GECF

MONTHLY GAS MARKET REPORT

January 2024

Disclaimer

About GECF

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

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

Contributors

Project Leader

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

Experts Team (In Alphabetical Order)

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

Acknowledgements

We would like to highlight the important role of HE Secretary General Eng. Mohamed Hamel in developing this report and thank GaffneyCline for their editorial contributions.

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

Contents

Highlights **1**

Feature Article: Implications of COP28 for the gas industry **2**

1 Global Perspectives **4**

2 Gas Consumption **7**

2.1 Europe *7*
2.1.1 European Union 7
2.1.2 United Kingdom 12

2.2 Asia *13*
2.2.1 China 13
2.2.2 India 13
2.2.3 Japan 14
2.2.4 South Korea 14

2.3 North America *15*
2.3.1 US 15
2.3.2 Canada 16

2.4 Weather Forecast *16*
2.4.1 Temperature Forecast for January to March 2024 16
2.4.2 Precipitation Forecast for January to March 2024 17

3 Gas Production **18**

3.1 Global *18*

3.2 Europe *20*
3.2.1 Norway 21
3.2.2 UK 21
3.2.3 Netherlands 22

3.3 Asia Pacific *23*
3.3.1 China and India 23
3.3.2 Australia 23

3.4 North America *24*
3.4.1 US 24
3.4.2. Canada 26

3.5 Latin America and the Caribbean (LAC) *26*

3.6 Other Regions *27*

4 Gas Trade **28**

4.1 Pipeline Natural Gas (PNG) Trade *28*
4.1.1 Europe 28
4.1.2 Asia 30
4.1.3 North America 31
4.1.4 Latin America and the Caribbean 31
4.1.5 Other Developments 32

4.2 LNG Trade *33*
4.2.1 LNG Imports 33
4.2.2 LNG Exports 36
4.2.3 Global LNG Reloads 38

4.2.4 Arbitrage Opportunity 38
4.2.5 Maintenance Activity at LNG Liquefaction Facilities 39
4.2.6 Other Developments 40
4.2.7 LNG Shipping 42

5 Gas Storage 45

5.1 Europe 45

5.2 Asia 46

5.3 North America 46

6 Gas Balance 47

6.1 EU + UK 47

6.2 OECD 48

6.3 India 48

7 Energy Prices 49

7.1 Gas Prices 49
7.1.1 Gas & LNG Spot Prices 49
7.1.2 Spot and Oil-indexed Long-Term LNG Price Spreads 52
7.1.3 Regional Spot Gas & LNG Price Spreads 52
7.1.4 Gas & LNG Futures Prices 54

7.2 Cross Commodity Prices 55
7.2.1 Oil Prices 55
7.2.2 Coal Prices 55
7.2.3 Carbon Prices 56
7.2.4 Fuel Switching 57

7.3 Other Developments 57

8 Abbreviations 58

9 References 61

List of Figures

Figure 1: GECF participation in COP28 3
Figure 2: GDP growth 4
Figure 3: Inflation rates 5
Figure 4: Monthly commodity price indices 5
Figure 5: Interest rates in major central banks 6
Figure 6: Exchange rates 6
Figure 7: Gas consumption in the EU 7
Figure 8: Trend in electricity production in the EU in December 2023 (y-o-y change) 7
Figure 9: Gas consumption in Germany 8
Figure 10: Trend in gas consumption in the industrial sector in Germany (y-o-y change) 8
Figure 11: Trend in electricity production in Germany in December 2023 (y-o-y change) 8
Figure 12: German electricity mix in December 2023 8
Figure 13: Gas consumption in Italy 9
Figure 14: Trend in gas consumption in the industrial sector in Italy (y-o-y change) 9
Figure 15: Trend in electricity production in Italy in December 2023 (y-o-y change) 9
Figure 16: Italian electricity mix in December 2023 9
Figure 17: Gas consumption in France 10
Figure 18: Trend in gas consumption in the industrial sector in France (y-o-y change) 10
Figure 19: Trend in electricity production in France in December 2023 (y-o-y change) 10
Figure 20: French nuclear capacity availability 10
Figure 21: Gas consumption in Spain 11
Figure 22: Trend in gas consumption in the industrial sector in Spain (y-o-y change) 11
Figure 23: Trend in electricity production in Spain in December 2023 (y-o-y change) 11
Figure 24: Spanish electricity mix in December 2023 11
Figure 25: Gas consumption in the UK 12
Figure 26: Trend in gas consumption in the industrial sector in the UK (y-o-y change) 12
Figure 27: Trend in electricity production in UK in December 2023 (y-o-y change) 12
Figure 28: UK electricity mix in December 2023 12
Figure 30: Gas consumption in China 13
Figure 31: Trend in electricity production in China in in November 2023 (y-o-y change) 13
Figure 32: Gas consumption in India 14
Figure 33: India's gas consumption by sector in Nov 14
Figure 34: Gas consumption in Japan 14
Figure 35: Nuclear availability in Japan 14
Figure 36: Gas consumption in South Korea 15
Figure 37: HDD in South Korea (y-o-y change) 15
Figure 38: Gas consumption in the US 15
Figure 39: Electricity production in the US in December 2023 (y-o-y change) 15
Figure 40: Gas consumption in Canada 16
Figure 41: HDD in Canada (y-o-y change) 16
Figure 42: Temperature forecast January 2024 to March 2024 16
Figure 43: Precipitation forecast January 2024 to March 2024 17
Figure 44: Trend in monthly global gas rig count 19
Figure 45: Monthly gas and liquid discovered volumes 20
Figure 46: Discovered volumes in November 2023 by region 20
Figure 47: Europe's monthly gas production 20
Figure 48: Trend in gas production in Norway 21
Figure 49: Trend in gas production in the UK 22
Figure 50: Trend in gas production in the Netherlands 22
Figure 51: Trend in gas production in China 23
Figure 52: Trend in gas production in India 23
Figure 53: Trend in gas production in Australia 23
Figure 54: Trend in shale gas production in the US shale oil/gas producing regions 24
Figure 55: US shale region oil and gas rig count 25
Figure 56: Drilled but uncompleted well (DUCs) counts in the US 25
Figure 57: New-well gas production per rig 25
Figure 58: Trend in gas production in Canada 26
Figure 59: Trend in gas production in Brazil 27
Figure 60: Trend in gas production in Argentina 27
Figure 61: Monthly PNG imports to the EU 28
Figure 62: Year-to-date EU PNG imports by supplier 28
Figure 63: Monthly EU PNG imports by supplier 28
Figure 64: EU PNG supply from Russia and Norway 28
Figure 65: EU PNG imports by supply route, ... 29
Figure 66: PNG imports to the EU by supply route (12M 2023 v 12M 2022) 29

Figure 67: Monthly PNG imports in China 30
Figure 68: Year-to-date PNG imports in China 30
Figure 69: Monthly PNG imports in Singapore 30
Figure 70: Monthly PNG imports in Thailand 30
Figure 71: Historical net PNG trade in the USA 31
Figure 72: Monthly US PNG trade 31
Figure 73: Monthly PNG exports from Bolivia 31
Figure 74: Trend in global monthly LNG imports 33
Figure 75: Trend in regional LNG imports 33
Figure 76: Trend in Europe's monthly LNG imports 34
Figure 77: Top LNG importers in Europe 34
Figure 78: Trend in Asia's monthly LNG imports 34
Figure 79: Top LNG importers in Asia Pacific 34
Figure 80: Trend in LAC's monthly LNG imports 35
Figure 81: Top LNG importers in LAC 35
Figure 82: Trend in MENA's monthly LNG imports 35
Figure 83: Top LNG importers in MENA 35
Figure 84: Trend in global monthly LNG exports 36
Figure 85: Top 10 LNG exporters in Dec 2023 36
Figure 86: Trend in GECF monthly LNG exports 37
Figure 87: GECF's LNG exports by country 37
Figure 88: Trend in non-GECF monthly LNG exports 37
Figure 89: Non-GECF's LNG exports by country 37
Figure 90: Trend in global monthly LNG reloads 38
Figure 91: Global LNG reloads by country 38
Figure 92: Price spreads & shipping costs between Asia & Europe spot LNG markets 39
Figure 93: Maintenance activity at LNG liquefaction facilities during December (2022 and 2023) 40
Figure 94: Number of LNG export cargoes 42
Figure 95: Number of LNG cargoes by exporting country 42
Figure 96: Changes in LNG cargo exports 42
Figure 97: Average LNG spot charter rate 43
Figure 98: Average price of shipping fuels 43
Figure 99: LNG spot shipping costs for steam turbine carriers 44
Figure 100: Underground gas storage in the EU 45
Figure 101: Weekly rate of EU UGS level changes 45
Figure 102: UGS in EU countries as of Dec 31, 2023 46
Figure 103: Total LNG storage in the EU 46
Figure 104: LNG in storage in Japan and South Korea 46
Figure 105: Underground gas storage in the US 46
Figure 106: Weekly rate of UGS changes in the US 46
Figure 107: EU + UK monthly gas balance 47
Figure 108: Daily gas & LNG spot prices 49
Figure 109: Daily variation of spot prices 49
Figure 110: Monthly European spot gas prices 50
Figure 111: Monthly Asian spot LNG prices 50
Figure 112: Monthly North American gas spot prices 51
Figure 113: Monthly South American LNG spot prices 51
Figure 114: Asia: Spot and oil-indexed price spread 52
Figure 115: Europe: Spot and oil-indexed price spread 52
Figure 116: NEA-TTF price spread 53
Figure 117: NBP-TTF price spread 53
Figure 118: NWE LNG-TTF price spread 53
Figure 119: NWE LNG – SA LNG price spread 53
Figure 120: NEA-HH price spread 53
Figure 121: TTF-HH price spread 53
Figure 122: Gas & LNG futures prices 54
Figure 123: Variation in gas & LNG futures prices 54
Figure 124: Monthly crude oil prices 55
Figure 125: Monthly coal parity prices 56
Figure 126: EU carbon prices 56
Figure 127: Daily TTF vs coal-to-gas switching prices 57

List of Tables

Table 1: Global gas production forecast by region (bcm) 18
Table 2: New LNG sale agreements signed in December 2023 41
Table 3: Shipping costs for LNG spot cargoes from selected regions ($/MMBtu) – December 2023 43
Table 4: EU + UK gas supply/demand balance for December 2023 (bcm) 47
Table 5: OECD's gas supply/demand balance for September 2023 (bcm) 48
Table 6: India's gas supply/demand balance for November 2023 (bcm) 48

Highlights

Global economy: Global GDP growth for 2023 was estimated at 2.7% by Oxford Economics. In the US, GDP growth was estimated at 2.5%, while in the Euro area, GDP growth was estimated at 0.5%. Looking forward to 2024, the global economy is anticipated to experience a further slowdown, with global GDP growth projected at 2.3% by Oxford Economics. Inflation is also expected to continue its downward trend in 2024, though at a slower pace, with global inflation forecasted to decrease to 4.1%.

Gas consumption: In December 2023, gas consumption in the EU reverted to a negative trend after two consecutive months of growth. This decline amounted to 14% y-o-y, totalling 35 bcm. China's apparent gas demand, encompassing pipeline imports, LNG imports and domestic production, rose by 5.7% y-o-y to 35 bcm, driven by the revival of economic activities following the relaxation of stringent COVID-19 lockdown restrictions and the cold weather recorded at the end of the month. The US witnessed a 6% y-o-y decrease in gas consumption, reaching 89 bcm, with a significant drop in the residential sector.

Gas production: Europe experienced a 4% y-o-y decline in gas production in November 2023, culminating in an overall output of 15.8 bcm. This decrease was predominantly due to lower production levels in the Netherlands and the UK. In Asia, China continues to lead the growth in gas production with a 6% y-o-y increase. The seven key shale gas-producing regions in the US recorded a 3.1% y-o-y increase in gas production in December 2023, reaching 87.1 bcm. Additionally, December 2023 witnessed a m-o-m decrease of 13 units in the global number of gas drilling rigs, with a total number reaching 372 rigs.

Gas trade: Pipeline natural gas imports to the EU continued at a stable level during the final quarter of 2023. In December 2023, 13.5 bcm of PNG was imported, a modest decline of 1% compared with the previous month. Simultaneously, there was a 2.8% y-o-y increase in global LNG imports, reaching a historic peak of 38.7 Mt. The notable surge in global LNG imports was fuelled by robust demand in Asia, with substantial contributions from China, India, South Korea, Taiwan and Thailand. In contrast, LNG imports in other regions, particularly Europe, experienced a decline. France, Spain and the UK played significant roles in the decrease in European LNG imports. Global LNG exports expanded by 5.3% y-o-y to a record 37.5 Mt, driven by increased exports from key players such as Qatar, Russia, the United Arab Emirates and the United States.

Gas storage: With the net gas withdrawal season underway in the EU, the average volume of gas in storage in December 2023 decreased to 94.4 bcm, representing 89% of the total storage capacity of the region. Similarly, in the US, the average storage level in the country declined to 101.5 bcm, equivalent to 76% of the country's capacity. In Asia, the estimated combined volume of LNG in storage in Japan and South Korea decreased slightly to 13.2 bcm.

Energy prices: Gas and LNG spot prices in Europe and Asia experienced a notable decline following a four-month period of increasing trends. The downward trend in spot prices can be primarily attributed to bearish market fundamentals. Mild winter temperatures led to subdued demand, while robust LNG supplies and high storage levels in both regions further contributed to the decrease. The average TTF spot price stood at $11/MMBtu, reflecting a sharp decline of 18% m-o-m. In addition, the average NEA spot LNG price experienced a 16% m-o-m decrease, reaching $13/MMBtu. In the upcoming months, the trajectory of spot prices is expected to be heavily influenced by weather conditions.

Feature Article: Implications of COP28 for the gas industry

The COP28 UN Climate Change Conference was convened from 30 November to 13 December 2023 in Dubai, the United Arab Emirates, a distinguished GECF member country. With some 85,000 participants from 197 countries and more than 150 Heads of State and Government, the event was by far the largest UN climate change conference to date.

One of the most significant outcomes of COP28 was the inauguration of the Global Stocktake (GST), a pivotal element outlined in Article 14 of the 2015 Paris Agreement. The GST serves as a comprehensive global assessment, gauging the progress made in addressing climate change and identifying the remaining challenges. The decision titled "Outcome of the first global stocktake" was adopted. Some elements of this document are of the utmost importance to the natural gas industry, in particular items 28 and 29.

In item 28, the Parties recognize "the need for deep, rapid and sustained reductions in greenhouse gas emissions in line with 1.5 °C pathways". In this context, the decision *calls on Parties to contribute to the following global efforts, in a nationally determined manner, taking into account the Paris Agreement and their different national circumstances, pathways and approaches.* It is clear that the bottom-up approach underpinning the Paris Agreement is fully respected as well as the nationally determined character of any contribution. Various global efforts may, directly or indirectly, influence gas markets.

First, "transitioning away from fossil fuels in the energy systems in a *just, orderly, and equitable manner*, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science" stands out. There was a vigorous debate on the path forward to achieve climate goals, with a heightened emphasis on addressing the role of fossil fuels in the global energy mix. In this context, abandoning the wordings like "phasing-out or phasing-down of fossil fuels" in favor of the approved wordings "transitioning away from fossil fuels" could be considered as a positive signal for the gas industry, aimed at efficiently resolving the energy trilemma challenge rather than deliberately eliminating specific energy sources from the global mix. There is an understanding that there is no singular solution, underscoring the need for a diverse array of energy sources and technologies to collectively meet global climate goals.

Second, a focus on "accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilization and storage, particularly in hard-to-abate sectors, and low-carbon hydrogen production" opens bright perspectives for advancing new technologies, such as CCUS and blue hydrogen, in the natural gas industry.

Third, "accelerating efforts towards the phase-down of unabated coal power" paves the way for the accelerated development of coal-to-gas switching on the global level.

In item 29, the Parties recognize that "transitional fuels can play a role in facilitating the energy transition while ensuring energy security". Natural gas is considered as one of the most efficient and widely accepted transitional fuel. In this context, even an emphasis on "tripling renewable energy capacity globally by 2030" is a positive signal to the gas industry, since natural gas is a perfect backup energy source for renewables, notable for its intermittency.

Moreover, item 154 states that “measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade”. This item was a response to requests from developing countries to address trade-related unilateral measures such as the EU's Carbon Border Adjustment Measures (CBAM).

The GECF served as an advocate for the voice of natural gas at COP28. The GECF Secretary General, HE Eng Mohamed Hamel delivered a statement at the event, emphasizing the need "to support financing for natural gas projects and the scaling-up of cleaner technologies, such as carbon capture, utilization, and storage (Figure 1). This is crucial for a just, inclusive, and orderly energy transitions that satisfy the need for sustainable development, energy security, and energy affordability." Moreover, several workshops were held at the GECF Pavilion for industry experts to exchange views on key topics, including the role of natural gas in sustainable development, coal-to-gas switching, innovation in the gas industry, partnership between renewables and gas, clean cooking, and energy transition solutions.

Figure 1: GECF participation in COP28

Source: GECF Secretariat

The highly anticipated COP29 will be held on 11-22 November 2024, in another GECF member country, Azerbaijan, marking the third consecutive COP to be hosted by one of our distinguished member countries.

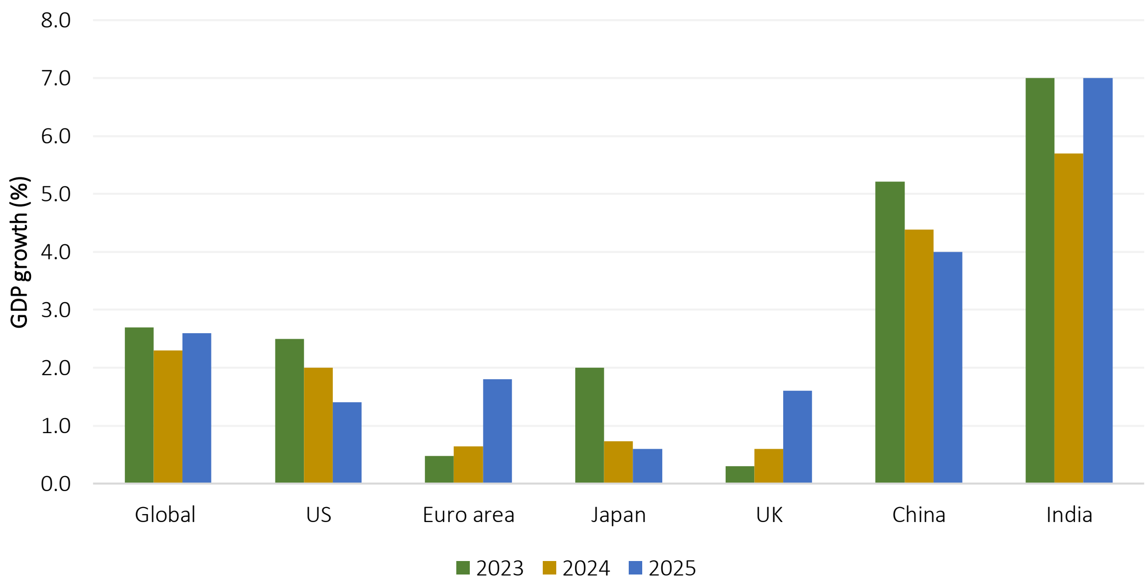
1 Global Perspectives

In the World Economic Prospects report for January 2024, Oxford Economics revised its estimate for global GDP growth for 2023 upward by 0.1 percentage points to 2.7%. In the US, GDP growth estimate has been revised upward by 0.1 percentage points to 2.5%, driven by robust consumer spending and a strong labour market. In the Euro area, the GDP growth estimate remains unchanged at 0.5%. Initial estimates for GDP growth in Q3 and Q4 suggest a marginal contraction, influenced by weak industrial activity, reduced external demand, and tight monetary policy. In China, the GDP growth estimate is also unchanged at 5.2%, supported by strong industrial activity and accommodative monetary policies.

Looking forward to 2024, the global economy is anticipated to slow further, with global GDP growth projected at 2.3%. In the US, the GDP growth forecast has been revised upward by 0.8% to 2%, motivated by a quicker moderation in inflation, more relaxed financial conditions, and a robust labour market. In the Euro area, GDP growth is projected to be 0.6%, only modestly higher than in 2023. In China, the GDP growth projection remains at 4.4%, with economic growth expected to be buoyed by increased external demand (Figure 2).

Both the World Bank, in its Global Economic Prospects for January 2024, and the United Nations, in its World Economic Situation and Prospects 2024 report, estimated the global GDP growth for 2023 at 2.6% and 2.7%, respectively, and 2.4% for 2024.

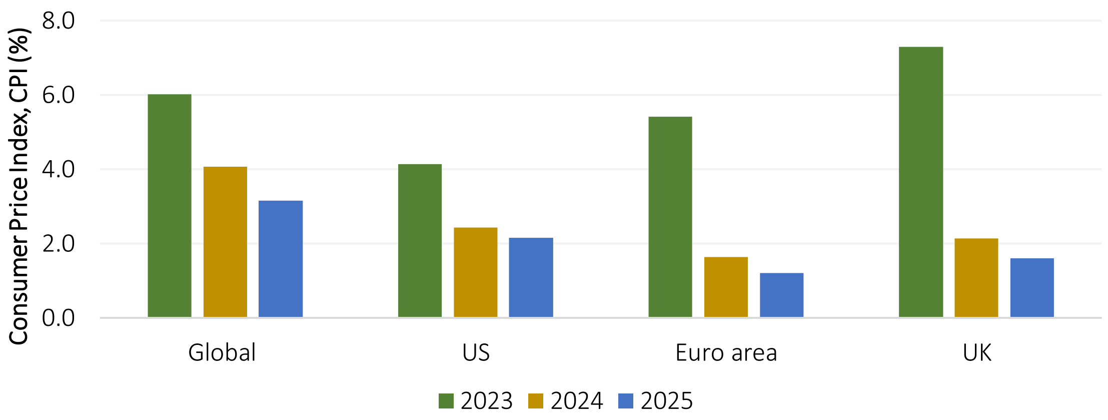
Figure 2: GDP growth



Source: GECF Secretariat based on data from Oxford Economics

According to the latest forecast from Oxford Economics, global inflation was estimated at 6% in 2023, a decrease from 8.1% in 2022. Global inflation is projected to fall to 4.1% in 2024 and 3.2% in 2025. In the Euro area, inflation was estimated at 5.4% in 2023 and is expected to drop to 1.6% in 2024, while in the UK inflation was estimated at 7.3% in 2023 and is forecasted to decline to 2.1% in 2024. In the US, inflation was estimated at 4.1% in 2023, and is projected to decline to 2.4% in 2024 (Figure 3).

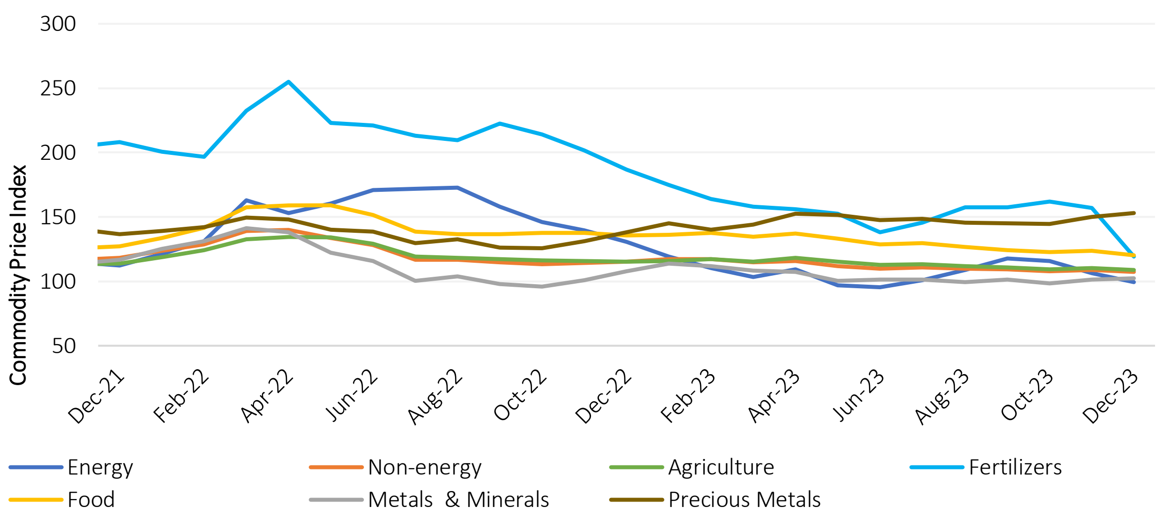
Figure 3: Inflation rates



Source: GECF Secretariat based on data from Oxford Economics

In December 2023, commodity prices in the energy sector declined for the third consecutive month. The energy price index experienced a 6% decrease m-o-m, and was 24% lower y-o-y. This decrease was primarily attributed to the decline in oil and gas prices during the month. Meanwhile, the non-energy price index decreased by 2% m-o-m, and registered a 7% decline y-o-y. A significant factor in this trend was the notable drop in the fertilizer price index, which decreased by 24% m-o-m and was 36% lower y-o-y (Figure 4).

Figure 4: Monthly commodity price indices

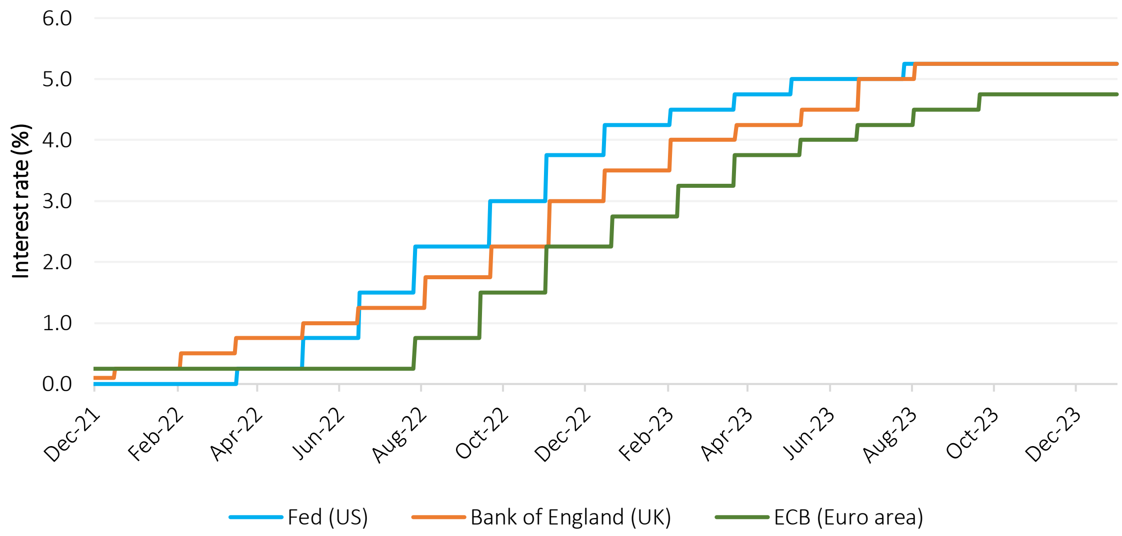


Source: GECF Secretariat based on data from World Bank Commodity Price Data
Note: Monthly price indices based on nominal US dollars, 2010=100. The energy price index is calculated using a weighted average of global crude oil (84.6%), gas (10.8%) and coal (4.7%) prices. The non-energy price index is calculated using a weighted average of agriculture (64.9%), metals & minerals (31.6%) and fertilizers (3.6%).

In December 2023, the US Federal Reserve (Fed) maintained its benchmark interest rate within the range of 5.25% to 5.50%. The Fed's last rate hike occurred in July 2023 (Figure 5). Similarly, the Bank of England (BOE) kept its key interest rate at 5.25%, following its most recent increase in August 2023. The European Central Bank (ECB) also held its key interest rates, with the main refinancing operations, marginal lending facility and deposit facility rates at 4.5%, 4.75% and

4.0%, respectively, since their last hike in September 2023. Central banks are expected to approach a potential reduction in interest rates with considerable caution.

