.9% in 2023, after which it drops to 1% in 2024 (Figure 3).

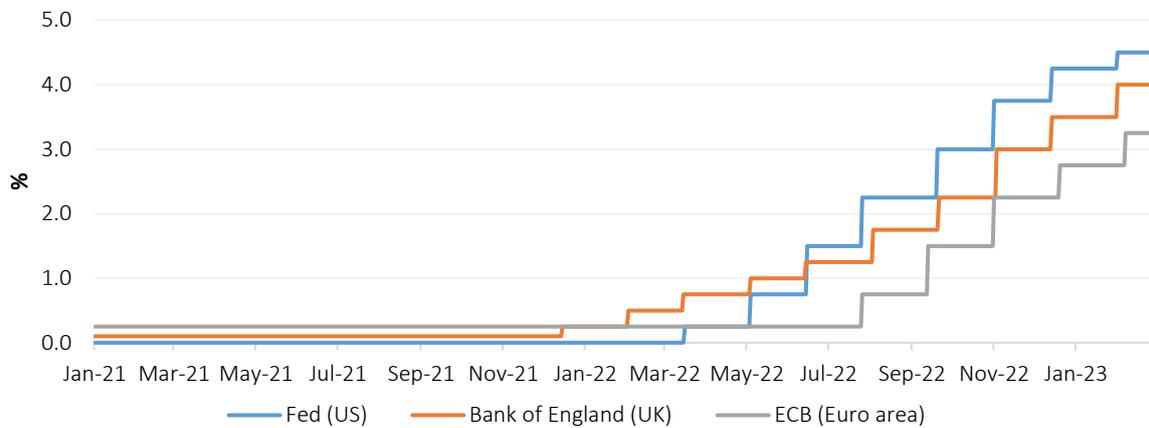
Figure 3: Inflation rates



Source: GECF Secretariat based on data from IMF World Economic Outlook Update January 2023 and Oxford Economics

The US Federal Reserve, the Bank of England (BOE) and European Central Bank (ECB) increased their interest rates in early February 2023. On 2 February 2023, the US Fed announced a 0.25 percentage points interest rate hike, reflecting a less aggressive hike compared to previous months. This brought its benchmark lending rate in the range of 4.5 – 4.75%, the highest since September 2007. In the UK, the BOE raised its interest rates by 0.5 percentage points bringing its benchmark rate to 4%. On 8 February, the ECB raised its three key interest rates by 0.5 percentage points, bringing its interest rates on the main refinancing operations, marginal lending facility and deposit facility to 3%, 3.25% and 2.5% respectively (Figure 4).

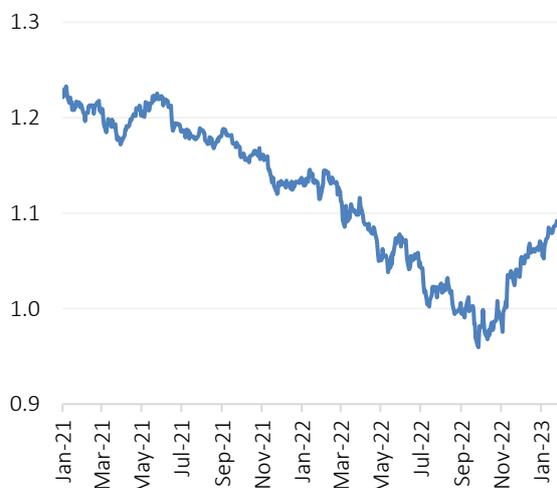
**Figure 4: Interest rates in major central banks**



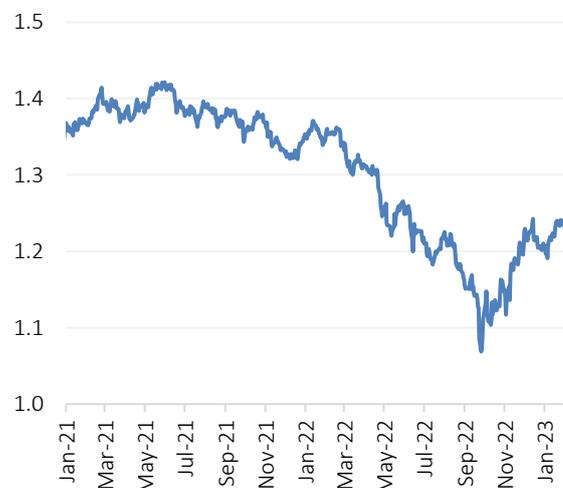
Source: GECF Secretariat based on data from US Federal Reserve, European Central Bank and Bank of England

In January 2023, there was an easing of inflation in the euro area and the UK leading to stronger currencies. The euro was valued at an average of \$1.0780, increasing 2% from the previous month and was 5% lower y-o-y (Figure 5). In the euro area, there was some easing of inflationary pressures during the month, with inflation estimated at 8.5% in January 2023, down from 9.2% in December 2022. Meanwhile, the British pound was valued at an average of \$1.2238, increasing 1% m-o-m and was 10% lower y-o-y (Figure 6).

**Figure 5: Euro/USD exchange rates**



**Figure 6: GBP/USD exchange rates**



Source: GECF Secretariat based on data from Refinitiv Eikon

## 2 Gas Consumption

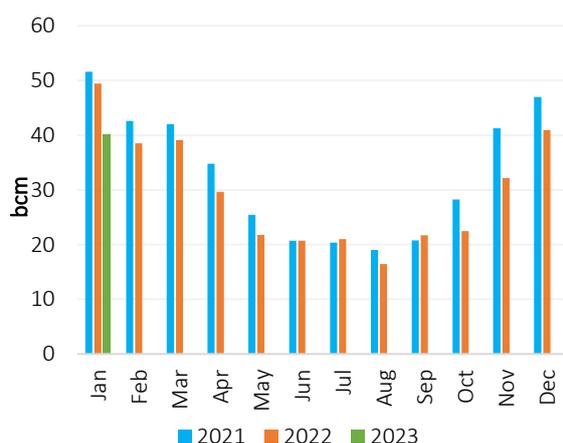
### 2.1 Europe

#### 2.1.1 European Union

In January 2023, total European Union (EU) gas consumption decreased by 19% y-o-y to reach 40 Bcm (Figure 7). The decline of the natural gas consumption was driven by the above-normal temperatures recorded during the month, which affected demand for heating in the residential sector. In addition, the implementation of the EU regulation 2022/1369 of 5 August 2022 on coordinated gas demand-reduction measures contributed to a drop in gas consumption in the EU. The industrial sector consumption continued its declining trend mainly due to high European hub prices.

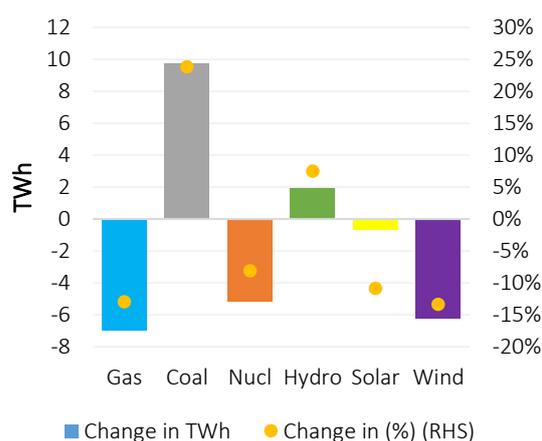
In January 2023, electricity production from gas declined by 13% y-o-y, while total electricity production in the EU decreased by 3% y-o-y to reach 241 TWh. The decline in gas consumption in the power generation sector was due to higher gas-to-coal switching as a consequence of higher natural gas prices and higher hydro output, coupled with a decline in electricity export from Spain to France, which is produced mainly from gas. In particular, higher generation from coal (24% y-o-y) and hydro (8%) was recorded. However, electricity production from gas, nuclear, wind and solar declined by 13%, 8%, 13% and 11% y-o-y, respectively (Figure 8). Nuclear was the dominant fuel in the power mix with a share of 24%, followed by coal (21%), gas (19%), renewables (19%) and hydro (11%).

Figure 7: Gas consumption in the EU



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

Figure 8: Trend in electricity production in the EU in January 2023 (y-o-y change)

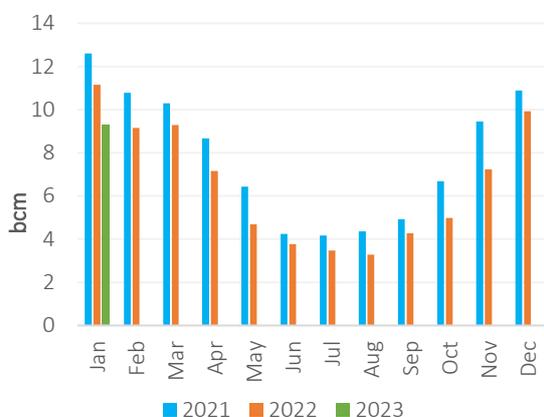


Source: GECF Secretariat based on data from Ember

### 2.1.1.1 Germany

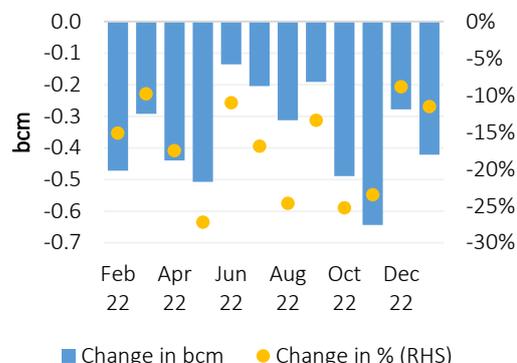
In January 2023, Germany's gas consumption decreased by 17% y-o-y to 9.3 Bcm, driven by the execution of the policies to reduce gas consumption, mild weather, high wind and hydro output and low industrial activities as a consequence of high gas prices (Figure 9 and 10). Consumption in the residential/commercial and industrial/power generation sectors was down by 14% and 19% y-o-y, respectively.

**Figure 9: Gas consumption in Germany**



Source: GECF Secretariat based on data from Refinitiv

**Figure 10: Trend in gas consumption in the industrial sector Feb 22 – Jan 23 (y-o-y change)**

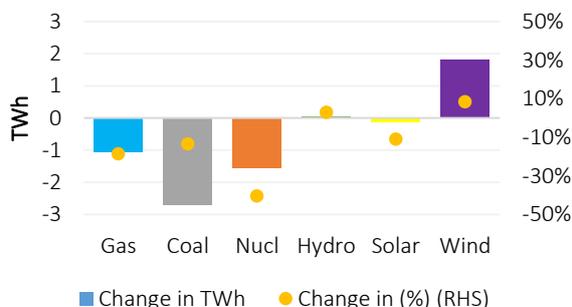


Source: GECF Secretariat based on data from Refinitiv

Electricity production from gas declined by 19%, while total electricity production in Germany decreased by 7% y-o-y to reach 51 TWh. Higher generation from wind (8%) and hydro (3%) was recorded during the month. However, electricity production from coal, nuclear, and solar declined by 13%, 40% and 11% respectively (Figure 11). Renewables were the dominant fuel in the power mix with a share of 49% followed by coal (35%), gas (10%), nuclear (4.6%) and hydro (3.3%).

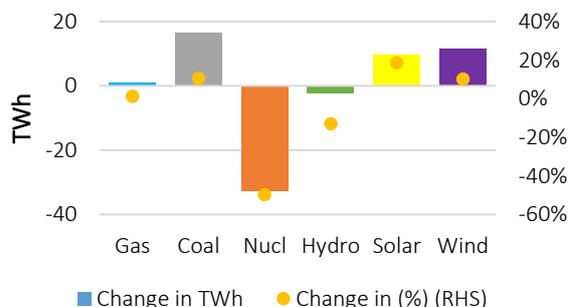
For the period Jan/Dec 2022, gas, coal, solar and wind consumption in the power generation sector increased by 1%, 10%, 19% and 10% y-o-y respectively. By contrast, nuclear and hydro consumption decreased by 50% and 13% y-o-y respectively (Figure 12).

**Figure 11: Trend in electricity production in Germany in January 2022 (y-o-y change)**



Source: GECF Secretariat based on data from Refinitiv and Ember

**Figure 12: Trend in electricity production in Germany in Jan/Dec 2022 (y-o-y change)**

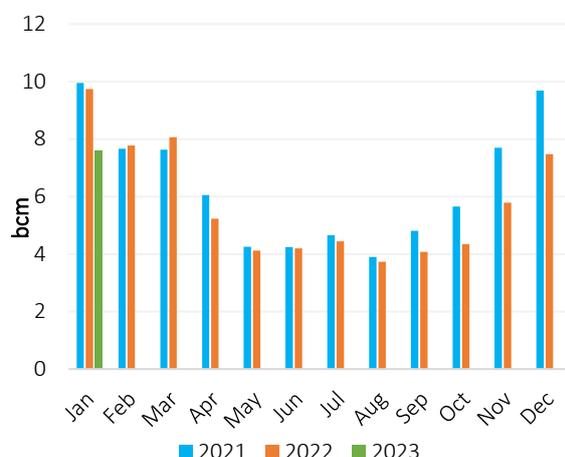


Source: GECF Secretariat based on data from Refinitiv and Ember

### 2.1.1.2 Italy

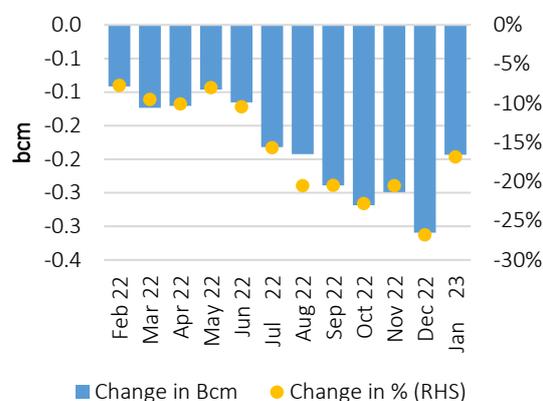
In January 2023, Italy's gas consumption decreased by 22% y-o-y to 7.6 Bcm (Figure 13). The power generation, industrial and residential sectors were down by 17%, 17% and 20% to 1.8 Bcm, 0.9 Bcm and 4.5 Bcm respectively. The decline in gas consumption was driven by warmer temperatures, with an average temperature higher than the seasonal normal by 1.1°C. For the 13<sup>th</sup> month in a row, gas consumption in the industrial sector declined on monthly basis compared to the previous year as a response to high natural gas prices (Figure 14).

Figure 13: Gas consumption in Italy



Source: GECF Secretariat based on data from Snam

Figure 14: Trend in gas consumption in the industrial sector Feb 22 – Jan 23 (y-o-y change)

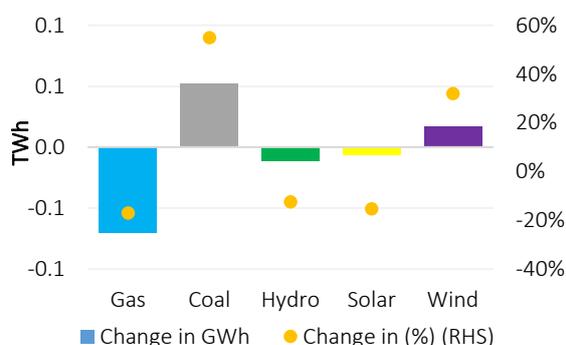


Source: GECF Secretariat based on data from Snam

Electricity production from gas declined by 17% y-o-y, while total electricity production in Italy decreased by 15% y-o-y to reach 21 TWh. Lower generation from gas, hydro (12%), and solar (15%) was recorded during the month. However, electricity production from coal increased by 55% y-o-y (Figure 15). Gas was the dominant fuel in the power mix with a share of 53% followed by renewables (20%), coal (15%) and hydro (12%).

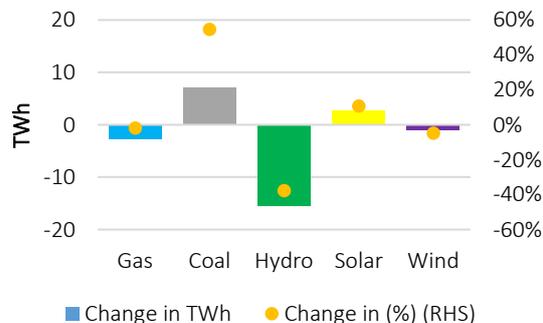
For the period Jan/Dec 2022, gas, hydro and wind consumption in the power generation sector declined by 2%, 38% and 5% y-o-y, respectively. By contrast, coal and solar consumption increased by 55% and 11% y-o-y respectively (Figure 16).

Figure 15: Trend in electricity production in Italy in January 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 16: Trend in electricity production in Italy in Jan/Dec 2022 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

### 2.1.1.3 France

In January 2023, France’s gas consumption decreased by 17% y-o-y to reach 4.8 Bcm, driven by above-than-normal temperatures, which affected the residential sector demand (Figure 17). The latter was down by 17% y-o-y. Despite low nuclear output, due to the shutdown for maintenance of some nuclear reactors across the country (Figure 20), France natural gas consumption in the power generation sector declined. Gas consumption in the industrial sector recorded a decline of 19% y-o-y (Figure 18). The drop in the industrial sector was due to high gas prices leading to a shutdown or reduction of output in some industries, such as fertilizer and cement.

Figure 17: Gas consumption in France

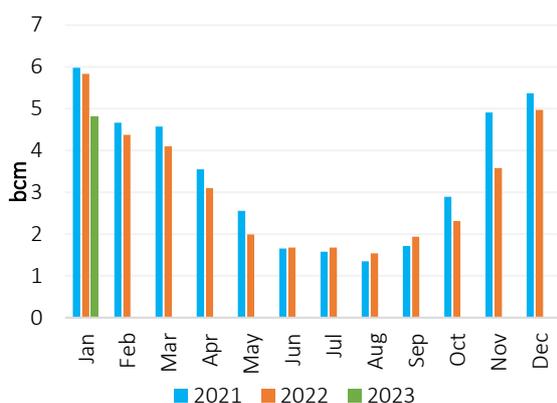
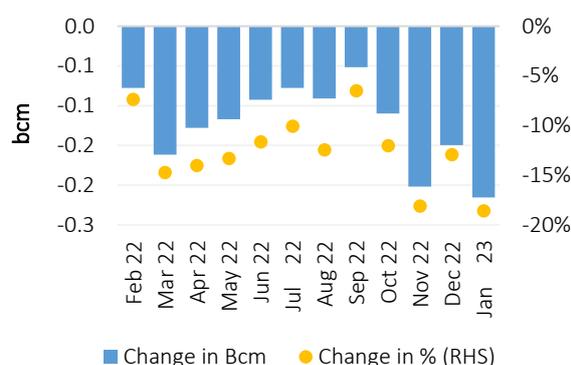


Figure 18: Trend in gas consumption in the industrial sector in France (y-o-y change)

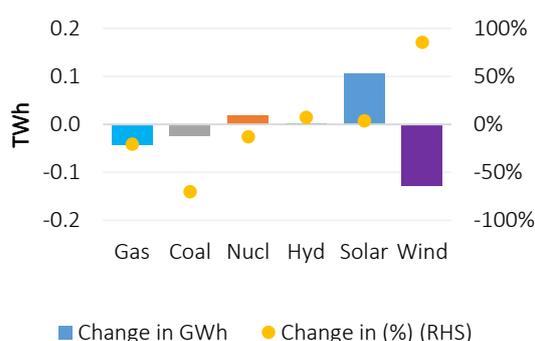


Source: GECF Secretariat based on data from GRTgaz

Electricity production from gas declined by 20%, while total electricity production in France decreased by 6% y-o-y to reach 30 TWh. Higher generation from wind (86% y-o-y), solar (4%) and hydro (7%) was recorded during the month. However, electricity production from nuclear and coal declined by 13%, and 70% respectively (Figure 19). Nuclear remained the dominant fuel in the power mix with a share of 64% followed by renewables (14%), hydro (13%) and gas (9%).

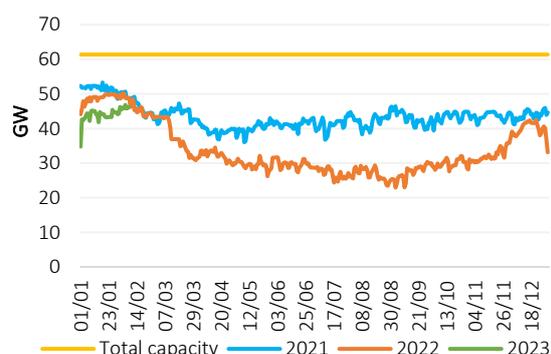
For the period Jan/Dec 2022, gas consumption in the power generation sector increased by 30% y-o-y. By contrast, nuclear, coal and hydro consumption declined by 23%, 26% and 24% y-o-y, respectively.

Figure 19: Trend in electricity production in France in January 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

Figure 20: French nuclear availability



Source: GECF Secretariat based on data from Refinitiv and RTE

### 2.1.1.4 Spain

In January 2023, Spain’s gas consumption decreased by 29% y-o-y to reach 2.7 Bcm, driven by a decline of 21% and 51% in the industrial/residential and power generation sectors respectively, due to warmer-than-normal weather during the month, lower electricity exports to France and high gas prices (Figure 21). Gas consumption in the industrial sector recorded an eleventh month consecutive decline, with a decrease of 21% y-o-y driven mainly by high gas prices during the month (Figure 22).

Figure 21: Gas consumption in Spain

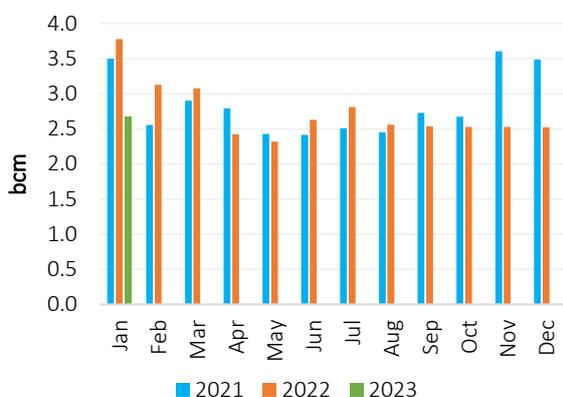
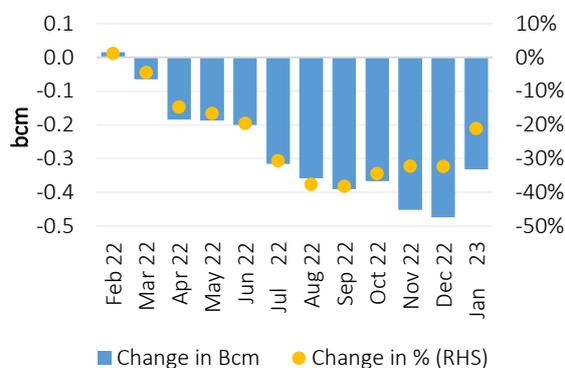


Figure 22: Trend in gas consumption in the industrial sector in Spain (y-o-y change)



Source: GECF Secretariat based on data from Enagas

Source: GECF Secretariat based on data from Enagas

Electricity production from gas declined by 51%, while total electricity production decreased by 2% y-o-y to reach 24 TWh. Higher generation from wind (38% y-o-y), solar (8%) and hydro (85%) was recorded during the month. However, electricity production from coal declined by 58% (Figure 23). Renewables are still the dominant fuel in the power mix with a share of 41% followed by nuclear (23%), gas (18%), hydro (17%) and coal (1.3%).

For the period Jan/Dec 2022, gas and coal consumption in the power generation sector increased by 25% and 54% y-o-y, respectively. By contrast, hydro consumption declined by 33% y-o-y (Figure 24).

Figure 23: Trend in electricity production in Spain in January 2023 (y-o-y change)

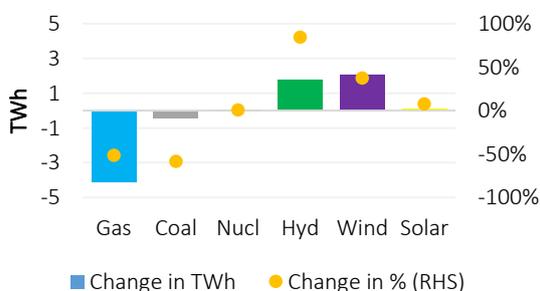
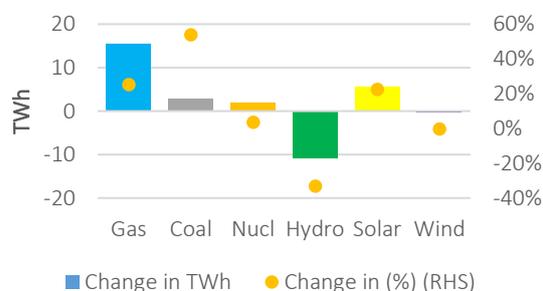


Figure 24: Trend in electricity production in Spain in Jan/Dec 2022 (y-o-y change)



Source: GECF Secretariat based on data from Ember and Ree

Source: GECF Secretariat based on data from Ember and Ree

## 2.1.2 United Kingdom

In January 2023, the UK gas consumption decreased by 16% y-o-y to reach 7.4 Bcm (Figure 25). That was driven by a combination of mild weather, lower than usual heating demand, high renewables output and high gas prices, which affected gas demand in the residential, power generation and industrial sectors, with a decline of 12%, 29% and 16% y-o-y respectively and with many factories forced to reduce or shut down their production (Figure 25 and 26).

Figure 25: Gas consumption in the UK

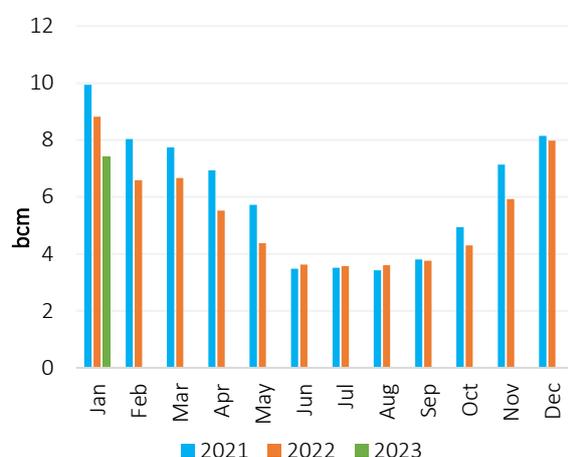
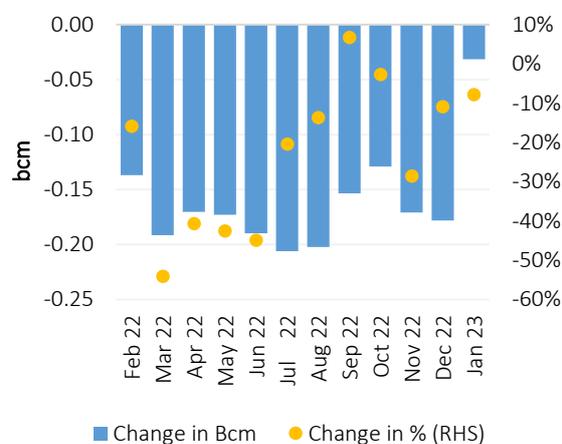


Figure 26: Trend in gas consumption in the industrial sector in the UK (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv Source: GECF Secretariat based on data from Refinitiv

Electricity production from gas declined by 29% y-o-y, while total electricity production decreased by 8% y-o-y to reach 21.7 TWh. Higher generation from hydro (32% y-o-y), solar (3%) and wind (30%) was recorded during the month. However, electricity production from coal and nuclear declined by 15% and 8% y-o-y respectively (Figure 27). Renewables became the dominant fuel in the power mix with a share of 38% followed by natural gas (34%) and nuclear (17%).

For the period Jan/Dec 2022, gas, wind and nuclear consumption in the power generation sector increased by 3.6%, 26% and 3% y-o-y respectively. By contrast, coal consumption declined by 14% y-o-y (Figure 28).

Figure 27: Trend in electricity production in UK in January 2023 (y-o-y change)

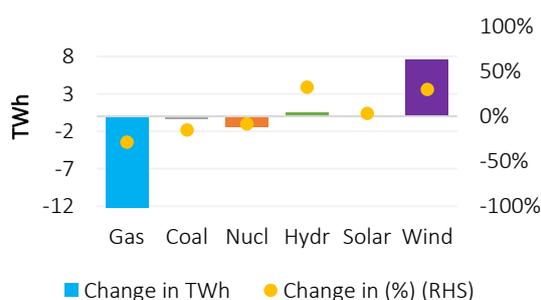
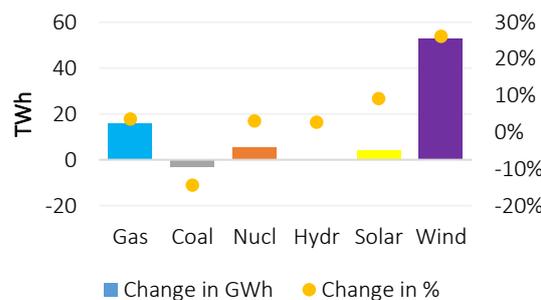


Figure 28: Trend in electricity production in UK in Jan/Dec 2022 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

Source: GECF Secretariat based on data from Refinitiv

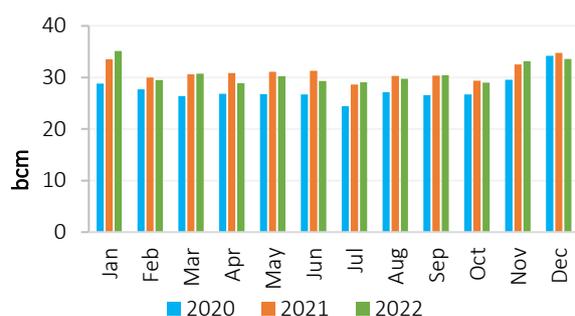
## 2.2 Asia

### 2.2.1 China

In December 2022, Chinese apparent gas demand (PNG imports + LNG imports + national production) decreased by 3.3% y-o-y to 34 Bcm, despite the ease of COVID-19 lockdown measures and cold weather during the month (Figure 29).

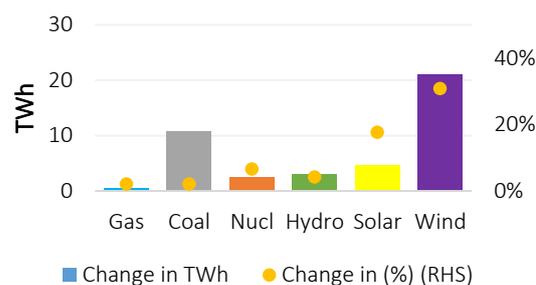
Electricity production from gas rose by 2% y-o-y, while total electricity production increased by 6% y-o-y to reach 791 TWh. Higher generation from coal (2%), nuclear (7%), hydro (4%), solar (18%) and wind (31%) was recorded during the month (Figure 30). Coal remained the dominant fuel in the power mix with a share of 66% followed by renewables (15%), hydro (9%), nuclear (5%), and gas (3%).

Figure 29: Gas consumption in China



Source: GECF Secretariat based on data from Refinitiv

Figure 30: Trend in electricity production in China in December 2022 (y-o-y change)



Source: GECF Secretariat based on data from Ember

### 2.2.2 India

In December 2022, India's gas consumption decreased by 6% y-o-y to reach 4.8 Bcm (Figure 31). The share of regasified LNG in India's gas supply dropped to 41%.

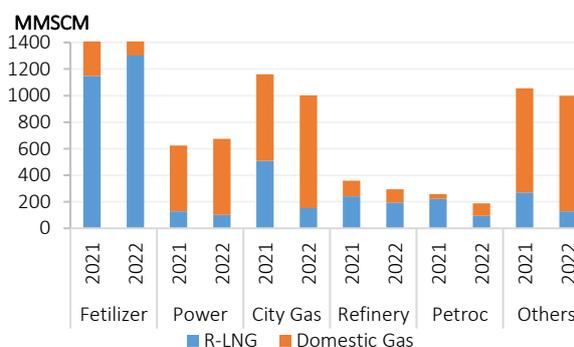
In terms of the share of gas consumption by sector, the fertilizer sector maintained its dominant share of 33%, followed by city gas and power generation sector with the shares of 21% and 14%, respectively. The refining and petrochemical sectors represented a share of 6% and 4%, respectively (Figure 32).

Figure 31: Gas consumption in India



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

Figure 32: India's gas consumption by sector

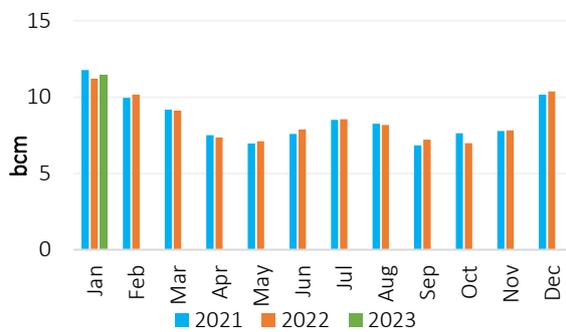


Source: GECF Secretariat based on data from India's PPAC

### 2.2.3 Japan

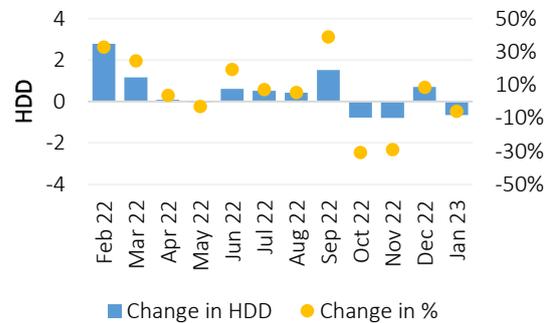
In January 2023, gas consumption in Japan grew by 2.4% y-o-y to reach 11 Bcm (Figure 33). That was driven by higher gas burn in the power generation sector due to lower nuclear output caused by the shutdown of some nuclear reactors for mandatory upgrades to protect against attacks and accidents. Japan’s Heating Degree Days (HDD) during the month averaged 11, down 6% y-o-y (Figure 34).

Figure 33: Gas consumption in Japan



Source: GECF Secretariat based on data from Refinitiv

Figure 34: Trend in HDD in Japan

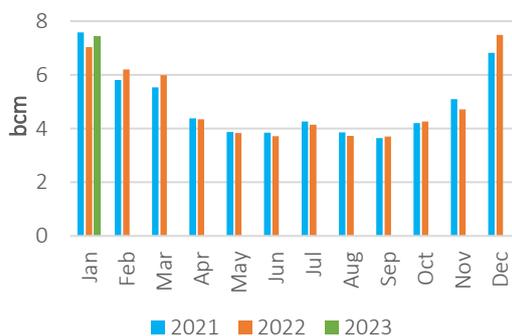


Source: GECF Secretariat based on data from Refinitiv

### 2.2.4 South Korea

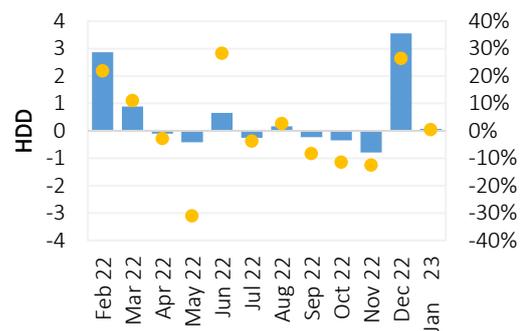
In January 2023, gas consumption in South Korea rose by 6% y-o-y to 7.5 Bcm, driven mainly by higher gas burn in the power generation sector with an increase of 16% to reach 2.9 Bcm y-o-y (Figure 35). The growth was due to the below norm temperatures that were recorded during the month. Korea’s HDD during the month averaged 16, up by 0.4% y-o-y (Figure 36).

Figure 35: Gas consumption in South Korea



Source: GECF Secretariat based on data from Refinitiv

Figure 36: Trend in HDD in South Korea



Source: GECF Secretariat based on data from Refinitiv

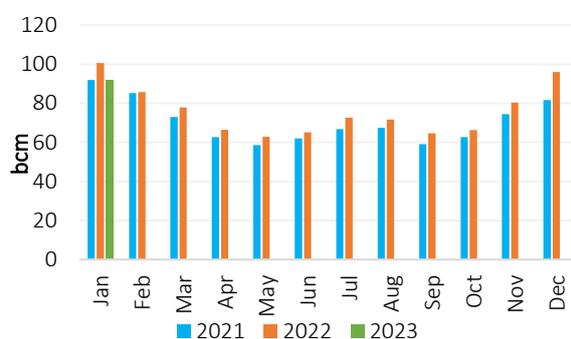
## 2.3 North America

### 2.3.1 US

In January 2023, gas consumption in the U.S. is estimated to decline by 8.8% y-o-y to 92 Bcm (Figure 37). The industrial, residential and commercial sectors were the main drivers of the decline in gas consumption with a decrease of 4% (0.9 Bcm), 23% (6.2 Bcm) and 11% (1.7 Bcm) y-o-y respectively. The drop is due to warmer temperatures in the majority of the regions during the month and a slowdown in the industrial activity. In terms of the share of gas consumption by sector, the power generation sector led with a share of 30% followed by industrial (24%), residential (23%) and commercial (15%) sectors.

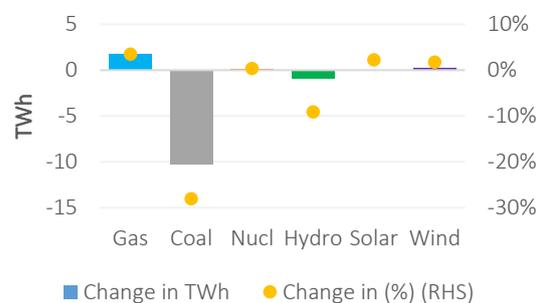
Electricity production from gas rose by 3% y-o-y, while total electricity production declined by 6.6%. Higher y-o-y generation from nuclear (0.4%), wind (2%) and solar (2%) was offset by a decline in generation from coal and hydro by 28% and 9% respectively (Figure 38). Gas remained the dominant fuel in the power mix with a share of 37% followed by nuclear (21%), coal (19%), renewables (14%) and hydro (7%).

Figure 37: Gas consumption in the US



Source: GECF Secretariat based on data from EIA and Refinitiv

Figure 38: Electricity production in the US in January 2023 (y-o-y change)

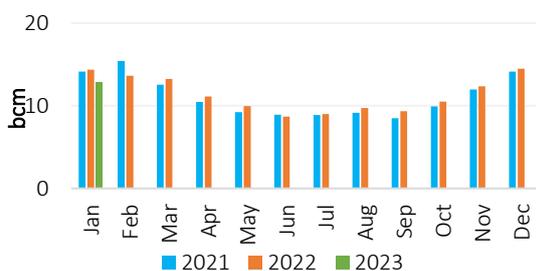


Source: GECF Secretariat based on data from Ember and Refinitiv

### 2.3.2 Canada

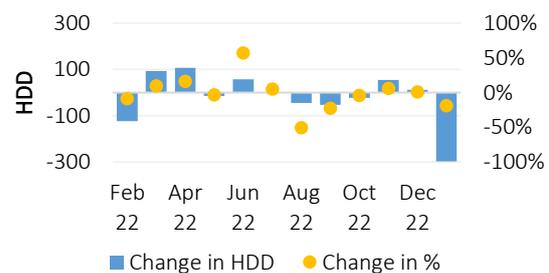
In January 2023, Canada's gas consumption is estimated to decline by 10% y-o-y, driven by a fall in the industrial/power generation and residential sectors by 14% and 22% y-o-y respectively (Figure 379), as consequence of mild weather during the month. January 2023 was warmer on average across Canada compared to January 2022, with HDD averaging 1274, down by 19% y-o-y (Figure 40).

Figure 39: Gas consumption in Canada



Source: GECF Secretariat based on data from Refinitiv

Figure 40: Trend in HDD in Canada



Source: GECF Secretariat based on data from Refinitiv

## 2.4 Weather Forecast

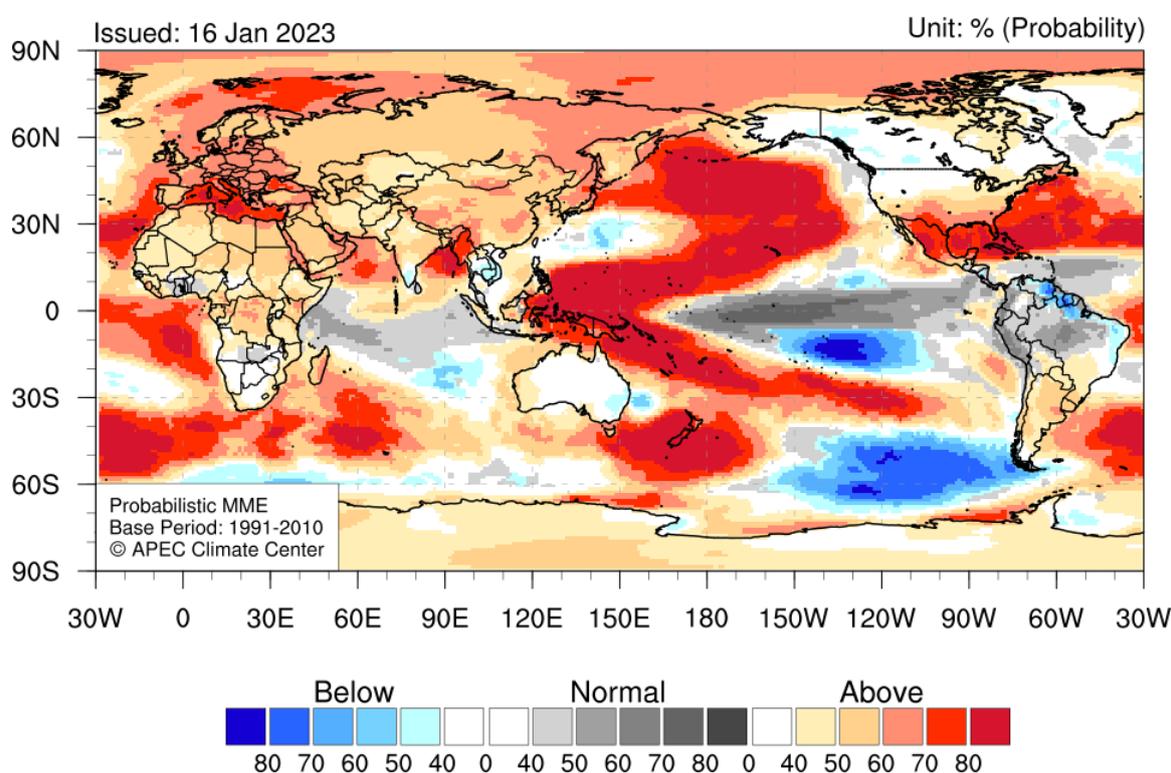
Weather and precipitation conditions have significant impact on gas consumption. Below normal temperature in winter and above normal temperatures in summer boost heating and cooling demand respectively, while below normal precipitation leads to lower hydro output, which may trigger higher gas demand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

### 2.4.1. Temperature forecast for February to April 2023

As per the forecast produced by the APEC Climate Center on 16 January 2023 (Figure 41), the weather for the period February to April 2023 is forecast as follows:

- Above normal temperature is expected for most of the globe (excluding Canada, northern South America, southern Africa, and the western and eastern Indian Ocean),
- Below normal temperature is expected for southern region of the central and eastern tropical Pacific and the southern South Pacific,
- Near normal temperature is predicted for equatorial Pacific, northern South America, the western and eastern Indian Ocean.

Figure 41: Temperature forecast February to April 2023



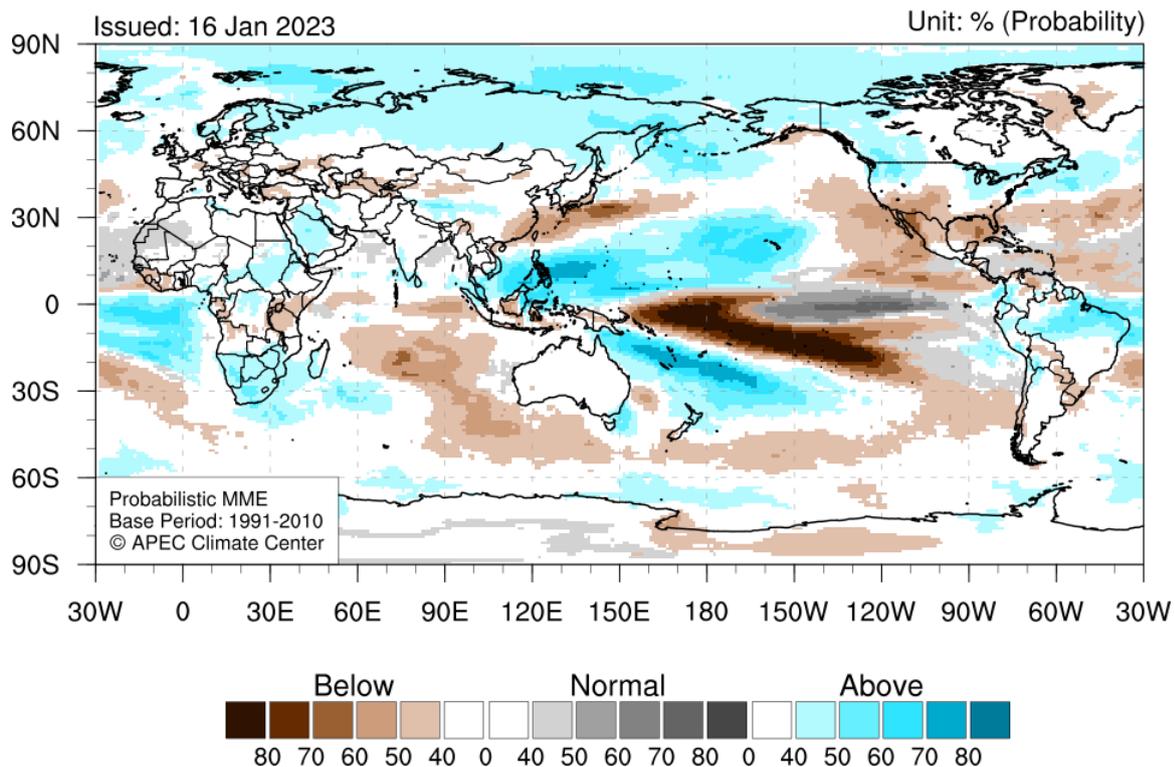
Source: APEC Climate Center

### 2.4.2. Precipitation forecast for February to April 2023

As per the forecast produced by the APEC Climate Center on 16 January 2023 (Figure 42), the precipitation prediction for the period February to April 2023 is as follows:

- Above normal precipitation is expected for southern region of the western subtropical Pacific, South China Sea, Philippine Sea, Philippines, northern region of central tropical and subtropical Pacific, equatorial Atlantic, Canada, and northern region of USA, Brazil and some region of the Arctic Ocean.
- Near normal precipitation is predicted for the central and eastern equatorial Pacific.
- Below normal precipitation is expected for the western equatorial Pacific and the central off-equatorial South Pacific, Mexico and southern USA.