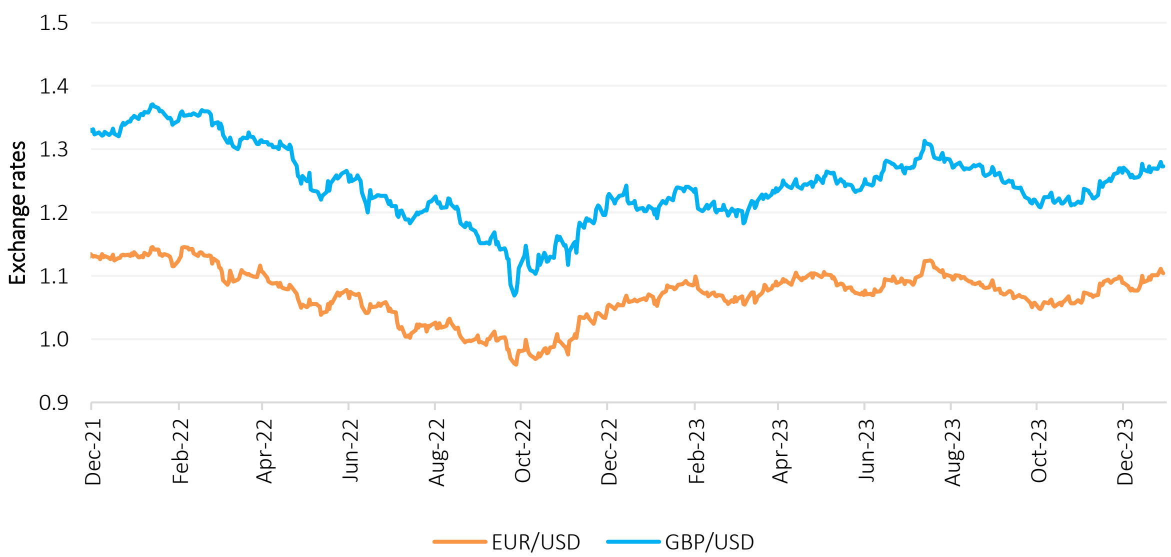
Figure 5: Interest rates in major central banks



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

In December 2023, the euro appreciated against the US dollar, resulting in an average exchange rate of $1.0920. This represented a 1% m-o-m increase and a 3% y-o-y increase. Similarly, the British pound also strengthened against the US dollar, as the average exchange rate reached $1.2664 reflecting a 2% increase m-o-m and 4% increase y-o-y (Figure 6).

Figure 6: Exchange rates



Source: GECF Secretariat based on data from Refinitiv Eikon

2 Gas Consumption

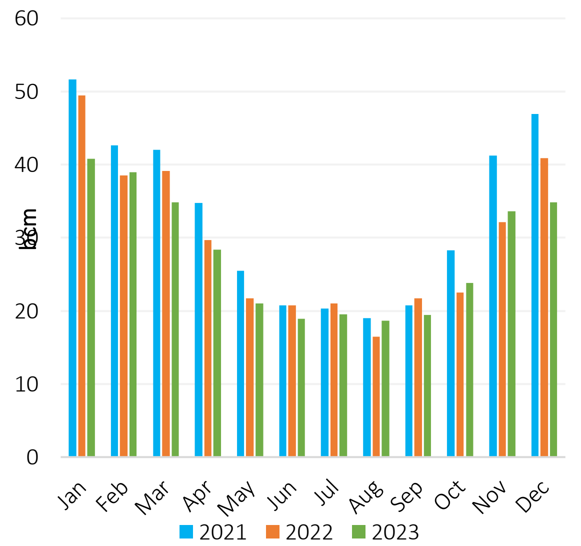
2.1 Europe

2.1.1 European Union

In December 2023, gas consumption in the EU reverted to a negative trend after two consecutive months of growth. This decline amounted to 14% y-o-y, totalling 35 bcm (Figure 7). The reduction in gas consumption can be attributed to milder-than-normal temperatures across Europe, resulting in decreased heating demand in the residential sector. Additionally, the holiday period led to reduced gas consumption in the industrial sector. Moreover, increased output from renewable and nuclear energy sources compensated for a decrease in natural gas use in the power generation sector.

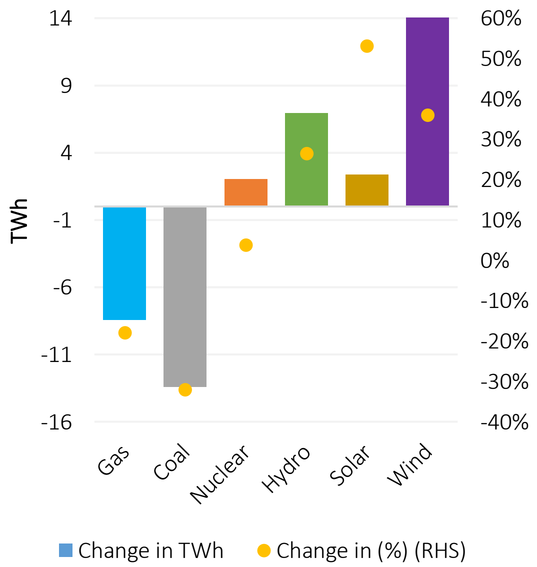
With regards to electricity production, gas-based generation in the EU witnessed a 18% y-o-y decline, while total electricity production rose by 1%, reaching 228 terawatt-hours (TWh). This significant drop in gas consumption within the power sector is attributed to the expansion of renewable energy sources, alongside increases in hydroelectric and nuclear power production. Nuclear, hydro, solar and wind power generation registered considerable y-o-y increases of 4%, 26%, 53% and 36%, respectively. Conversely, electricity generated from coal experienced a substantial decrease of 32% y-o-y, equivalent to 8 TWh (Figure 8). In the power mix, renewables constituted the largest share at 31%, followed by nuclear (25%), gas (17%), hydro (15%) and coal (12%).

Figure 7: Gas consumption in the EU



Source: GECF Secretariat based on data from Entsog and McKinsey

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

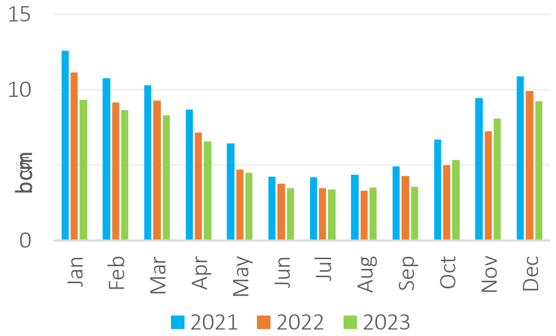


Source: GECF Secretariat based on data from Ember

2.1.1.1 Germany

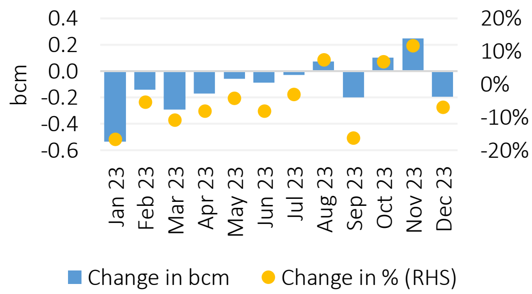
In December 2023, Germany witnessed a 6.8% y-o-y decline in gas consumption after two consecutive months of growth, with consumption reaching 9.2 bcm (Figure 9). This drop was observed in the residential, power generation and industrial sectors, with respective y-o-y declines of 14%, 2% and 13%. Several factors contributed to this drop: the mild weather during the month; a holiday period, which affected the industrial gas consumption and the increase in the renewable output (Figure 10).

Figure 9: Gas consumption in Germany



Source: GECF Secretariat based on data from Refinitiv

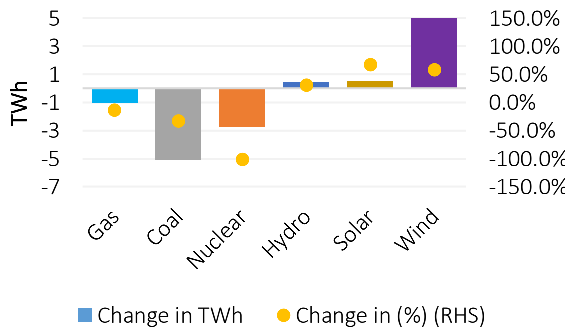
Figure 10: Trend in gas consumption in the industrial sector in Germany (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

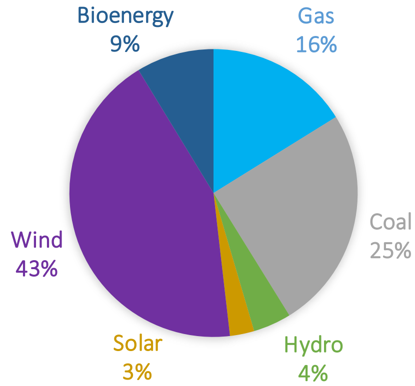
Gas-fired power generation experienced a 13% y-o-y increase, while the overall electricity production declined by 2.5% y-o-y, totalling 43 TWh. By contrast, hydro, solar and wind energy generation saw significant y-o-y increases of 31%, 69% and 59%, respectively. In contrast, electricity production from coal decreased by 32% y-o-y. These shifts were largely attributed to favourable weather conditions boosting hydro, solar and wind energy generations (Figure 11). In the energy mix, renewables continued to dominate, comprising 55% of the total, followed by coal at 25%, gas at 16%, and hydro at 4% (Figure 12).

Figure 11: Trend in electricity production in Germany in December 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 12: German electricity mix in December 2023

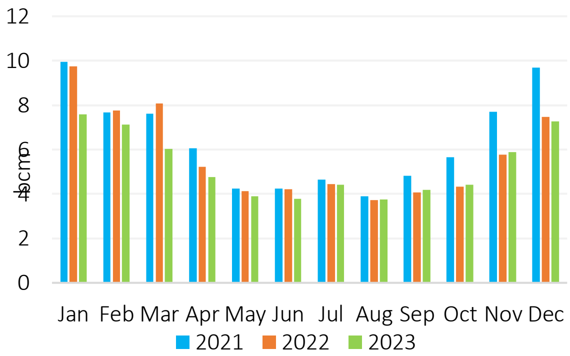


Source: GECF Secretariat based on data from Refinitiv and Ember

2.1.1.2 Italy

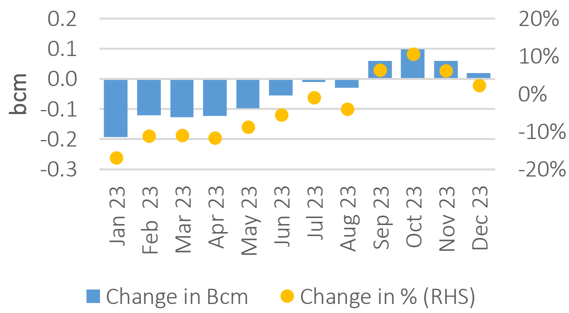
In December 2023, Italy experienced a 2.7% y-o-y decrease in gas consumption, totalling 7.3 bcm. This continues to be 25% below the figures reported in December 2021 (Figure 13). The power generation sector was the main driver of the decline, largely because of an increase in hydroelectric, solar and wind energy production. The industrial and residential sectors saw rises in consumption of 2.3% and 1.6%, respectively. Despite the average temperatures in December being 0.5 degrees higher than the average, the residential sector recorded an increase in gas consumption compared to the last year. Additionally, there was a resurgence in industrial activity, spurred by a slowdown in gas prices (Figure 14). Notably, after 20 consecutive months of y-o-y declines, the industrial sector recorded its fourth consecutive month of increased gas consumption, reaching 0.9 bcm.

Figure 13: Gas consumption in Italy



Source: GECF Secretariat based on data from Snam

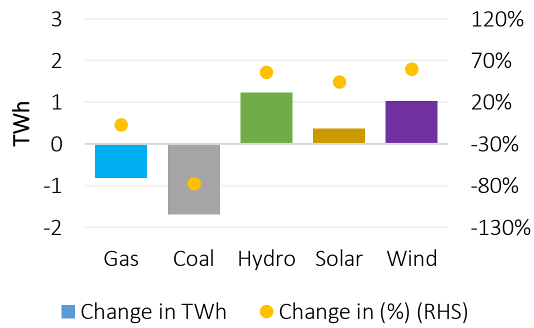
Figure 14: Trend in gas consumption in the industrial sector in Italy (y-o-y change)



Source: GECF Secretariat based on data from Snam

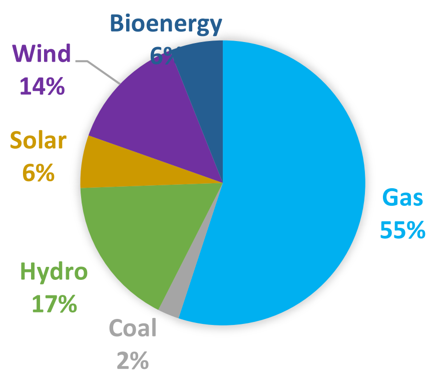
Gas-based electricity production fell by 7% y-o-y, while the total electricity production declined by 0.4% y-o-y, reaching 20 TWh. Additionally, there was a notable y-o-y increase in energy generation from hydro (57%), wind (60%) and solar (45%) (Figure 15). Meanwhile, gas continued to be the dominant fuel in the power mix, accounting for 55% of the total, followed by renewables (26%), hydro (17%), and coal (2%) (Figure 16).

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



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 16: Italian electricity mix in December 2023

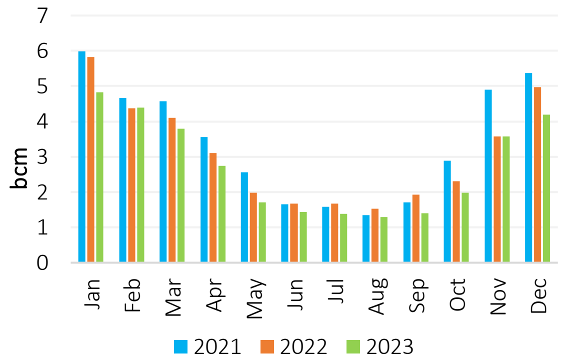


Source: GECF Secretariat based on data from Refinitiv and Ember

2.1.1.3 France

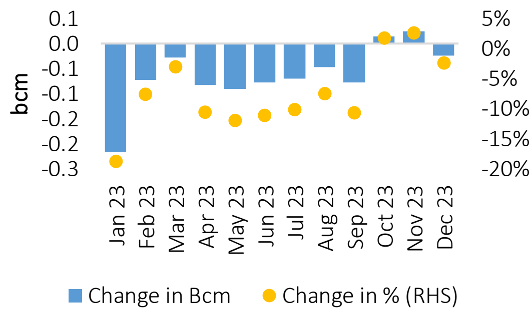
In December 2023, France's gas consumption experienced a 15% y-o-y decrease, totalling 4.2 bcm. This represented the tenth consecutive month of decline following a brief surge in February 2023 (Figure 17). The primary driver of this reduction was a significant drop in gas usage in the power generation sector. This decline is linked to an increase in nuclear and hydro power output compared to the previous year. Similarly, both the residential and industrial sectors reported decreases in gas consumption. The residential sector's consumption dropped by 15% y-o-y to 2.9 bcm, while the industrial sector saw a 2.3% y-o-y decrease, reaching 1 bcm (Figure 18).

Figure 17: Gas consumption in France



Source: GECF Secretariat based on data from GRTgaz

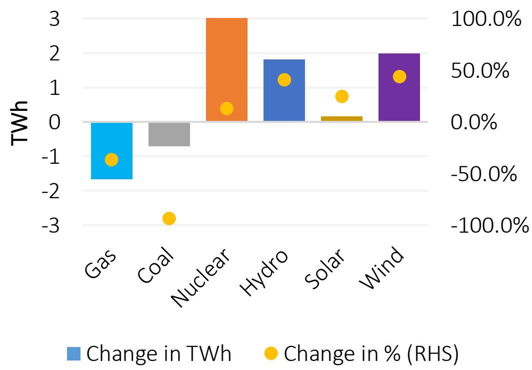
Figure 18: Trend in gas consumption in the industrial sector in France (y-o-y change)



Source: GECF Secretariat based on data from GRTgaz

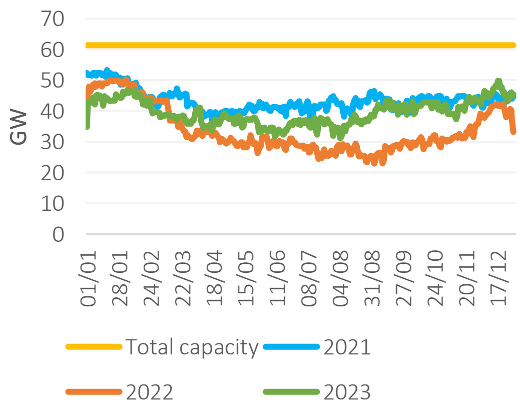
Electricity production from gas in France saw a 36% y-o-y decrease. Meanwhile, the country's total electricity production increased by 12% y-o-y, reaching 48 TWh. This period also marked a significant rebound in nuclear power generation, which rose by 13% y-o-y. The availability of nuclear capacity increased by 15% y-o-y and 18% m-o-m (Figure 20). Notably, on December 18 and 19, French nuclear production reached its peak for the year, with output exceeding 49 GW. Additionally, there were higher levels of electricity production from hydro (up 41% y-o-y), solar (2%), and wind (13%). In contrast, electricity production from coal plummeted by 93% y-o-y (Figure 19). In France's energy mix, nuclear power continued to be the dominant source, accounting for 65% of the total, followed by renewables (16%), hydro (13%), and gas (6%).

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



Source: GECF Secretariat based on data from Ember

Figure 20: French nuclear capacity availability

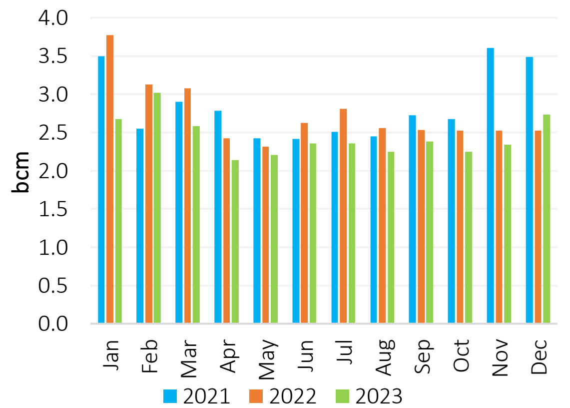


Source: GECF Secretariat based on data from Refinitiv and RTE

2.1.1.4 Spain

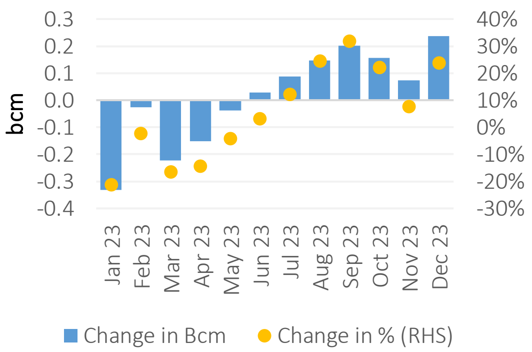
In December 2023, Spain experienced an 8.6% y-o-y increase in gas consumption, reaching 2.7 bcm (Figure 21). This rise was primarily due to increased gas usage in the industrial and residential sectors. The industrial sector saw its seventh consecutive month of expansion, with a 24% y-o-y increase (Figure 22). This growth was propelled by heightened gas consumption across various industries, notably in refineries (106% y-o-y increase), pharmaceuticals (36%), textiles (24%), agrifood (15%), and metallurgy (9%). Additionally, the residential sector experienced significant growth due to a cold spell in the country during the latter part of the month. In contrast, the power generation sector continued its downward trend, influenced by increased production from hydro, wind and solar energy sources, coupled with a cessation of electricity exports to France.

Figure 21: Gas consumption in Spain



Source: GECF Secretariat based on data from Enagas

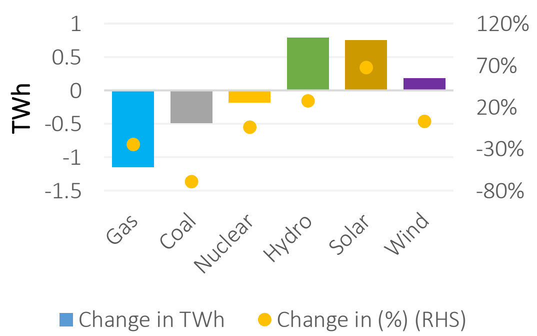
Figure 22: Trend in gas consumption in the industrial sector in Spain (y-o-y change)



Source: GECF Secretariat based on data from Enagas

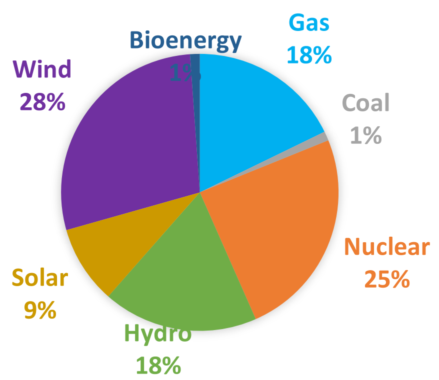
Electricity generation from gas experienced a 24% y-o-y decrease, while the overall electricity production in the country dropped by 0.7% y-o-y, totalling 20.4 TWh. Additionally, there were notable reductions in electricity production from coal and nuclear sources, decreasing by 24% and 3% y-o-y, respectively. In contrast, significant increases were observed in electricity generation from renewable sources: hydroelectric power surged by 27% y-o-y, solar by 68% and wind by 3% (Figure 23). Renewables maintained the dominant position in the power mix, accounting for 38% of the total, followed by nuclear (25%), gas (18%), hydro (18%) and coal (1%) (Figure 24).

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



Source: GECF Secretariat based on data from Ember and Ree

Figure 24: Spanish electricity mix in December 2023

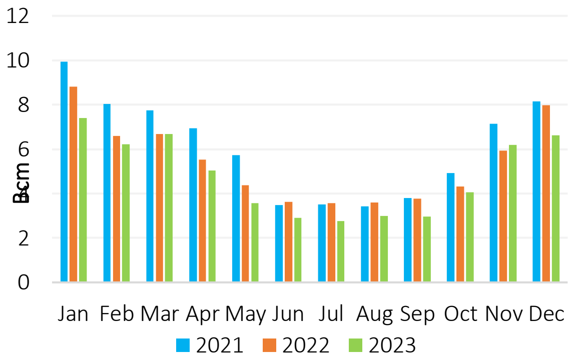


Source: GECF Secretariat based on data from Ember and Ree

2.1.2 United Kingdom

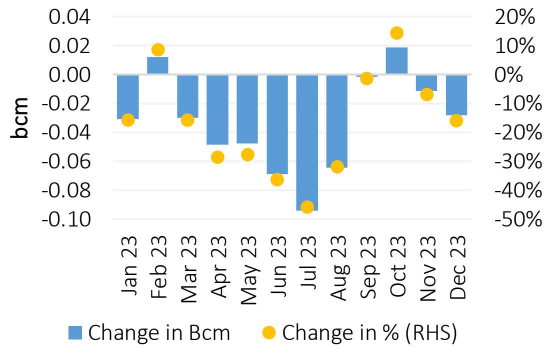
In December 2023, following a brief resurgence in gas consumption in the previous month that interrupted a fifteen-month downward trend, gas consumption in the UK reverted to a declining trend with a 17% y-o-y decrease, totalling 6.6 bcm (Figure 25). This decline was due to reduced gas usage in the residential, industrial and power generation sectors (Figure 26). Factors contributing to this drop include milder than usual temperatures, the holiday period and increased hydro and wind energy output.

Figure 25: Gas consumption in the UK



Source: GECF Secretariat based on data from Refinitiv

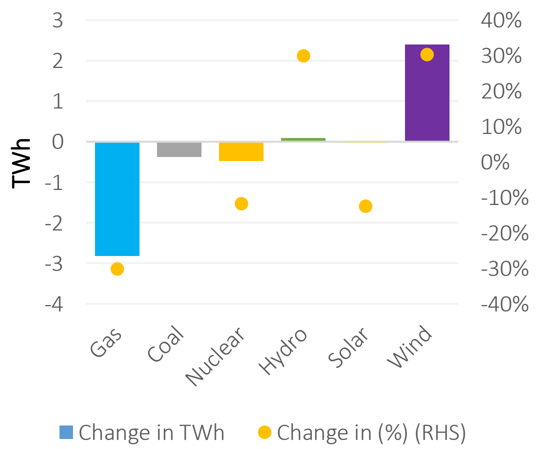
Figure 26: Trend in gas consumption in the industrial sector in the UK (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

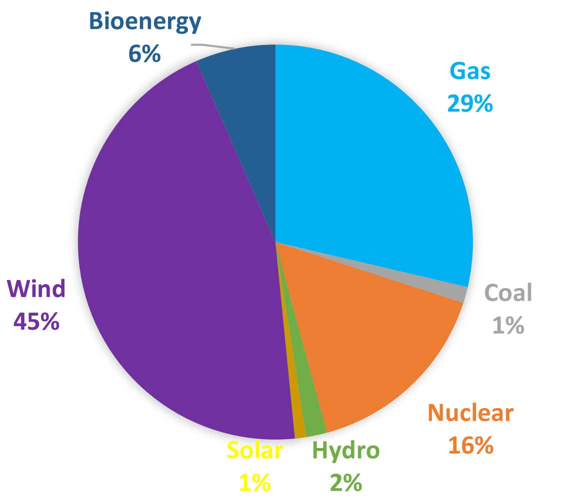
In the UK, electricity production from gas saw a 30% y-o-y decrease, contributing to a total electricity production drop of 4.2% y-o-y to 23 TWh. There were also declines in electricity generation from nuclear, coal and solar sources, falling by 12%, 56% and 13% y-o-y, respectively. In contrast, hydro and wind energy production experienced significant increases, each surging by 30% y-o-y, respectively (Figure 27). Within the power mix, renewables took the lead, comprising 52% of the total electricity production, followed by gas at 29%, nuclear at 16%, hydro at 2% and coal at 1% (Figure 28).

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



Source: GECF Secretariat based on data from Refinitiv

Figure 28: UK electricity mix in December 2023



Source: GECF Secretariat based on data from Refinitiv

2.2 Asia

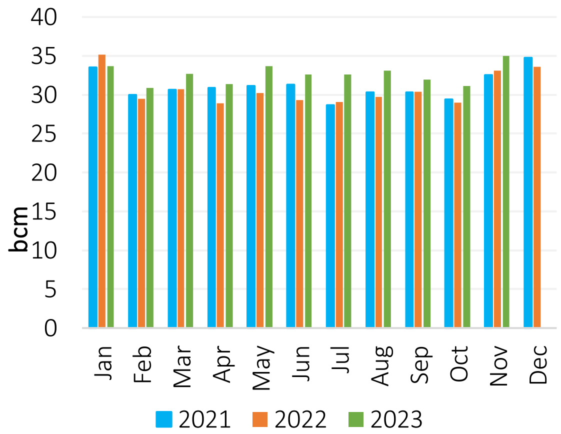
2.2.1 China

In November 2023, China's apparent gas demand, encompassing pipeline imports, LNG imports and domestic production, rose by 5.7% compared to the previous year, reaching 35 bcm (Figure 29). This increase in natural gas consumption is linked to the revival of economic activities following the relaxation of stringent COVID-19 lockdown restrictions and the cold weather that was recorded at the end of the month.

Electricity production from gas in China increased by 10% y-o-y, while the total electricity production rose by 11%, reaching 765 TWh. The month witnessed a significant surge in electricity generation from hydro (6%), solar (54%), wind (36%) and coal (6%) (Figure 30). Coal remained the dominant fuel in the power mix, accounting for 61% of the total, followed by renewables (20%), hydro (11%), nuclear (5%) and gas (3%).

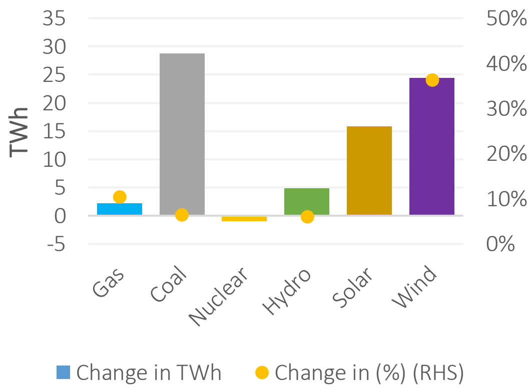
From January to November 2023, China's gas consumption rose by 7% y-o-y to 359 bcm.

Figure 29: Gas consumption in China



Source: GECF Secretariat based on data from Refinitiv

Figure 30: Trend in electricity production in China in in November 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

2.2.2 India

In November 2023, India's gas consumption marked its eleventh consecutive month of growth with a 19% y-o-y increase, reaching 5.6 bcm (Figure 31). This increase was primarily driven by fertilizer, city gas, refinery and petrochemical sectors, which registered growth of 8%, 14%, 56% and 58% y-o-y, respectively. In India, the reliance on LNG imports for meeting natural gas demand was 45% of the country's total consumption.

Power generation surged to 128 TWh, marking a 7% y-o-y increase. In the aftermath of the monsoon season, India's power utilities are operating at full capacity to meet an expected increase in electricity demand in the coming months. The power ministry, in response, has extended its earlier instructions for utilities to augment coal imports and has also instructed gas-based utilities to maintain maximum operational capacity. Natural gas, representing 6% of India's installed power generation capacity (with coal accounting for 50%), is primarily utilized in the country's gas distribution network for piped natural gas in households and compressed natural gas in vehicles. Within the sectoral breakdown, the fertilizer sector accounted for 33% of gas demand, followed by city gas distribution (19%), power generation (10%), refining (8%) and the petrochemical sector (4%) (Figure 32).