Figure 42: Precipitation forecast February to April 2023



Source: APEC Climate Centre

### 3 Gas Production

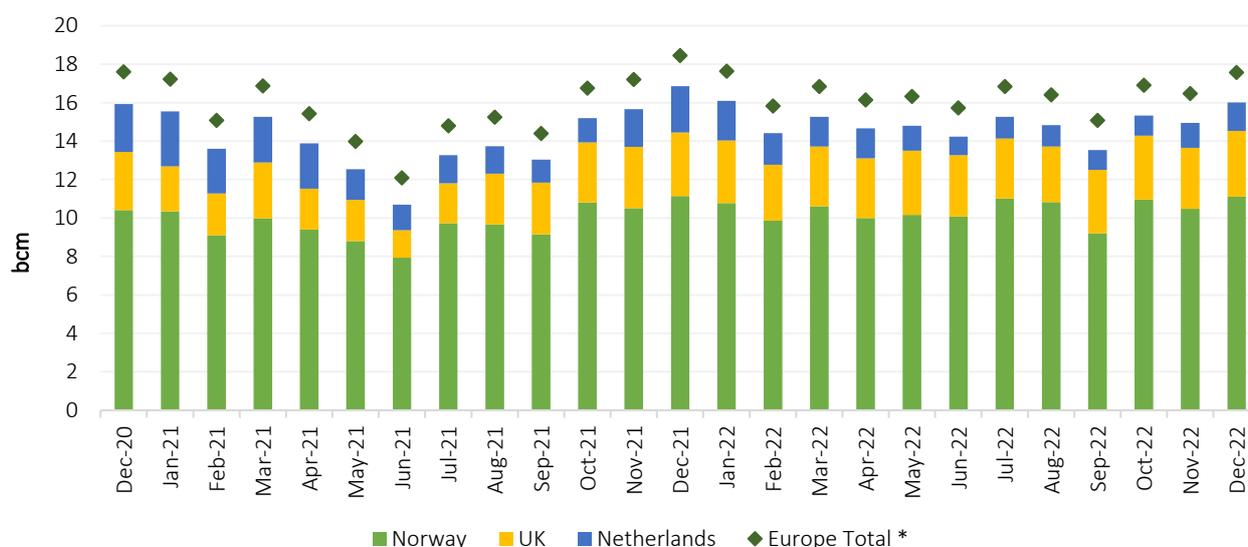
#### 3.1 Europe

In December 2022, Europe’s gas production dropped by 5% y-o-y, but increased by 3% m-o-m to stand at 17.6 bcm (Figure 43). The m-o-m increase was driven by the rise in output of Norway, UK, and Netherlands, whose production stood at 11.1 bcm, 3.4 bcm and 1.5 bcm, respectively.

Norway secured the top spot as Europe's leading gas supplier in 2022. The Norwegian Petroleum Directorate reports that the country's natural gas production is forecasted to stay steady in 2023, while upstream investment is predicted to increase by 10%, reaching 189 billion crowns.

Meanwhile, the Netherlands’ government plans to stick to its timeline for the closure of the Groningen gas field by October 2023, with the option of extending its operation by one more year in case of a gas shortage in Europe in winter. It is worth noting that the production cap on the Groningen field has been gradually reduced since 2014, with the aim of its eventual closure.

Figure 43: Europe’s monthly gas production



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

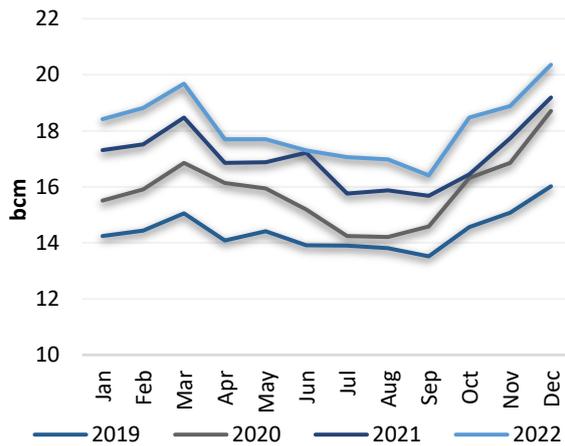
\*Europe’s production: UK, Netherlands, Norway, Germany, Italy, Poland, Denmark, Austria, and Romania

#### 3.2 Asia

In December 2022, China’s gas production increased by 6% y-o-y and 8% m-o-m to reach 20.4 bcm (Figure 44). Cumulative gas production in 2022 stood at 217.8 bcm, up by 16% y-o-y. It should be noted that China’s domestic natural gas production recorded an all-time high in December. China’s natural gas production has seen a steady increase in recent years and has the potential to continue its upward trend.

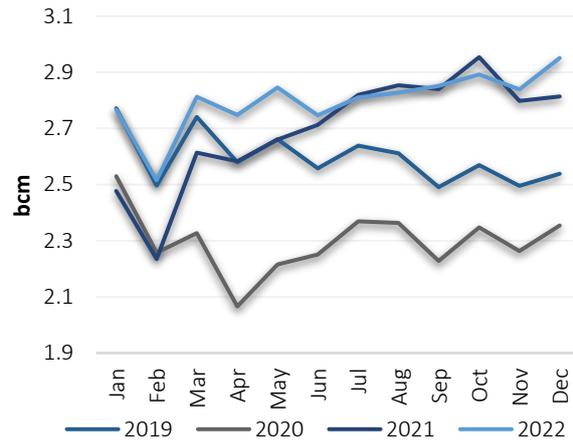
India’s gas production increased by 5% y-o-y and 4% m-o-m to stand at 2.9 bcm (Figure 45). Its cumulative gas production in 2022 stood at 33.6 bcm, or 4% higher y-o-y. In 2022, natural gas production from India's offshore fields rose while the output from onshore fields remained constant.

Figure 44: Trend in gas production in China



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

Figure 45: Trend in gas production in India



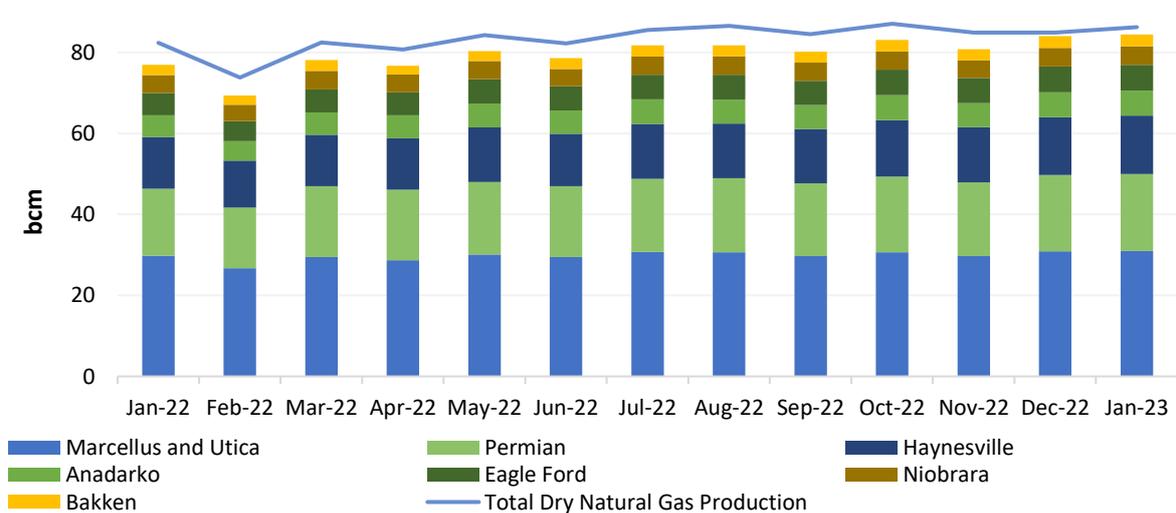
Sources: GECF Secretariat based on data from Refinitiv, Ministry of Petroleum (India)

### 3.3 North America

In January 2022, total dry natural gas production in the US lower 48 stood at 86.3 bcm, representing a y-o-y increase of 5% (3.9 bcm) as reported by EIA. It should be noted that cumulative production for 2022 (January to December) reached 999 bcm in the US lower 48. The rise in the US natural gas production in 2022 was attributed to a surge in drilling operations in the Permian and Haynesville basins, according to EIA’s Short-term Energy Outlook, and due to the recent expansion of pipeline infrastructure in both regions.

Furthermore, shale gas production from seven key shale gas/oil regions (Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara, and Permian) jumped by 10% y-o-y (7.5 bcm) to reach 84.4 bcm (Figure 46). The Appalachian region, consisting of Marcellus and Utica plays, remains the dominant shale gas-producing region, representing 37% of total shale gas production. The associated gas output of the oil shale fields in Permian jumped by 14% y-o-y to reach 18.9 bcm, or 22% of total shale gas production.

Figure 46: Trend in total gas production and 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

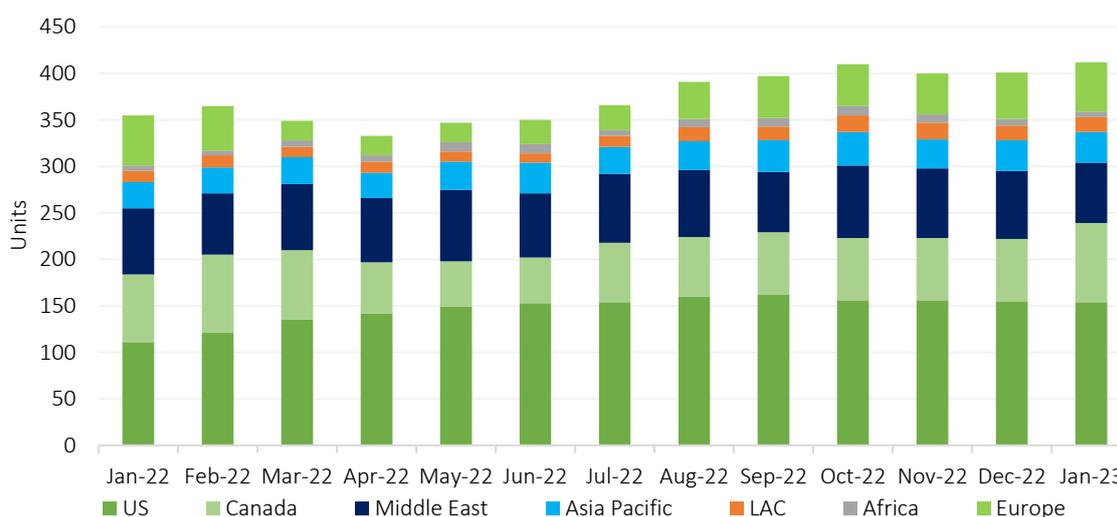
In January 2022, global natural gas rig count, a measure of upstream activity, rose by 11 units from the previous month and by 57 units from the prior year, totalling 412 units (Figure 47). The number of active natural gas rigs in Canada and Europe increased by 18 and 3 units, respectively, while the natural gas rig count in other regions declined or remained unchanged.

As of December 2022, the total number of oil and gas rigs in 7 major shale-producing regions in the US was 696, representing a 1-unit increase from November 2022 and a 174-unit increase from December 2021 (Figure 48). The rise in active rigs number in 2022 results from higher natural gas prices and increased demand from liquefied natural gas (LNG) export facilities. This has prompted oil and gas firms to ramp up their upstream operations to produce more natural gas.

The number of drilled but uncompleted (DUC) wells in 7 key US shale oil and gas-producing regions of the US increased by 40 compared to the previous month to stand at 4,577 in December 2022 (Figure 49). This is 498 wells below the number of DUCs in December 2021. The high prices of natural gas and the rising costs of drilling new wells have incentivized drillers to complete previously drilled wells and make them operational.

EIA's Drilling Productivity Report shows that in the seven major shale oil and gas production regions, the production of natural gas per rig declined 1.9% m-o-m and 14.1% y-o-y, reaching 5434 thousand cubic feet per new well (Figure 50).

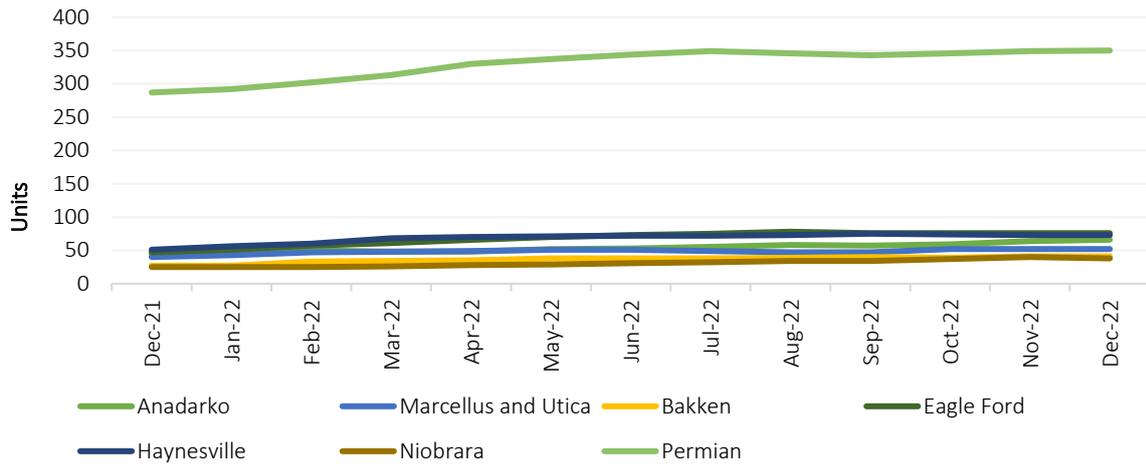
Figure 47: Trend in monthly global natural gas rig count\*



\* Excludes data for CIS and Iran

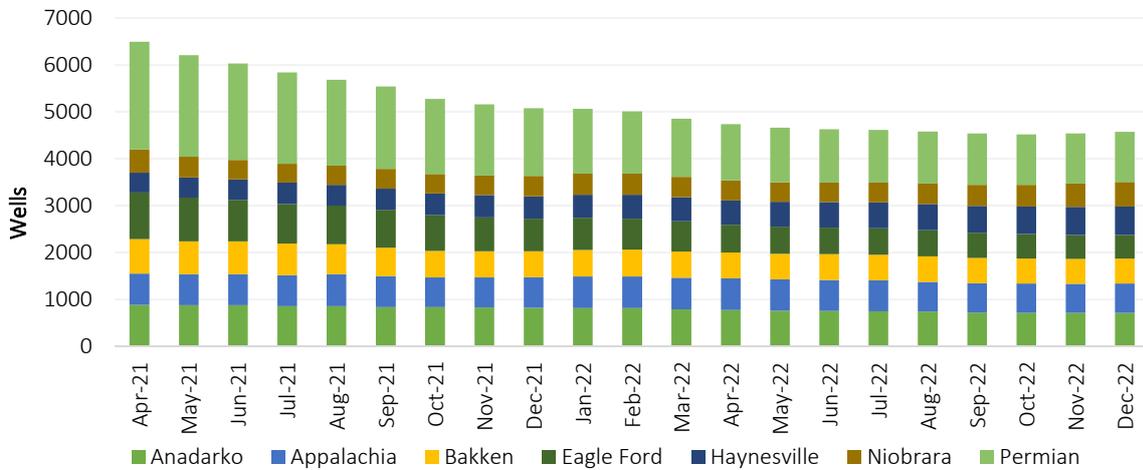
Source: GECF Secretariat based on data from Baker Hughes

Figure 48: US shale region rig count



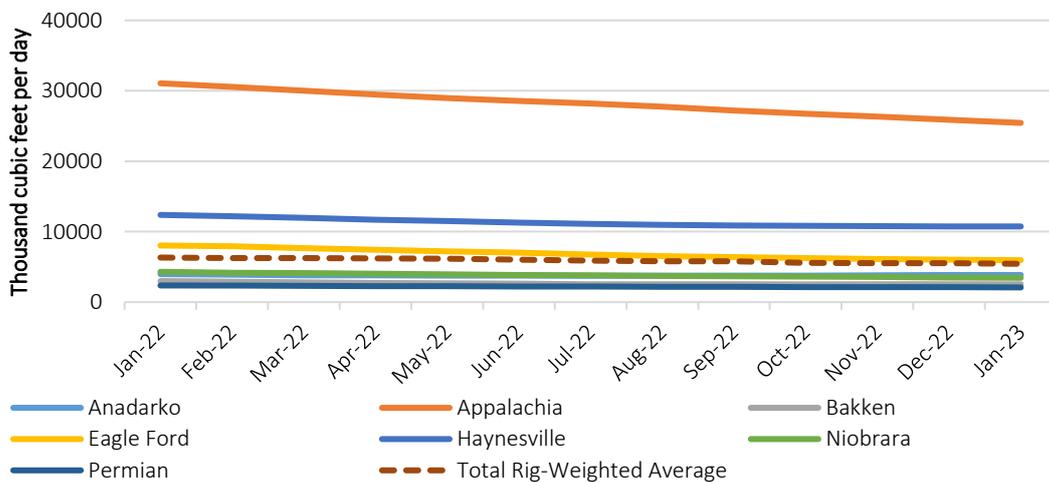
Source: GECF Secretariat based on data from Refinitiv

Figure 49: Drilled but uncompleted well (DUCs) counts in the US



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

Figure 50: New-well gas production per rig



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

### 3.5 Discoveries

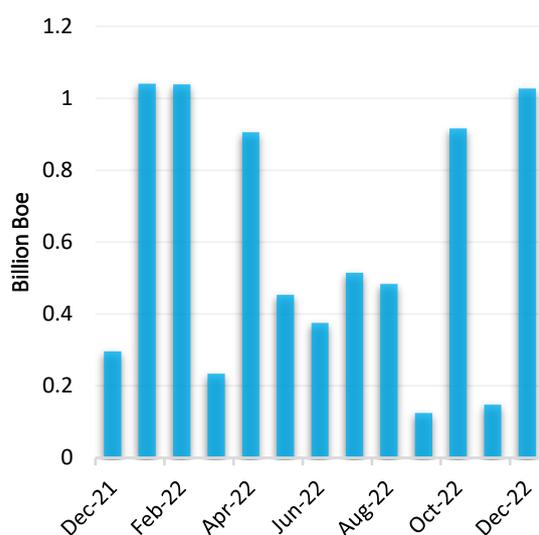
Natural gas and liquids volumes discovered in December 2022 totalled 1027 million barrels of oil equivalent (boe), of which 94% (965 million boe) are natural gas, while the remaining 6% (62 million boe) is liquid oil. This compares to 148 million boe of discovered volumes in November 2022 and 296 million boe of discovered volumes in December 2021. This makes December 2022 one of the most significant months in term of new discoveries (Figure 51).

In total, 8 new discoveries took place in December 2022, of which 6 offshore discoveries and 2 onshore discoveries. The major discovered natural gas volumes were in Europe and Africa with 59% and 26% of the discovered volumes respectively with no major discoveries in LAC, North America and the Middle East (Figure 52).

In terms of key discoveries in December 2022, Cyprus’ Zeus new offshore gas discovery - drilled in Block 6, 162 km off the coastline in 2300 meters of water depth within the eastern Mediterranean basin - stood as the most significant discovery of the month. The discovery well, Zeus-1, encountered 105 meters of net gas pay in a carbonate reservoir sequence. The gas in place associated to this reservoir is preliminarily estimated between 58 and 85 bcm as per Eni’s announcement. It represents the third consecutive discovery in Block 6, after Cronos and Calypso discoveries and confirms the promising outlook for the area and its development.

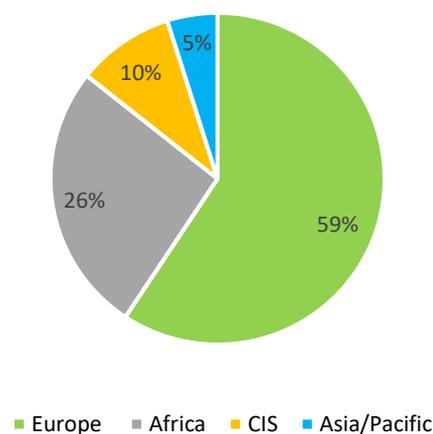
Also in the eastern Mediterranean basin, Eni and Chevron announced a significant new gas discovery at the Nargis-1 exploration well, located in Nargis offshore area concession, offshore Egypt. Nargis-1 well has encountered approximately 61 meters of net gas bearing sandstones and was drilled in 309 m of water depth.

Figure 51: Monthly gas and liquids discovered volumes



Source: GECF Secretariat based on Rystad Energy

Figure 52: Discovered volumes in December 2022 by regions



Source: GECF Secretariat based on Rystad Energy

### 3.6 Other Developments

According to Rystad Energy's preliminary forecast, global natural gas production is estimated to decrease by 0.4% to 4032 bcm in 2022 due to the decline in production in the CIS and Africa regions. Several factors, including a decrease in gas demand due to high prices and geopolitical tensions, exerted downward pressure on gas production. Conversely, the natural gas output of North America, the Middle East, Europe, and Latin America increased by 64 bcm, 19 bcm, 7 bcm, and 3 bcm, respectively. The 2022 figures have been slightly revised upward from the previous month's estimates due to upward revisions in natural gas output in Asia Pacific, the Middle East, and North America. Non-GECF natural gas output is estimated to increase by 3.8% to reach 2388 bcm in 2022, mainly due to a production increase of 47 bcm in the US. In 2023, the forecasts reveal a growth in global gas production, driven by growth in North America, the Middle East, Africa, Latin America, and Asia Pacific.

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

Region	2021	2022	2022 Revision*	2023	2023 Revision*
Africa	270	260	1.0%	266	-1.9%
Asia Pacific	668	669	0.6%	670	-1.0%
CIS	898	797	0.1%	783	0.4%
Latin America	152	154	-3.5%	155	-4.1%
Europe	224	231	-0.1%	223	0.2%
Middle East	671	690	0.5%	714	-0.1%
North America	1166	1230	0.3%	1299	0.8%
<b>World</b>	4050	4032	0.22%	4111	-0.1%
<b>GECF</b>	1749	1643	0.0%	1642	-0.5%
<b>non-GECF</b>	2301	2388	0.4%	2469	0.1%

Source: GECF Secretariat based on Rystad Energy Ucube

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

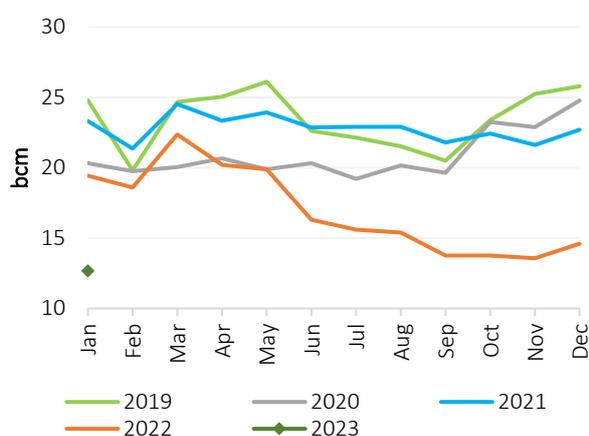
## 4 Gas Trade

### 4.1 Pipeline Natural Gas (PNG) Trade

#### 4.1.1 Europe

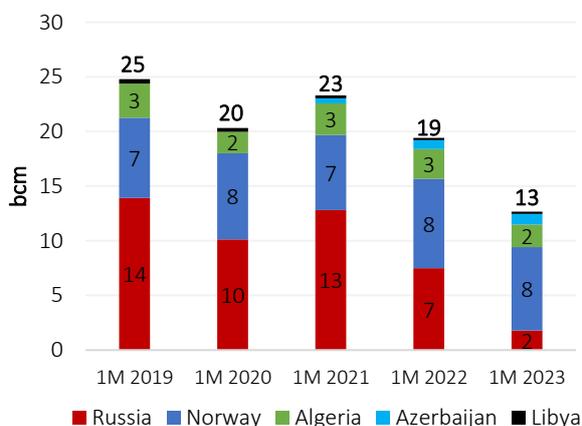
In January 2023, PNG imports to the European Union reached 12.7 bcm, which was 13% lower than the previous month, and 35% lower than one year ago (Figure 53). In 2022, pipeline gas imports to the region decreased as a result of lower flows from Russia, despite increases in pipeline gas exports to the region from Norway and Azerbaijan, and this trend continued for the first month of 2023 (Figure 54).

Figure 53: Monthly PNG imports to the EU



Source: GECF Secretariat based on data from McKinsey and Refinitiv

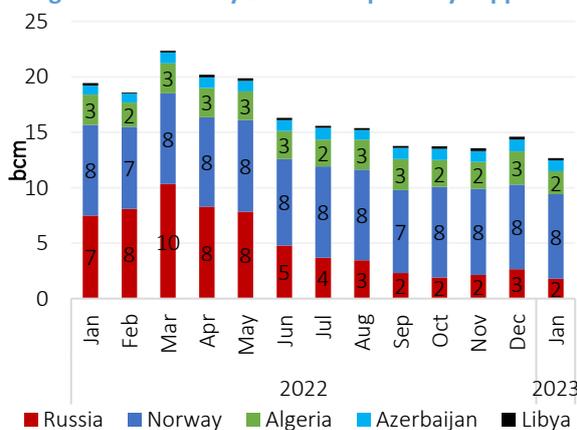
Figure 54: Year-to-date EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

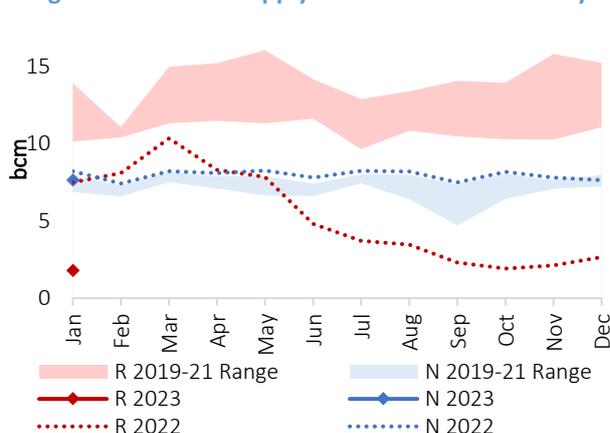
In 2022, Norway increased supply by 8%, while Russian exports decreased by 55%. Over the course of 2022, Norway accounted for 47% of total supply to the EU, compared with Russia at 31%. From 2019 to 2021, Norway's PNG exports to the EU have averaged 7.3 bcm per month, while in 2022, this average was 9% higher (Figure 56). Imports from Norway were slightly reduced in January 2023 due to upstream maintenance activity. For comparison, from 2019 to 2021, Russia's PNG exports to the EU have averaged 12.5 bcm per month; in 2022 this average was 58% lower, and the trend was unchanged in January 2023.

Figure 55: Monthly EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

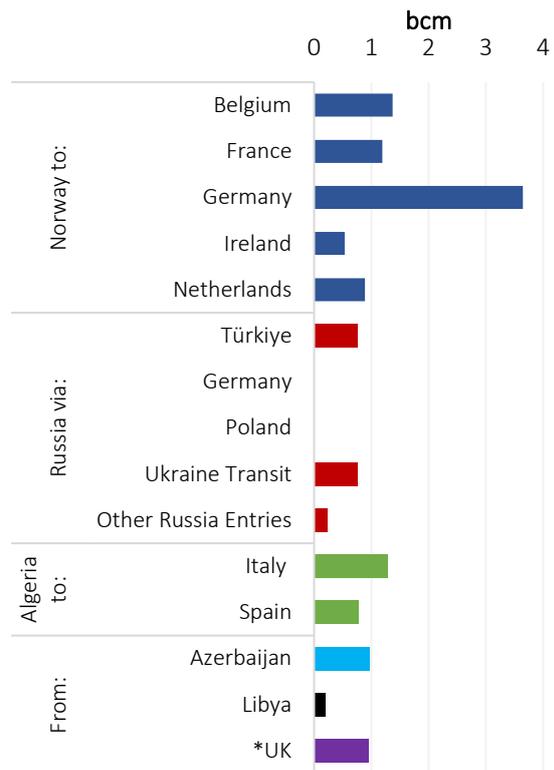
Figure 56: EU PNG supply from Russia and Norway



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Looking more closely at EU PNG trade on a more granular level, Figure 57 shows the flows to the region via the major import supply routes in January 2023. Norway continues to export most of its volumes (48%) to Germany, but some of these volumes are expected to be redistributed towards Poland via the Baltic Pipe. For Russia, the main supply routes are the Ukraine transit pipelines (44%) and the Turkstream pipeline (43%). With the continued influx of LNG imports to the UK, there has been a substantial volume of PNG entering the region via the interconnectors, reaching 1.0 bcm in January.

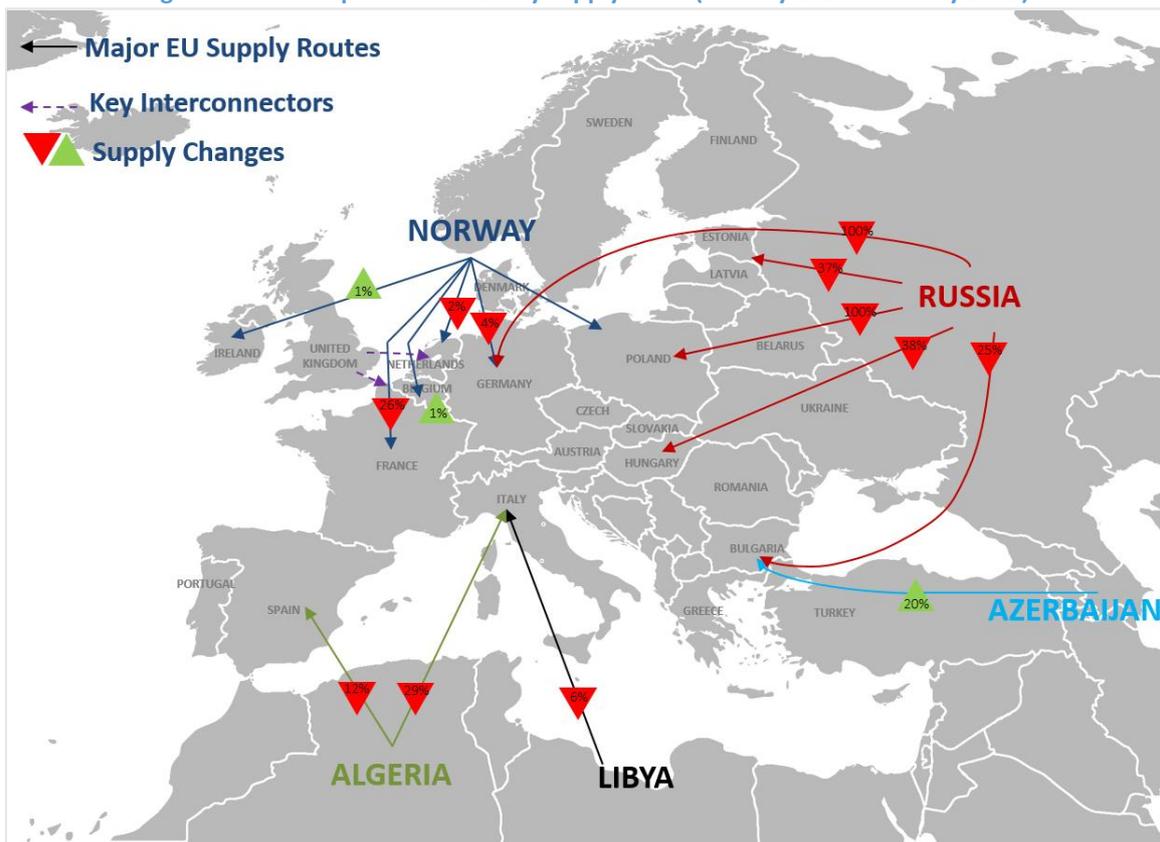
Figure 57: EU PNG imports by supply route in January 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 58 shows the EU PNG imports via the major supply routes, in January 2023, versus the same month in the previous year. Russian PNG flows have observed declines in all routes, and quantities from Norway recorded decreases or remained stable to its major markets.

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

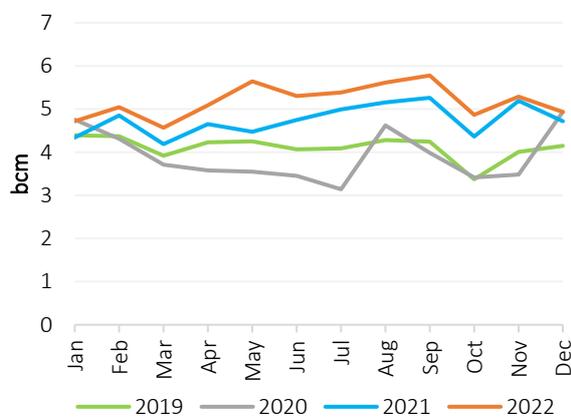


Source: GECF Secretariat based on data from McKinsey and Refinitiv

### 4.1.2 Asia

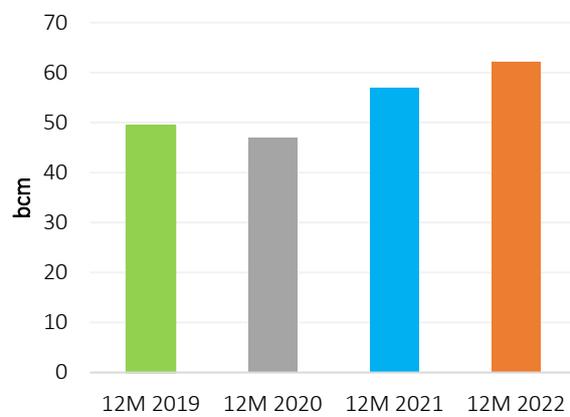
In December 2022, PNG imports to China reached 4.9 bcm, which was 7% lower m-o-m, but 5% higher y-o-y (Figure 59). Over the course of 2022, cumulative PNG imports totalled 62.2 bcm, which is 9% higher than the quantity imported during 2021 (Figure 60). The average monthly PNG imports in 2022 was 5.2 bcm, compared with 4.7 bcm during the same period in 2021, which is an increase of 9%.

Figure 59: Historical PNG imports in China



Source: GECF Secretariat based on data from Refinitiv

Figure 60: Monthly PNG imports in China



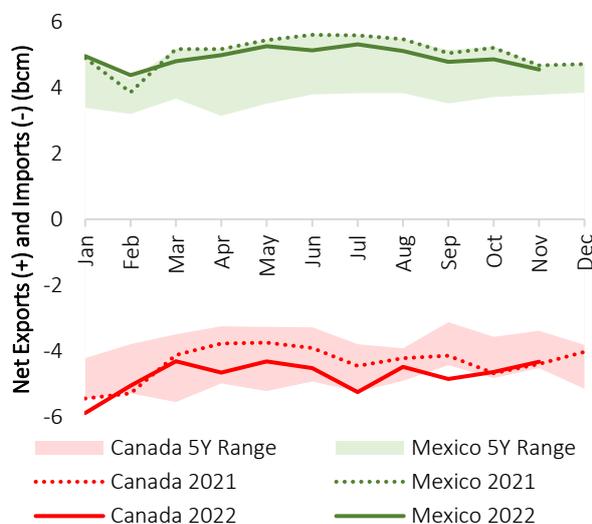
Source: GECF Secretariat based on data from Refinitiv

### 4.1.3 North America

In November 2022, net PNG imports from Canada to the US reached 4.3 bcm, which was 7% lower m-o-m and 1% lower y-o-y (Figure 61). Net PNG exports from the US to Mexico reached 4.6 bcm, which was 6% lower m-o-m and 3% lower y-o-y.

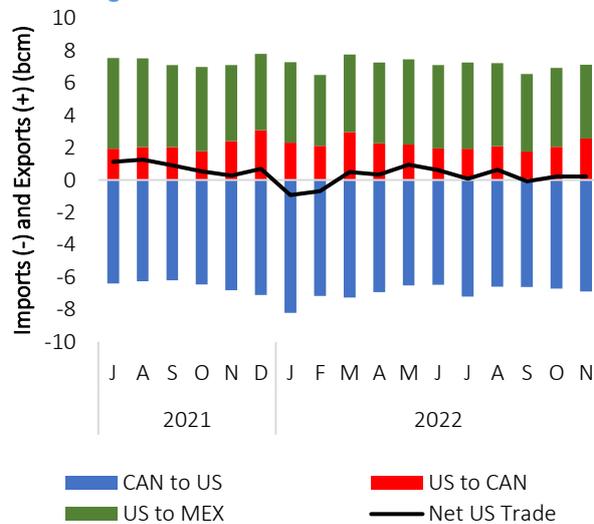
These PNG flows resulted in a small quantity of net pipeline exports from the US to the other countries of North America (Figure 62). For 2022 thus far, average monthly flows in the region are: CAN to US – 7.0 bcm, US to CAN – 2.2 bcm, and US to MEX – 4.9 bcm.

Figure 61: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 62: PNG trade in North America



Source: GECF Secretariat based on data from US EIA

#### 4.1.4 Other Developments

*New Turkmenistan to China gas link:* The governments of Turkmenistan and China have announced the acceleration of the construction of the Central Asia-China Gas Pipeline D, the fourth such link between the nations. The previous three lines have a combined capacity of 55 bcma, placing Turkmenistan as the leading gas supplier to China. This new pipeline has a design capacity of 30 bcma, and follows a different route into western China.

*Pipeline trade between Venezuela and Trinidad & Tobago:* Hurdles have recently been removed, clearing the way for progress on gas trade between the South American country of Venezuela and the Caribbean nation of Trinidad & Tobago. This project is intended to bring gas to market from the Dragon field in the waters of northern Venezuela, via the LNG export terminal in Trinidad. The construction of a 20 km gas pipeline link from the field to a Shell-operated platform in Trinidad's waters, will facilitate the gas flows for the trade.

*Updates on the Central African Pipeline System:* Equatorial Guinea and Cameroon are currently advancing the first phase of the Central African Pipeline System (CAPS). The CAPS project is envisioned to construct 6500 km of oil and gas pipelines, connecting Central African countries Angola, Cameroon, Chad, the Republic of the Congo, the Democratic Republic of the Congo (DRC), Equatorial Guinea and Gabon. Initial agreements were signed by these nations in September 2022, and start-up is expected in 2030. The project will also include gas power plants and LNG terminals.

*Potential pipeline trade from Iraq to Germany:* The German Chancellor has disclosed discussions have been held with Iraqi authorities over the possibility to import natural gas from that country. This would form part of an overall investment in the gas industry in Iraq by Germany, as they seek to diversify their energy supply. The volumes would enter Europe via Türkiye.

*Tanzania to Kenya gas pipeline proposal:* Authorities from Kenya and Tanzania have discussed the feasibility of a gas pipeline link from Dar es Salaam, Tanzania to Mombasa, Kenya. This line would later be extended to Kenya's capital, Nairobi. The 600 km pipeline is being developed to mitigate against Kenya's rising energy imports, especially for power generation and the industrial sector. The project is expected to cost \$1.1 billion.

*Canada's Coastal GasLink pipeline nears completion:* TC Energy, the owner of the under-construction Coastal GasLink pipeline, has reported that the project is at 80% completion. This comes after the recent announcement that the construction costs have ballooned by 30% to over \$10 billion. The 670 km pipeline, which aims to bring supply to Shell's LNG Canada export terminal on the west coast in British Columbia, has been hit with issues of indigenous and climate activists, labour shortages, and adverse weather.

## 4.2 LNG Trade

### 4.2.1 LNG Imports

In January 2023, global LNG imports fell by 1.4% (0.51 Mt) y-o-y to 36.71 Mt (Figure 63), which is the first y-o-y decline since February 2021. Similarly, global LNG imports declined by 3.4% (1.29 Mt) m-o-m. The weaker y-o-y global imports was driven by lower LNG imports across all regions except Europe (Figure 64). Asia and Latin America and the Caribbean (LAC) accounted for the bulk decline in imports.

Figure 63: Trend in global monthly LNG imports

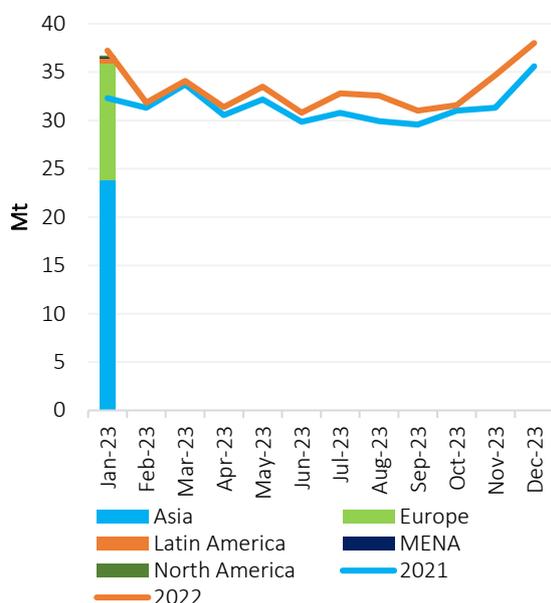
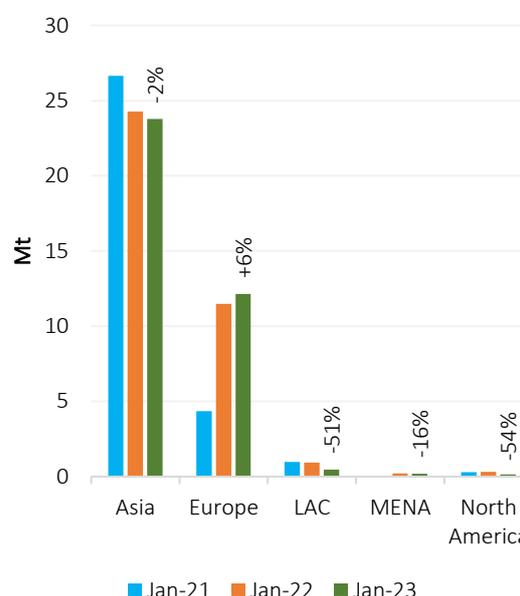


Figure 64: Trend in regional LNG imports in January



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.1.1 Europe

In January 2023, Europe's LNG imports grew by 5.7% (0.66 Mt) y-o-y to 12.15 Mt (Figure 65), which represents a slowdown in the pace of growth. The weaker y-o-y growth in LNG imports was attributed to weaker gas demand, amidst a mild winter season, and high gas inventories in the region. Meanwhile, the higher LNG imports compared to January 2022 compensated for weaker pipeline gas imports from Russia. Belgium, Germany, Italy, Lithuania, Netherlands and Poland drove the increase in Europe's LNG imports and offset weaker imports in France, Portugal, Spain and the UK (Figure 66). In early January 2023, Germany sent out the first regasified LNG from the Deutsche Ostsee FSRU in Lubmin to the German gas grid.

In Belgium and Netherlands, the higher LNG imports was due to stronger gas import demand in Germany to compensate for lower Russian pipeline gas in the country. It is worth mentioning that the second LNG import terminal in Germany, the Deutsche Ostsee FSRU, sent out the first regasified LNG into the gas grid in January 2023. Germany is developing LNG import terminals to replace Russian pipeline gas. In Italy, lower pipeline gas from Russia and Algeria in January boosted LNG imports in the country. The higher LNG imports in Lithuania and Poland was attributed to lower Russian pipeline gas supply to both countries. It should also be noted that Latvia has been sourcing regasified LNG from the LNG import terminal in Lithuania. On the other hand, the lower LNG imports in France, Portugal, Spain and the UK was mainly driven by weaker gas consumption in these countries.

Figure 65: Trend in Europe’s monthly LNG imports

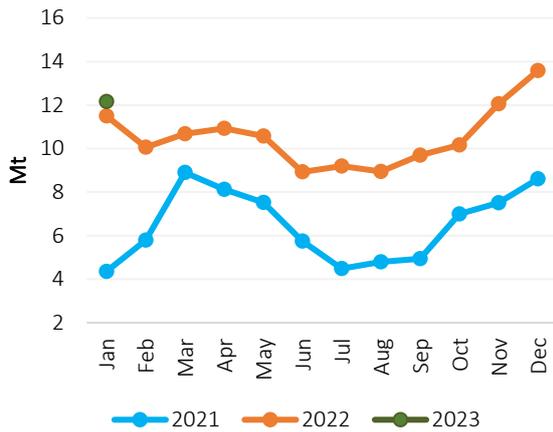
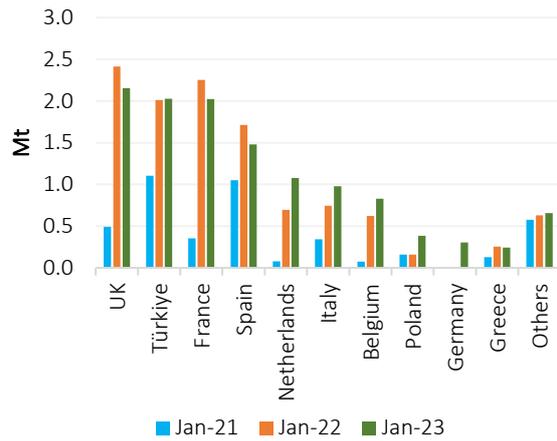


Figure 66: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.1.2 Asia

In January 2023, Asian LNG imports declined by 2.0% (0.49 Mt) y-o-y to 23.77 Mt (Figure 67), which represents the fifteenth consecutive monthly y-o-y decline. However, the magnitude of the decline slowed from the previous month. China and India drove the decline, which was partially offset by higher imports in Thailand and Taiwan (Figure 68).

Despite the easing of the Zero-COVID policy in China, this has yet to materialise in a significant rise in gas consumption in the country. As such, Chinese LNG imports in January 2023 remained below the previous year’s level and may have also been impacted by higher domestic gas production. In India, the uptick in domestic gas production and relatively high spot LNG prices for Indian LNG buyers drove the decline in LNG imports. In addition, lower contractual LNG supply under the long-term contract between Gazprom and GAIL contributed to the weaker imports. Following the EU’s sanctions on Russia in 2022, Germany’s Securing Energy for Europe (Seferis) took over a Gazprom subsidiary and failed to deliver contractual LNG cargoes to India. On the other hand, the rise in Taiwan’s LNG imports was driven by lower coal-fired electricity generation between October and March. In Thailand, LNG imports grew significantly in January to compensate for lower domestic gas production.