Figure 31: Gas consumption in India

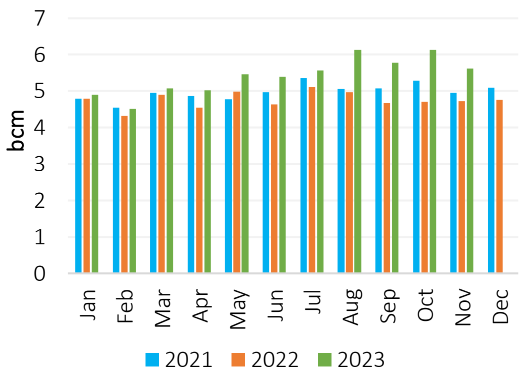
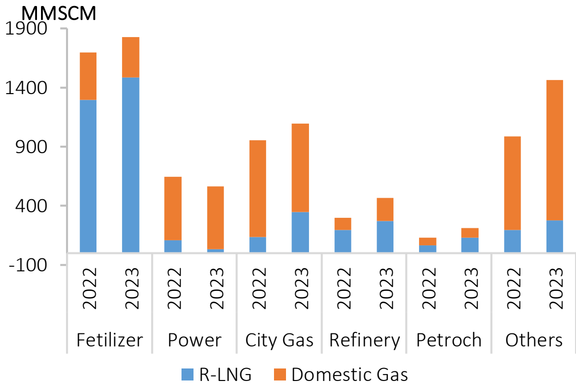


Figure 32: India's gas consumption by sector in Nov



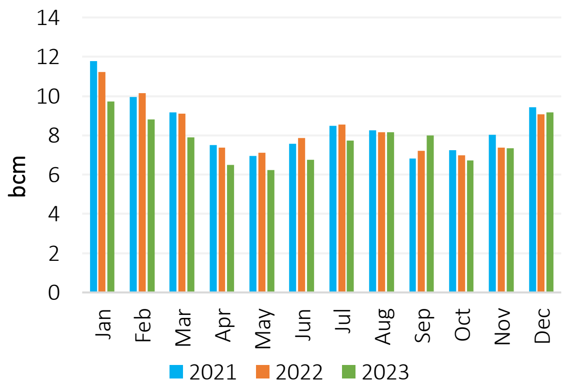
Source: GECF Secretariat based on data from PPAC

From January to November 2023, India's gas consumption rose by 14% y-o-y to 60 bcm.

2.2.3 Japan

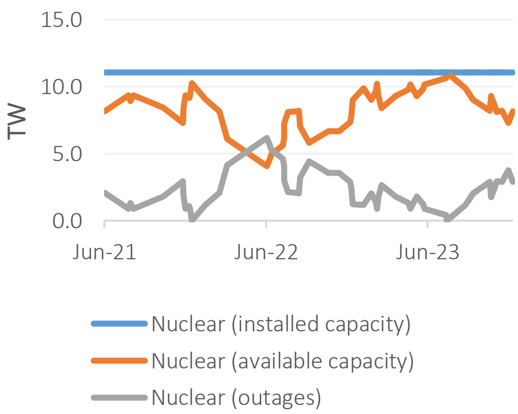
In December 2023, Japan experienced a modest 0.9% y-o-y increase in gas consumption, totalling 9.2 bcm (Figure 33). This modest rise was mainly driven by increased demand in the power generation sector due to the cold weather. Specifically, the power generation sector experienced a 3.2% y-o-y growth, reaching 5.3 bcm. On the other hand, the city gas sector witnessed a 2% y-o-y decline in consumption. The month also saw an 18% y-o-y reduction in Japan's Heating Degree Days (HDD), a measure of heating demand, which averaged 7.4. This suggests a greater heating requirement compared to the previous year. Additionally, the availability of nuclear power in December 2023 was 9% lower than in the same month of the previous year, contributing to an increased reliance on gas for power generation (Figure 34).

Figure 33: Gas consumption in Japan



Source: GECF Secretariat based on data from Refinitiv

Figure 34: Nuclear availability in Japan

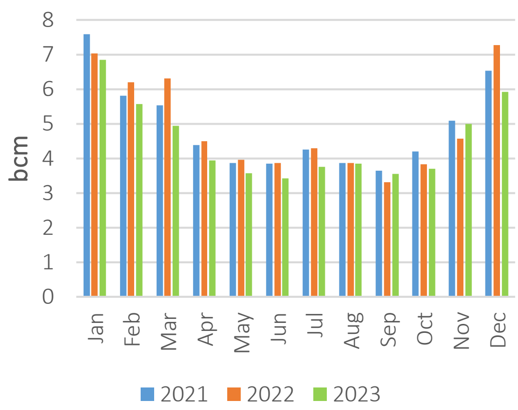


Source: GECF Secretariat based on data from Refinitiv

2.2.4 South Korea

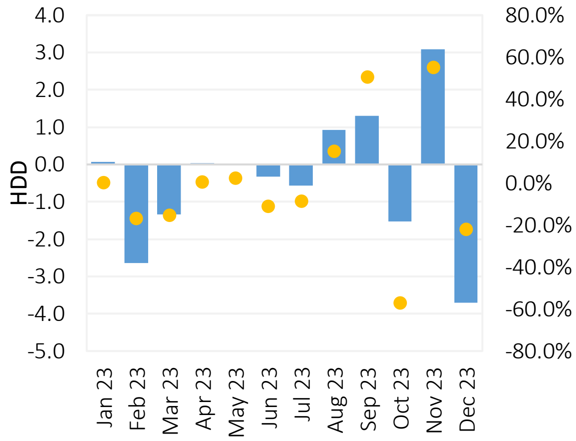
In December 2023, South Korea's gas consumption declined by 19% y-o-y, totalling 5.9 bcm. This drop was mainly propelled by a notable 15% decline in gas usage within the city gas sector. The power generation sector also showed a drop in gas consumption (7%) (Figure 35). The Heating Degree Days (HDD) in South Korea averaged 13 during December, representing a significant 22% y-o-y decrease, highlighting a lower need for heating compared to the previous year (Figure 36).

Figure 35: Gas consumption in South Korea



Source: GECF Secretariat based on data from Refinitiv

Figure 36: HDD in South Korea (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

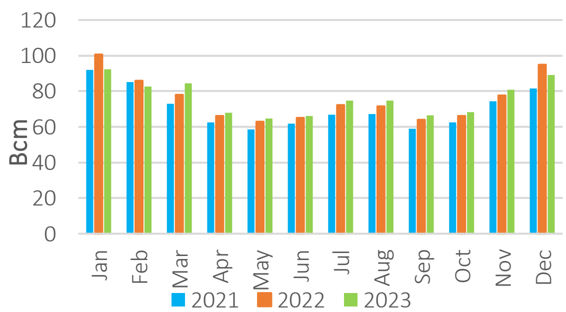
2.3 North America

2.3.1 US

In December 2023, the US witnessed a 6% y-o-y decrease in gas consumption, reaching 89 bcm. The significant drop in the residential sector can be attributed to the mild weather, which reduced gas consumption by 17% to reach 20 bcm. However, the industrial and power generation sectors registered increases in gas consumption, with 2.5% and 4.5% y-o-y growth, respectively.

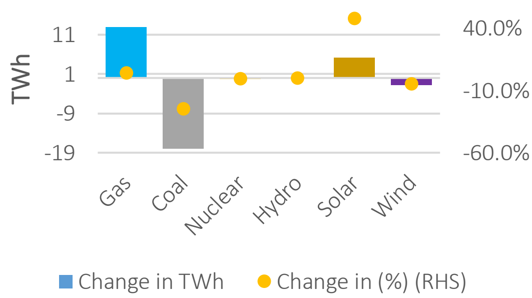
Electricity generation from gas experienced a 4.5% y-o-y increase, whereas the overall electricity production declined by 2.8%. The month was marked by a decline in generation from coal, nuclear and wind, which decreased by 25%, 0.4% and 5%, respectively. On the other hand, solar energy production saw a significant surge, increasing by 48% y-o-y (Figure 38). In the power mix, gas continued to lead with a 41% share, followed by nuclear (20%), renewable energy sources (17%), coal (16%) and hydro (6%).

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 December 2023 (y-o-y change)

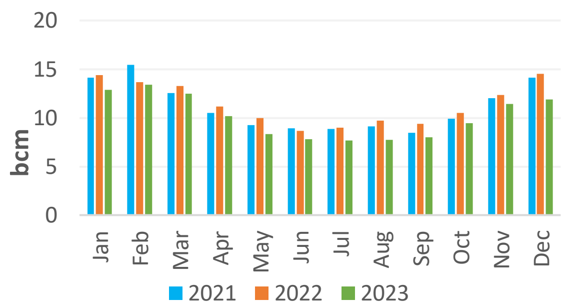


Source: GECF Secretariat based on data from Ember and Refinitiv

2.3.2 Canada

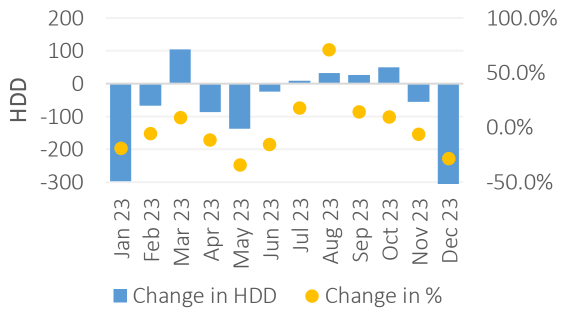
In December 2023, Canada experienced a 18% y-o-y decrease in gas consumption, dropping to 12 bcm (Figure 39). This decline was mainly due to a reduction in gas usage in the residential, commercial and combined industrial and power generation sectors of 13%, 27% and 23% respectively. The Heating Degree Days (HDD) in Canada averaged 1044 for December, indicating a 28% decrease compared to the same period last year (Figure 40).

Figure 39: Gas consumption in Canada



Source: GECF Secretariat based on data from Refinitiv

Figure 40: HDD in Canada (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

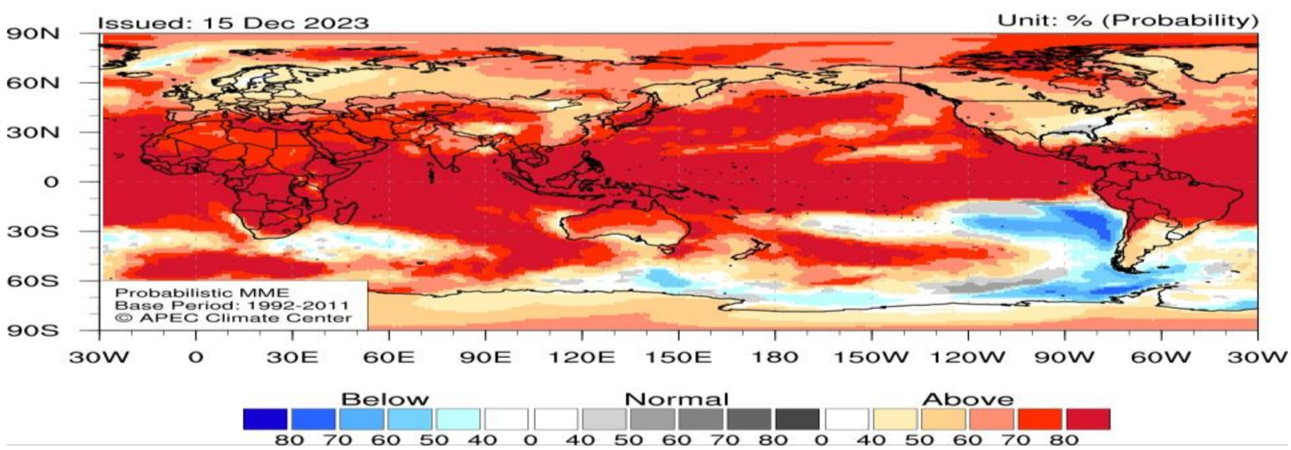
2.4 Weather Forecast

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

2.4.1 Temperature Forecast for January to March 2024

According to the Climate Outlook by the APEC Climate Center published on December 15, 2023 (Figure 41), a pronounced likelihood of experiencing above normal temperatures is predicted for most of the globe (excluding some region of the southeastern South Pacific and the Antarctic Ocean between South America and the Antarctic) for the period January 2024 to March 2024.

Figure 41: Temperature forecast January 2024 to March 2024

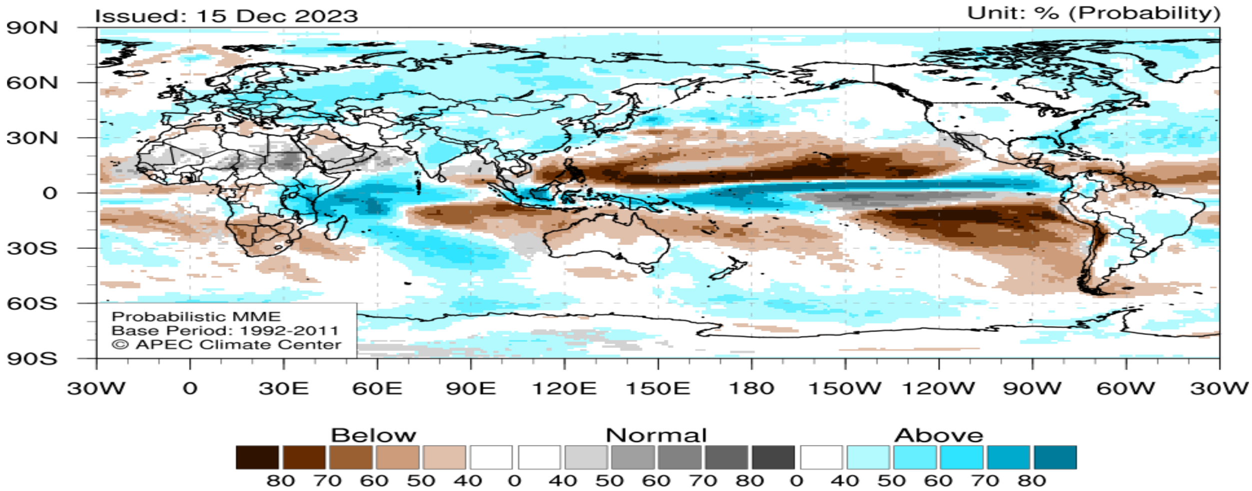


Source: APEC Climate Center

2.4.2 Precipitation Forecast for January to March 2024

According to the Climate Outlook by APEC Climate Center published on November 15, 2023 (Figure 42), above normal precipitation is expected for the western equatorial Pacific, off-equatorial North Pacific, the western Indian Ocean, the southern Indian Ocean, and Indonesia. While below normal precipitation is expected for the central and western off-equatorial North Pacific, eastern off-equatorial South Pacific, the eastern Indian Ocean, western tropical South Pacific, off-equatorial Atlantic, and southern Africa and northern Australia for the period January 2024 to March 2024.

Figure 42: Precipitation forecast January 2024 to March 2024



Source: APEC Climate Center

3 Gas Production

3.1 Global

The 2023 global gas production figures suggests a modest increase of 0.8% (Table 1). This growth is predominantly expected in regions such as North America, the Middle East, and Asia Pacific, whereas Europe, Africa, and the CIS regions are likely to experience a decline in production. Non-GECF countries are projected to boost their gas production by 2.5%, reaching a total of 2,394 bcm. The US is expected to be a major player, with an increase of 42 bcm over the previous year, primarily driven by enhanced associated gas production from shale oil fields. Furthermore, the Middle East is also projected to see a significant rise in gas production, approximately 20 bcm, with Iran, Qatar, and Saudi Arabia being key contributors.

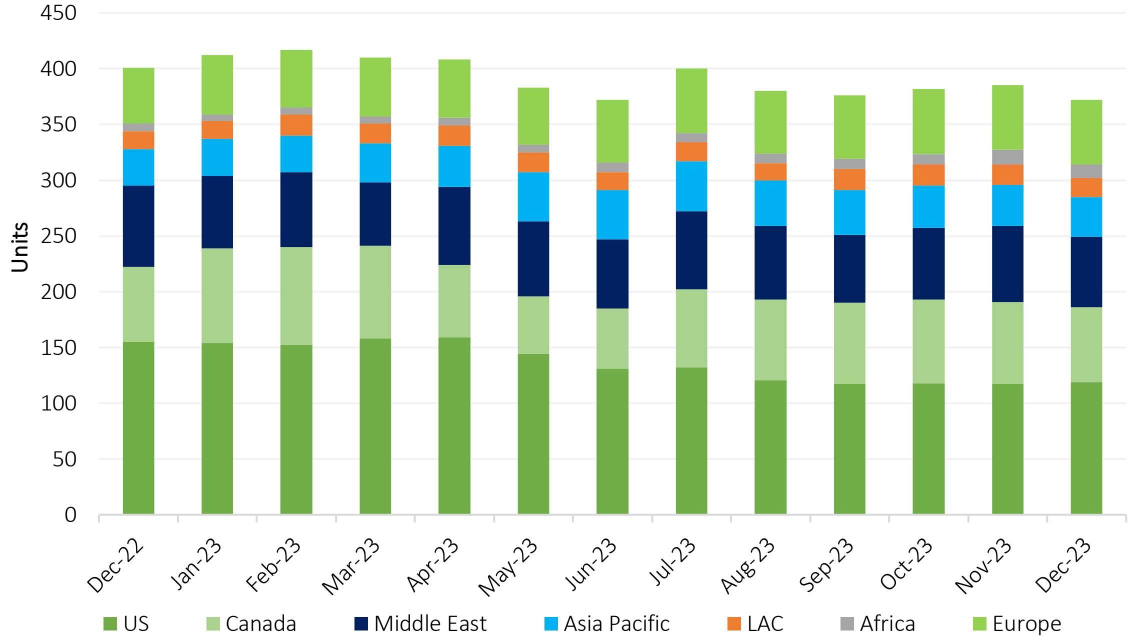
Table 1: Global gas production forecast by region (bcm)

Region	2021	2022	2022 Revision*	2023	2023 Revision*
Africa	258	253	0.1%	252	0.7%
Asia Pacific	642	648	0.0%	658	0.2%
CIS	910	812	0.0%	781	-0.2%
LAC	157	161	-0.9%	161	-0.8%
Europe	225	233	0.0%	214	-1.1%
Middle East	669	682	0.0%	702	0.3%
North America	1165	1229	0.0%	1282	0.1%
World	4026	4018	-0.03%	4051	0.0%
GECF	1759	1682	-0.1%	1657	0.2%
non-GECF	2267	2336	0.0%	2394	0.0%

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

December 2023 marked a m-o-m reduction of 13 units in the global count of gas drilling rigs, indicative of upstream activities, with the total decreasing to 372 rigs. This represented a decline from the 401 rigs in December 2022, translating to a y-o-y reduction of 29 units. The m-o-m decrease was mainly attributed to a decrease in gas rigs across Canada, the Middle East, Latin America and Africa (Figure 43).

Figure 43: Trend in monthly global gas rig count



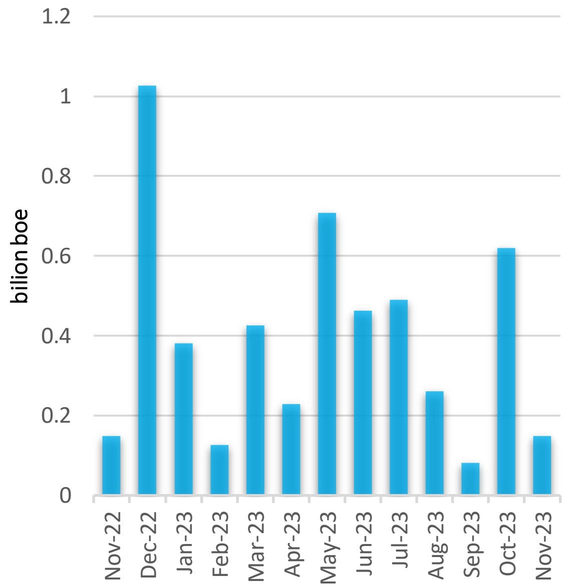
Source: GECF Secretariat based on data from Baker Hughes
Note: Excludes data for Eurasia and Iran

In November 2023, the total volume of discovered gas and liquids amounted to 150 million barrels of oil equivalent (boe). Of this, natural gas accounted for 39% (10 bcm), while oil constituted 61% (86 million boe). The cumulative volume of discoveries in the period January to November 2023 reached 4.4 billion boe, compared to discovered volumes of 6.2 billion boe for the same period in 2022. This resulted in an average monthly discovered volume of 410 million boe in the first eleven months of 2023 (Figure 44). The decline in discovered volumes in 2023 reflects the challenges confronting global exploration activity. Approximately 67% of the total discoveries were made offshore.

Ten relatively small discoveries were announced in November 2023, four of which were offshore. LAC held the major share in the new discovered volumes with 54%, followed by Middle East and Africa with 26% and 14%, respectively. No significant discoveries were reported in Europe and North America (Figure 45).

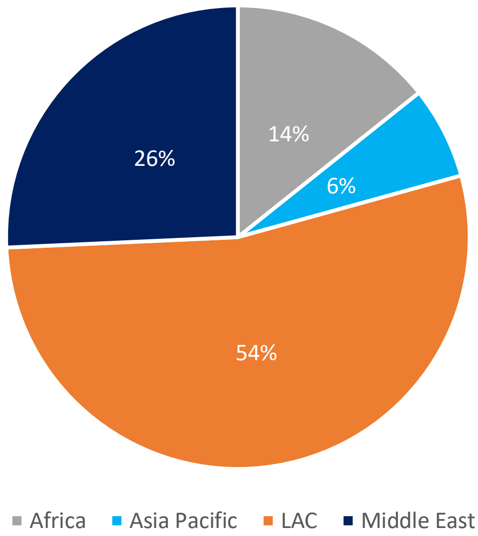
Al Hiran gas discovery, in the Empty Quarter, Eastern Province of Saudi Arabia, was the largest gas discovery announced in November 2023. The discovery was made through the exploration well Al Hiran-1. According to Saudi Aramco, the well was tested with 30 mmcf/d of gas and 1600 bpd of condensate from the Hanifa reservoir, proving the commerciality of the discovery. Moreover, the gas flow was tested from the Arab-C formation with a rate of 3 mmcf/d. This development comes in line with the company's strategy to boost gas production by 50% by 2030. It is worth noting that Saudi Aramco has recently started production from its unconventional field in South Ghawar, its second unconventional project after the North Arabia unconventional field and the first from tight gas formations.

Figure 44: Monthly gas and liquid discovered volumes



Source: GECF Secretariat based on Rystad Energy Ucube

Figure 45: Discovered volumes in November 2023 by region

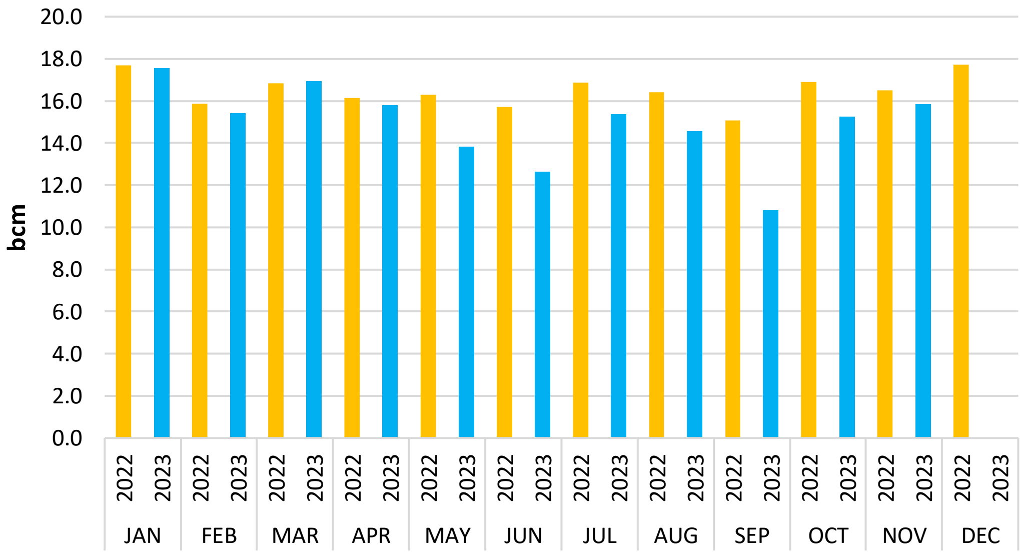


Source: GECF Secretariat based on Rystad Energy Ucube

3.2 Europe

November 2023 saw a 4% y-o-y reduction in Europe's gas production, leading to a total output of 15.8 bcm (Figure 46). This decrease was largely due to decreased production in the Netherlands and the UK, which are major producers in the region along with Norway. Additionally, the total gas production for 2023 is estimated to fall by 18 bcm compared to 2022 production level.

Figure 46: Europe’s monthly gas production



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

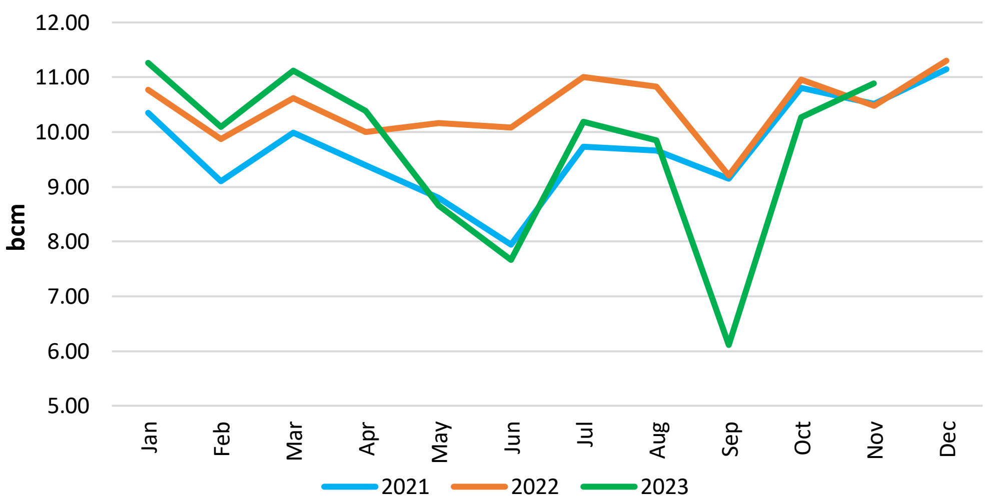
3.2.1 Norway

Initial figures from the Norwegian Petroleum Directorate indicate a 4% y-o-y rise in Norway's gas production for November 2023, reaching 10.9 bcm (Figure 47). As a result, the cumulative gas production from January to November amounted to 106.5 bcm.

Furthermore, Neptune Energy, along with its partners, announced a new gas discovery in the Kyrre prospect in the North Sea. The discovery is estimated to contain about 2.5 bcm of recoverable reserves. In addition, a sidetrack from the exploratory well confirmed the volumes from the Ofelia discovery to be in the range of 4.5 bcm, bringing the total recoverable volumes from both discoveries to 7 bcm.

Regarding maintenance activities, a short planned maintenance outage in the 27 mcm/d Oseberg gas field reduced its output capacity to 22.5 mmcm/d for a period of 4 days. In addition, an unplanned maintenance activity for Kollsnes processing plant took place for a period of 2 days, which resulted a 6 mmcm/d cut in its output.

Figure 47: Trend in gas production in Norway



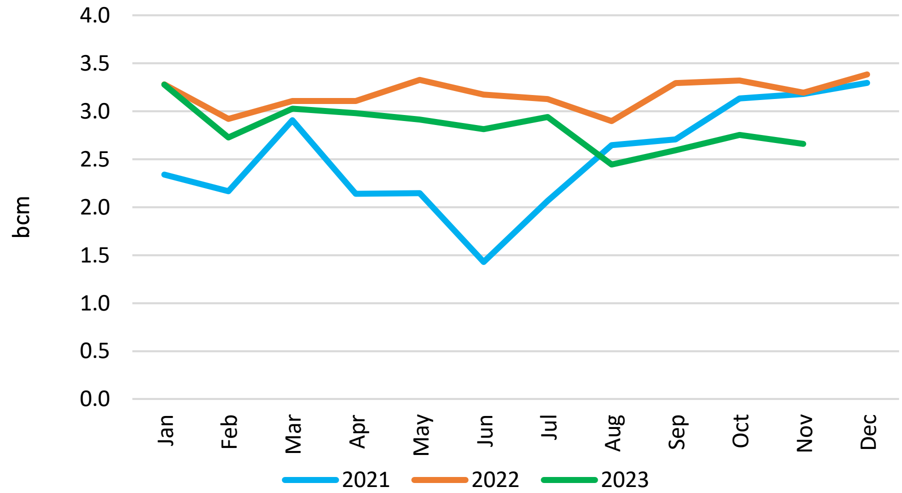
Source: GECF Secretariat based on data from Refinitiv and Norwegian Petroleum Directorate

3.2.2 UK

In November 2023, the UK experienced a y-o-y decrease of 17% in its gas production, culminating in a total output of 2.7 bcm (Figure 48). The cumulative gas production from January to November amounted to 31.1 bcm, representing a 10% y-o-y reduction.

In a recent development, BP, along with its partner Neptune Energy, announced the production startup from the Seagull oil and gas field in the British part of the North Sea. The field was tied-back into the central processing facility (CPF) of the Eastern Trough Area Project (ETAP) in the central North Sea, approximately 140 miles east of Aberdeen. Production is transported via a new three-mile subsea pipeline, which connects to an existing pipeline system. It is estimated that the field would produce about 50,000 boe/d at its peak level.