Figure 67: Trend in Asia’s monthly LNG imports

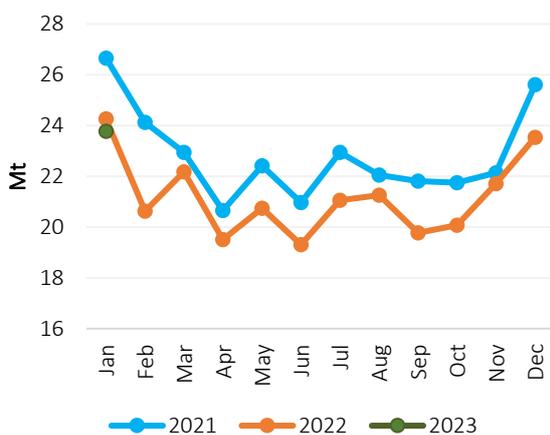
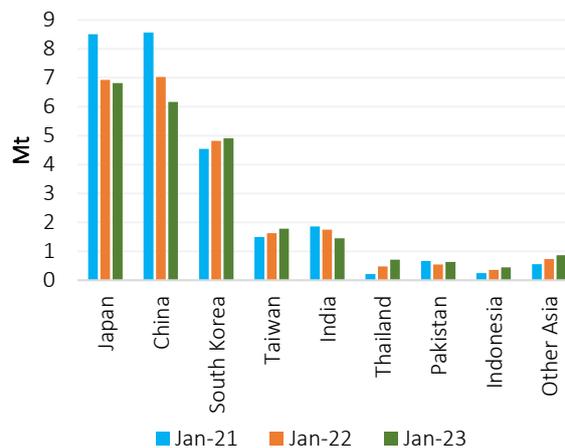


Figure 68: Top LNG importers in Asia



Source: GECF Secretariat based on data from ICIS LNG Edge

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

In January 2023, LAC’s LNG imports slumped by 51% (0.48 Mt) y-o-y to 0.46 Mt (Figure 69), which is the lowest monthly imports since January 2020. Brazil, and to a lesser extent Chile and Colombia, accounted for the bulk incremental LNG imports in the region (Figure 70). Brazil did not import any LNG cargo in January due to significantly higher hydro levels compared to a year earlier. The reservoir levels in the country’s southeast/centre-west averaged 50% at the end of 2022, which was double the reservoir levels from a year earlier. In contrast, Jamaica’s LNG imports were up significantly y-o-y and may be attributed to higher gas demand in the electricity sector.

Figure 69: Trend in LAC’s monthly LNG imports

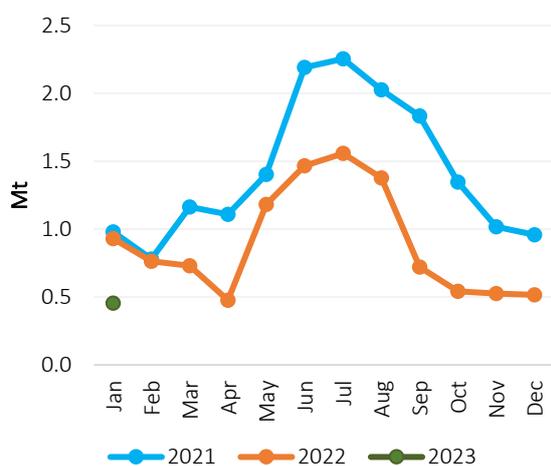
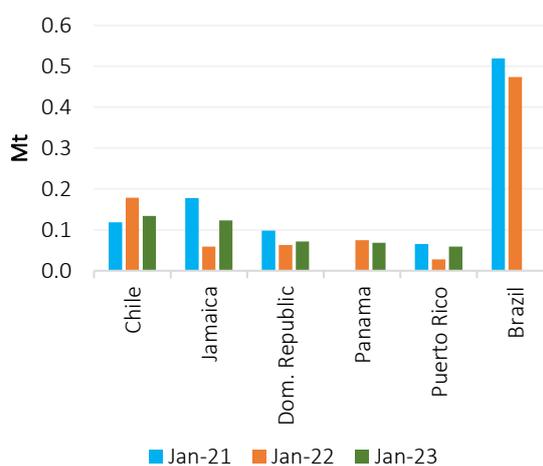


Figure 70: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.1.4 MENA

In January 2023, MENA region’s LNG imports dropped by 16% (0.03 Mt) y-o-y to 0.18 Mt (Figure 71), which represents the seventh consecutive monthly y-o-y decline. Kuwait was the only country that imported LNG in the region in January and drove the weaker LNG imports in the region (Figure 72). The weaker LNG imports in Kuwait came mainly from lower imports from Egypt, which was partially offset by higher imports from Qatar.

Figure 71: Trend in MENA’s monthly LNG imports

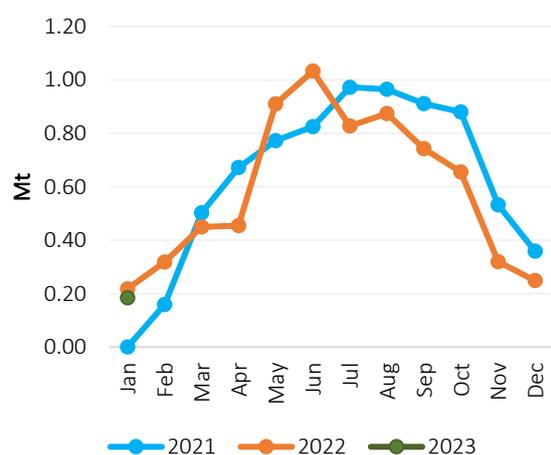
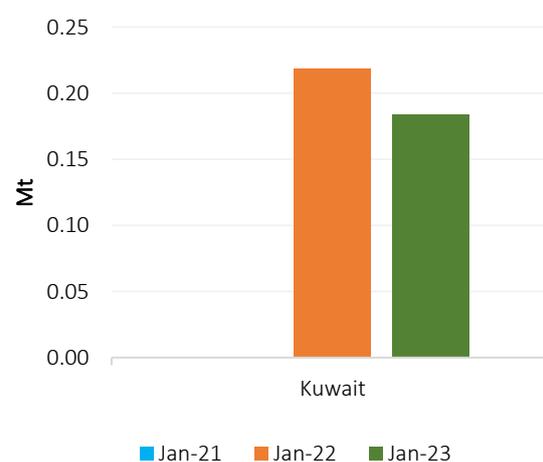


Figure 72: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

## 4.2.2 LNG Exports

In January 2023, global LNG exports grew by 2.8% (0.98 Mt) y-o-y to 35.56 Mt (Figure 73). The higher LNG exports was driven mainly by non-GECF countries and to a lesser extent from GECF member countries and LNG reloads. However, GECF member countries were the largest LNG exporter globally with a share of 49.7%, down from 50.9% during the same period a year earlier. Similarly, the share of LNG reloads in global LNG exports decreased from 1.5 % to 1.2% during the same period. In contrast, the share of non-GECF countries LNG exports globally increased from 47.9% to 48.8%. At a country level, the U.S. was the largest LNG exporter followed by Australia and the Qatar (Figure 74).

Figure 73: Trend in global monthly LNG exports

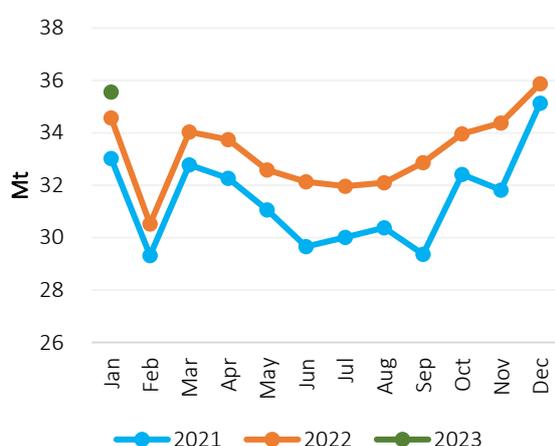
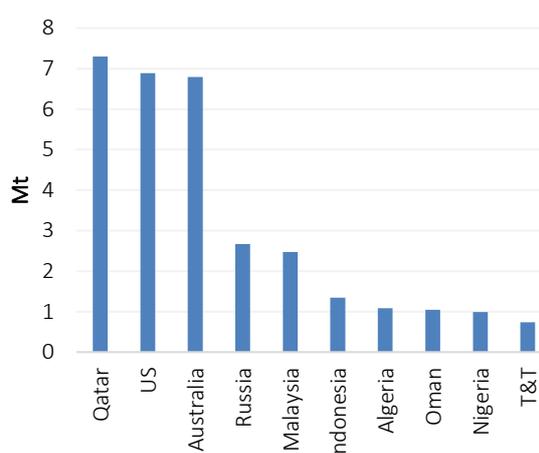


Figure 74: Top 10 LNG exporters in Jan 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.2.1 GECF

In January 2023, GECF's LNG exports (Members and Observers) increased slightly by 0.4% (0.07 Mt) y-o-y to 17.66 Mt (Figure 75). The increase in GECF's LNG exports came from Norway (+0.37 Mt), Algeria (+0.27 Mt), Malaysia (+0.19 Mt), Qatar (+0.12 Mt), Mozambique (+0.06 Mt) and Trinidad and Tobago (+0.06 Mt). On the other hand, LNG exports were weaker in Nigeria (-0.51 Mt), Russia (-0.23 Mt), Peru (-0.14 Mt), Angola (-0.06 Mt), Equatorial Guinea (-0.04 Mt) and the United Arab Emirates (-0.03 Mt) as shown in Figure 76.

The jump in LNG exports in Norway was supported by the ramp-up in production from the Hammerfest LNG facility, which resumed operations in June 2022, following an extended period of unplanned maintenance. In Algeria, despite ongoing planned maintenance activity at the Skikda LNG facility, stronger LNG exports from the Arzew LNG facility boosted LNG exports from the country. Higher feedgas availability for LNG exports almost doubled LNG exports from the Arzew LNG facility. Similarly, higher feedgas availability for LNG exports supported the increase in LNG exports in Malaysia and Trinidad and Tobago. In Qatar, LNG production above the nameplate capacity of the liquefaction facility continues to drive the higher LNG exports from the country. Meanwhile, the ramp-up in production from the Coral South FLNG facility boosted LNG exports in Mozambique.

In contrast, the fall in Nigeria's LNG exports was due to lower feedgas availability for LNG exports. The force majeure on the Bonny LNG facility declared in October 2022, following widespread flooding, has remained in place. In Russia, the weaker LNG exports came mainly from the Sakhalin LNG 2 facility.

Figure 75: Trend in GECF monthly LNG exports

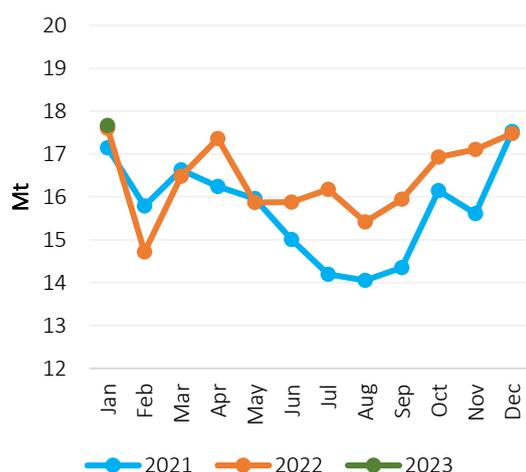
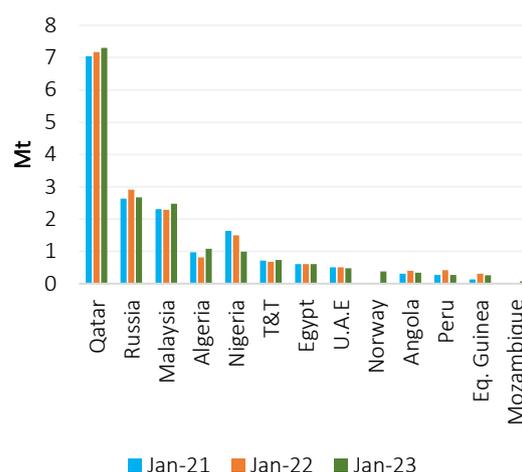


Figure 76: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

#### 4.2.2.2 Non-GECF

In January 2023, non-GECF's LNG exports grew by 4.8% (0.80 Mt) y-o-y to 17.37 Mt (Figure 77). The higher LNG exports was driven by Australia (+0.35 Mt), Indonesia (+0.30 Mt), Oman (+0.08 Mt), Cameroon (+0.07 Mt), the US (+0.04 Mt) and Brunei (+0.03 Mt), which offset weaker exports from Papua New Guinea (-0.07 Mt), as shown in Figure 78.

In Australia, lower maintenance activity in January 2023 compared to a year earlier, mainly at the Gorgon, NWS and Prelude LNG facilities, supported the jump in LNG exports from the country. Higher LNG exports from these facilities offset weaker LNG exports from the APLNG and QLNG facilities, due to higher maintenance activity, as well as lower exports from Darwin LNG, which has been impacted by a decline in feedgas availability. Likewise, lower maintenance activity at the Tangguh LNG facility, compared to January 2022 as well as higher feedgas availability boosted Indonesia's LNG exports. Despite the ongoing maintenance at the Freeport LNG facility, following an explosion in June 2022, the US LNG exports increased meagrely in January 2023. This was driven by the ramp-up in production from the Calcasieu Pass and Sabine Pass Train 6 LNG facilities, as well as higher production from other facilities.

Figure 77: Trend in non-GECF monthly LNG exports

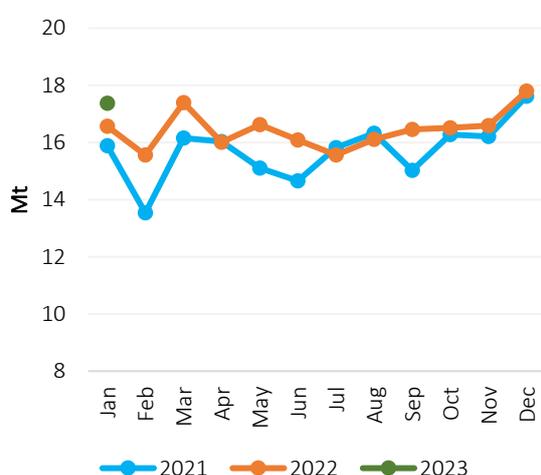
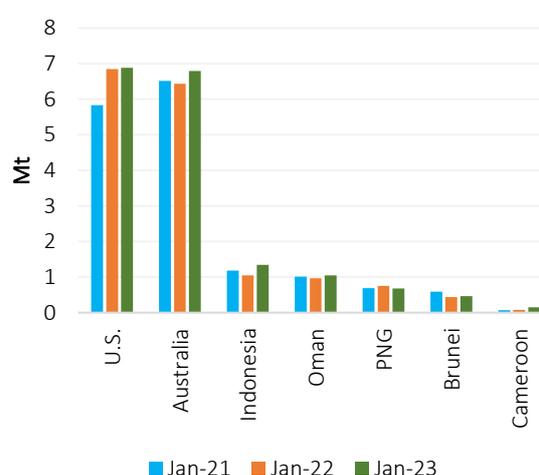


Figure 78: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

### 4.2.3 Global LNG Reloads

In January 2023, global LNG reloads increased by 26% (0.11 Mt) y-o-y to 0.53 Mt (Figure 79), which is the highest January reloads since 2018. Stronger LNG reloads from Spain (+0.11 Mt), Indonesia (+0.08 Mt) and South Korea (+0.06 Mt) more than offset weaker reloads from Belgium (-0.07 Mt), China (-0.01 Mt) and Singapore (-0.07 Mt) as shown in Figure 80. The higher LNG reloads from Spain was driven by strong intra-regional LNG trade, with five LNG reload cargoes from the country were exported to Germany and Italy, while one cargo was exported to Puerto Rico. In Indonesia, higher LNG reloading activity from the Arun and Cilamaya LNG terminals supported the LNG reloads from the country. TotalEnergies utilises a storage tank at the Arun LNG terminal for LNG offload, storage and reloads to Asian countries. The two LNG cargoes reloaded from the Arun terminal were exported to Japan while one LNG cargo reloaded from Cilamaya was exported to Benoa, Indonesia.

Figure 79: Trend in global monthly LNG reloads

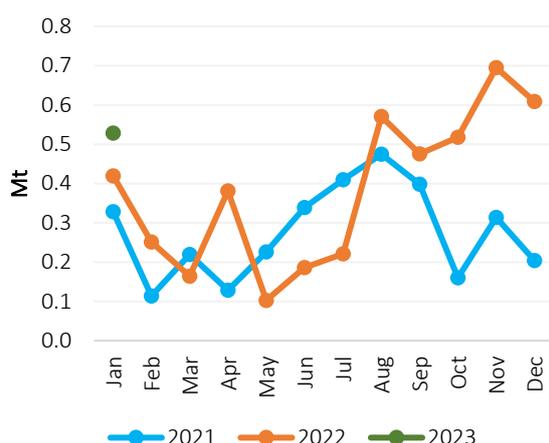
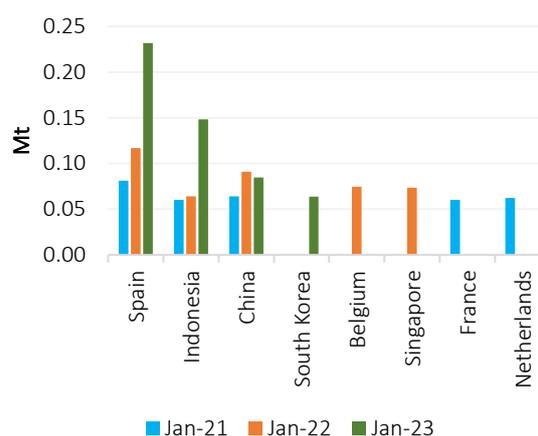


Figure 80: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

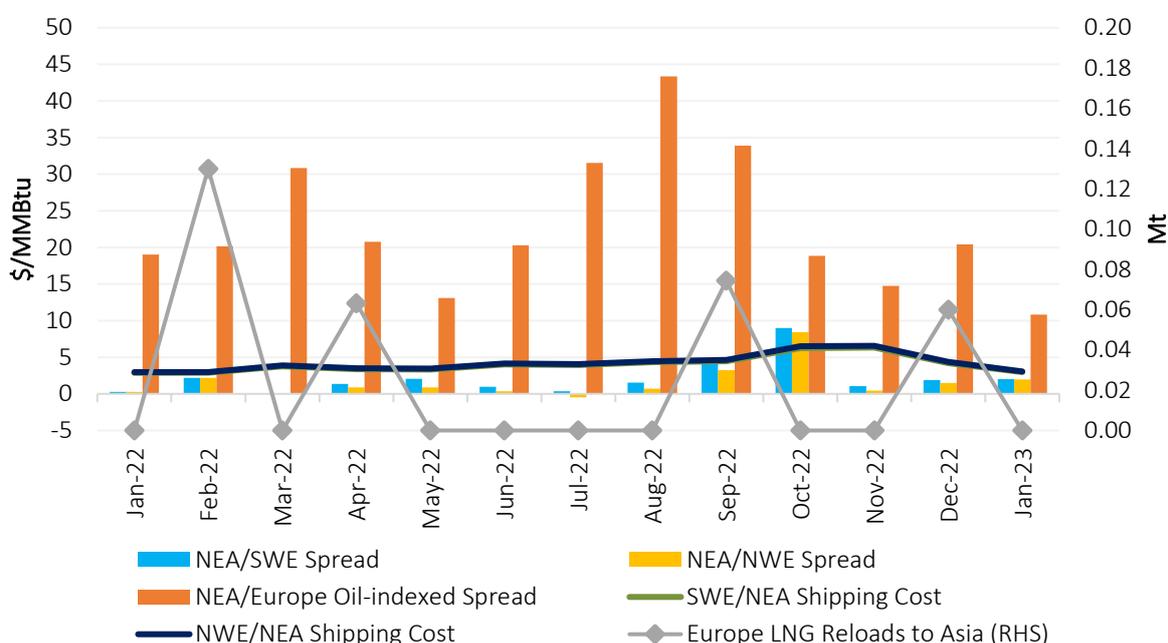
### 4.2.4 Arbitrage Opportunity

In January 2023, the arbitrage opportunity for LNG reloads from Europe to Asia, based on the spot LNG price differential between both markets, was out-the-money. Despite the decline in spot shipping cost from Europe to Asia and an increase in the spot LNG price differential between Asia and Europe, the spot shipping cost maintained a premium over the price spreads (Figure 81). Meanwhile, the arbitrage opportunity based on the spot LNG price in Asia and oil-indexed price in Europe was in-the-money. The NEA/SWE and NEA/NWE price spreads increased by 6% (\$0.11/MMBtu) and 30% (\$0.45/MMBtu) m-o-m to \$2.00/MMBtu and \$1.95/MMBtu respectively. This was attributed to the stronger decline in the SWE and NWE spot LNG prices compared to the NEA spot LNG price. In contrast, the price spread between the spot LNG price in Asia and the oil-indexed price in Europe fell by 47% (\$9.58/MMBtu) m-o-m to \$10.83/MMBtu.

In terms of the spot shipping costs, the NEA/SWE and NEA/NWE spot shipping costs dropped by 29% (\$0.11/MMBtu) m-o-m each to \$2.97/MMBtu and \$3.08/MMBtu respectively. However, it should be noted that the shipping cost with vessels under medium and long-term charters might be lower than the spot shipping costs. The absence of the arbitrage opportunity prevented LNG reloads from Europe to Asian countries in January 2023.

When compared to January 2022, the NEA/SWE and NEA/NWE price spreads surged by 641% (\$1.73/MMBtu) and 622% (\$1.68/MMBtu) y-o-y respectively. In contrast, the price spread between the NEA spot LNG and European oil-indexed gas price fell by 43% (\$8.17/MMBtu) y-o-y. Meanwhile, the NEA/SWE and NEA/NWE spot shipping costs increased by 3.5% (\$0.10/MMBtu) and 3.7% (\$0.11/MMBtu) y-o-y respectively.

Figure 81: Price spreads & shipping costs between Asia & Europe spot LNG markets



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

#### 4.2.5 Other Developments

**First regasified LNG from Inkoo FSRU sent to Finnish gas grid** – following the arrival of Exemplar FSRU in Inkoo, Finalnd, in December 2022, the first regasified LNG from the FSRU was sent to the Finnish gas grid on January 2, 2023. The FSRU loaded an LNG cargo via a ship-to-ship transfer near Gibraltar before arriving in Finalnd. The FSRU, with a regasification capacity of 3.7 Mtpa, will supply regasified LNG to Finland and Estonia. Gasgrid signed a 10-year agreement with Exceletrate for the FSRU in May 2022.

**First regasified LNG from Deutsche Ostsee FSRU sent LNG to German gas grid** – following the arrival of Neptune FSRU in Lubmin, Germany, in December 2022, the first regasified LNG from the FSRU was sent to the German gas grid on January 14, 2023. The LNG volumes were delivered using the Coral Furcata vessel, which loaded from the Seapeak Hispania FSU in Lubmin, Germany. This is the second LNG import to start operations in Germany and the facility has a regasification capacity of 375 Mtpa.

**Hoegh Gannet FSRU arrives in Germany** – on January 20, 2023, the Hoegh Gannet FSRU, which will be used for the Brunsbuttel LNG import terminal arrived in Germany. The FSRU, with a regasification capacity of 3.7 Mtpa, was loaded in Ferrol, Spain in mid-January 2023 before arriving in Germany. The import project was developed by RWE and is the third LNG import terminal to start operations in Germany.

**Stade LNG terminal in Germany starts construction** – on January 20, 2023, construction of the necessary infrastructure to accommodate the Stade FSRU started construction in Germany.

The FSRU will have a regasification capacity of 3.7 Mtpa and is expected to start operations in Q4 2023. The Transgas Force FSRU from Dynagas will be utilised for the LNG import terminal.

In terms of LNG agreements, several contracts were signed in December 2022 and the details are shown in Table 2 below.

**Table 2: New LNG sale agreements signed in December 2022**

Contract Type	Exporting Country	Project	Seller	Importing Country	Buyer	Volume (Mtpa)	Duration (Years)
Termsheet	Oman	Qalhat LNG	Oman LNG	Portfolio	Shell	0.8	10
Termsheet	Oman	Qalhat LNG	Oman LNG	Portfolio	TotalEnergies	0.8	10
Termsheet	Oman	Qalhat LNG	Oman LNG	Thailand	PTT	0.8	9
SPA	U.S.	Rio Grande	NextDecade	Portfolio	Itochu	1	15
Termsheet	Oman	Qalhat LNG	Oman LNG	Turkiye	BOTAS	1	10

Source: GECF Secretariat based on Project Updates and News

#### 4.2.6 Maintenance Activity at LNG Liquefaction Facilities

Table 3: Maintenance activity at LNG liquefaction facilities during January 2023

Country	Plant	Outage Type	Start Date	End Date	Tonnes Affected	Description
US	Freeport - All plants	Unplanned	08-06-22	31-03-23	1,160,000	Repair following a fire at the facility in June 2022
Nigeria	Bonny - All plants	Planned	03-01-23	28-02-23	425,753	Force majeure following widespread flooding in October 2022 still in effect
Algeria	Skikda - All plants	Planned	01-01-23	07-02-23	382,192	Regula planned maintenance
Australia	QCLNG - Unknown plant	Unplanned	27-12-22	19-01-23	221,233	Unknown
Australia	Prelude FLNG	Unplanned	21-12-22	15-01-23	147,945	Unplanned outage due to a turbine fire
US	Calcasieu Pass - All plants	Unplanned	23-12-22	02-01-23	37,731	Unknown
	<b>Total Nameplate Tonnes Affected in January 2023</b>				<b>2,374,854</b>	
	<b>Total Nameplate Tonnes Affected in January 2022</b>				<b>1,042,819</b>	

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

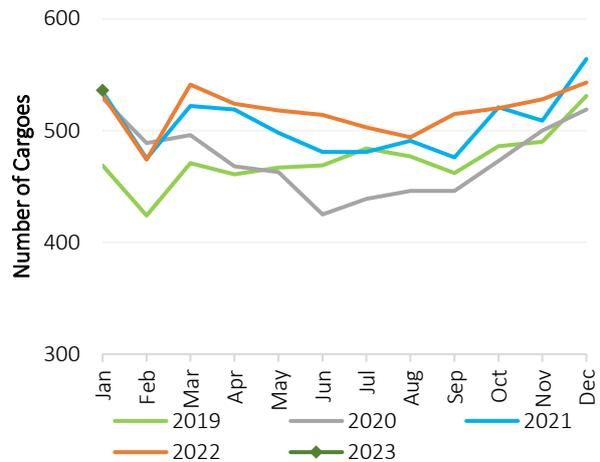
### 4.2.7 LNG Shipping

In January 2023, the total number of LNG export cargoes decreased by 1% m-o-m to 536 (Figure 82).

The total number of LNG shipments have been on a general upward trend since 2019 (Figure 83), and the number of shipments in January 2023 was the highest at the start of any of the previous four years. Australia, the US and Qatar already lead the number of LNG shipments in 2023 thus far.

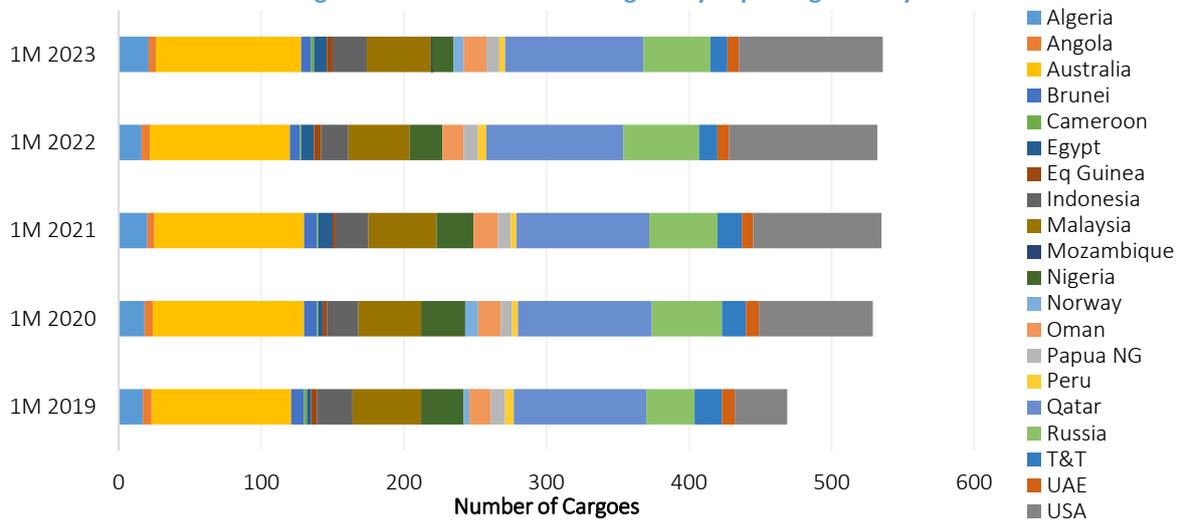
Compared with one year ago, Algeria and Indonesia each delivered 5 more cargoes in January 2023 (Figure 84).

Figure 82: Number of LNG export cargoes



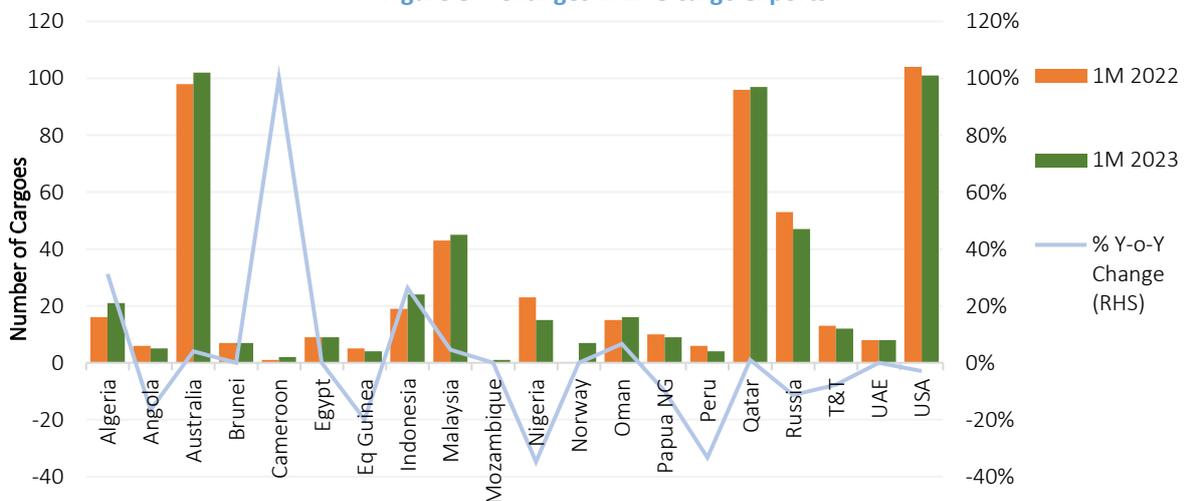
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 83: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

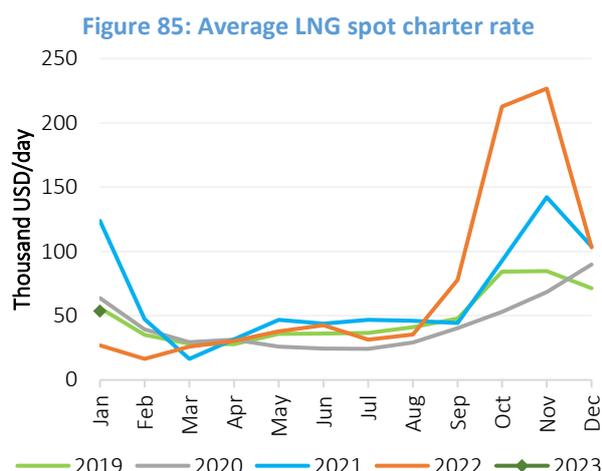
Figure 84: Changes in LNG cargo exports



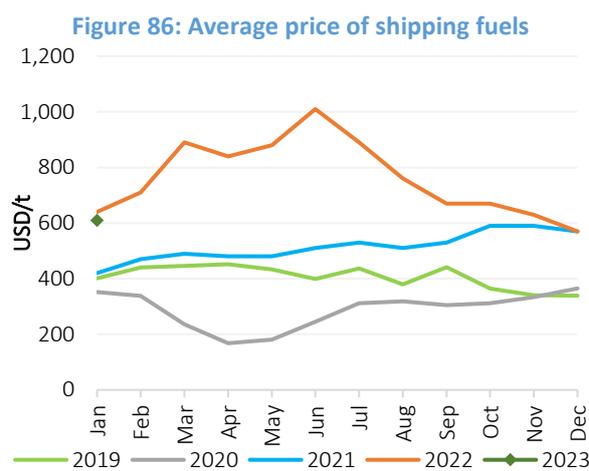
Source: GECF Secretariat based on data from ICIS LNG Edge

In January 2023, the LNG spot charter rate for steam turbine carriers averaged 53,700 USD/day, which was 48% lower m-o-m, but 100% higher y-o-y (Figure 85). Spot charter rates experienced a sharp upward trend during the final third of 2022. This tightness in the market was attributed to European buyers purchasing cargoes as floating storage, for energy security as well as to resell at a higher price deeper into the winter season. Thereafter, as the winter season commenced, and gas began to be withdrawn from storage, these floating cargoes were able to be unloaded across European ports. This essentially freed up carriers, and the softening of charter rates was observed into December 2022 and January 2023.

The average price of the leading shipping fuels in January 2023 was 610 USD/tonne, which was 7% higher than the previous month, but 5% lower y-o-y (Figure 86).

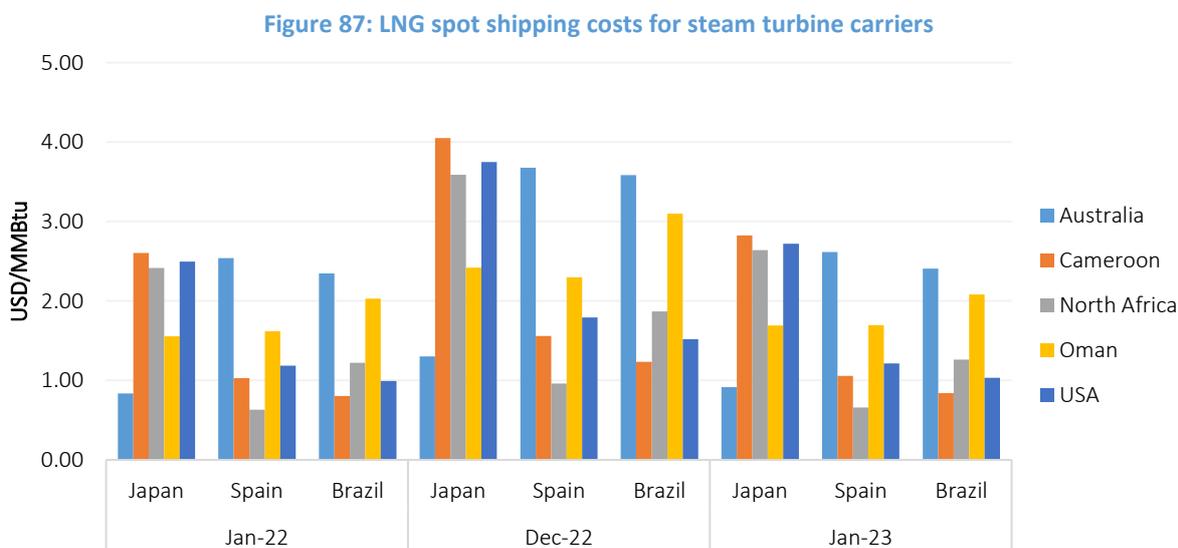


Source: GECF Secretariat based on data from ICIS LNG Edge and Argus



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

The impact of decreases in LNG spot charter rates as well as delivered spot LNG prices, was offset by the small increase in the shipping fuel price, resulting in a net decrease in the LNG shipping cost, by up to 1.23 USD/MMBtu compared with the previous month (Figure 87). When compared with the same month in the previous year, in January 2023 charter rates were greater, but delivered spot LNG prices were lower 2022, resulting in LNG shipping costs, which were relatively of a similar level.



Source: GECF Shipping Cost Model

Table 4: Shipping costs for LNG spot cargoes from selected regions (USD/MMBtu) – January 2023

LNG Supplier	Destination							
	To	Japan	China	India	UK	Spain	Argentina	Brazil
	From							
	Spot LNG delivered price	21.18	21.18	19.47	17.79	16.31	20.87	18.74
	Australia	0.92	0.97	1.10	2.76	2.61	2.25	2.41
	Cameroon	2.82	2.79	1.82	1.18	1.06	1.32	0.84
	North Africa	2.64	2.63	1.40	0.77	0.66	1.85	1.26
	Oman	1.69	1.58	0.33	1.82	1.69	2.16	2.08
	USA	2.72	3.01	2.84	1.28	1.21	1.77	1.03

Source: GECF Shipping Cost Model

**Second Qatari LNG carrier under construction in China:** China's Hudong-Zhonghua shipyard has commenced the construction of the second out of four new LNG carriers, ordered by Mitsui OSK Lines (MOL). The 174,000 m<sup>3</sup> vessel will be chartered with QatarEnergy as part of the current wave of carrier orders.

**South Korean firm secures order for 3 new LNG carriers:** The top shipyard in South Korea, Korea Shipbuilding & Offshore Engineering, has confirmed an order for three newbuild LNG carriers, worth \$784 million in total. The vessels are expected to be constructed by Hyundai Heavy Industries, starting in 2026, each with a capacity of 200,000 m<sup>3</sup>.

**Labour shortage crisis at South Korean shipyards:** Shipbuilding facilities across South Korea are reportedly currently being plagued by an acute shortage in skilled labour. Factors which have been cited as contributory to the issue include harsh working conditions as well as inadequate compensation. While the Ministry of Trade, Industry and Energy attempts to alleviate the situation by easing restrictions on foreign workers, the estimated 14,000 worker shortfall may have a measurable impact on the output in 2023. South Korean shipyards have been losing market share, including for the construction of LNG carriers, to China in recent times.

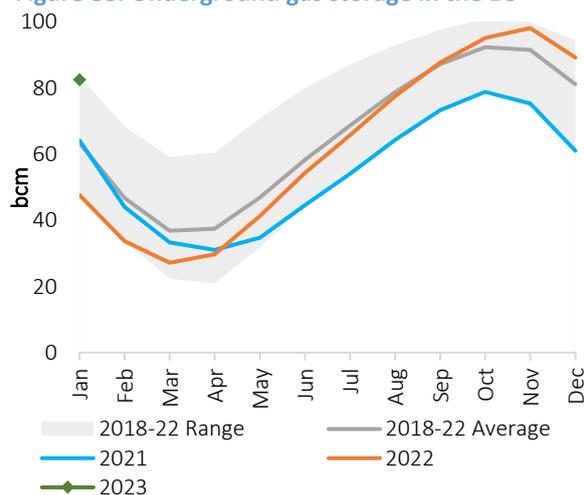
## 5 Gas Storage

### 5.1 Europe

The total working capacity for underground gas storage (UGS) sites in the EU stands at 104 bcm. Individual countries had surpassed their storage level targets for the start of November 2022, and currently the region is experiencing net gas withdrawals.

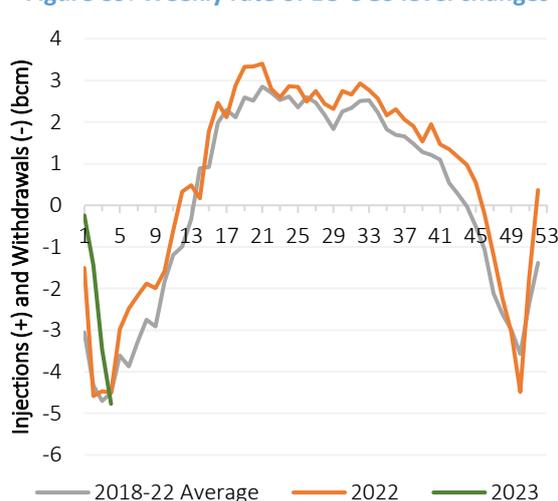
In January 2023, the average daily amount of gas in storage decreased to 82.5 bcm from 89.3 bcm in the previous month (Figure 88). The amount of gas in storage was 34.8 bcm higher than in the same month one year ago, and 19.1 bcm higher than the 5-year historical average. The average UGS capacity utilization fell to 79%. In January, gas injection to UGS amounted to 1.5 bcm, while gas withdrawal reached 13.1 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



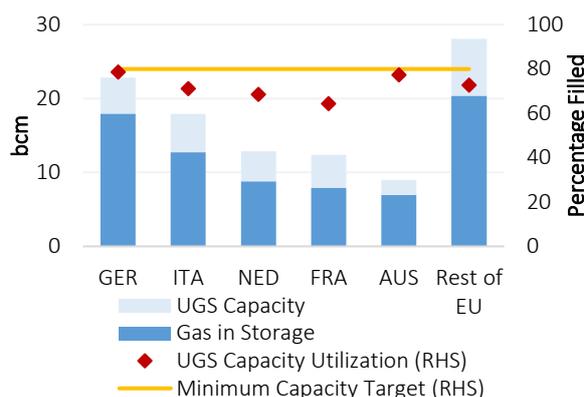
Source: GECF Secretariat based on data from AGSI+

In June 2022, the EU implemented new regulations for its member states as it relates to natural gas storage in underground sites. The mandate that was established is 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 January 2023, net gas withdrawals was observed, at an average rate of 2.5 bcm/week, which is less than the 3.8 bcm/week in 2022, and 4.1 bcm/week for the 5-year average (Figure 89).

The minimum storage level was intended to cover 35% of each country's annual gas consumption over the previous five years, but many states chose to surpass this target. This ensured that storage levels, even in the midwinter at the end of January 2023, remained at a high level, with Germany in particular ending the month at 79% (Figure 90). With respect to member states having no UGS sites of their own, these countries will be able to access storage sites in other member states, up to a capacity of 15% of their annual gas consumption over the previous five years.

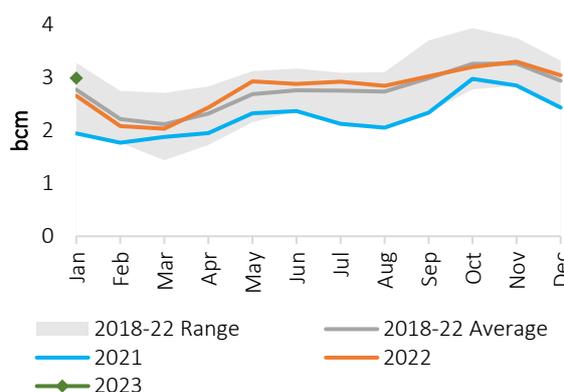
The EU currently has around 4.7 bcm of LNG storage capacity. The majority of this storage is located in Spain (43%) and France (17%). Total LNG storage levels in the region stood at 3.0 bcm in January 2023, which was 2% lower m-o-m, but 13% higher y-o-y (Figure 91). LNG storage levels are expected to remain elevated during the winter months, as the EU has commissioned additional regasification capacity to counter the anticipation of lower PNG imports.

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



Source: GECF Secretariat based on data from AGSI+

**Figure 91: Total LNG storage in the EU**



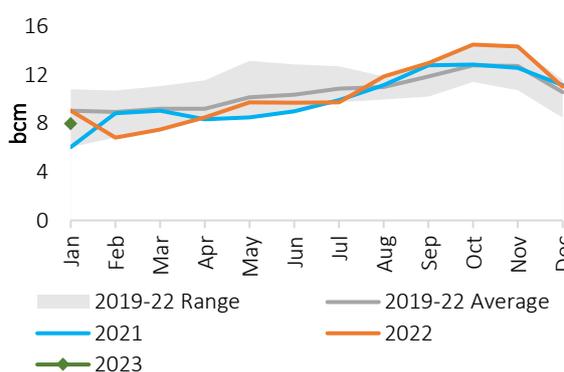
Source: GECF Secretariat based on data from ALSI

## 5.2 Asia

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

By January 2023, total LNG in storage was estimated at 8.0 bcm, which was 27% lower m-o-m, and 12% lower y-o-y. Of this quantity, 4.1 bcm was attributed to Japan, and 3.9 bcm to South Korea (Figure 92). LNG imports in this region have picked up in recent months, following muted activity earlier in the year, while storage is being used up for gas consumption during the winter.