Figure 48: Trend in gas production in the UK



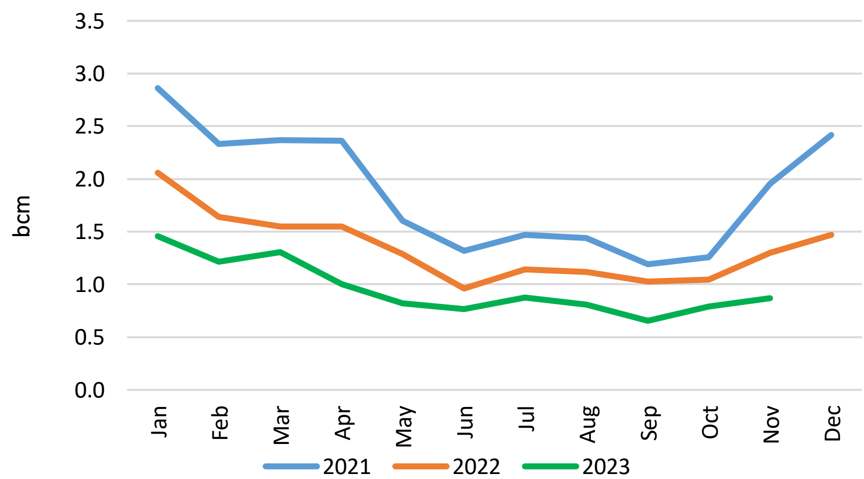
Source: GECF Secretariat based on data from Refinitiv

3.2.3 Netherlands

In November 2023, the Netherlands witnessed a 33% y-o-y reduction in gas production, recording a production of 0.87 bcm (Figure 49).

The aggregate gas production from January to November 2023 amounted to 10.6 bcm, showing a 28% decrease from the corresponding period in 2022. This decline in Dutch gas production is primarily attributed to the diminishing production from mature fields and the halt in production at the Groningen field.

Figure 49: Trend in gas production in the Netherlands



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

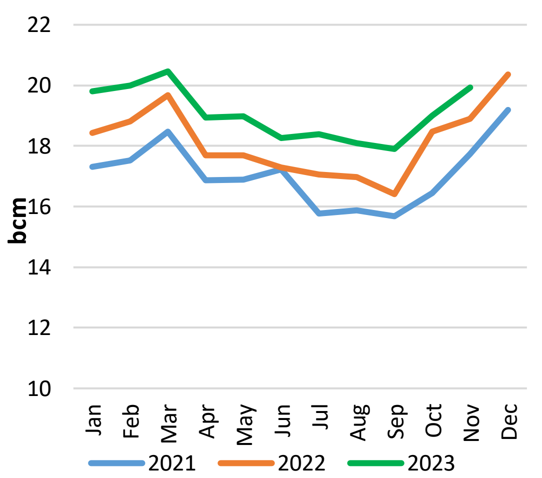
3.3 Asia Pacific

3.3.1 China and India

China recorded a 6% y-o-y growth in gas production in November 2023, reaching 19.9 bcm (Figure 50). From January to November of the same year, the cumulative gas production also saw a 6% increase from the previous year, totalling 209.8 bcm. Additionally, the country reported a coal-bed methane (CBM) production of 1.3 bcm for the month.

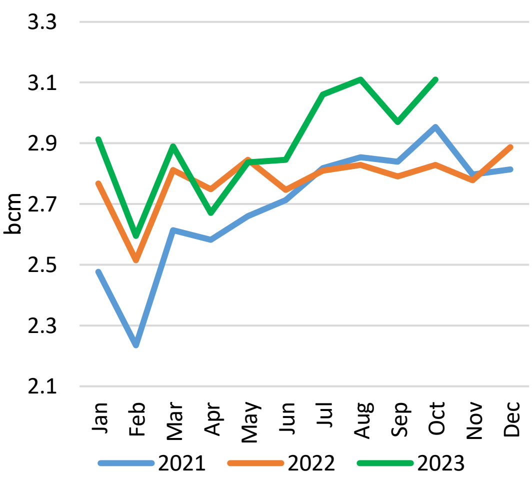
India experienced a 10% y-o-y rise in gas production in October 2023, achieving a total production of 3.1 bcm (Figure 51). The cumulative gas production from January to October 2023 amounted to 29 bcm, marking a 5% y-o-y increase.

Figure 50: Trend in gas production in China



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

Figure 51: Trend in gas production in India



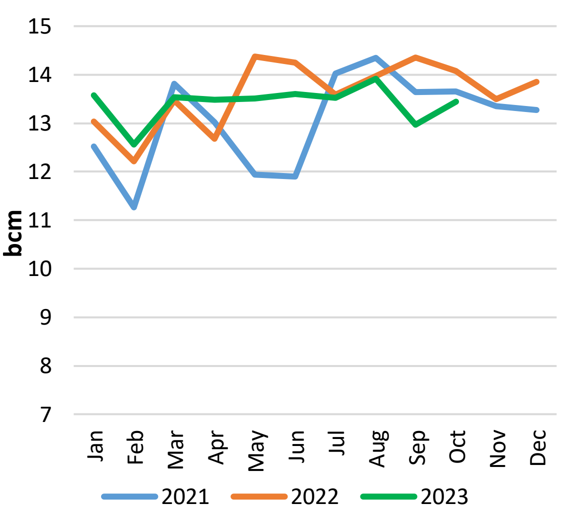
Source: GECF Secretariat based on data from Refinitiv, Ministry of Petroleum (India)

3.3.2 Australia

According to data from the Australian Department of Energy, the country's gas production in October 2023 reached 13.45 bcm, representing a 6.8% decline y-o-y (Figure 52). From January to October, there was a 1.4% y-o-y contraction in the cumulative gas production, reaching a volume of 134.1 bcm.

Notably, natural gas production from coal bed methane fields reached 3.49 bcm, representing 26% of the total production. This output level maintained Australia as the global frontrunner in coal bed methane production.

Figure 52: Trend in gas production in Australia



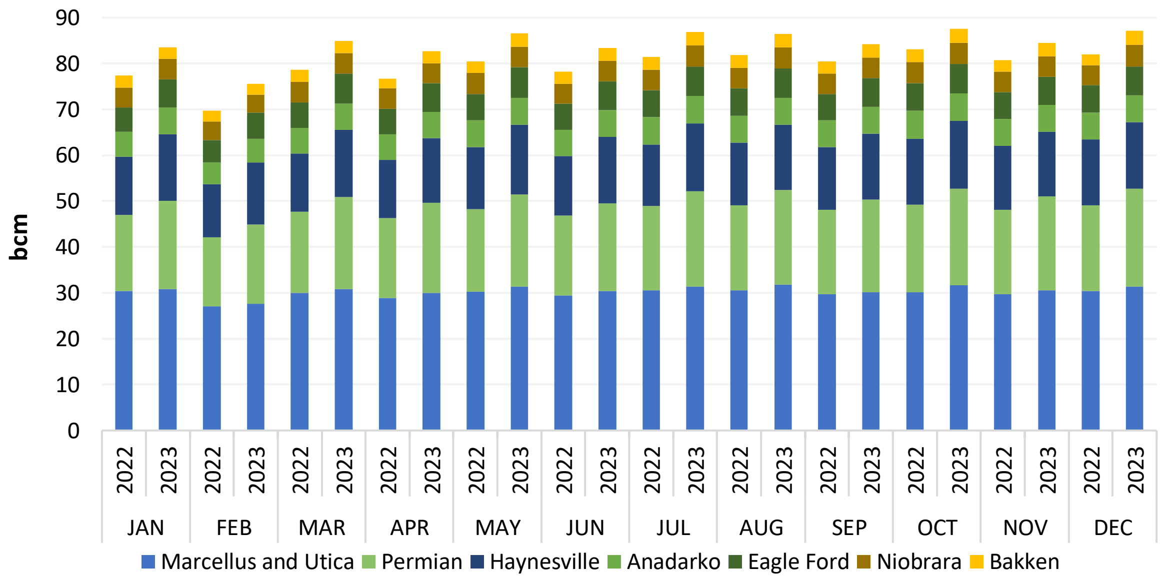
Source: GECF Secretariat based on data from the Australian Department of Energy

3.4 North America

3.4.1 US

In December 2023, the seven key shale gas-producing regions in the US—Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara, and Permian—saw a 3.1% y-o-y production increase, totalling 87.1 bcm (Figure 53). The Appalachian region, encompassing the Marcellus and Utica shale formations, contributed 36% to this total output. Moreover, the Permian shale oil field experienced a 13% y-o-y growth in its associated gas production, amounting to 21.3 bcm, which represented 24% of the overall shale gas production.

Figure 53: Trend in shale gas production in the US shale oil/gas producing regions



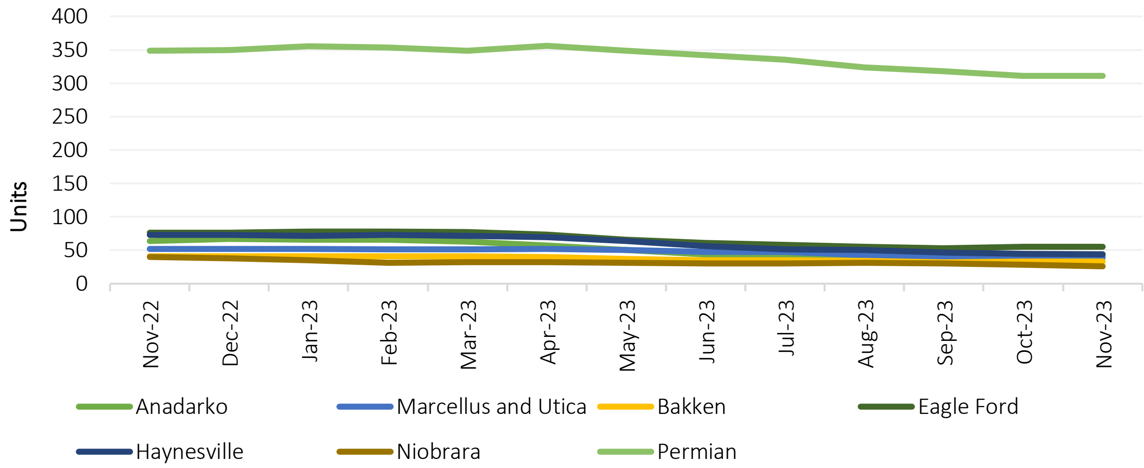
Source: GECF Secretariat based on data from Refinitiv, EIA

In November 2023, the count of oil and gas drilling rigs across the seven key shale oil and gas regions in the US stood at 548. This figure shows a decrease of one rig from October 2023 and a decline of 147 rigs when compared to November 2022 (Figure 54).

Furthermore, in November 2023, the seven key regions accounted for a total of 4,415 drilled but uncompleted (DUC) wells. This number signifies a reduction of 83 wells from the total recorded in October 2023 (Figure 55).

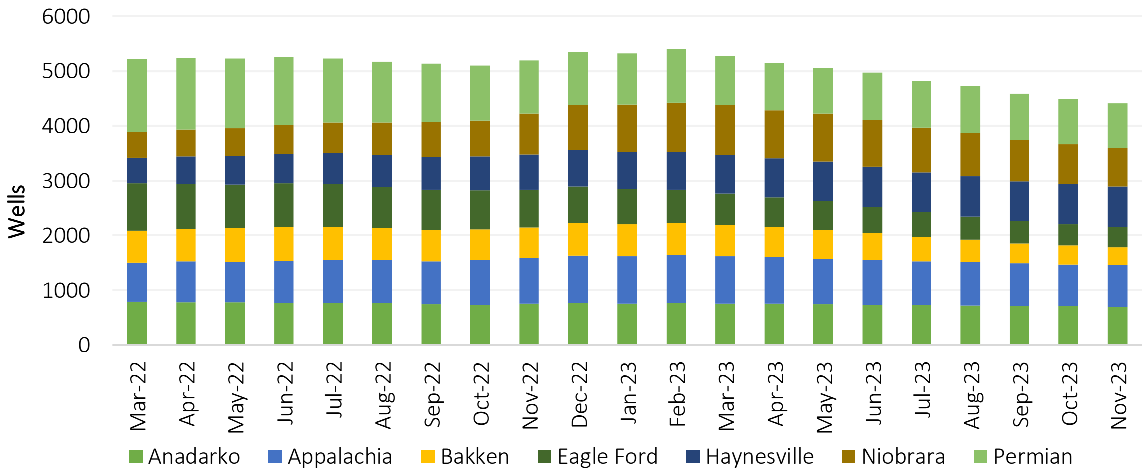
The November Drilling Productivity Report from the EIA underscored a decline in new well gas production per rig, both monthly and annually, by 1.5% and 2%, respectively (Figure 56). As a result, the average new well gas production per rig in all regions fell to 5,652,000 cubic feet per day.

Figure 54: US shale region oil and gas rig count



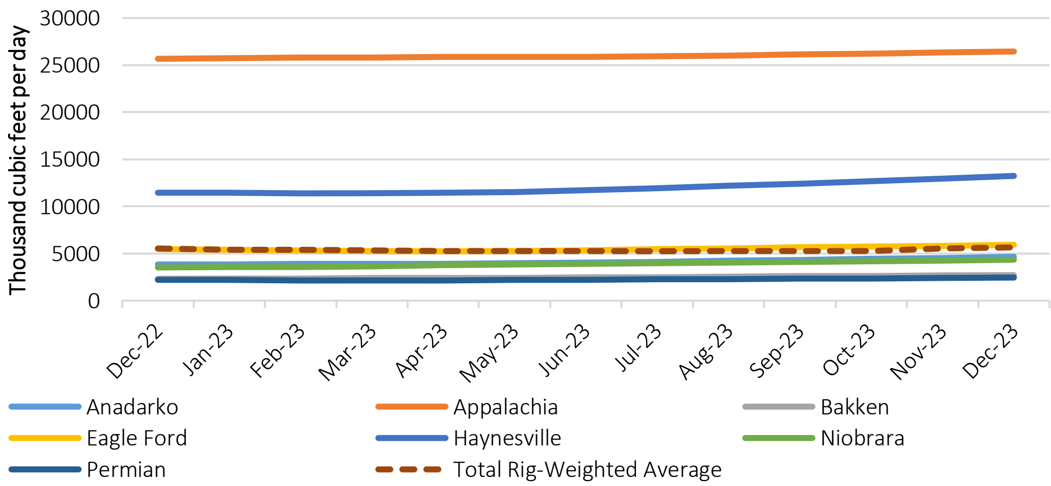
Source: GECF Secretariat based on data from Refinitiv and EIA

Figure 55: Drilled but uncompleted well (DUCs) counts in the US



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

Figure 56: New-well gas production per rig

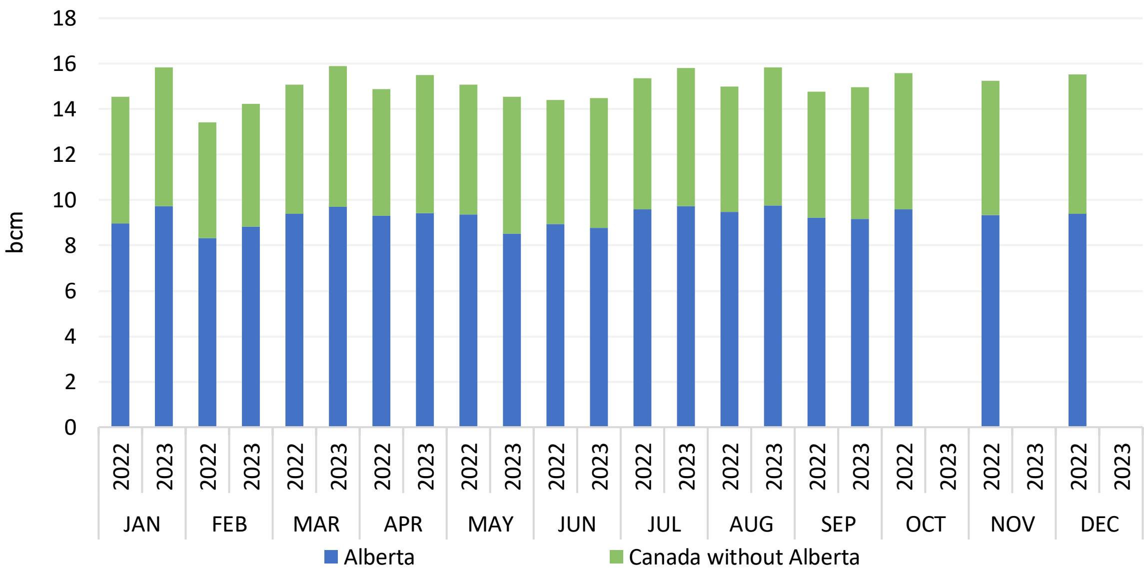


Source: GECF Secretariat based on data from Refinitiv, US EIA

3.4.2. Canada

In September 2023, according to the Canada Energy Regulator (CER), Canada's gas production rose by 1% y-o-y to reach 15 bcm, with Alberta contributing 9.8 bcm (Figure 57). From January to September, the total gas production exhibited a 3% y-o-y growth, accumulating to 137.1 bcm.

Figure 57: Trend in gas production in Canada



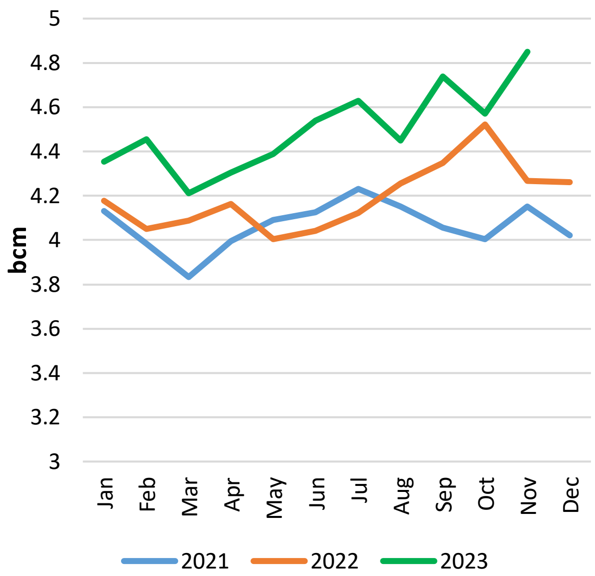
Source: GECF Secretariat based on data from the Canada Energy Regulator (CER)

3.5 Latin America and the Caribbean (LAC)

In Brazil, gross gas production reached 4.85 bcm in November 2023, according to data from the Brazilian National Agency of Petroleum (ANP). This represented a 6% m-o-m increase compared to October 2023 levels and a 15% y-o-y uptick compared to November 2022 levels. Notably, this also represented a new monthly production record surpassing the previous one, recorded in September 2023. (Figure 58). Approximately 51% of the produced gas was reinjected into reservoirs. Additionally, gas flaring witnessed a 1.8% m-o-m drop. In terms of distribution, offshore gas fields accounted for 85.2% of the gross monthly gas production, with the Tupi field in the Santos pre-salt basin emerging as the largest gas-producing field at 1.31 bcm (4.8% increase in production m-o-m). The FPSO facility in Guanabara in the shared Mero field was the highest gas producing facility with approximately 0.35 bcm, nearly mirroring the same level witnessed the previous month.

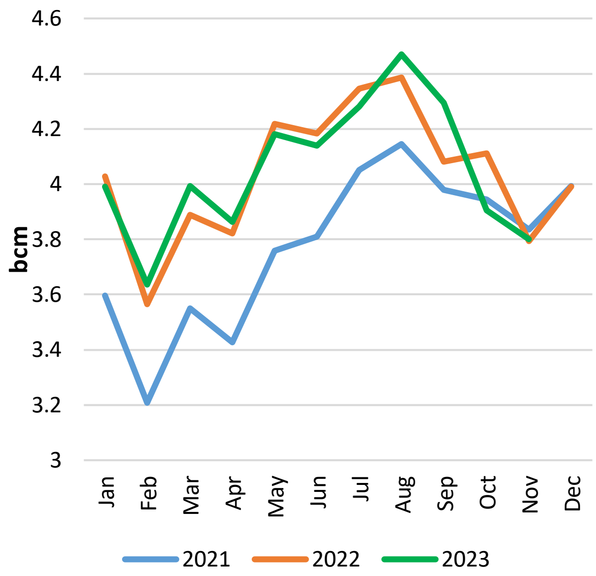
In Argentina, gross gas production reached 3.78 bcm in November 2023, based on data provided by the Argentinian Ministry of Economy. This represented a 2.7% m-o-m decrease compared to the 3.9 bcm output in October 2023. However, it matched the same level of production of November 2022 (Figure 59). The cumulative gas production from January to November 2023 amounted to 44.6 bcm, aligning closely with the production levels for the same period in 2022. Shale gas production amounted to 1.76 bcm in November 2023, representing 42.5% of the gross production while tight gas reservoir production was 0.52 bcm, accounting for 13.7% of the total gas production. The remaining part of the production originated from the conventional gas fields.

Figure 58: Trend in gas production in Brazil



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

Figure 59: Trend in gas production in Argentina



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

3.6 Other Regions

Egypt to launch a new bidding round for oil and gas exploration in 2024: The Egyptian Ministry of Petroleum and Mineral Resources announced that the country is working on the launch of a new international round of bidding for oil and gas exploration and production in 2024. The offered blocks would be located both onshore and offshore in the Gulf of Suez and the Eastern and Western Desert. It is worth noting that Egypt signed 29 oil and gas exploration agreements in 2023, with aggregated investments of at least 1.2 billion USD. These moves come in line with the country's commitment to boost its oil and gas production capacity and enhance the sustainability of the energy sector.

UAE's Mubadala Energy announced a game-changing gas discovery in Layaran field in Indonesia: According to Mubadala Energy's press release, a significant gas discovery was made by the exploration well Layaran-1, drilled in the South Andaman, which lies approximately 100 km offshore North Sumatra, Indonesia. The well was drilled at a depth of 4208m and a water depth of 1207m and encountered a gas column of 230m thickness. It is worth noting that the discovery was estimated to de-risk about 170 bcm of original gas in place from the block, providing the foundation for future organic growth and additional exploration drilling activities in 2024. This discovery is considered the second consecutive success story for Mubadala Energy in the Andaman area, following the discovery made through the exploration well Timpan-1.

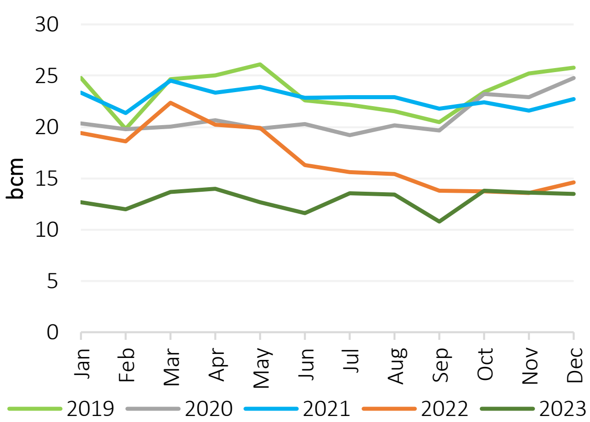
4 Gas Trade

4.1 Pipeline Natural Gas (PNG) Trade

4.1.1 Europe

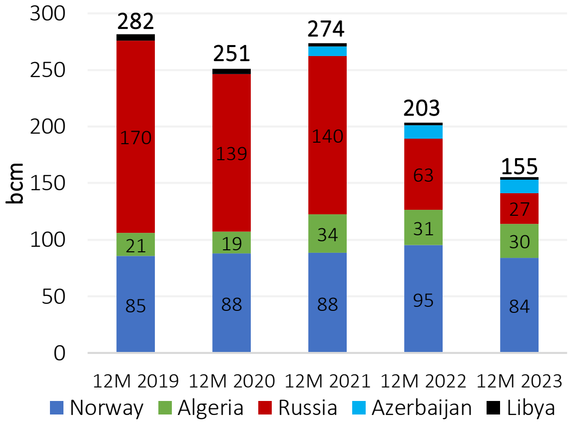
The EU imported 13.5 bcm of PNG in December 2023, which was 1% lower than the total volume imported in the previous month, and 8% less than the level observed one year ago (Figure 60). Over the course of the full year 2023, PNG volumes imported by the EU totalled 155 bcm, representing a shortfall of 24% when compared with the total PNG imports during 2022 (Figure 61). PNG supply during Q4 2023 has been relatively stable, when considering the total volume, as well as the quantity imported from the five suppliers (Figure 62).

Figure 60: Monthly PNG imports to the EU



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 61: Year-to-date EU PNG imports by supplier

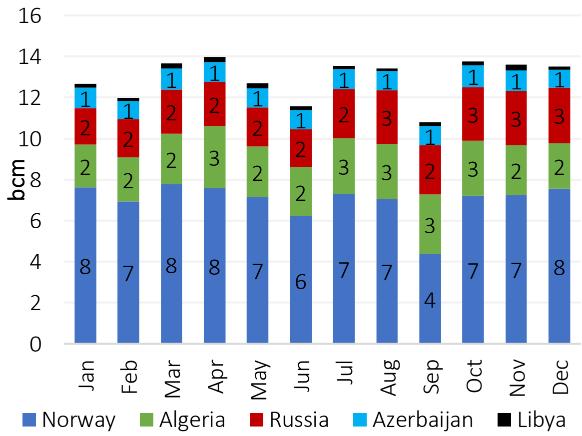


Source: GECF Secretariat based on data from McKinsey and Refinitiv

Throughout the year, Norway was the largest supplier of pipeline gas to the EU, accounting for 54% of the PNG imported by the bloc, followed by Algeria with 19% and Russia with 17%. When compared with the previous year, over the course of 2023, imports from Norway and Russia were observed to have declined by 12% y-o-y (11 bcm) and 57% y-o-y (36 bcm), respectively. However, supply from the three remaining providers were at a similar level to 2022.

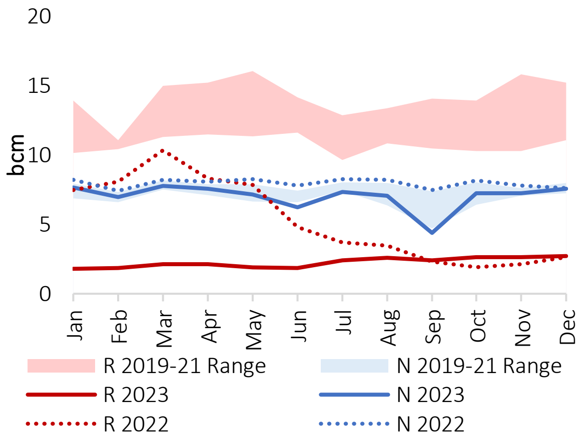
During 2023, PNG imports from Norway averaged 7.0 bcm per month, compared with 7.9 bcm in 2022 and 7.3 bcm in the years 2019 to 2021. On the other hand, PNG imports from Russia averaged 2.3 bcm per month in 2023, compared with 5.2 bcm in 2022 and 12.5 bcm in the years 2019 to 2021 (Figure 63).

Figure 62: Monthly EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 63: EU PNG supply from Russia and Norway



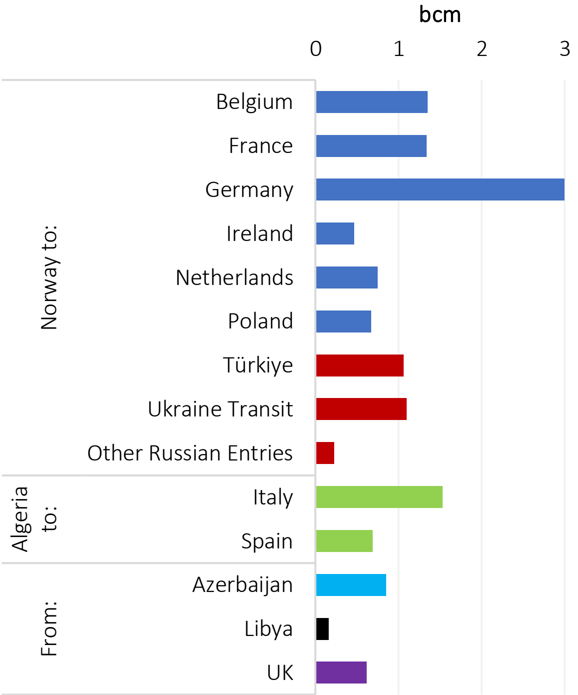
Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 64 shows the PNG imports to the EU via the major supply routes in December 2023.

Norwegian PNG exports to Germany, France and Belgium all increased m-o-m, by 17%, 8% and 4%, respectively. The German market accounted for 40% of Norway's PNG exports for the month. Russia's PNG exports via Turkstream declined by 11% m-o-m, however, flows via Ukraine increased by 2% over the same period. Supply to the EU was further complemented by 0.6 bcm of net PNG flows from the UK to Europe via the interconnectors, an increase of 78% from the quantity imported during the previous month.

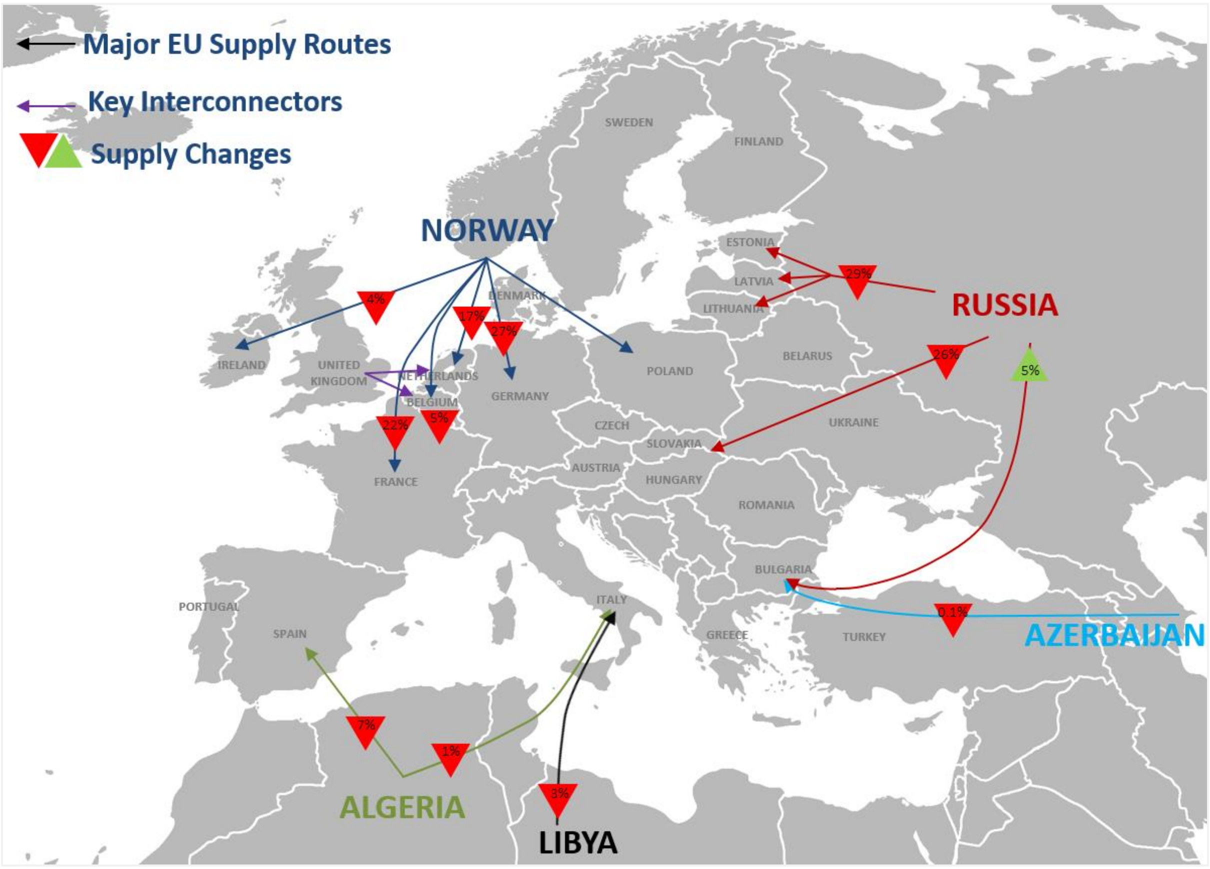
Figure 65 displays the PNG imports to the EU via the major supply routes over the course of 2023, as compared with the same period in 2022. Norway recorded declines along all routes, although some of its flows to Germany would have been supplied to Poland via the Baltic Pipe in 2023.

Figure 64: EU PNG imports by supply route, in December 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 65: PNG imports to the EU by supply route (12M 2023 v 12M 2022)

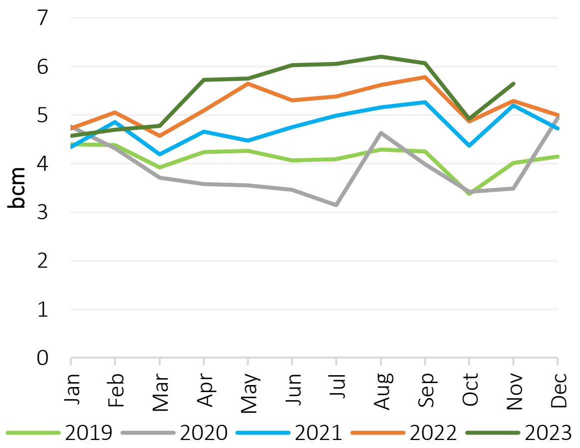


Source: GECF Secretariat based on data from McKinsey and Refinitiv

4.1.2 Asia

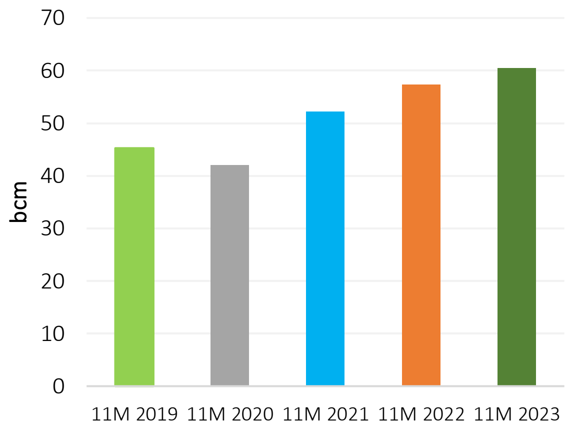
China imported 5.6 bcm of PNG in November 2023, a 15% increase from the levels observed one month ago. Continuing the trend for 2023 thus far, this volume was also 7% higher than one year ago (Figure 66). Total gas imports to the country reached the highest level since January 2022, of which PNG imports accounted for 38% during the month. For the period January to November 2023, a total of 60.4 bcm of PNG was imported, which signified a 5% increase compared with the same period in 2022 (Figure 67). There was also a marginal increase in the average monthly import rate, reaching 5.5 bcm in 2023 thus far, up from 5.2 bcm in 2022.

Figure 66: Monthly PNG imports in China



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

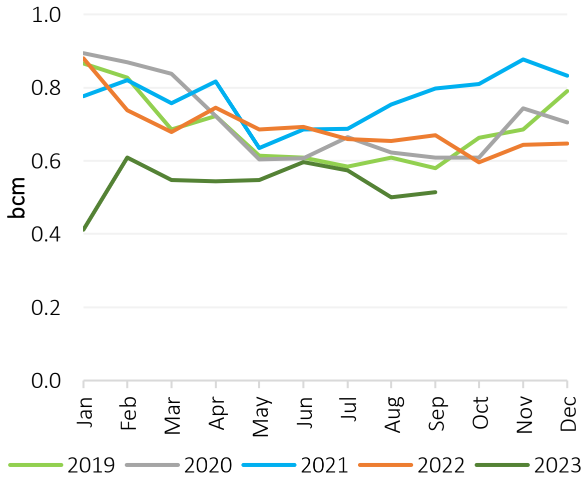
Figure 67: Year-to-date PNG imports in China



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

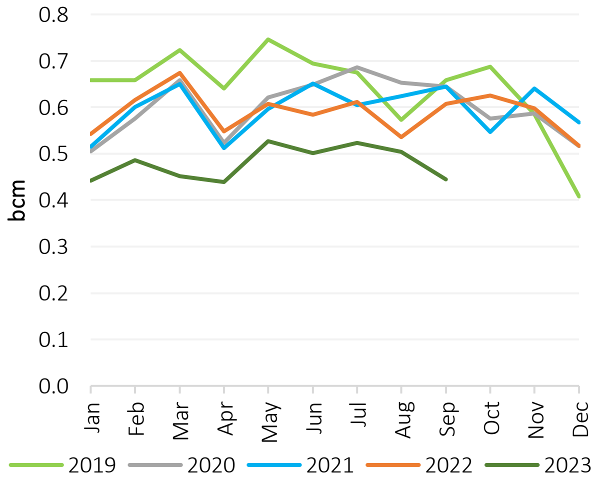
In September 2023, Singapore imported 0.51 bcm of PNG from Indonesia and Malaysia. This quantity was a 3% increase m-o-m but 23% less than the levels witnessed one year ago (Figure 68). After three quarters of 2023, total PNG imports totalled 4.8 bcm, 24% less compared to same period in 2022. Thailand imported 0.45 bcm from Myanmar in September 2023, which represented a 12% decrease m-o-m, as well as a 27% decrease y-o-y (Figure 69). From January to September 2023, total PNG imports declined by 19% y-o-y to reach 4.3 bcm.

Figure 68: Monthly PNG imports in Singapore



Source: GECF Secretariat based on data from JODI Gas

Figure 69: Monthly PNG imports in Thailand

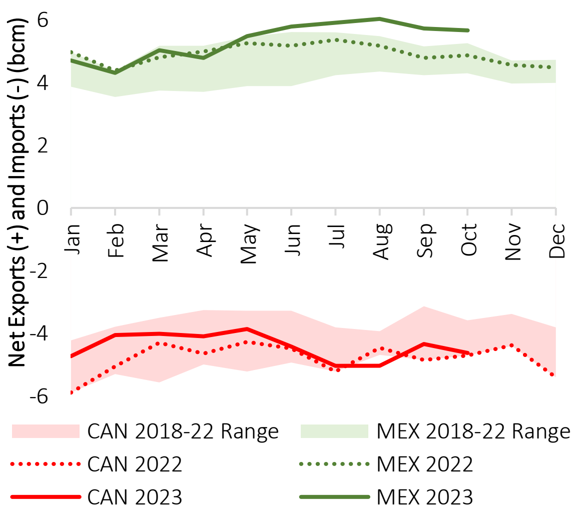


Source: GECF Secretariat based on data from JODI Gas

4.1.3 North America

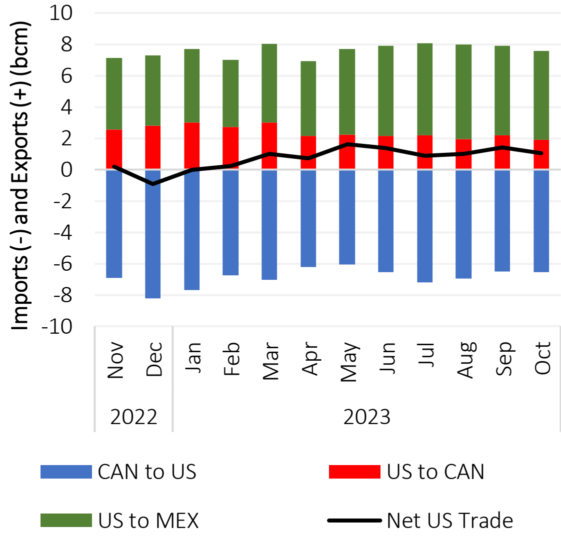
In October 2023, the US exported 5.7 bcm of PNG to Mexico, continuing the trend of high delivery quantities observed throughout the year (Figure 70). This quantity was just 1% lower than the previous month, but signified a 16% increase y-o-y. Net PNG imports from Canada reached 4.6 bcm, an increase of 7% m-o-m, but 2% lower y-o-y. In October, 1.0 bcm of net PNG flowed from the US to the other countries (Figure 71). During the period January to October 2023, net PNG imports from Canada to the US declined by 8% y-o-y, while exports to Mexico increased by 7%. The average monthly flows in the region in 2023 were 6.8 bcm from Canada to the US, 2.3 bcm from the US to Canada and 5.3 bcm from the US to Mexico.

Figure 70: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 71: Monthly US PNG trade



Source: GECF Secretariat based on data from US EIA

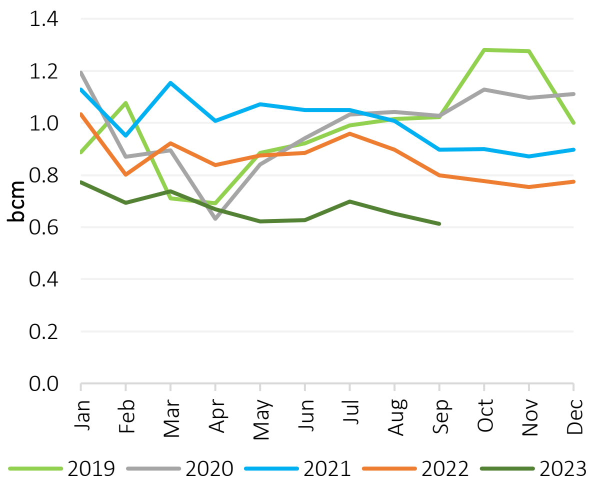
4.1.4 Latin America and the Caribbean

In September 2023, Bolivia exported 0.61 bcm of PNG to Brazil and Argentina. This represented a 6% decrease m-o-m and 23% lower than the levels witnessed one year ago (Figure 72).

This has been the general trend for 2023 thus far, with the total volume of PNG exported during the period January to September 2023 reaching 6.1 bcm, a 24% drop compared with the same period in 2022.

Moreover, Argentina exported 0.09 bcm of PNG to Chile in September 2023, which was a decrease of 15% m-o-m and 51% y-o-y. However, total exports from January to September 2023 increased by 28% y-o-y to reach 1.6 bcm.

Figure 72: Monthly PNG exports from Bolivia



Source: GECF Secretariat based on data from JODI Gas

4.1.5 Other Developments

Venezuela concludes gas export deal to Trinidad and Tobago: On 21 December 2023, the governments of Trinidad and Tobago and Venezuela brought the multi-year negotiations to a successful conclusion, with the signing of a 30-year agreement for the production and export of natural gas. The source of these reserves is the Dragon gas field, located in Venezuela's territorial waters. The project will necessitate the construction of an 18 km long pipeline from the Dragon field to the Shell-operated Hibiscus platform, located in Trinidadian waters. In the first phase, the project is estimated to deliver approximately 1.85 bcma of natural gas, which will feed the petrochemical and LNG industries in Trinidad and Tobago.

Completion of the Bulgaria-Serbia gas pipeline: The construction of the 1.8 bcma capacity Interconnector Bulgaria-Serbia (IBS) has been completed. This important pipeline link has great significance for the energy trade of the region, allowing Serbia to have access to gas supply from the Greek LNG import terminal, as well as import of pipeline gas from Azerbaijan. The IBS is 170 km long, with three-fifths of the line located within Serbia. Moreover, the pipeline was designed to facilitate bidirectional gas flows. In total, the project received around 97 million euros in financing from the European Commission, the European Investment Bank and Serbian institutions.

4.2 LNG Trade

4.2.1 LNG Imports

In December 2023, global LNG imports increased by 2.8% y-o-y (1.07 Mt), setting a new record at 38.71 Mt (Figure 73). The surge in global LNG imports was primarily propelled by the Asia Pacific region, compensating for weaker imports in other regions, notably Europe (Figure 74). Compared to November 2023, the increase in global LNG imports in December was 23% (3.42 Mt), driven primarily by the Asia Pacific region and, to a lesser extent, Europe.

Figure 73: Trend in global monthly LNG imports

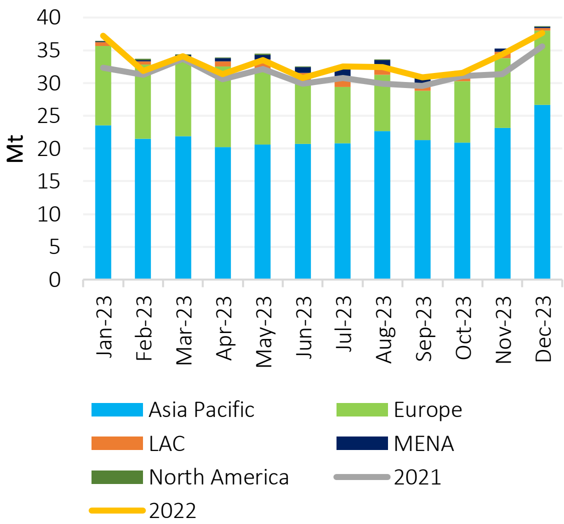
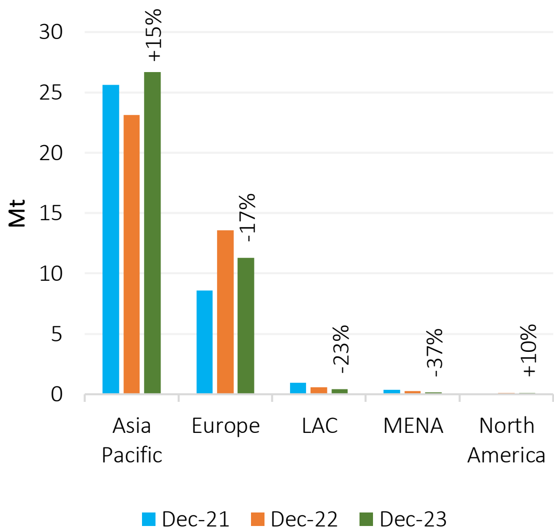


Figure 74: Trend in regional LNG imports



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.1 Europe

In December 2023, European LNG imports experienced a sixth consecutive y-o-y decline, marking a significant drop of 17% (2.25 Mt) to 11.32 Mt (Figure 75). This represents the most substantial monthly y-o-y reduction in LNG imports throughout 2023. The weakened LNG imports in the region can be attributed to reduced gas consumption, elevated gas storage levels, diminished gas production and a widening spot LNG price difference between Asia Pacific and Europe. Among European countries, Belgium, France, Lithuania, Spain and the UK contributed to the decline of LNG imports, counterbalanced by increased imports in Germany and the Netherlands (Figure 76).

Belgium's decrease in LNG imports resulted from a reduction in gas consumption, decreased pipeline gas exports to Germany and the Netherlands, and elevated gas storage levels. In Lithuania, a rise in pipeline gas imports from Latvia and a decrease in pipeline gas exports to Poland contributed to the overall decline in LNG imports. Spain's reduction in LNG imports was influenced by heightened pipeline gas imports from Portugal, reduced pipeline gas exports to France, and increased gas storage levels. Furthermore, an upswing in pipeline gas imports from Norway, combined with a decline in gas consumption, led to decreased LNG imports in France and the UK.

Conversely, Germany's LNG imports saw an increase due to the ramp-up of LNG imports through new terminals, coupled with a decline in pipeline gas imports from Norway. Meanwhile, the Netherlands experienced higher LNG imports driven by strengthened pipeline gas exports to Germany and diminished gas production.

Figure 75: Trend in Europe's monthly LNG imports

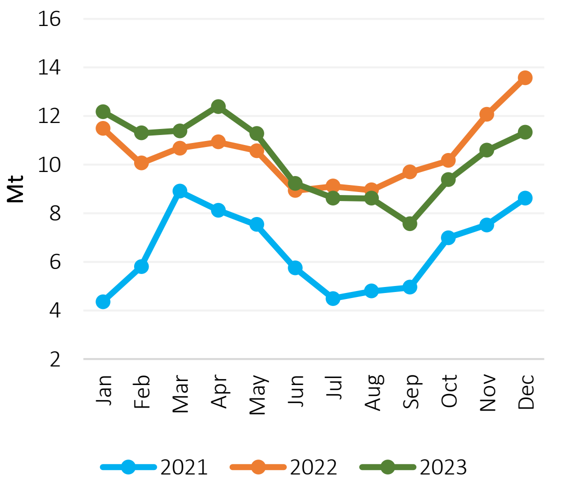
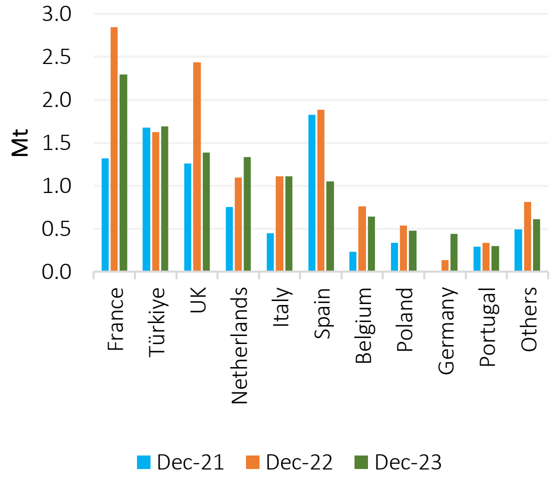


Figure 76: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.2 Asia Pacific

In December 2023, the Asia Pacific region experienced a notable 15% y-o-y increase (3.53 Mt), reaching a historic peak of 26.67 Mt in LNG imports (Figure 77). The primary contributors to this substantial growth in the region's LNG imports were China, India, Japan, the Philippines, South Korea, Taiwan and Thailand (Figure 78). The upswing in LNG imports was fuelled by various factors, with one key factor being the availability of cheaper spot LNG prices.

Both China and India saw an uptick in LNG imports due to heightened gas demand and the favourable impact of lower spot LNG prices in both countries. In Japan, there was an increased demand for LNG restocking following colder weather in December, leading to a reduction in LNG inventory. The Philippines experienced a rise in LNG imports facilitated by the expansion of imports through new terminals. South Korea and Taiwan witnessed a surge in LNG imports driven by restocking demand in anticipation of increased gas demand. Lastly, Thailand's increased LNG imports served as a compensatory measure for a decline in gas production within the country.

Figure 77: Trend in Asia's monthly LNG imports

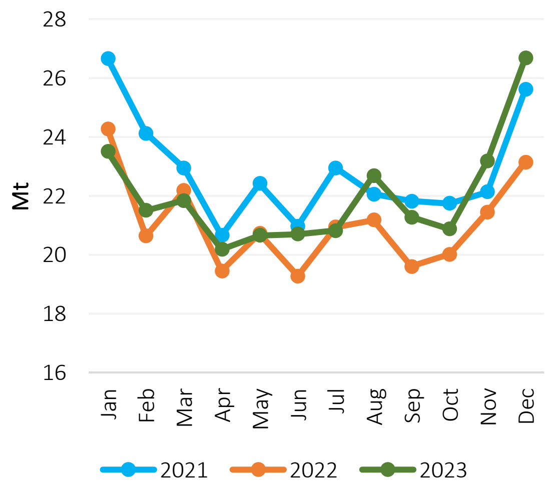
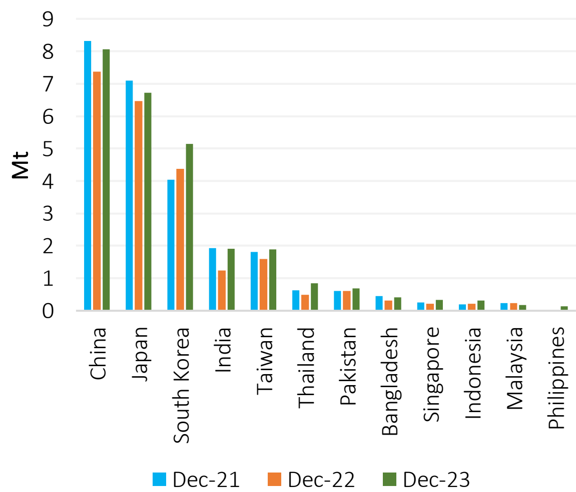


Figure 78: Top LNG importers in Asia Pacific



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.3 Latin America & the Caribbean (LAC)

In December 2023, LNG imports in the LAC region fell by 23% (0.13 Mt) y-o-y to reach 0.43 Mt (Figure 79). This represents the first monthly y-o-y decline since August 2023 and the lowest monthly LNG imports since January 2020. Brazil, Chile and El Salvador accounted for the bulk incremental decline, which offset stronger LNG imports in Colombia (Figure 80).

The drop in Brazil's LNG imports was due to lower imports from Trinidad and Tobago and the US. Similarly, a drop in LNG imports from Equatorial Guinea and Trinidad and Tobago contributed to the decline in Chile's LNG imports. Meanwhile, weaker LNG imports from Trinidad and Tobago drove El Salvador's LNG imports lower. Conversely, Colombia continues to build its LNG inventory in anticipation of higher gas demand during the El Nino occurrence.

Figure 79: Trend in LAC's monthly LNG imports

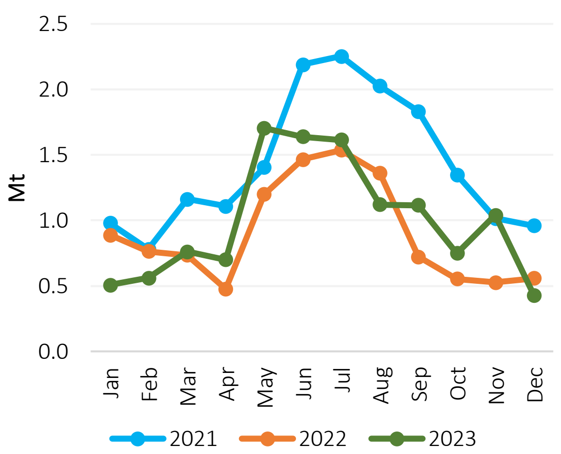
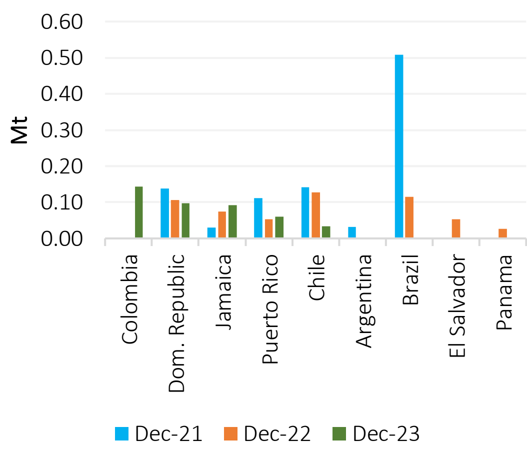


Figure 80: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.4 MENA

In December 2023, LNG imports in the MENA region experienced a significant 37% (0.09 Mt) y-o-y decrease, reaching a total of 0.16 Mt (Figure 81). Notably, Kuwait stood as the sole LNG importer in the region for the month, playing a key role in the decline observed in the overall LNG imports of the region (Figure 82). The reduction in Kuwait's LNG imports can be attributed to a decrease in imports from Qatar.

Figure 81: Trend in MENA's monthly LNG imports

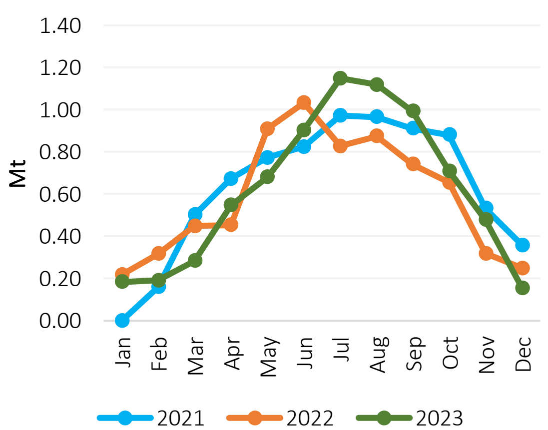
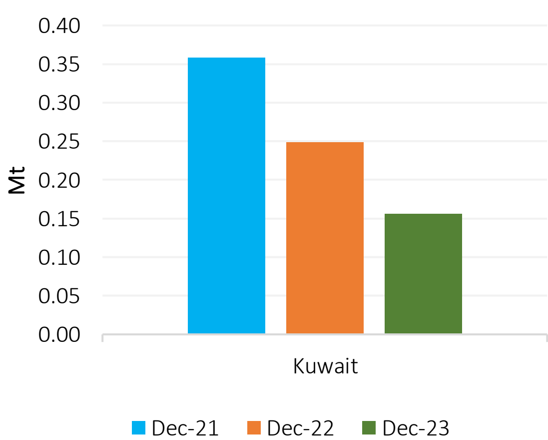


Figure 82: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2 LNG Exports

In December 2023, global LNG exports grew by a 5.3% y-o-y (1.90 Mt) reaching a record high of 37.48 Mt (Figure 83). This represents the strongest monthly y-o-y increase since February 2023. Both GECF and non-GECF countries drove the stronger LNG exports and offset weaker LNG reloads. Non-GECF countries were the largest LNG exporter with a market share of 51.2% followed by GECF member countries and LNG reloads with market shares of 48.1% and 0.7%, respectively. When compared to December 2022, non-GECF countries' market share increased from 49.4%, while the share of GECF member countries and LNG reloads declined from 48.8% and 1.8%, respectively. The top three LNG exporters in December were the US, Qatar and Australia (Figure 84).