**Figure 92: LNG in storage in Japan and South Korea**

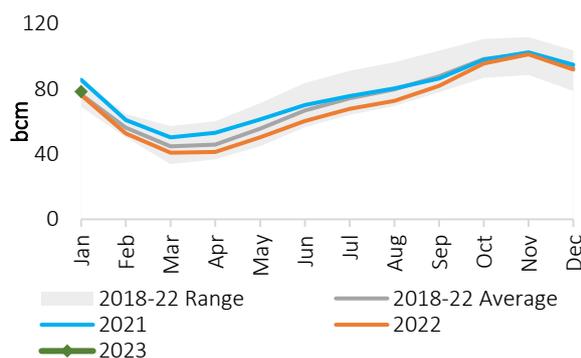


Source: GECF Secretariat based on data from Refinitiv

## 5.3 North America

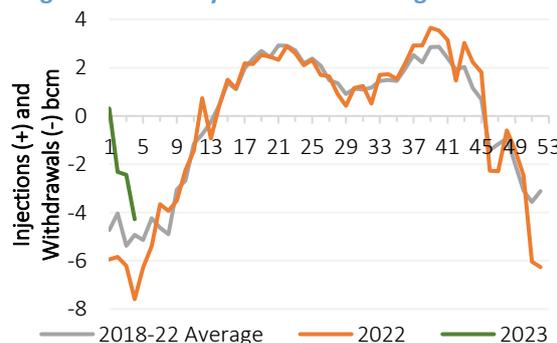
The total working gas storage capacity in the US stands at 134 bcm, and the net gas withdrawal season is underway in the country. In January 2023, the average daily amount of gas in storage in the US decreased to 78.1 bcm from 91.8 bcm in the previous month (Figure 93). This amount was 2.1 bcm higher than in the same month one year ago, and 1.7 bcm higher than the 5-year historical average. The average UGS capacity utilization decreased to 58%. During January 2023, gas withdrawal from storage was observed at an average rate of 2.2 bcm/week, compared with 6.4 bcm/week in 2022, and 4.8 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**



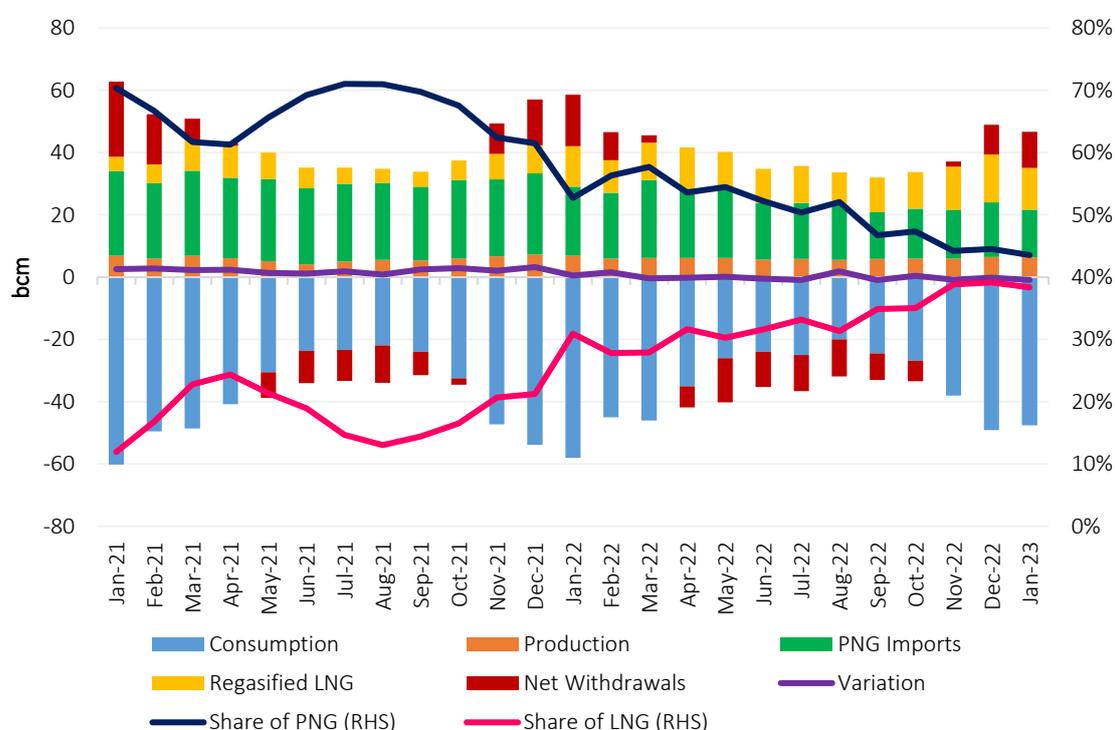
Source: GECF Secretariat based on data from US EIA

## 6 Gas Balance

### 6.1 EU + UK

In terms of the natural gas balance for the EU + UK, PNG and LNG imports account for the bulk of natural gas supply (excluding storage withdrawal and injection) to the bloc of countries. PNG imports has historically accounted for more than 50% of the pipeline gas supply to the EU + UK, however, since November 2021, the share of LNG in natural gas supply to these countries has risen sharply. In January 2023, the share of LNG in the EU + UK's natural gas supply moved slightly lower m-o-m to 38%, which was seven percentage points higher compared to January 2022 (Figure 95). Meanwhile, the share of PNG in EU + UK's natural gas supply was also down slightly m-o-m to 44% in December 2022, down by nine percentage points from a year earlier. The lower m-o-m shares of regasified LNG and PNG imports in the sub-region's gas supply was due to the higher decline in LNG and PNG supply compared to the fall in domestic gas production. The shifting reliance from PNG to LNG imports in EU + UK was driven by the EU's reduction in PNG from Russia, amidst the ongoing Ukraine crisis. The EU's target to increase LNG imports by 50 bcm in 2022, while reducing PNG imports from Russia, has supported the stronger role of LNG in meeting the natural gas supply needs of the bloc of countries.

Figure 95: EU + UK monthly natural 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 5: OECD's gas supply/demand balance for October 2022 (bcm)

	2021	Oct-21	Oct-22	YTD 2021	YTD 2022	Change* y-o-y	Change** 2022/2021
(a) OECD Gas Consumption	1820.4	136.1	130.3	1466.5	1462.3	-4.3%	-0.3%
(b) OECD Gas Production	1582.1	137.6	142.5	1306.8	1369.8	3.6%	4.8%
Difference (a) - (b)	238.3	-1.5	-12.2	159.6	92.6	718.9%	-42.0%
OECD LNG Imports	282.5	22.7	27.5	230.9	280.1	21.2%	21.3%
LNG Imports from GECF	148.5	12.1	12.9	121.6	130.4	6.0%	7.2%
LNG Imports from Non-GECF	134.0	10.6	14.7	109.3	149.7	38.6%	37.0%
OECD LNG Exports	209.5	18.5	18.8	171.6	184.8	1.7%	7.7%
Intra-OECD LNG Trade	106.8	8.7	12.4	87.0	123.5	42.9%	42.0%
OECD Pipeline Gas Imports	738.3	58.3	47.3	615.8	540.3	-18.9%	-12.3%
OECD Pipeline Gas Exports	585.0	47.8	45.3	487.0	473.4	-5.3%	-2.8%
Stock Changes and losses	-12.1	16.2	22.9	28.5	69.8	41.4%	145.2%

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

(\*): y-o-y change for Oct 2022 compared to Oct 2021

(\*\*): y-o-y change for YTD 2022 compared to YTD 2021

## 6.3 India

Table 6: India's gas supply/demand balance for December 2022 (bcm)

	2021	Dec-21	Dec-22	2021	2022	Change* y-o-y	Change** 2022/2021
(a) India Gas Demand	64.58	5.38	5.15	64.58	62.65	-4.1%	-3.0%
(b) India Gas Production	32.36	2.81	2.89	32.36	33.36	2.6%	3.1%
Difference (a) - (b)	32.22	2.56	2.27	32.22	29.29	-11.5%	-9.1%
India LNG Imports	33.80	2.71	1.76	33.80	28.09	-35.3%	-16.9%
LNG Imports from GECF	25.23	2.20	1.36	25.23	22.16	-38.1%	-12.2%
LNG Imports from Non-GECF	8.56	0.52	0.40	8.56	5.93	-23.3%	-30.7%
Stock Changes and losses	1.57	0.15	-0.51	1.57	-1.19	-435.9%	-175.9%

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

(\*): y-o-y change for Dec 2022 compared to Dec 2021

(\*\*): y-o-y change for 2022 compared to 2021

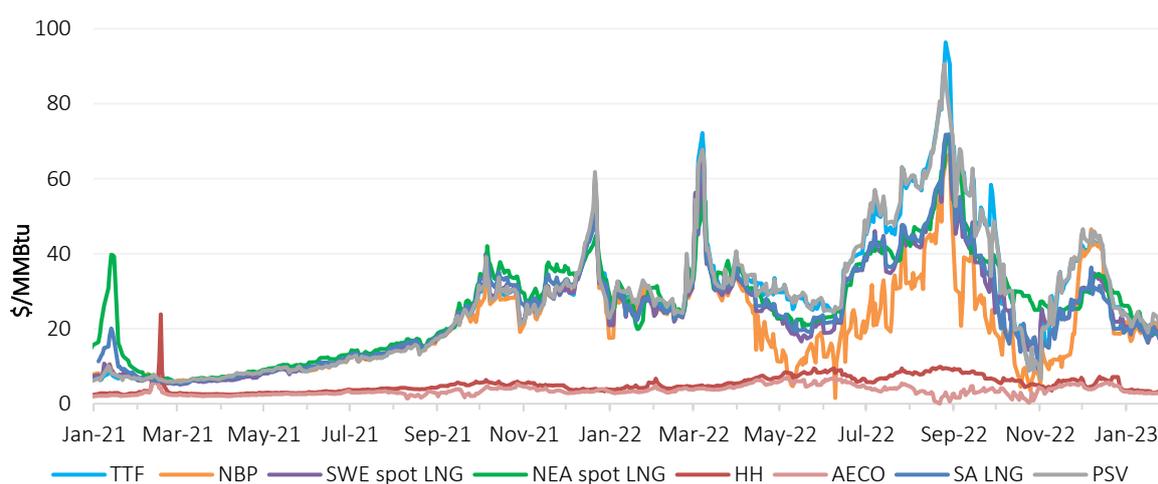
## 7 Energy Prices

### 7.1 Gas Prices

#### 7.1.1 Gas & LNG Spot Prices

In January 2023, gas and LNG spot prices in Europe and Asia declined sharply and experienced relatively lower volatility compared to previous months (Figure 96 and Figure 97). The bearish movement in spot prices in both regions was largely a result of mild temperatures, healthy storage levels and sufficient supply. In Europe, the continued influx of LNG cargoes and higher wind generation also weighed on prices. Meanwhile in Asia, buying activity remained soft in spite of lower spot prices.

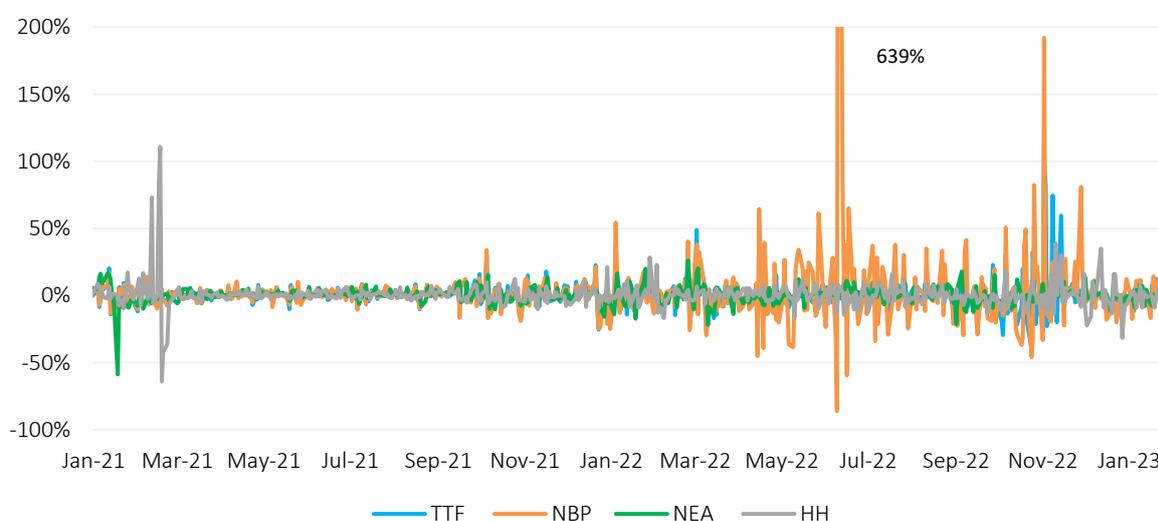
Figure 96: Daily gas & LNG spot prices



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 January 2023, TTF and NBP spot gas prices averaged \$19.94/MMBtu and \$18.90/MMBtu, decreasing sharply by 44% and 42% m-o-m respectively (Figure 98). Furthermore, both TTF and NBP spot prices were lower y-o-y by 29% and 30% respectively.

The SWE spot LNG prices averaged \$18.75/MMBtu in January 2023, 35% lower m-o-m and 29% lower y-o-y. The PSV spot price averaged \$21.49/MMBtu in January 2023, 41% lower m-o-m and 28% lower y-o-y.

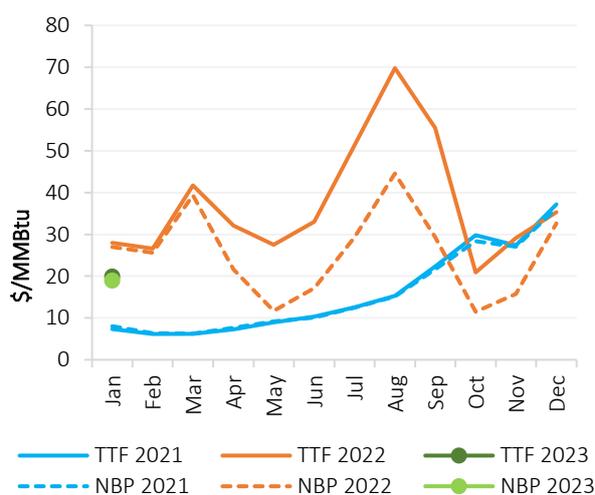
Several factors were responsible for the predominantly bearish movement in European hub prices including mild weather, robust LNG deliveries, stronger wind generation and healthy EU storage levels, which were at their highest in five years. Lower supply from Norway due to maintenance activities was buffered by storage withdrawals, which kept the region sufficiently supplied. Both TTF and NBP reached daily lows hovering around \$17/MMBtu during the month.

### 7.1.1.2 Asian Spot LNG Prices

In January 2023, the average North East Asia (NEA) spot LNG price declined by 32% m-o-m to average \$20.75/MMBtu. In addition, it was 22% lower than the average of \$26.63/MMBtu in January 2022 (Figure 99).

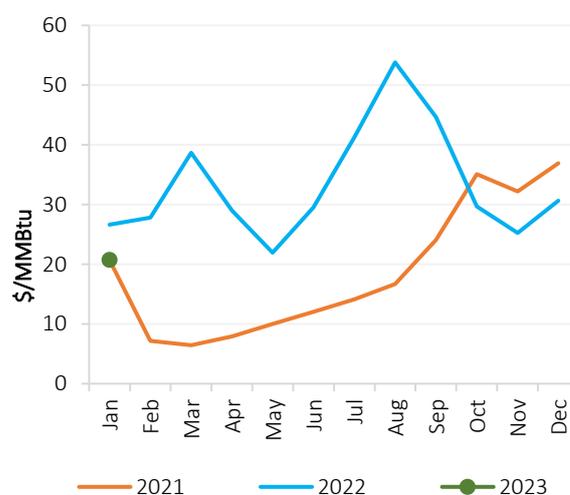
Asian LNG prices continued to track losses in European hub prices, but experienced a softer decline as above-normal seasonal temperatures were met by healthy LNG inventories. In addition, buying interest remained relatively soft as expected during the Lunar New Year holidays. Daily NEA spot LNG prices fell below \$18/MMBtu for the first time since August 2021.

Figure 98: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

Figure 99: Monthly Asian spot LNG prices



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

### 7.1.1.3 North America Spot Gas Prices

In January 2023, HH spot gas price decreased sharply by 42% m-o-m to average \$3.27/MMBtu, and was 25% lower than the average of \$4.38/MMBtu in January 2022 (Figure 100).

This downward trend in HH spot prices was driven by lower US LNG exports due to tepid demand in Europe and Asia, which gas supply in the domestic market.

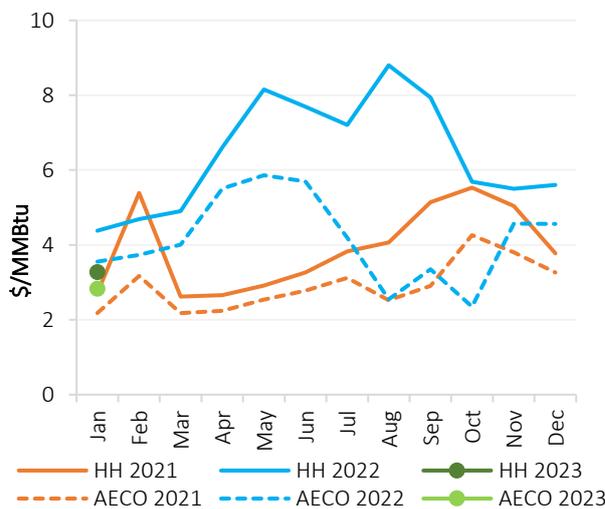
Similarly, in Canada, the AECO spot price decreased by 38% m-o-m, averaging \$2.83/MMBtu in January 2023, and was 20% lower y-o-y.

### 7.1.1.4 South America Spot LNG Prices

In January 2023, South American (SA) LNG price decreased by 29% m-o-m to average \$18.93/MMBtu however, it was 29% lower than the average of \$26.66/MMBtu in January 2022 (Figure 101).

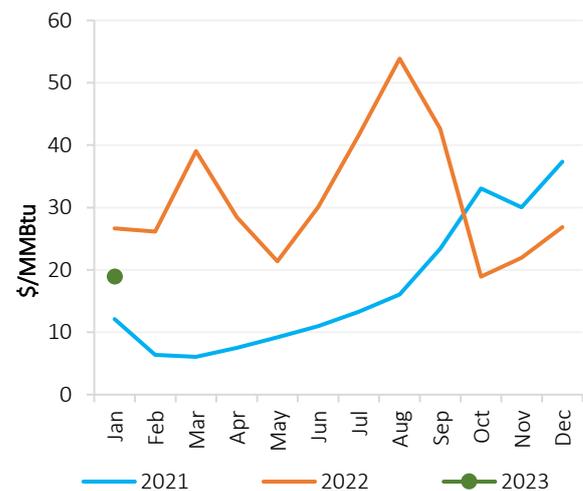
LNG spot prices in South America continued to closely track European and Asian spot prices. LNG delivered prices for Argentina, Brazil and Chile averaged \$19.19/MMBtu, \$18.53/MMBtu and \$19.08/MMBtu respectively in January 2023.

Figure 100: Monthly North American gas spot prices



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

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 January 2023, Oil-indexed I LNG price averaged \$14.04/MMBtu decreasing by 5% m-o-m, but was 17% higher y-o-y. Similarly, the Oil-indexed II LNG price averaged \$10.12/MMBtu decreasing by 2% m-o-m, but was 7% higher y-o-y (Figure 102). The discount of Oil-indexed I and Oil-indexed II prices to the average NEA spot LNG price narrowed in comparison to the previous month to around \$7/MMBtu and \$11/MMBtu respectively.

In Europe, the Oil-indexed III price averaged \$9.92/MMBtu in January 2023, decreasing by 2% m-o-m, but was 34% higher y-o-y (Figure 103). The average SWE LNG held a premium of \$9/MMBtu over the Oil-indexed III price, which was lower compared to the previous month.

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

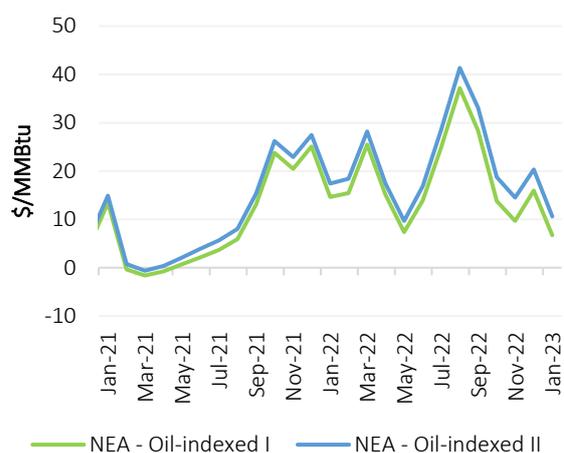
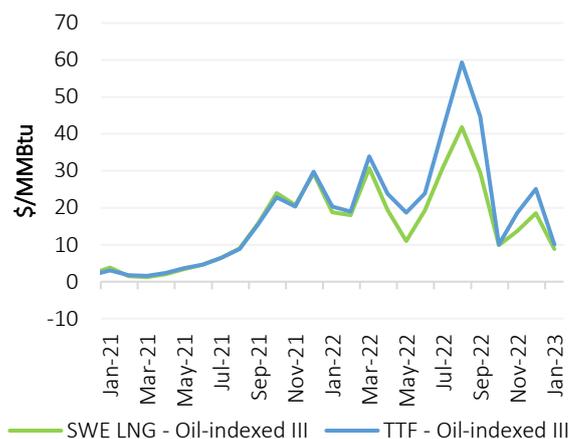


Figure 103: Europe: Spot and oil-indexed price spread



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 January 2023, the average NEA-TTF price spread turned positive, with NEA spot LNG gaining a slight premium of \$0.81/MMBtu (Figure 104). Both NEA LNG and TTF spot prices declined sharply during the month however, the TTF spot price suffered a greater loss.

NBP traded at a narrow discount to TTF of \$1.04/MMBtu, lower than the average of \$2.69/MMBtu during the previous month (Figure 105). Both TTF and NBP spot prices declined by around 40% m-o-m resulting in some convergence between both European spot prices.

Furthermore, the NWE LNG prices continued trading at a discount of \$1.14/MMBtu to TTF, lower than the discount of \$6.17/MMBtu in the previous month (Figure 106). This reflected greater capacity availability in the northwest Europe regasification terminals and a loosening of the gas market in the sub-region. The NWE LNG-SA LNG price spread narrowed to \$0.1/MMBtu in January 2023 indicating a convergence between both prices (Figure 107).

The NEA-HH and TTF-HH spreads narrowed in January 2023 to \$17.48/MMBtu and \$16.67/MMBtu respectively (Figure 108 and Figure 109). European and North American spot prices declined by around 40% m-o-m, while Asian LNG prices experience a lower decline of 32% m-o-m.

Figure 104: NEA-TTF price spread

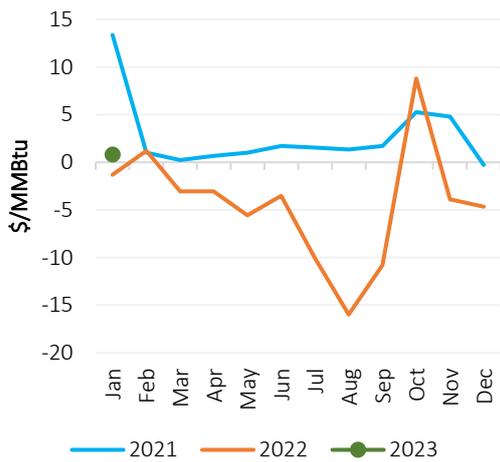


Figure 105: NBP-TTF price spread

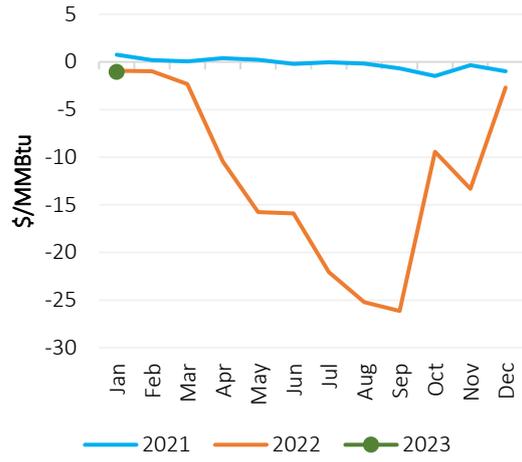


Figure 106: NWE LNG-TTF price spread

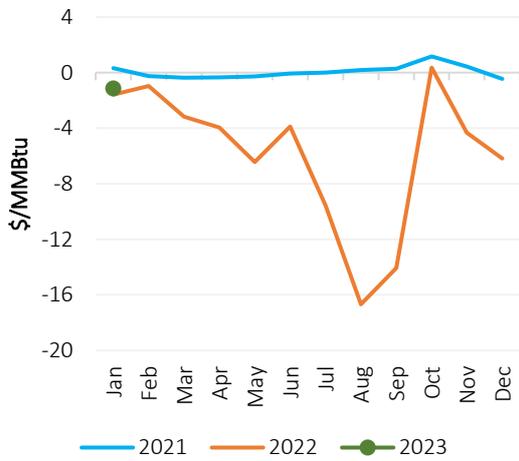


Figure 107: NWE LNG – SA LNG price spread

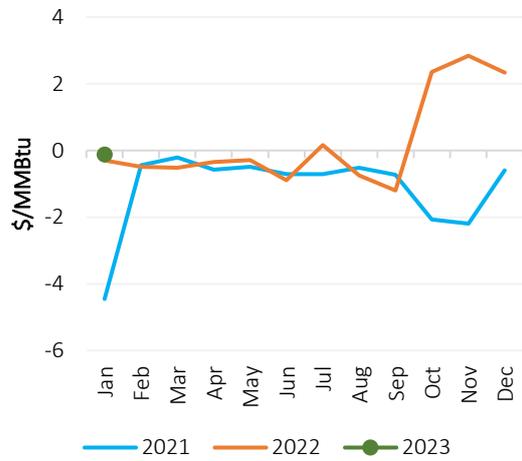


Figure 108: NEA-HH price spread

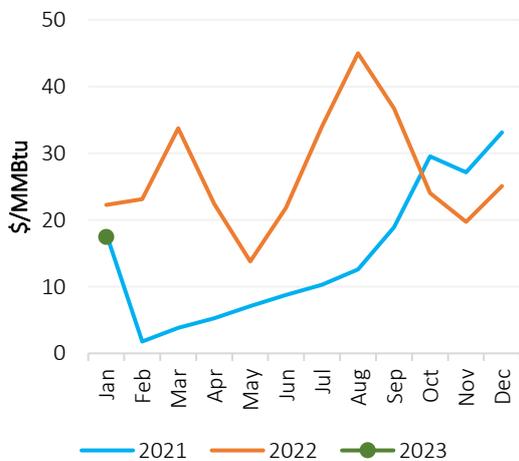
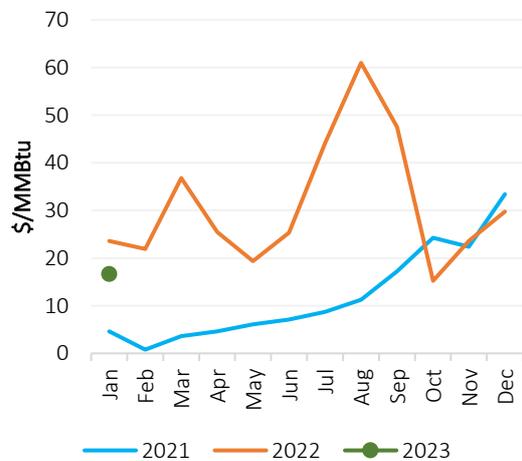


Figure 109: TTF-HH price spread



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

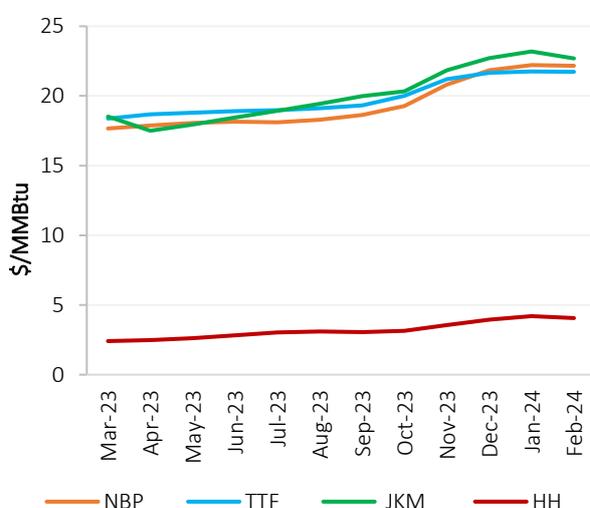
### 7.1.4 Gas & LNG Futures Prices

The JKM-TTF futures price spread for 2023 is expected to be slightly positive in March 2023, indicating the convergence of both spot prices. Subsequent to this, TTF is expected to hold a premium of \$1.2/MMBtu in April 2023. In Q2 2023, the average JKM-TTF spread remains slightly negative around -\$0.8/MMBtu. In H2 2023, the spread again flips to positive averaging around \$0.5/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 in Q2 2023 and Q3 2023. However, in December 2023, the spread flips slightly positive with NBP gaining a slight premium of around \$0.2/MMBtu.