Figure 83: Trend in global monthly LNG exports

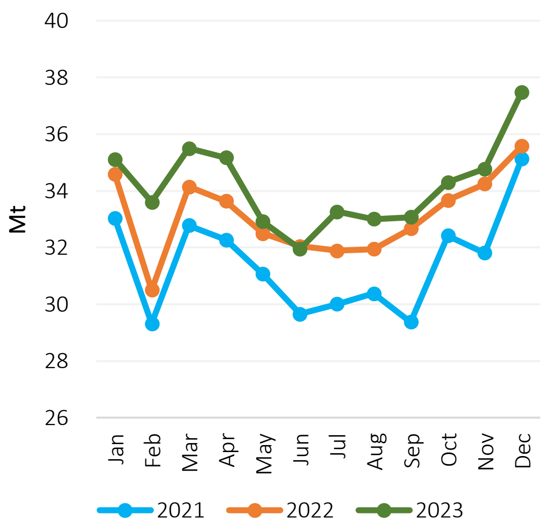
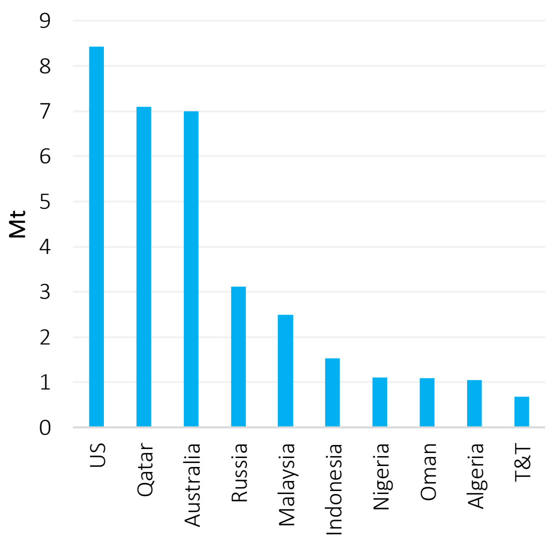


Figure 84: Top 10 LNG exporters in Dec 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.1 GECF

In December 2023, the LNG exports from GECF member countries and observers showed a notable 3.8% y-o-y growth to reach 18.03 Mt, marking a reversal from two consecutive monthly declines (Figure 85). This represents the highest monthly LNG exports for the GECF countries since January 2020. The upswing in the GECF countries' LNG exports was predominantly propelled by Malaysia, Mozambique, Qatar, Russia and the United Arab Emirates, compensating for lower LNG exports from Egypt (Figure 86).

In Malaysia, the increased LNG exports were attributed to higher availability of feedgas compared to the previous year, following the completion of repair work on the Sabah-Sarawak gas pipeline to the Bintulu LNG facility in December 2022. Mozambique witnessed a surge in LNG exports driven by the ramp-up in production at the Coral South FLNG facility. Qatar, contributing significantly to the overall rise in the GECF countries' LNG exports, recorded a substantial increase in its LNG exports as its LNG facility operated beyond its nameplate capacity. Russia experienced greater LNG exports driven by increased production at the Sakhalin 2 and Yamal LNG facilities. Meanwhile, the United Arab Emirates saw a rise in LNG exports attributed to reduced maintenance activity at the Das Island LNG facility compared to December 2022. Conversely, a decline in feedgas availability for LNG exports resulted in a reduction in Egypt's LNG exports.

Figure 85: Trend in GECF monthly LNG exports

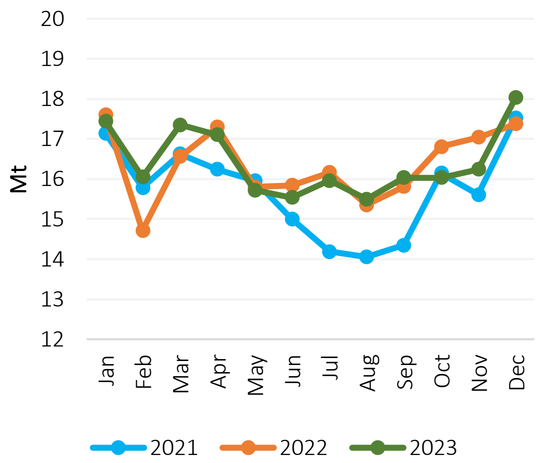
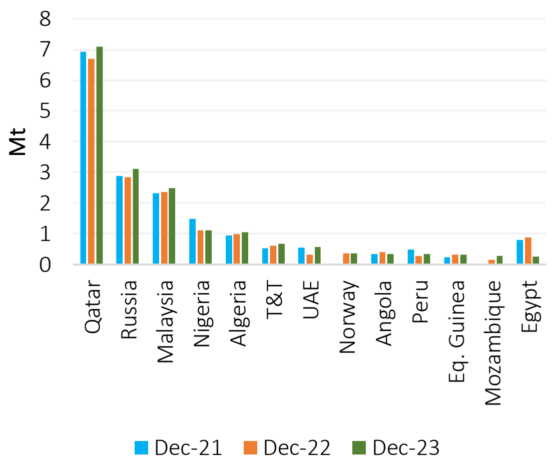


Figure 86: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.2 Non-GECF

In December 2023, LNG exports from non-GECF countries experienced a substantial 9.2% y-o-y increase, reaching an unprecedented 19.18 Mt (Figure 87). This marks the highest y-o-y growth in LNG exports for non-GECF countries since April 2023. The primary contributors to this growth were the US, and to a lesser extent Australia and Oman, which counterbalanced minor declines in Brunei, Cameroon and Papua New Guinea (Figure 88).

The notable surge in LNG exports from the US was propelled by the increased production at the Calcasieu Pass LNG facility, the resumption of production at the Freeport LNG facility and elevated production at the Cameron and Sabine Pass LNG facilities. In Australia, increased LNG exports from the Gorgon, Ichthys, and QCLNG facilities offset lower exports from the North West Shelf LNG facility, contributing to the overall increase in the country's LNG exports. Lower maintenance activity supported the rise in LNG exports from the QCLNG facility while weaker feedgas availability led to a decline in exports from the North West Shelf LNG facility. Simultaneously, increased LNG exports from the Qalhat LNG facility drove the upswing in Oman's LNG exports.

Figure 87: Trend in non-GECF monthly LNG exports

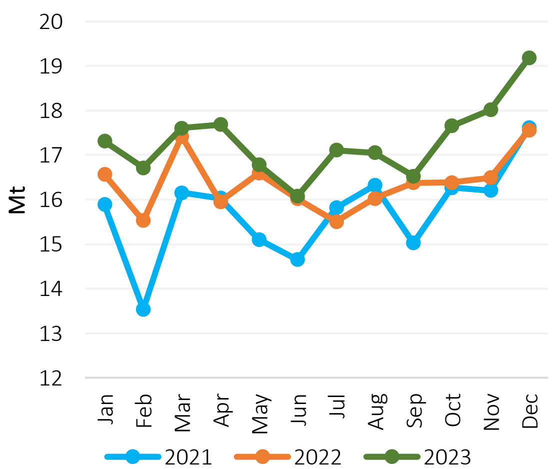
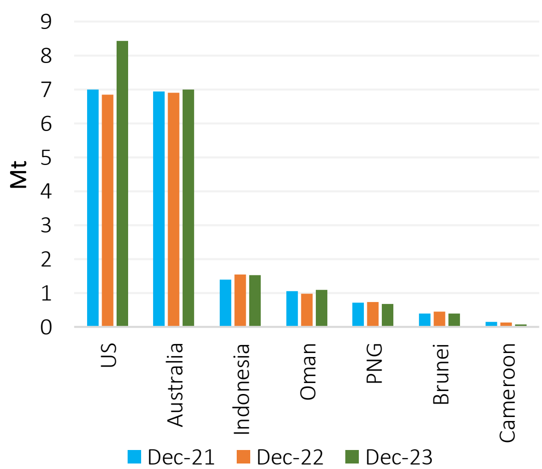


Figure 88: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.3 Global LNG Reloads

In December 2023, global LNG reloads registered at 0.27 Mt, indicating a significant 58% (0.37 Mt) y-o-y decline (Figure 89). This marks the lowest LNG reloads since July 2023 and represents sharpest y-o-y decrease in 2023. The reduction in LNG reloads was primarily observed in Spain, as well as France, Jamaica and the Netherlands (Figure 90). Conversely, China and Indonesia experienced marginal increases in their LNG reloading activities.

The decline in France and Spain's LNG reloads can be attributed to weakened intra-regional LNG trade in Europe, resulting from diminished gas demand and elevated gas storage levels. Sharp decreases were observed in the exports of reloaded LNG from France and Spain to Germany, Greece and Italy.

Figure 89: Trend in global monthly LNG reloads

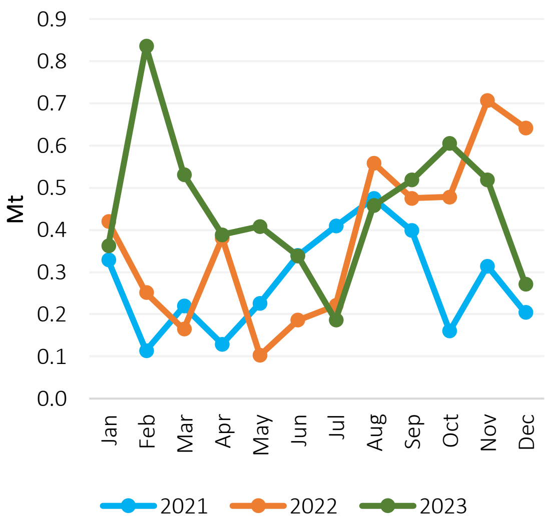
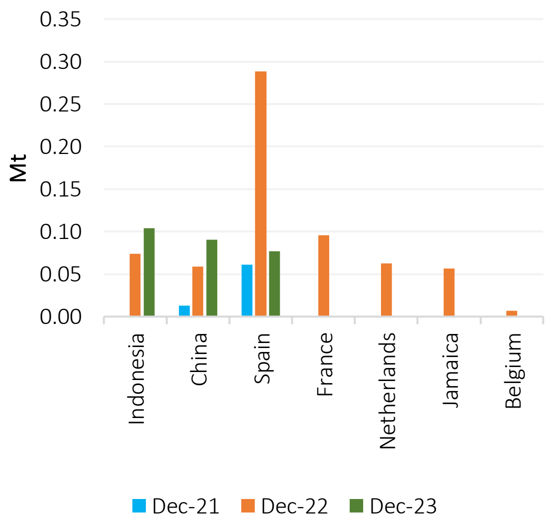


Figure 90: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.4 Arbitrage Opportunity

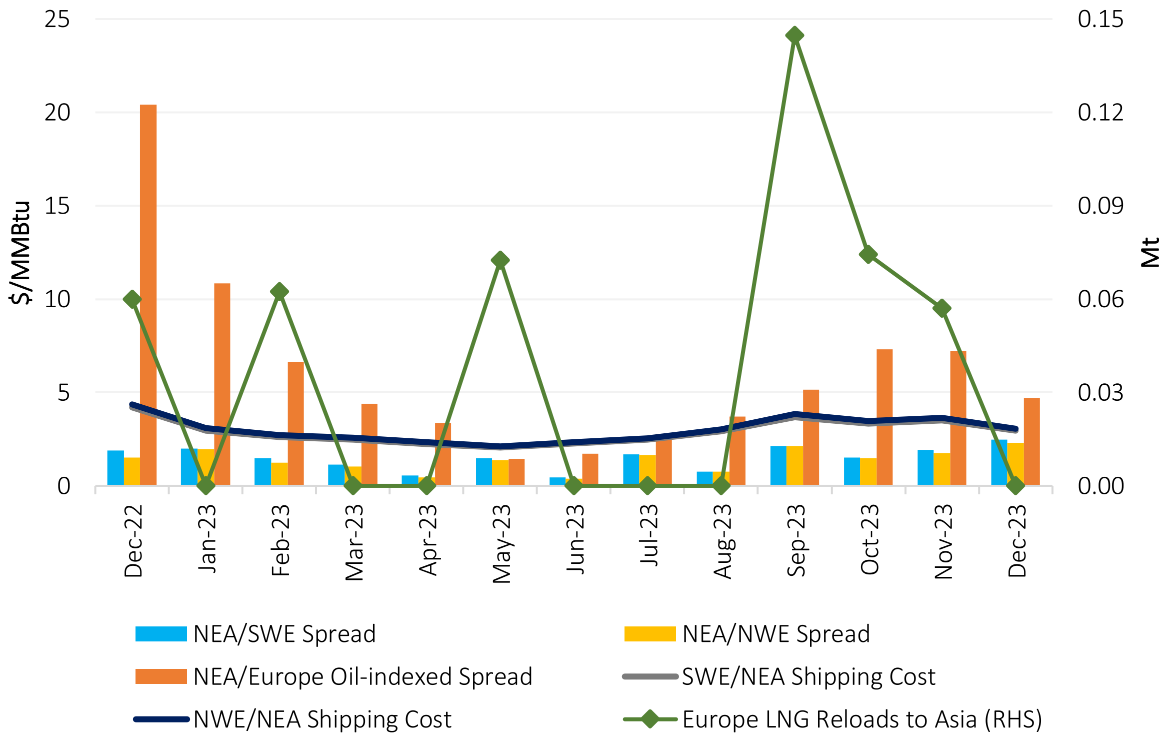
In December 2023, the potential for arbitrage in LNG reloads from Europe to the Asia Pacific region was largely diminished. The spot LNG price differentials between Asia Pacific and Europe maintained a modest premium over the corresponding spot LNG shipping costs between the two markets, resulting in the continued closure of the arbitrage opportunity (Figure 91). However, the price gap between spot LNG prices in Asia Pacific and oil-indexed prices in Europe retained a premium over the spot LNG shipping cost.

The price differentials between NEA/SWE and NEA/NWE expanded by 31% ($0.58/MMBtu) and 30% ($0.53/MMBtu) month-on-month, reaching $2.49/MMBtu and $2.30/MMBtu, respectively. The growth in spot LNG price spreads between Asia Pacific and Europe was attributed to a more pronounced decline in European spot LNG prices compared to those in the Asia Pacific region. Conversely, the price differential between spot LNG prices in Asia Pacific and oil-indexed prices in Europe decreased by 35% ($2.50/MMBtu) month-on-month to $4.71/MMBtu.

Regarding shipping costs for the NEA/SWE and NEA/NWE spot routes, they decreased by 16% ($0.57/MMBtu) each month-on-month, reaching $2.94/MMBtu and $3.04/MMBtu, respectively. It is essential to note that shipping costs can vary depending on the specific vessels used. Medium to long-term chartered vessels may incur lower costs compared to spot shipping rates. The absence of arbitrage opportunities prevented LNG reloads from Asia Pacific to Europe.

Meanwhile, the NEA/SWE and NEA/NWE price spreads increased by 32% ($0.60/MMBtu) and 53% ($0.80/MMBtu) year-on-year, respectively. In contrast, the price differential between NEA spot LNG and European oil-indexed gas prices, as well as the NEA/SWE and NEA/NWE spot shipping costs, decreased by 77% ($15.70/MMBtu), 30% ($1.26/MMBtu), and 31% ($1.32/MMBtu) year-on-year, respectively.

Figure 91: Price spreads & shipping costs between Asia & Europe spot LNG markets

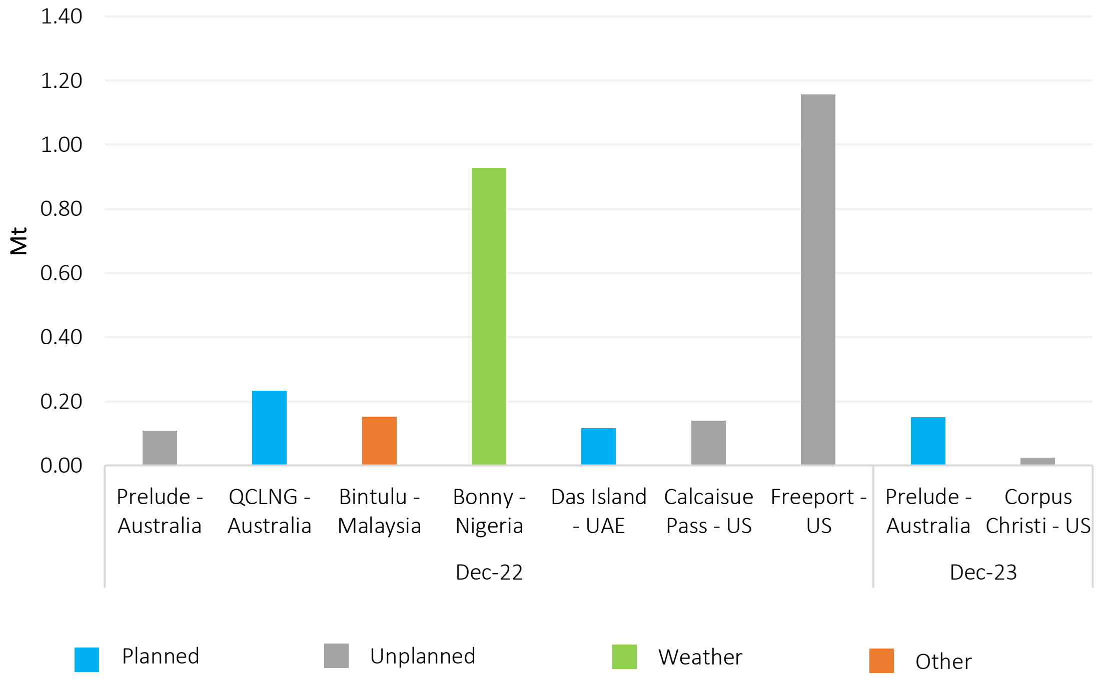


Source: GECF Secretariat based on data from GECF Shipping Model, Argus and ICIS LNG Edge

4.2.5 Maintenance Activity at LNG Liquefaction Facilities

In December 2023, the combined effects of planned maintenance, unplanned outages, and other factors at liquefaction facilities globally experienced a substantial decrease, dropping sharply from 2.83 Mt in December 2022 to a minimal 0.17 Mt (Figure 92). In comparison to November 2023, the cumulative impact also saw a significant decline from 1.13 Mt. Key activities at liquefaction facilities during this period included planned maintenance at the Prelude FLNG facility in Australia and an unplanned outage at the Corpus Christi LNG facility in the US. Notably, there were no reported weather-related incidents or other noteworthy events during the month.

Figure 92: Maintenance activity at LNG liquefaction facilities during December (2022 and 2023)



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

4.2.6 Other Developments

Fourth round of EU joint gas purchasing completed – The fourth round of the EU joint gas purchasing took place between November 17 and December 7, 2023. During the demand aggregation phase, European companies registered a total of 10.1 bcm for their gas purchase requirements. In the subsequent tender phase, global gas suppliers collectively offered 9.1 bcm of gas supply. The gas-purchasing platform operator, Prisma, successfully matched 7.4 bcm of gas supply offers with the gas demand needs of buyers. Subsequently, the results were communicated to both buyers and suppliers, initiating negotiations for potential Sales and Purchase Agreements (SPAs). Across the initial four rounds of the joint gas purchasing initiative, a total of 42.2 bcm of gas volumes were matched.

Indonesia's government approves Abadi LNG project – In early December 2023, the Indonesian government granted approval for a modified development plan for the Abadi LNG project. The updated development plan incorporates carbon capture and storage measures, aimed at mitigating the project's carbon footprint. Anticipated to cost $20 billion, the project, boasting a nameplate capacity of 9.5 Mtpa, is set to commence operations by the conclusion of 2029. Key stakeholders in the project's development include Inpex, Pertamina and Petronas.

First gas delivered to Congo's Tango FLNG facility – In late December 2023, the Tango floating LNG (FLNG) facility initiated its first gas production from the Marine XII field in Congo. The 0.6 Mtpa FLNG vessel had arrived in Congo in November 2023, with initial exports anticipated to commence in December. However, the first LNG production and the export of the inaugural LNG cargo are now projected to take place in the first quarter of 2024. This marks the country's inaugural LNG export facility, and Eni is in the process of developing a second FLNG with a capacity of 2.4 Mtpa, expected to commence operations in 2025.

In terms of LNG agreements, two contracts were signed in December 2023 (Table 2).

Table 2: New LNG sale agreements signed in December 2023

Contract Type	Exporting Country	Project	Seller	Importing Country	Buyer	Volume (Mtpa)	Duration (Years)
SPA	Mexico	Saguaro Energia LNG	Mexico Pacific LNG	Portfolio	Woodside	1.3	20
HOA	UAE	Ruwais LNG	ADNOC	China	ENN	1	15

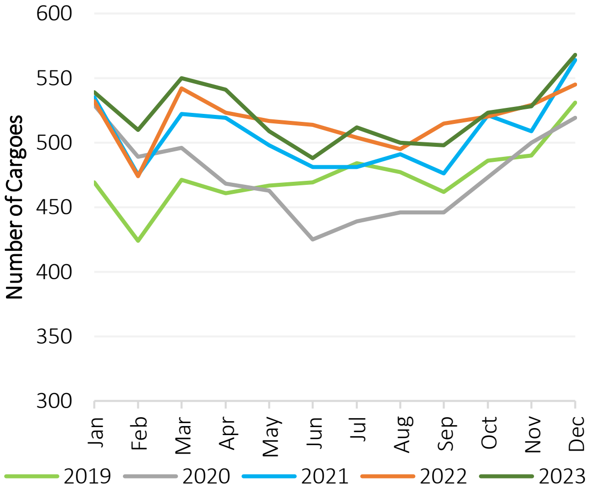
Source: GECF Secretariat based on Project Updates and News

4.2.7 LNG Shipping

There were 568 LNG shipments recorded in December 2023, 23 more cargoes than the previous month and signified a 4% increase y-o-y (Figure 93). Over the course of 2023, the number of shipments totalled 6,266, 56 cargoes higher than the total recorded in 2022 (Figure 94).

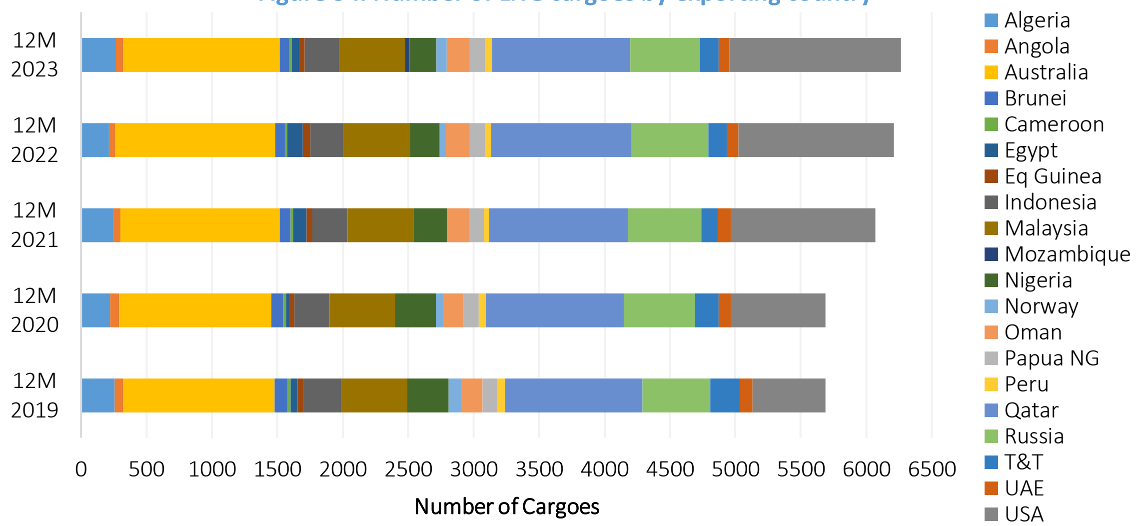
During this period, the US (123), Algeria (54) and Mozambique (35) recorded the largest increases in shipments compared with 2022 (Figure 95). The largest percentage increase in cargo exports was registered by Norway at 59%, followed by Algeria (25%) and Peru (22%).

Figure 93: Number of LNG export cargoes



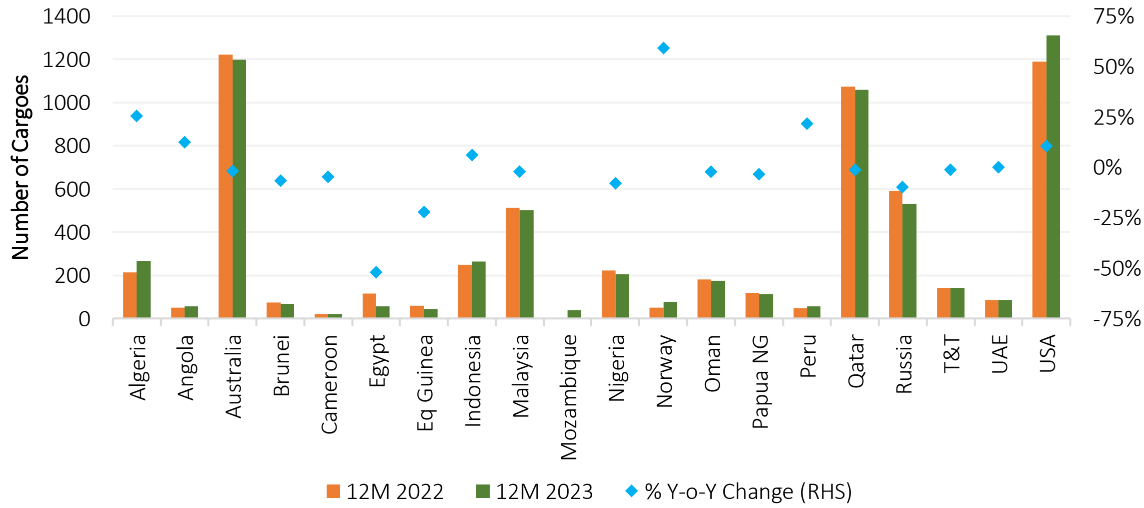
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 94: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 95: Changes in LNG cargo exports

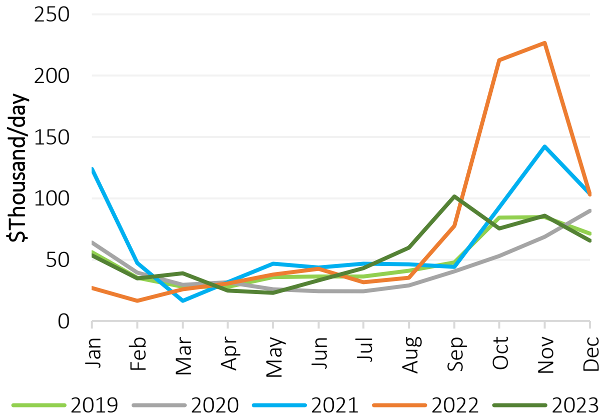


Source: GECF Secretariat based on data from ICIS LNG Edge

The monthly average spot charter rate for steam turbine LNG carriers decreased by 24% m-o-m in December 2023, to reach $65,300 per day (Figure 96). In contrast to the high levels in 2022, this average rate was 37% lower y-o-y. Moreover, the average rate was $24,200 less than the five-year average price for the month and was also the lowest average price recorded for the month of December in any of the past five years. Additionally, decreases were observed in the average charter rates for the other segments of the global LNG carrier fleet during the month. The average spot charter rate for TDFE vessels decreased by 27% m-o-m to reach $112,200 per day, while the average spot charter rate for two-stroke vessels declined by 28% m-o-m to reach $141,700 per day.

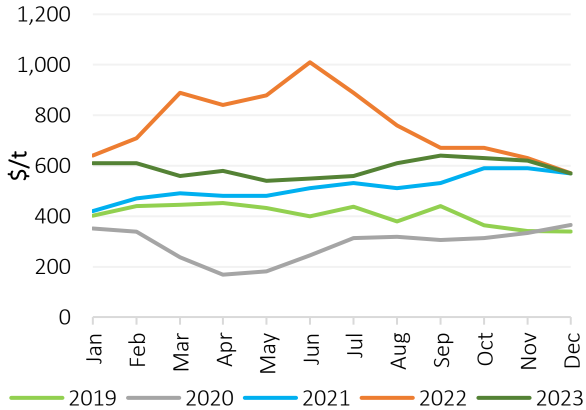
Over the course of December 2023, the shipping market recorded a sustained softening of charter rates. Particularly in the Pacific Basin, despite an increase in LNG cargo loadings, there was still a high level of carrier availability during the month. In the Atlantic Basin, concerns about disruptions to the Suez transit, which would have an upward pressure on shipping prices, were tempered by this eased demand in the Asia Pacific region, resulting in losses in the charter market. The shipping market is expected to loosen towards the end of January, as a number of vessels which were booked for short-term winter charters are reintroduced into the spot market. In December 2023, the average price of the leading shipping fuels was $570 per tonne (Figure 97), which was 8% lower m-o-m, but the same level as one year ago.

Figure 96: Average LNG spot charter rate



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

Figure 97: Average price of shipping fuels



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

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

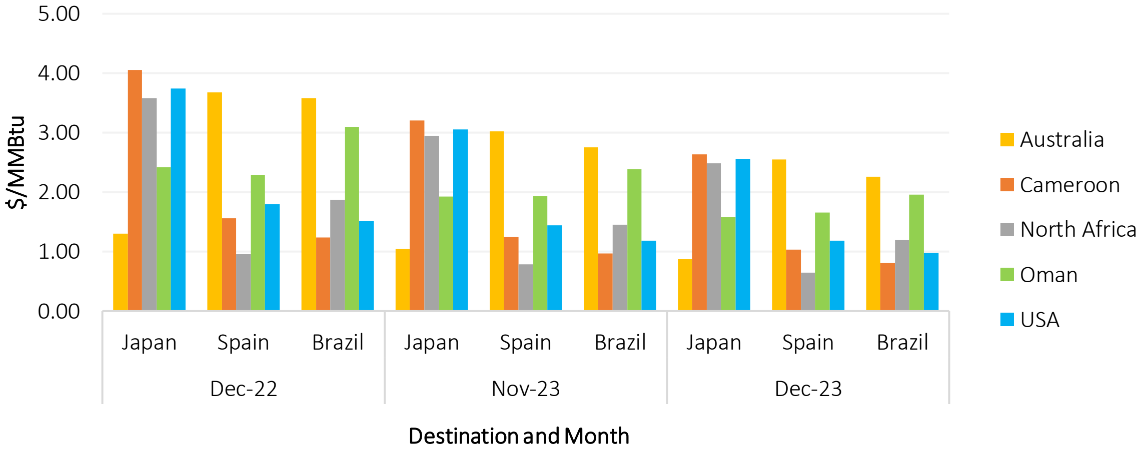
Table 3: Shipping costs for LNG spot cargoes from selected regions ($/MMBtu) – December 2023

	Destination							
LNG Supplier	*From / To*	**Japan**	**China**	**India**	**UK**	**Spain**	**Argentina**	**Brazil**
	Spot LNG delivered price	12.87	12.87	12.07	10.97	10.94	11.06	11.01
	Australia	0.87	0.92	1.05	2.64	2.55	2.06	2.26
	Cameroon	2.63	2.60	1.73	1.13	1.04	1.21	0.80
	North Africa	2.49	2.48	1.36	0.74	0.65	1.70	1.20
	Oman	1.59	1.48	0.33	1.75	1.66	1.97	1.96
	USA	2.56	2.82	2.70	1.22	1.19	1.63	0.98

Source: GECF Shipping Cost Model

In December 2023, the average LNG carrier spot charter rate, the cost of LNG shipping fuels and the delivered spot LNG prices, all declined compared with the levels of the previous month. Consequently, there was a net decrease in the LNG spot shipping costs for steam turbine carriers by up to $0.57/MMBtu on certain routes, relative to the previous month (Figure 98). When compared with one year ago, in December 2023, the monthly average spot charter rate and delivered spot LNG prices were much lower, resulting in LNG shipping costs of up to $1.42/MMBtu lower.

Figure 98: LNG spot shipping costs for steam turbine carriers



Source: GECF Shipping Cost Model

Shipping disruptions in the Red Sea: An escalation of the tensions in the Middle East region are posing a threat to the safe passage of vessels through the Red Sea. Majors such as BP, Hapag-Lloyd and Moller-Maersk expressed deep concerns about the growing number of attacks on ships traversing these waters, leading to the companies' suspending transits through the maritime area. In response, LNG carriers have altered their courses to avoid transit through the Suez Canal. There have even been reports of some carriers, having already made a southbound journey through the canal, turning around and heading back northwards to avoid the hotspots.

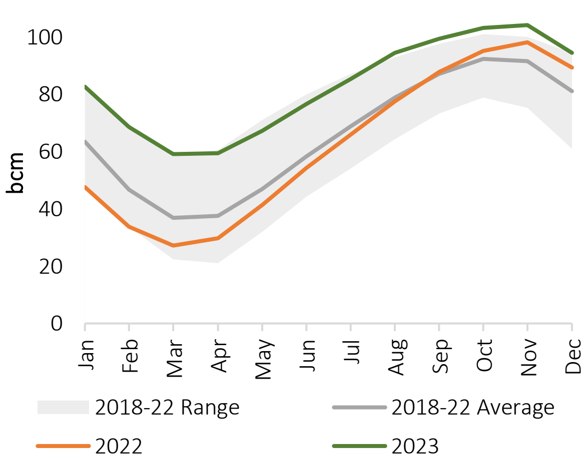
Japanese firm obtains approval for an LNG carrier engine conversion: The robust decarbonisation policies in the maritime sector will continue to keep the LNG shipping industry within a state of tightness in the coming years. Despite a wave of newbuilds entering the global fleet in the next few years, there will be a gradual phase-out of the steam turbine-powered segment of the fleet. These carriers, the oldest of the fleet, are noted as having the lowest efficiency in terms of emissions and cargo boiloff rates. Japanese shipowner NYK Line has partnered with shipbuilder Sasebo Heavy Industries to combat this phase-out, by converting the steam turbine engines on older moss-type LNG carriers with modern two-stroke engines. Despite the smaller capacity of these older vessels, an engine conversion may be preferable to shippers due to the lower cost compared with a newbuild, as well as faster turnaround based on the current backlog at construction shipyards.

5 Gas Storage

5.1 Europe

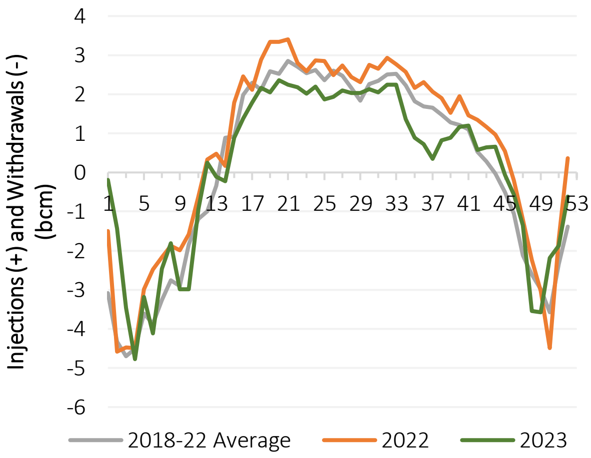
The net gas withdrawal season is underway in the EU, and the average daily volume of gas in storage decreased to 94.4 bcm in December 2023, down from 104.2 bcm in the previous month (Figure 99). Accordingly, the average capacity utilisation of the UGS sites in the region fell to 89%. Nevertheless, there was still 5.1 bcm more gas in storage than the average levels attained in December 2022. Furthermore, even though the December 2023 level has now fallen to within the five-year range, 13.2 bcm more gas was in storage than the five-year average for the month. All thirty-one days of December 2023 recorded net gas withdrawals, and a total of 11.1 bcm of gas was taken out of storage during the month, with just 1.7 bcm of gas injections into the UGS facilities.

Figure 99: Underground gas storage in the EU



Source: GECF Secretariat based on data from AGSI+

Figure 100: Weekly rate of EU UGS level changes



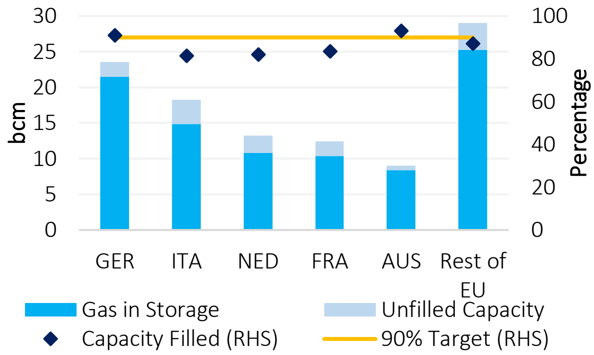
Source: GECF Secretariat based on data from AGSI+

As legislated by the European Commission, EU member states were obligated to fill UGS sites according to a prescribed schedule throughout the year, culminating in a minimum of 90% filled capacity by November 1. In 2023, less gas was required to be injected into storage during the summer than in 2022. However, the net gas withdrawal season commenced earlier in 2023 than one year ago. In December 2023, the average gas withdrawal rate was 2.4 bcm/week, compared with 2.2 bcm/week in 2022, and the five-year average withdrawal rate for the month of 2.6 bcm/week (Figure 100). Thus far, there have been a total of 13.8 bcm of gas withdrawal during the winter 2023/24 season.

The top EU countries for UGS capacity are Germany, Italy, Netherlands, France and Austria. By December 31, these top five countries still maintained over 80% filled capacity (Figure 101).

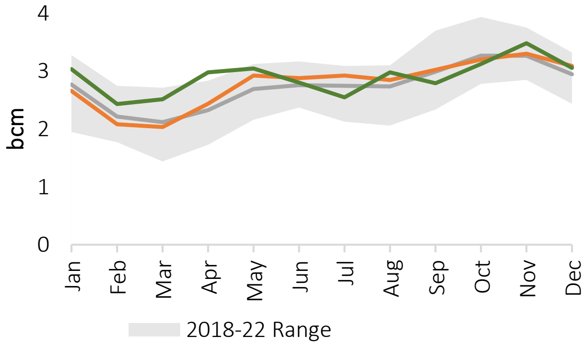
The EU has 5.0 bcm of LNG storage capacity, primarily concentrated in Spain (40%) and France (16%). In December 2023, the combined amount of LNG stored in the EU countries was 3.1 bcm (Figure 102). This quantity represented a decline of 12% m-o-m, 1% lower than the five-year historical average for that month.

Figure 101: UGS in EU countries as of Dec 31, 2023



Source: GECF Secretariat based on data from AGSI+

Figure 102: Total LNG storage in the EU



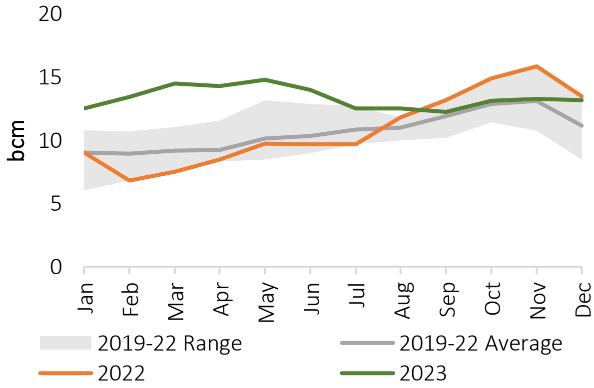
Source: GECF Secretariat based on data from ALSI

5.2 Asia

Japan and South Korea possess a combined capacity of 17 bcm of LNG storage. In December 2023, the combined volume of LNG in storage reached an estimated 13.2 bcm, representing a 1% decrease m-o-m (Figure 103). Furthermore, this quantity was also 2% lower than in December 2022, but was 2.0 bcm higher than the four-year average for the month.

Storage in Japan and South Korea accounted for 6.3 bcm and 6.9 bcm, respectively.

Figure 103: LNG in storage in Japan and South Korea

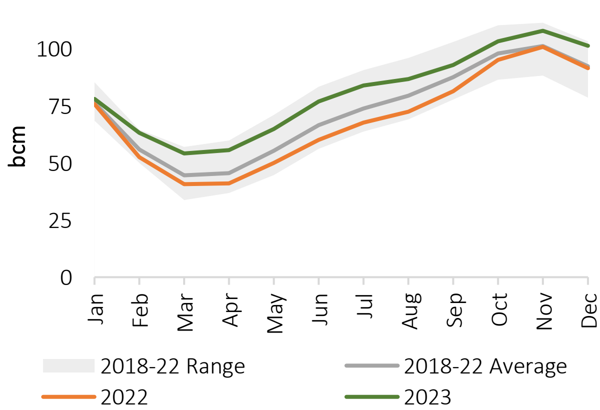


Source: GECF Secretariat based on data from Refinitiv

5.3 North America

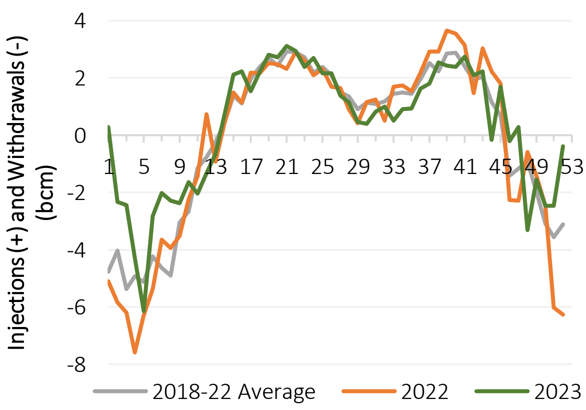
The net gas withdrawal season started in the US in December 2023, with the average daily volume of gas in storage decreasing to 101.5 bcm, down from the high of 108.1 bcm in the previous month (Figure 104). The average capacity utilisation of UGS sites in the country declined to 76%. However, the level of gas in storage in December 2023 was still 9.8 bcm higher than one year ago, and 8.9 bcm more than the five-year historical average. The rate of gas withdrawals during the month was 2.0 bcm per week, compared with 3.4 bcm/week in December 2022, and the five-year average rate of 2.5 bcm/week (Figure 105).

Figure 104: Underground gas storage in the US



Source: GECF Secretariat based on data from US EIA

Figure 105: Weekly rate of UGS changes in the US



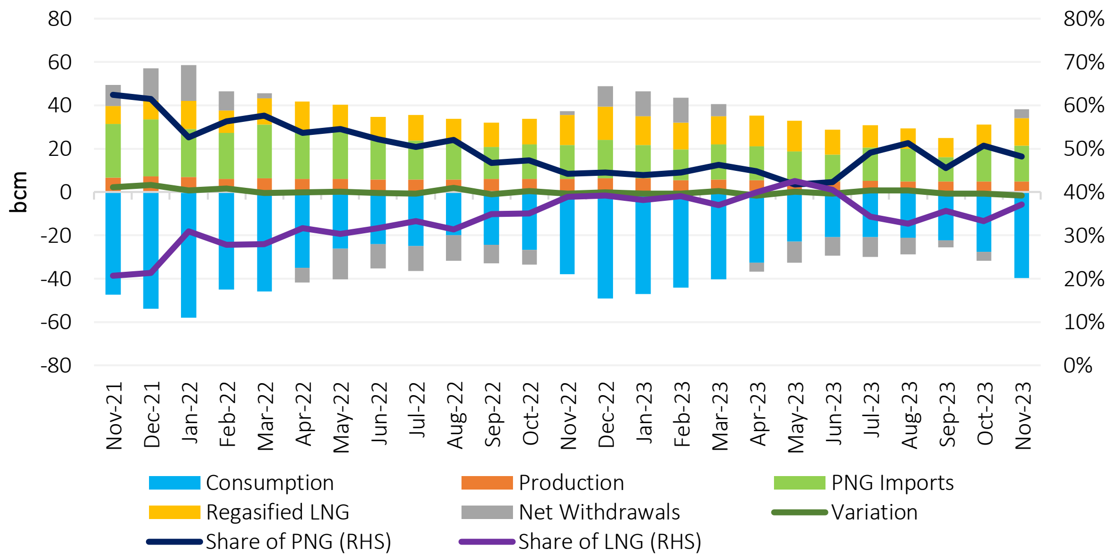
Source: GECF Secretariat based on data from US EIA

6 Gas Balance

6.1 EU + UK

In December 2023, the proportion of regasified LNG in the gas supply for the EU and the UK remained steady at 37%, consistent with the previous month, but showed a modest decrease from the 39% observed a year earlier. Similarly, the share of gas imports via pipelines remained unchanged from November 2023 at 48% (Figure 106). Conversely, the share of pipeline gas imports increased from 45% in December 2022. The stable shares of regasified LNG and pipeline gas imports in the region's gas supply were a result of the relatively stable supply from LNG send-out pipeline gas imports. However, when compared to December 2022, the more pronounced decline in LNG send-out, relative to pipeline gas imports, contributed to the reduction in the share of regasified LNG in the region's gas supply.

Figure 106: EU + UK monthly gas balance



Note: Variation refers to losses and statistical differences

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

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

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

	2022	Dec-22	Dec-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) Gas Consumption	417.40	49.10	41.50	417.40	380.85	-15%	-9%
(b) Gas Production	72.79	6.42	5.07	72.79	62.58	-21%	-14%
Difference (a) - (b)	344.61	42.68	36.43	344.61	318.27	-15%	-8%
PNG Imports	230.46	17.55	16.69	230.46	177.72	-5%	-23%
Regasified LNG	146.57	15.44	12.72	146.57	143.15	-18%	-2%
Net Withdrawals	-31.79	9.51	9.38	-31.79	-4.98	-1%	-84%
Variation	-0.63	0.18	-2.36	-0.63	2.38		

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

Note: variation refers to statistical differences and losses

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

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

6.2 OECD

Table 5 below provides data on the gas supply and demand balance for all OECD countries, including OECD Americas, OECD Asia Oceania and OECD Europe for the month of September 2023.

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

	2022	Sep-22	Sep-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) OECD Gas Consumption	1805.4	122.5	123.5	1331.8	1298.5	0.9%	-2.5%
(b) OECD Gas Production	1671.8	139.4	134.9	1243.4	1263.4	-3.2%	1.6%
Difference (a) - (b)	133.7	-16.9	-11.4	88.4	35.1	-32.6%	-60.3%
OECD LNG Imports	346.9	26.5	22.6	252.5	245.3	-14.6%	-2.8%
LNG Imports from GECF	161.8	12.2	10.1	117.6	110.1	-17.0%	-6.4%
LNG Imports from Non-GECF	185.1	14.3	12.5	134.9	135.2	-12.5%	0.2%
OECD LNG Exports	223.2	19.4	19.1	165.6	175.9	-1.9%	6.2%
Intra-OECD LNG Trade	152.7	12.0	10.5	111.0	113.4	-12.4%	2.2%
OECD Pipeline Gas Imports	632.0	43.5	32.9	494.5	371.4	-24.4%	-24.9%
OECD Pipeline Gas Exports	565.1	39.3	31.6	430.2	361.0	-19.6%	-16.1%
Stock Changes and losses	56.9	28.2	16.3	62.7	44.7		

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

6.3 India

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

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

	2022	Nov-22	Nov-23	YTD-2022	YTD-2023	Change* y-o-y	Change** 2023/2022
(a) India Gas Consumption	60.96	5.00	5.33	55.21	56.84	6.6%	3.0%
(b) India Gas Production	33.46	2.78	2.99	30.57	32.01	7.6%	4.7%
Difference (a) - (b)	27.50	2.22	2.34	24.64	24.83	5.3%	0.8%
India LNG Imports	28.07	2.36	2.67	25.58	27.62	12.8%	8.0%
LNG Imports from GECF	22.15	1.71	2.20	20.21	21.59	28.5%	6.8%
LNG Imports from Non-GECF	5.92	0.65	0.47	5.38	6.04	-28.1%	12.2%
Stock Changes and losses	0.57	0.15	0.33	0.94	2.79		

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

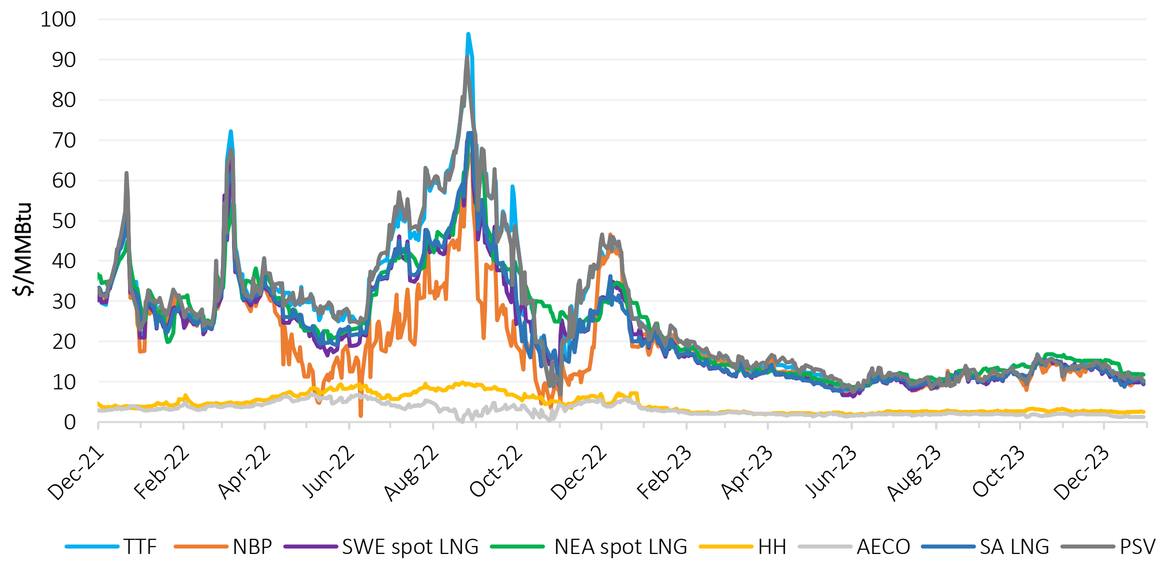
7 Energy Prices

7.1 Gas Prices

7.1.1 Gas & LNG Spot Prices

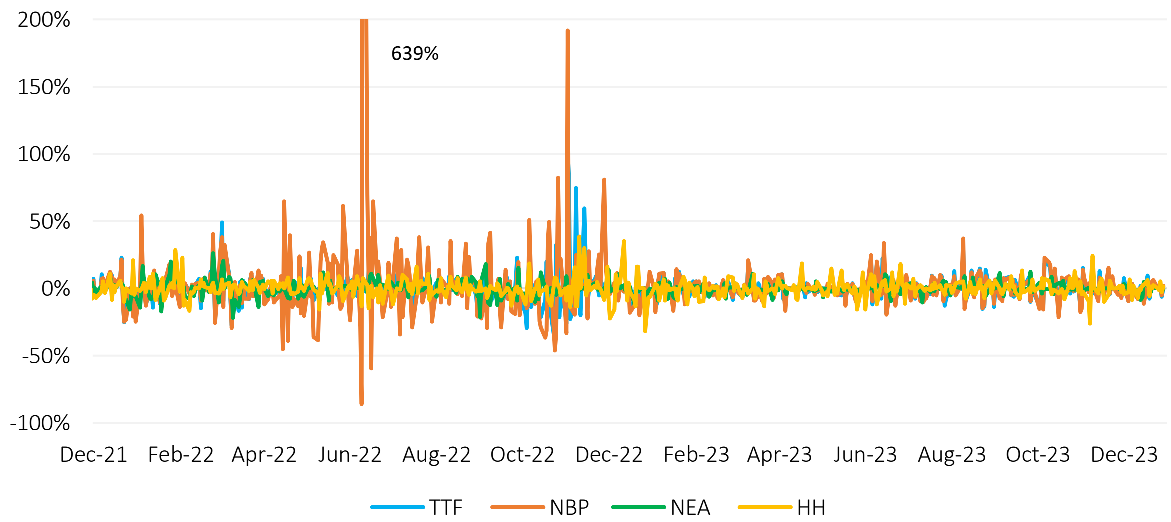
In December 2023, gas and LNG spot prices in Europe and Asia experienced a notable decline following a four-month period of upward movement. This shift was marked by reduced volatility compared to the previous month (Figure 107 and Figure 108). The downward trend in spot prices can be primarily attributed to bearish market fundamentals. Mild winter temperatures led to subdued demand, while robust LNG supplies and high storage levels in both regions further contributed to the decrease. Looking ahead, spot prices in the coming months is expected to be heavily influenced by weather conditions.

Figure 107: 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 108: Daily variation of spot prices

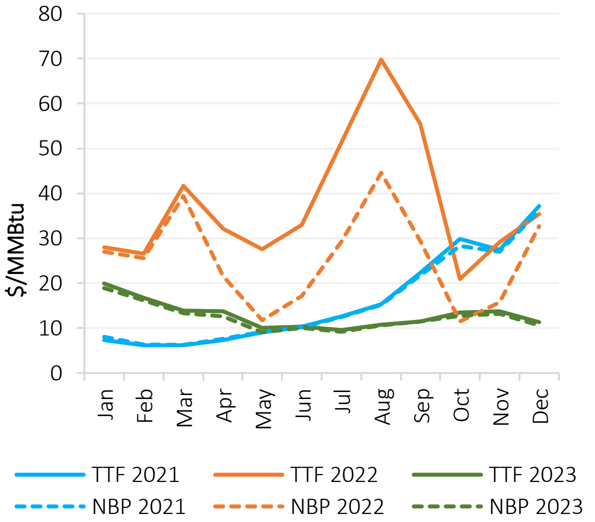


Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

7.1.1.1 European Spot Gas and LNG Prices

In December 2023, TTF spot gas prices averaged \$11.30/MMBtu, reflecting a significant 18% decline m-o-m and a 68% decline y-o-y. In addition, NBP spot prices averaged \$10.65/MMBtu, reflecting a 19% decrease m-o-m and a 67% decrease y-o-y (Figure 109). The SWE spot LNG prices averaged \$10.51/MMBtu in December 2023 (22% decrease m-o-m and 63% decrease y-o-y). As for the PSV spot price, it averaged \$11.72/MMBtu in November 2023, a 14% decrease m-o-m and a 68% decrease y-o-y.

Figure 109: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

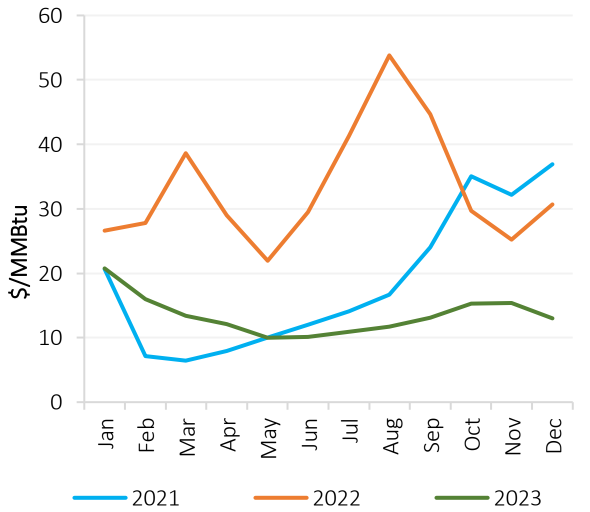
European gas and LNG spot prices experienced a decline, primarily influenced by overall bearish market conditions. Warmer-than-average temperatures, coupled with high wind speeds, resulted in a relatively low demand for gas. Furthermore, factors such as a robust LNG supply, strong Norwegian gas production, and elevated storage levels in the EU contributed to an easing of the market balance in the region. Daily TTF spot prices remained below \$14/MMBtu during the month.

7.1.1.2 Asian Spot LNG Prices

In December 2023, the average North East Asia (NEA) spot LNG price experienced a decrease of 16% m-o-m, reaching an average of \$13.00/MMBtu. This represents a 58% decrease y-o-y (Figure 110).

The significant drop in Asian LNG prices was primarily due to persistently weak demand in the region, alongside ample supply and high inventory levels. Additionally, escalating tensions in the Middle East, including attacks in the Red Sea, led to some cargo diversions with minimal impact on spot prices. During the month, daily NEA spot LNG prices fell below \$12/MMBtu.

Figure 110: Monthly Asian spot LNG prices



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

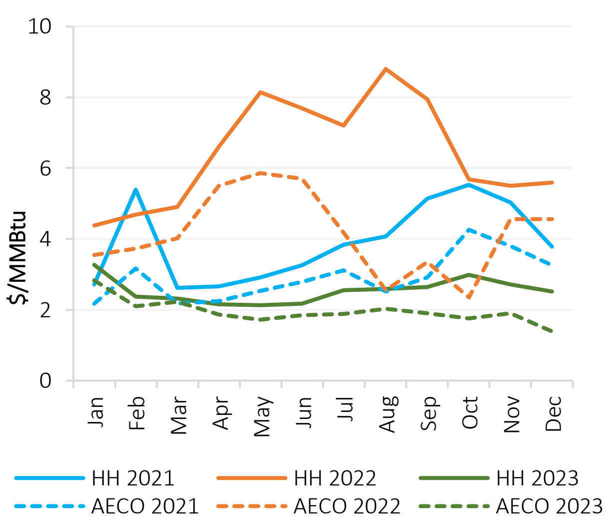
7.1.1.3 North American Spot Gas Prices

In December 2023, the HH spot gas price averaged $2.52/MMBtu, reflecting a decrease of 7% m-o-m. However, it was significantly lower y-o-y, dropping by 55%, compared to the average price of $5.60/MMBtu observed in December 2022. (Figure 111).

Henry Hub prices exhibited a bearish trend, primarily due to sustained high gas production and elevated gas storage levels, which consistently remained above the five-year average. Furthermore, daily HH spot prices stayed below $3/MMBtu throughout the month.

Similarly, in Canada, the AECO spot price averaged $1.39/MMBtu in December 2023, reflecting a decrease of 27% m-o-m and a decrease of 70% y-o-y.

Figure 111: Monthly North American gas spot prices



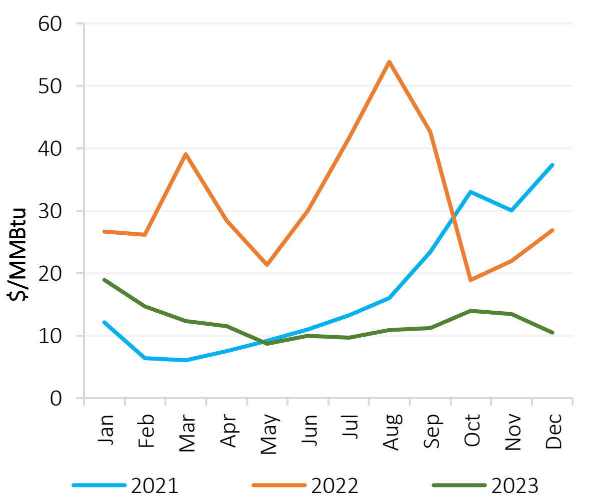
Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

7.1.1.4 South American Spot LNG Prices

In December 2023, the South American (SA) LNG price experienced a 22% m-o-m decrease, averaging $10.54/MMBtu. However, this price was 61% lower compared to the average price of $26.83/MMBtu observed in December 2022 (Figure 112).