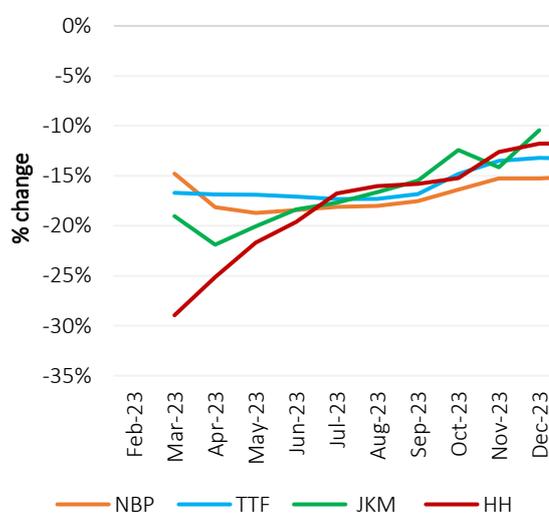
For the 6-month period from March - August 2023, the gas and LNG futures prices (as of 7 February 2022) for TTF, NBP and JKM were all lower than the expectations of the futures prices considered on 9 January 2023 (and as reported in the GECF MGMR January 2023). The average TTF, NBP and JKM futures prices for this period were \$18.03/MMBtu, \$18.80/MMBtu and \$18.47/MMBtu respectively. In addition, the average HH futures price was \$2.75/MMBtu, which was much lower than previous expectations of \$3.5/MMBtu (Figure 111).

Figure 110: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon  
 Note: Futures prices as of 7 February 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 9 January 2023 as reported in GECF MGMR January 2023.

## 7.2 Cross Commodity Prices

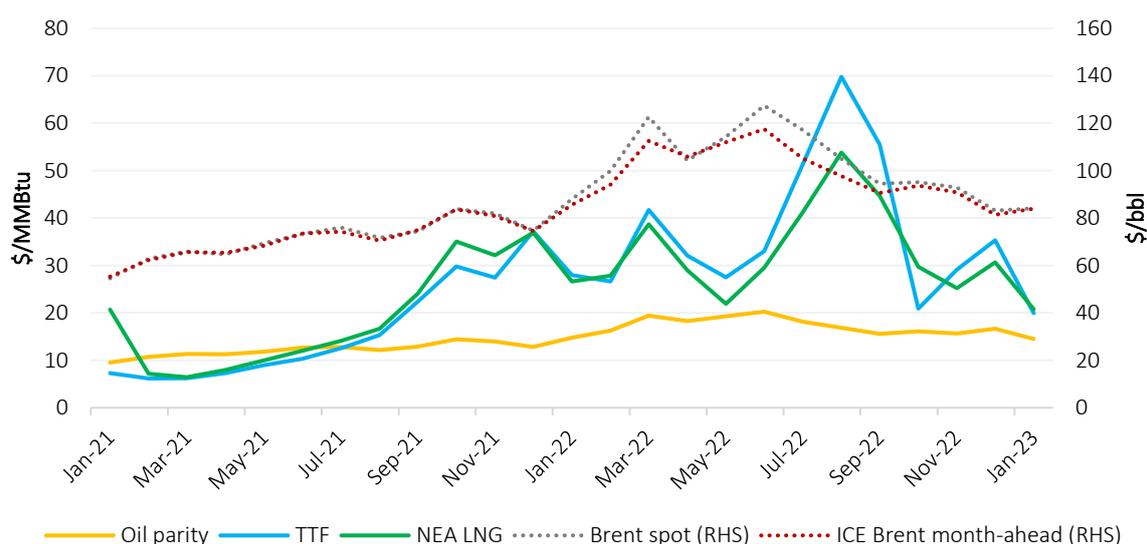
### 7.2.1 Oil Prices

In January 2023, Brent spot averaged \$84.13/bbl increasing by 1% m-o-m, but was 4% lower y-o-y (Figure 112). Brent one month-ahead price averaged \$83.91/bbl, which was 3% higher m-o-m, but 6% lower y-o-y.

Oil prices rebounded slightly after two consecutive months of decline. This rebound was mainly driven by the anticipated economic recovery in China, following the easing of its zero-COVID policy, and resulting optimism for higher oil demand.

Furthermore, due to the sharp decline in TTF spot prices in January 2023, the premium over the oil parity price decreased significantly to \$5/MMBtu. In addition, the premium of NEA LNG spot price over the oil parity price decreased to \$6/MMBtu.

Figure 112: Monthly crude oil prices



Source: GECF Secretariat based on data from Refinitiv Eikon

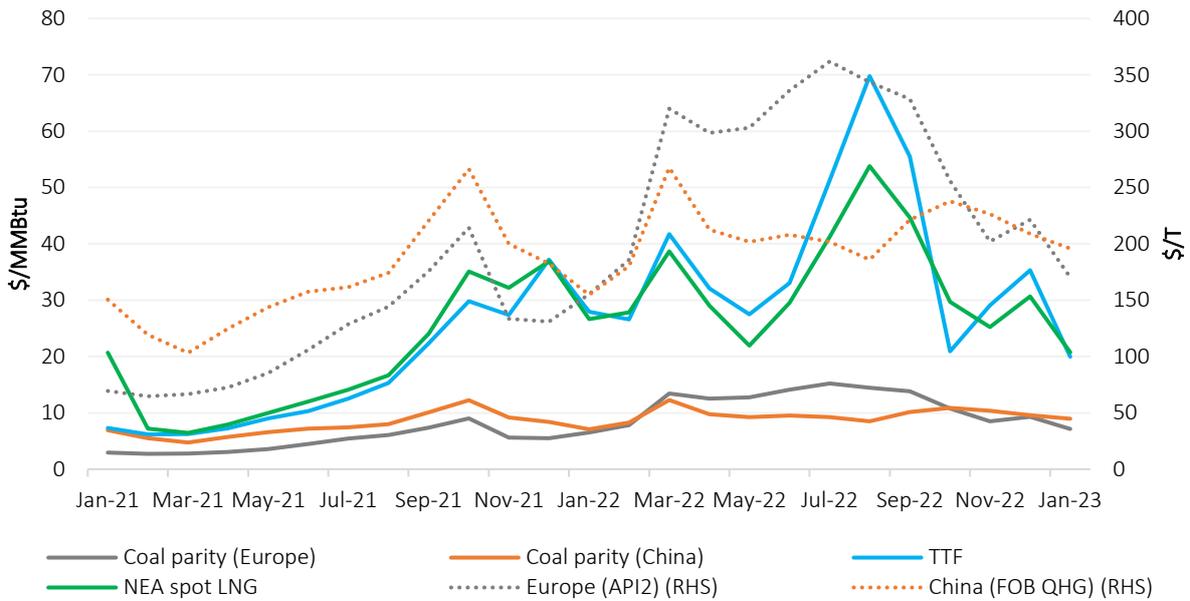
Note: Conversion factor of 5.8 was used to calculate the oil parity price in \$/MMBtu based on the ICE Brent month-ahead price.

### 7.2.2 Coal Prices

In January 2023, the European coal price (API2) decreased by 23% m-o-m, averaging \$170.28/T, but was 10% higher y-o-y. Meanwhile, in China, the QHG coal price marker decreased by 6% m-o-m to average \$195.77/T, but was 26% higher y-o-y (Figure 113).

Mild temperatures in Europe substantially curbed coal consumption and weighed on prices. Furthermore, in January 2023, the premium of TTF spot price over the API2 parity price decreased significantly to \$13/MMBtu, 51% lower m-o-m. This was due to the sharp drop in TTF spot prices, as well as the decline in European coal prices. In addition, the premium of NEA spot LNG price over the QHG parity price narrowed to \$12/MMBtu, 44% lower m-o-m. This was due to decline in Asian LNG spot prices during the month.

Figure 113: Monthly coal parity prices



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

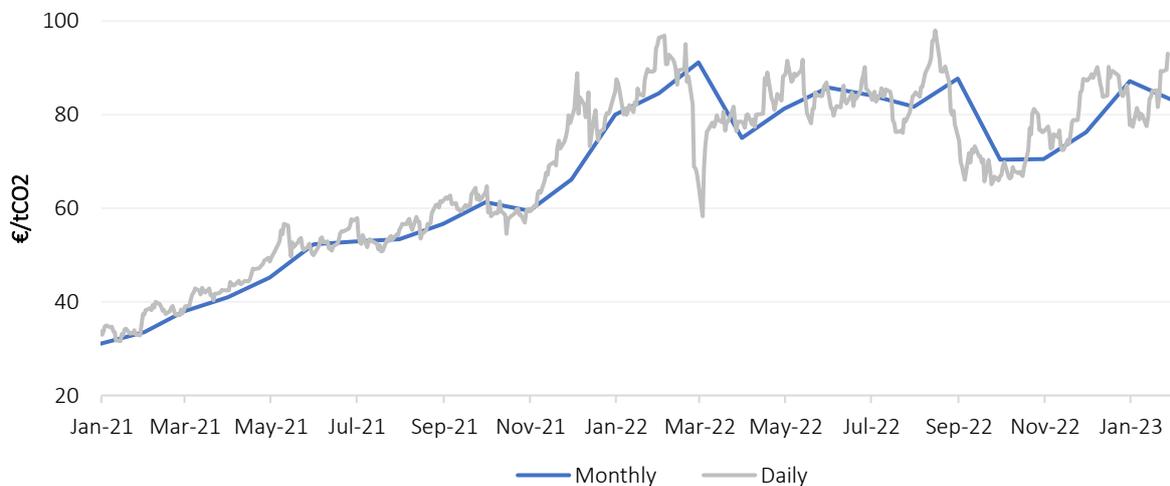
Note: Conversion factors of 23.79 and 21.81 were used to calculate the coal prices in \$/MMBtu for Europe (API2) and China (QHG) respectively.

### 7.2.3 Carbon Prices

In January 2023, EU carbon prices averaged €83.03/tCO<sub>2</sub>, a decrease of 5% m-o-m and was 2% lower y-o-y (Figure 114).

The bearish movement of EU carbon prices was largely driven by persistent mild and windy weather, which reduced hydrocarbon demand in Europe. EU carbon prices reached a high of €93/tCO<sub>2</sub> at the end of January 2023.

Figure 114: EU carbon prices



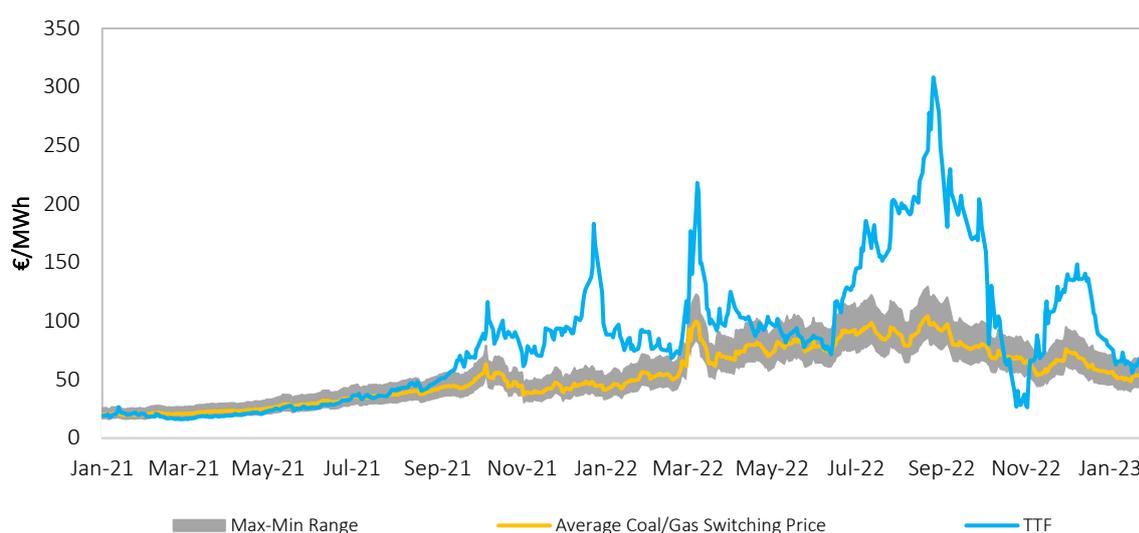
Source: GECF Secretariat based on data from Refinitiv Eikon

## 7.2.4 Fuel switching

In January 2023, daily TTF spot prices fell within the coal-to-gas switching range. The coal-to-gas switching price averaged €50.91/MWh, which was 21% lower m-o-m, driven by lower European coal and carbon prices. The monthly spread between the TTF spot price and the average coal-to-gas switching price narrowed significantly to €12/MWh, compared to €56/MWh in the previous month (Figure 115).

The sharp decline in TTF spot prices would have incentivized some coal-to-gas switching as the most efficient gas plants became more competitive than the least efficient coal plants. Furthermore, in Q2 2023, the TTF spot price is expected to remain within the coal-to-gas switching range, which is likely to incentivise some coal-to-gas switching.

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, CO<sub>2</sub> emissions prices, operation costs and power plant efficiencies. The efficiencies considered for gas plants are max: 56%, min: 46%, avg: 49.13%. The efficiencies considered for coal plants are max: 40%, min: 34%, avg: 36%.

## 7.3 Other developments

The EU's market correction mechanism (MCM) for TTF derivatives, as well as other EU gas trading hubs, which will take effect from 15 February 2023 for a period of one year (as per Regulation (EU) 2022/2578).

The MCM will be triggered if the following two conditions are met: the front-month TTF settlement price exceeds €180/MWh for three days and is €35/MWh higher than the reference price during the same period. Subsequent to this announcement, several trading firms and financial institutions in Europe have expressed concerns over this regulation.

The operators of the Intercontinental Exchange (ICE) in which TTF derivatives are traded have expressed their concerns about the EU's market intervention and its potential risks to the functioning of the market. Following its assessment of the potential implications on trading and financial stability, ICE intends to launch a parallel TTF market at its London-based ICE

Futures Europe Exchange on 20 February 2023, and believes that this option will allow its clients to adequately manage their risk exposure if the MCM prevents such functioning.

Furthermore, the European Central Bank (ECB) stated that these regulations may have a negative impact on financial stability in the euro area, as they may result in higher volatility and margin calls, as well as incentivize migration from trading venues in the EU. In addition, the European Federation of Energy Traders (EFET) has also expressed concerns that the price cap can lead to increased demand, reduced supply and reopening of LNG contracts. This intervention may trigger price re-opener clauses, with suppliers having the upper hand to renegotiate terms.

This MCM may have a potential downside risk for TTF, and by extension to other European hub prices. Furthermore, it may also affect Asian LNG prices, which have closely tracked European hub prices over the past two years. However, if Asian LNG demand increases, there will be increased competition for cargoes, and any TTF price limit may incentivize sellers to divert cargoes away from the EU. This can result in a deficit of gas in the EU and ultimately, regional gas demand destruction. Consequently, these regulations may have spillover effects on the global gas market, leading to market distortions and lower investment in the industry, which may only serve to further tighten the gas market.

However, based on current gas market conditions and the relatively high TTF price level that will cause the MCM to be triggered, there is a low probability that the MCM would be activated in the short term, unless there are further severe supply disruptions to the EU.

In addition to this mechanism, the European Union Agency for the Cooperation of Energy Regulators (ACER) was tasked with the objective to publish a daily LNG price assessment by 13 January 2023, followed by a daily LNG price benchmark by 31 March 2023 (as per Regulation (EU) 2022/2576). On 19 January 2023, ACER published its first LNG price assessments for northwest Europe and south Europe. During the first few days, an LNG price assessment was not published due to insufficient trades.

The European Securities and Markets Authority (ESMA) and ACER are tasked with assessing the effects of the MCM on financial and energy markets and security of supply. Both organizations published preliminary reports on 23 January 2023. ESMA stated that there may be future consequences on trading behaviour and the ability of market participants to manage their risk, potentially shifting trading to over-the-counter trades or non-EU exchanges. ACER also shared similar views and added its concern about the potential impact on supply security. ESMA and ACER are expected to submit final reports to the European Commission by 1 March 2023.

## 8 Feature Article: Underground Gas Storage Filling in the EU

The European Commission, through Regulation (EU) 2022/2301 of November 23, 2022, has proclaimed the targets for the filling of underground natural gas storage sites in countries across the bloc for 2023. Whereas in 2022, which had a minimum filling target of 80% by November 1, in 2023, Member States are now required to meet a minimum of 90% of working gas capacity by November 1. In addition to this deadline, intermediate gas storage filling targets have been set forth for checkpoints at the beginning of February, May, July and September 2023. Details of these targets for the major EU underground gas storage countries are shown in Table 7 below.

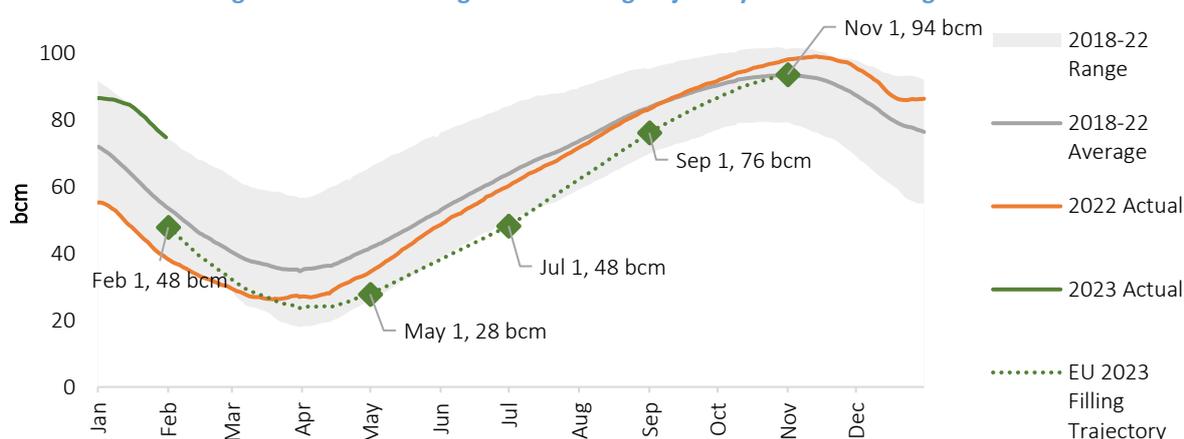
**Table 7: EU UGS filling targets for 2023**

Country	February 1	May 1	July 1	September 1	November 1
<b>Germany</b>	45%	10%	30%	65%	90%
<b>Italy</b>	45%	36%	54%	72%	90%
<b>Netherlands</b>	49%	34%	56%	78%	90%
<b>France</b>	41%	7%	35%	81%	90%
<b>Austria</b>	49%	37%	52%	67%	90%
<b>EU Average</b>	<b>46%</b>	<b>27%</b>	<b>46%</b>	<b>73%</b>	<b>90%</b>

Source: European Commission

This gas filling trajectory for 2023 is illustrated in Figure 116. The critical checkpoint would have been February 2023, for which the target is heavily dependent on gas consumption and imports during the winter. However, the mild temperature, plus demand curbing measures, have placed the Union in a highly favourable position, already 27 bcm above where they need to be at this time. For the injection season of 2023, the gas storage may follow a similar trend as in 2022, when Member States opted to fill storage sites at a much higher rate than anticipated.

**Figure 116: Forecasting the UGS filling trajectory in the EU during 2023**



Source: GECF Secretariat based on data from AGSI+ and the European Commission

Similar to 2022, allowances have been made by the EU to ease the burden on Member States in fulfilling these gas storage quotas. Firstly, to prevent undue imposition on smaller Member States, the filling level will be limited by a “Consumption Target” equating to 35% of the country’s annual gas consumption over the previous five years. Furthermore, for Member States having no UGS sites of their own, these countries will be able to access storage sites in other member states, up to a capacity of 15% of their annual gas consumption over the previous five years. In addition, from 2023, Member States would be allowed to meet their 90% target through storage of LNG or other alternative fuels.

## 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
CIS	Commonwealth of Independent States
CNG	Compressed Natural Gas
CO <sub>2</sub>	Carbon dioxide
CO <sub>2e</sub>	Carbon dioxide equivalent
CPI	Consumer Price Index
DOE	Department of Energy
DQT	Downward Quantity Tolerance
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

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

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

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

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### 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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**Gas Exporting Countries Forum (GECF)**

GECF Headquarters

P.O.Box 23753, Tornado Tower

47th & 48th Floors, West Bay, Doha

[www.gecf.org](http://www.gecf.org)

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