LNG spot prices in South America continued to align with the trends observed in European and Asian spot prices. The average delivered prices for LNG in Argentina, Brazil and Chile averaged $10.09/MMBtu, $10.37/MMBtu and $11.15/MMBtu, respectively.

Figure 112: 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 December 2023, the average Oil-indexed I LNG price was $12.99/MMBtu, reflecting an increase of 1% m-o-m and a decrease of 12% y-o-y. Similarly, the Oil-indexed II LNG price averaged $9.97/MMBtu, showing a decrease of 3% m-o-m and a decrease of 7% y-o-y (Figure 113). Furthermore, the Oil-indexed I prices was at relatively the same level as NEA spot LNG prices, reversing the discount of the previous month. In addition, the Oil-indexed II prices held an average discount of $3/MMBtu compared to the NEA spot LNG prices.

In Europe, the Oil-indexed III price averaged $8.29/MMBtu in December 2023, reflecting a 3% increase m-o-m and a 21% y-o-y decrease (Figure 114). Moreover, the Oil-indexed III price held a discount of $2/MMBtu over the average SWE LNG.

Figure 113: Asia: Spot and oil-indexed price spread

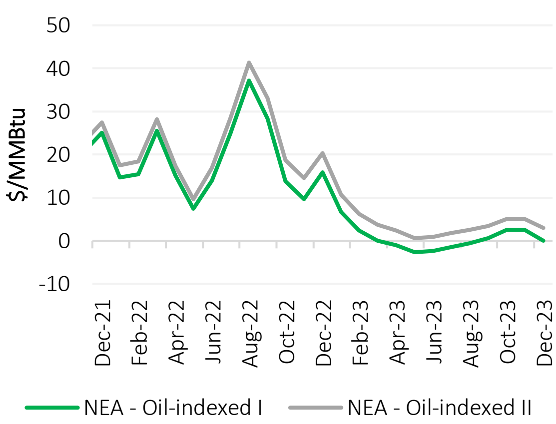
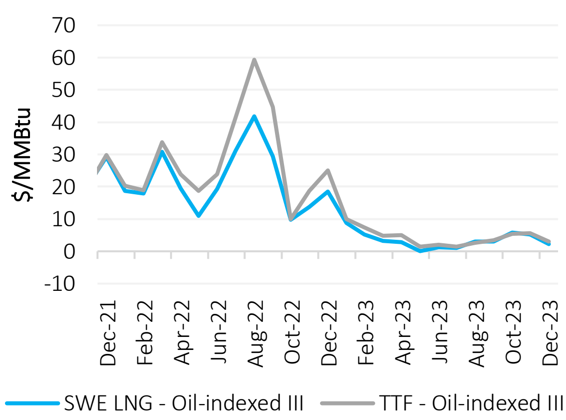


Figure 114: Europe: Spot and oil-indexed price spread



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 December 2023, the NEA-TTF price spread remained positive, but increased slightly compared to the previous month. The average premium of NEA LNG spot price over the average TTF spot price was $1.70/MMBtu. Both benchmark prices experienced bearish movement during the month (Figure 115).

NBP traded at a discount of $0.65/MMBtu compared to TTF, which was higher than the average discount of $0.57/MMBtu in the previous month (Figure 116). The NBP-TTF spread remained negative but widened due to a well-supplied UK gas market with high domestic production and LNG sendout.

Furthermore, the NWE LNG-TTF spread remained negative, with the NWE LNG spot price trading at a discount of $0.60/MMBtu compared to TTF, indicating high LNG sendout in the region (Figure 117). The NWE LNG-SA LNG price spread turned positive, averaging $0.16/MMBtu (Figure 118). Meanwhile, the NEA-HH and TTF-HH spreads both widened to $10.48/MMBtu and $8.78/MMBtu, respectively (Figure 119 and Figure 120). Asian and European spot prices held higher premiums over North American spot prices during the month. However, the spreads narrowed significantly.

Figure 115: NEA-TTF price spread

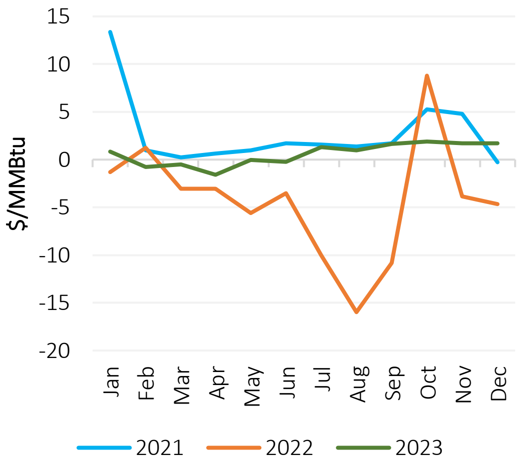


Figure 116: NBP-TTF price spread

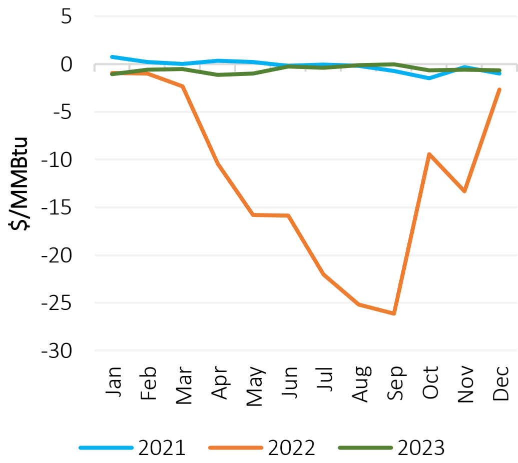


Figure 117: NWE LNG-TTF price spread

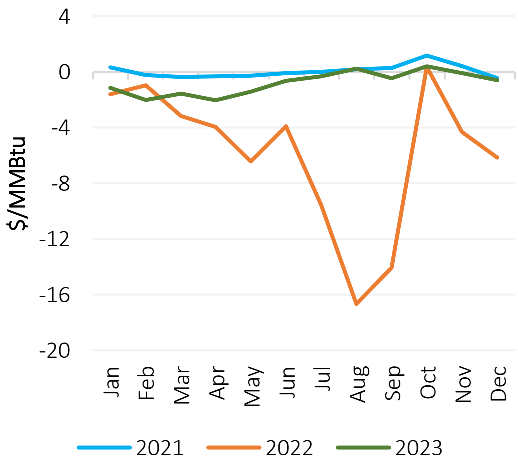


Figure 118: NWE LNG – SA LNG price spread

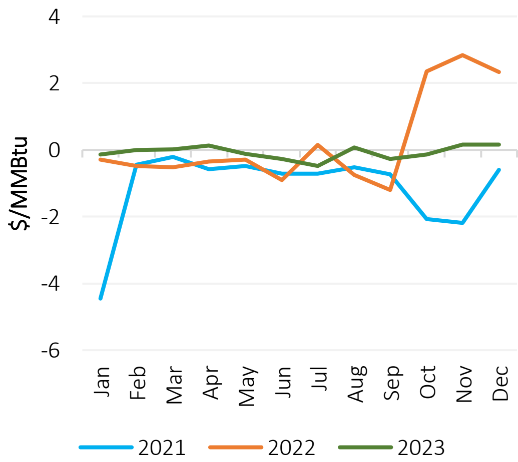


Figure 119: NEA-HH price spread

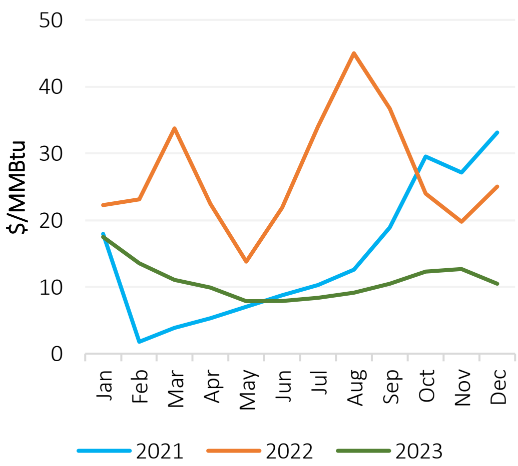
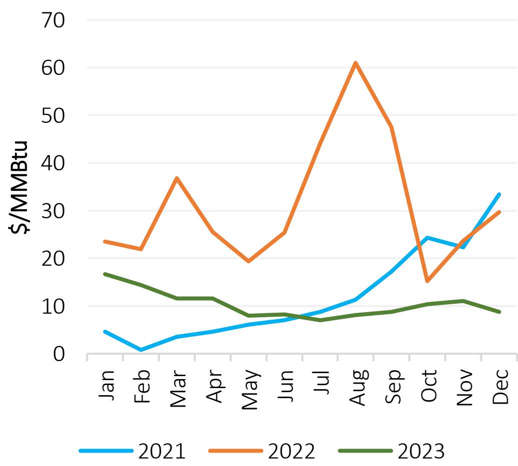


Figure 120: TTF-HH price spread



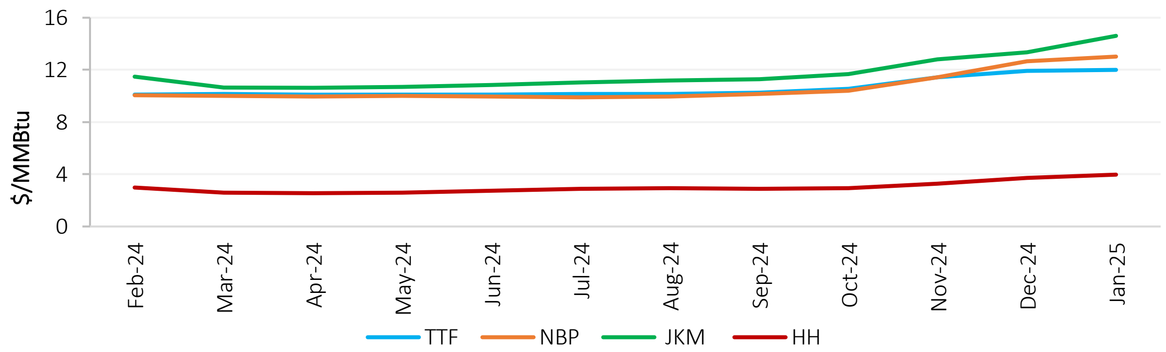
Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

7.1.4 Gas & LNG Futures Prices

For the six-month period spanning from February to July 2024, the JKM-TTF futures price spread is expected to remain positive, reflecting the likelihood for Asian LNG prices to maintain a premium over European spot prices. Moreover, in February 2024, JKM is expected to trade at a premium of $1.4/MMBtu compared to TTF. Subsequently, in both March and April 2024, the JKM-TTF spread is projected to narrow to $0.5/MMBtu. Additionally, the NBP-TTF spread is expected to be negligible in the same six-month period, with both prices converging (Figure 121).

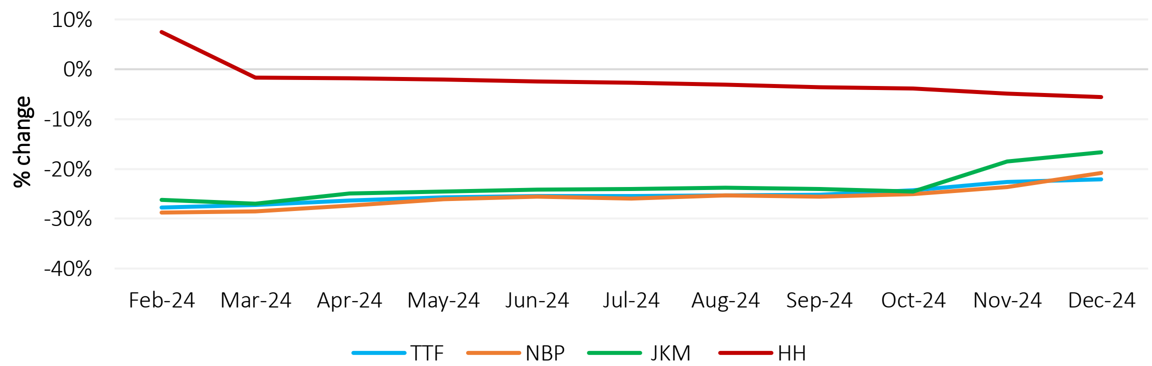
Moreover, gas and LNG futures prices for TTF, NBP and JKM for the six-month period from February to July 2024, (as of January 9, 2024) are lower than the futures prices expectations considered on December 4, 2023 (as reported in the GECF MGMR December 2023). Moreover, as of January 9, 2024, the average futures prices for TTF, NBP and JKM during the same six-month period are $10.13/MMBtu, $9.97/MMBtu and $10.89/MMBtu, respectively. Meanwhile, the average HH futures price is $2.73/MMBtu, which is slightly higher than previous expectations (Figure 122).

Figure 121: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Futures prices as of January 9, 2024.

Figure 122: Variation in gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Comparison with the futures prices as of December 4, 2023, as reported in GECF MGMR December 2023.

7.2 Cross Commodity Prices

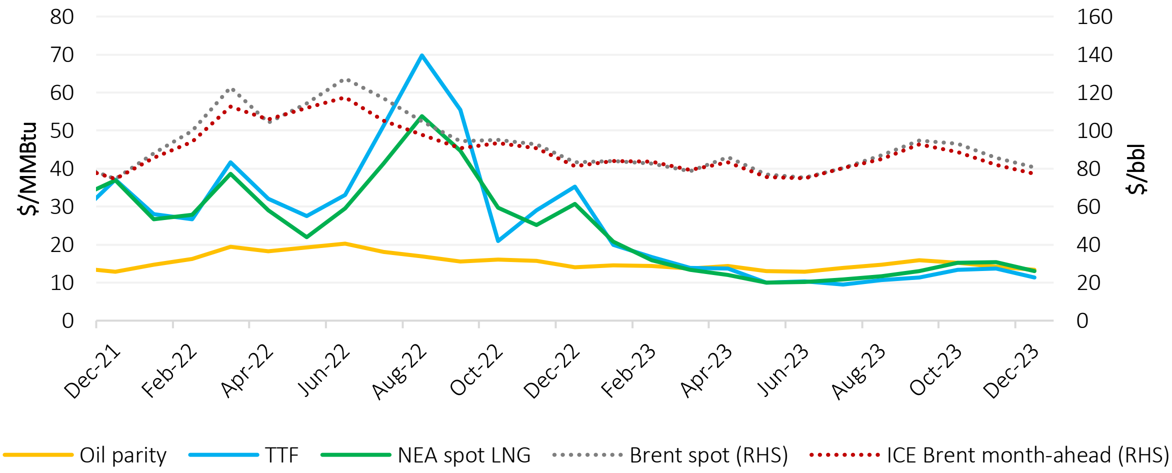
7.2.1 Oil Prices

In December 2023, the average Brent spot price was $80.47/bbl, reflecting a decrease of 6% m-o-m and a decrease of 3% y-o-y (Figure 123). The Brent month-ahead price averaged $77.32/bbl, marking a 6% decrease m-o-m and a 5% decrease y-o-y.

Oil prices experienced a decline for the third consecutive month, despite OPEC+ announcing voluntary production cuts totalling 2.2 million barrels per day, set to commence in early this year. Contributing to the bearish market sentiment were factors such as slowed economic growth and lacklustre global manufacturing activity. Nevertheless, there have been bullish indicators, notably due to increased attacks on vessels traversing the Red Sea. These incidents have compelled some tankers to navigate via the Cape of Good Hope, leading to extended shipping voyages and the incorporation of additional risk premiums.

Furthermore, in December 2023, TTF spot prices traded at a higher discount to the oil parity price of $2.1/MMBtu, compared to the previous month. NEA LNG spot prices also held a discount of $0.4/MMBtu to the oil parity price, after trading at a premium in the previous month.

Figure 123: Monthly crude oil prices



Source: GECF Secretariat based on data from Argus and Refinitiv Eikon
Note: Conversion factor of 5.8 was used to calculate the oil parity price in $/MMBtu based on the ICE Brent month-ahead price.

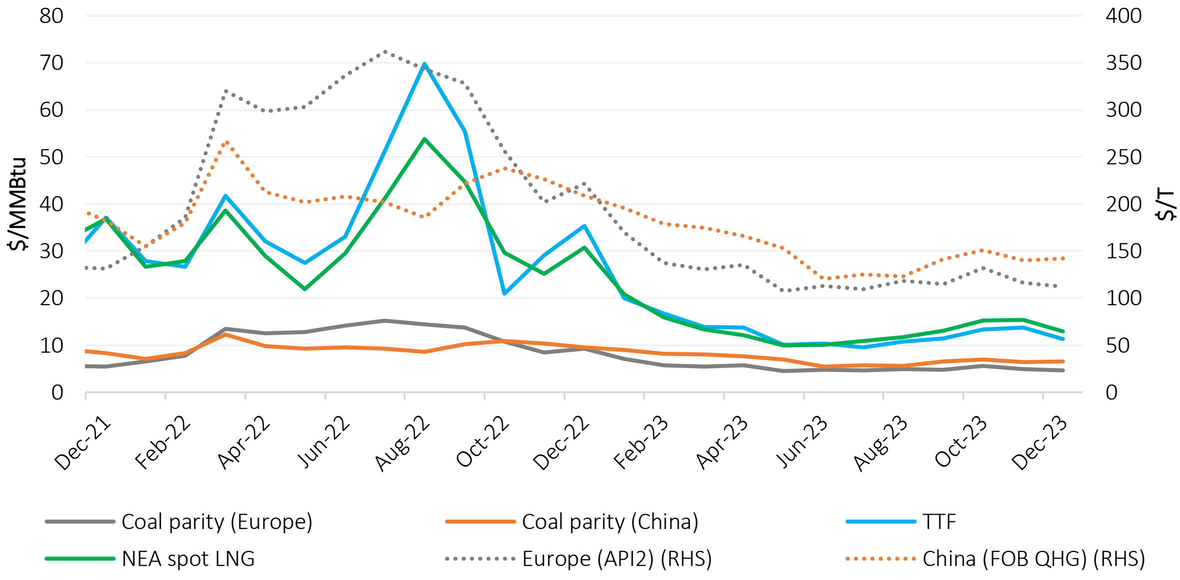
7.2.2 Coal Prices

In December 2023, the European coal price (API2) averaged $112.03/T, decreasing by 4% m-o-m and 49% y-o-y. Meanwhile, in China, the QHG coal price averaged $141.99/T, reflecting an increase of 1% m-o-m and a decline of 32% y-o-y (Figure 124).

European coal prices experienced a decline for the third consecutive month. This trend was primarily driven by mild temperatures, which led to reduced demand in the region. Additionally, the economics of coal-to-gas fuel switching were more favourable towards gas during this period. Meanwhile, in China, coal prices gained some momentum.

The premium of TTF spot price over the API2 parity price decreased by 25% m-o-m to $6.6/MMBtu in December 2023. Additionally, the premium of NEA spot LNG price over the QHG parity price decreased by 28% m-o-m to $6.5/MMBtu.

Figure 124: Monthly coal parity prices



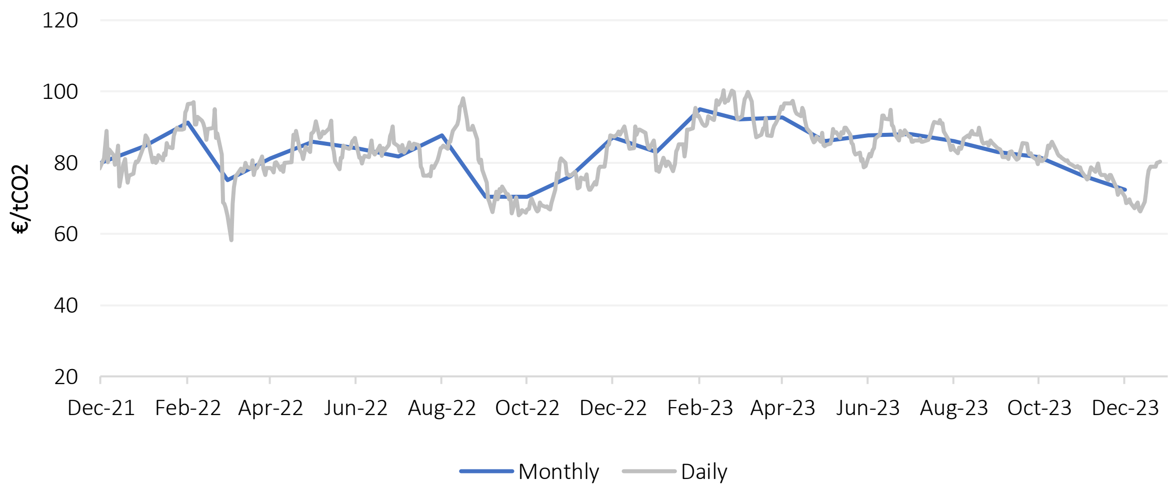
Source: GECF Secretariat based on data from Argus and Refinitiv Eikon
Note: Conversion factors of 23.79 and 21.81 were used to calculate the coal prices in $/MMBtu for Europe (API2) and China (QHG) respectively.

7.2.3 Carbon Prices

In December 2023, EU carbon prices averaged €72.44/tCO_2, reflecting a 5% decline m-o-m, and 17% y-o-y (Figure 125).

EU carbon prices have seen a consistent decline over the past five months. Furthermore, daily EU carbon prices reached a 14-month low, falling below €67/tCO_2 during the month. This bearish trend was mainly attributed to weak energy fundamentals, driven by forecasts of above-average temperatures in the region.

Figure 125: EU carbon prices

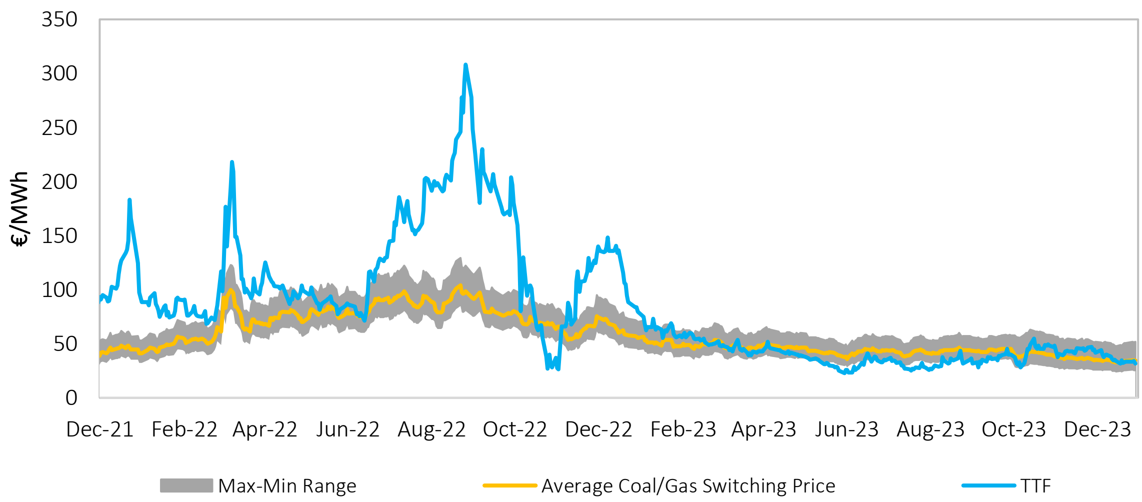


Source: GECF Secretariat based on data from Refinitiv Eikon

7.2.4 Fuel Switching

In December 2023, daily TTF spot prices remained within the range suitable for coal-to-gas switching but remained closer to the upper bound. Moreover, the average coal-to-gas switching price experienced a decline of 6% m-o-m to reach €33.98/MWh, and the average TTF spot price decreased. Consequently, the average monthly spread between the TTF spot price and the coal-to-gas switching price narrowed to €2/MWh. At the end of December 2023, the daily spread turned slightly positive with TTF falling below the average switching price (Figure 126). Looking ahead to February 2024, the TTF spot price is expected to remain below the average coal-to-gas switching price. This is likely to incentivize coal-to-gas switching in Europe.

Figure 126: Daily TTF vs coal-to-gas switching prices



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

7.3 Other Developments

EU emergency measures extension: On December 19, 2023, EU energy ministers reached an agreement to extend three regulations associated with emergency measures introduced in 2022 to address the energy crisis. Specifically, Regulation (EU) 2022/2576, concerning gas solidarity measures, has been extended until December 31, 2024. Additionally, Regulation (EU) 2022/2577, which provides a framework for accelerating the deployment of renewable energy, will now be in effect until June 30, 2025. Lastly, Regulation (EU) 2022/2578, establishing a market correction mechanism (MCM) to prevent excessively high prices, has been extended until January 31, 2025. This regulation was initially enacted on February 15, 2023. The MCM will be activated when two criteria are met: firstly, if the front-month TTF settlement price surpasses €180/MWh for three consecutive days, and secondly, if this price is €35/MWh higher than the reference price over the same timeframe. Following their publication in the EU's Official Journal, the extension of these three emergency measures will become effective immediately after the current regulations expire.

8 Abbreviations

Abbreviation	Explanation
AE	Advanced Economies
AECO	Alberta Energy Company
bcm	Billion cubic metres
bcma	Billion cubic metres per annum
bcm/yr	Billion cubic metres per year
CBAM	Carbon Border Adjustment Mechanism
CBM	Coal bed methane
CCS	Carbon, Capture and Storage
CCUS	Carbon Capture, Utilization and Storage
CDD	Cooling Degree Days
CNG	Compressed Natural Gas
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CPI	Consumer Price Index
DOE	Department of Energy
EC	European Commission
ECB	European Central Bank
EEXI	Energy Efficiency Existing Ship Index
EMDE	Emerging Markets and Developing Economies
EU	European Union
EU ETS	European Union Emissions Trading Scheme
EUA	European Union Allowance
Fed	Federal Reserve
FID	Final Investment Decision
FSU	Floating Storage Unit
FSRU	Floating Storage Regasification Unit

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

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

9 References

Argus. (n.d.). *Argus LNG Daily and Global LNG.*

Baker Hughes. (n.d.). *Worldwide Rig Counts*. Retrieved from http://phx.corporateir.net/phoenix.zhtml?c=79687&p=irol-rigcountsintl

Balkan Green Energy News. (2023, April 6). *Firms from Energy Community can now use EU's joint gas purchasing platform*. Retrieved from Balkan Green Energy News: https://balkangreenenergynews.com/firms-from-energy-community-can-now-use-eus-joint-gas-purchasing-platform/

Bank of England . (2023). *Official bank rate* . Retrieved from https://www.bankofengland.co.uk/boeapps/database/Bank-Rate.asp

BloombergNEF. (n.d.). Retrieved from https://www.bnef.com/

China's Chongqing Petroleum & Gas Exchange. (n.d.). Retrieved from https://www.chinacqpgx.com/information/informationBulletinDetails.htm?type=14&id=4559&rownumber=3

Enagas Spanish Transport System Operator. (n.d.). Retrieved from https://www.enagas.es/

European Central Bank (ECB). (2023). *Official interest rates*. Retrieved from https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html

European Commission. (2023). *EU Energy Platform*. Retrieved from European Commission: https://energy.ec.europa.eu/topics/energy-security/eu-energy-platform_en

GECF Secretariat. (n.d.). GECF Shipping Model.

GIE AGSI+. (n.d.). *Gas Infrastructure Europe - Aggregated Gas Storage Inventory.*

GIE ALSI. (n.d.). European LNG Storage.

GRTgaz French Transport System Operator. (n.d.). Retrieved from https://www.smart.grtgaz.com/

ICIS. (n.d.). *ICIS LNG Daily and Global LNG Market.*

ICIS. (n.d.). ICIS LNG Edge.

India's Petroleum Planning & Analysis Cell (PPAC) . (n.d.). Retrieved from https://www.ppac.gov.in/

International Monetary Fund (MF). (2023). *World Economic Outlook October 2023.*

McKinsey Fusion. (n.d.). EU Pipeline Entries.

National Bureau of Statistics of China . (n.d.). Retrieved from http://data.stats.gov.cn/english/easyquery.htm?cn=A01

Organization for Economic Co-operation and Development (OECD). (2023). *OECD Economic Outlook, Interim Report September 2023* . Paris: OECD Publishing.

Organization of Petroleum Exporting Countries (OPEC). (n.d.). *Monthly Oil Market Reports.* Retrieved from https://www.opec.org/opec_web/en/publications/338.htm

Oxford Economics. (2023). *World Economic Prospects Monthly.*

Refinitiv. (n.d.). Refinitiv Eikon Database.

Rystad Energy Ucube. (2023).

Snam, Italian Transport System Operator . (n.d.). Retrieved from https://www.snam.it/

U.S Energy Information Administration (EIA). (n.d.). Retrieved from https://www.eia.gov

US Federal Reserve. (2023). *Selected interest rates*. Retrieved from https://www.federalreserve.gov/releases/h15/

World Bank. (2023). World Bank Commodity Price Data.

GECF

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

www.gecf.org

Follow us on @ GECF_News