MONTHLY GAS MARKET REPORT

December 2023

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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 8 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, Norway and Peru have the status of Observer Members.

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

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Contents

List of Figures

List of Tables

Highlights

Global economy: The latest forecast from Oxford Economics maintained global GDP growth at 2.6%. However, the anticipated slowdown in economic growth next year prompted a downward revision in the global GDP growth forecast for 2024 by 0.1 percentage points to 2.1%. The Euro area will continue to face multiple headwinds, including contractionary monetary policy and weak industrial activity, but a gradual recovery is anticipated to begin in 2024.

Gas consumption: In November 2023, the European Union (EU) experienced its second consecutive month of increased gas consumption, which amounted to 33.6 billion cubic meters (bcm). This growth was primarily driven by higher demand in the residential and industrial sectors. In China, apparent gas demand — which includes pipeline imports, liquefied natural gas (LNG) imports and domestic production — registered a 7.4% year-on-year (y-o-y) rise, reaching 31 bcm. This increase was largely attributed to the resurgence of economic activities following the easing of strict COVID-19 lockdown measures, signalling a rebound in energy demand. Similarly, the United States (US) observed a 4% y-o-y increase in gas consumption, totalling 81 bcm. This rise was mainly driven by the power generation sector, reflecting a shift in energy sourcing dynamics in response to market and environmental factors.

Gas production: In October 2023, there was a 10% y-o-y reduction in Europe's gas production, bringing it down to 15.2 bcm. This decrease was largely due to lower production from Norway, the Netherlands and the UK. Conversely, in November 2023, the US witnessed a 4% y-o-y increase in gas production with a combined output of 84.9 bcm. Additionally, in the same month, there was a m-o-m increase of 3 units in the global count of gas drilling rigs, totalling 385 rigs. However, this was still a decrease from the 400 rigs noted in November 2022, indicating a y-o-y decline of 15 units.

Gas trade: In the EU, pipeline gas imports stabilised in November 2023, recording 13.6 bcm, just 1% less than the previous month. At the same time, there was a 2.8% y-o-y increase in global LNG imports, reaching 35.4 Mt. The primary contributors to this substantial rise were the Asia Pacific and LAC regions, notably Brazil, China, India, South Korea and Thailand. In contrast, Europe experienced a continued decline in LNG imports for the fifth consecutive month, marked by significant decreases in Greece, Portugal, Spain, Türkiye and the United Kingdom. On the supply side, global LNG exports grew by 1.5% y-o-y to 34.8 Mt, driven by stronger exports from Malaysia, Mozambique, the United Arab Emirates and the US.

Gas storage: Despite the EU experiencing net gas withdrawals toward the end of November 2023, the average volume of gas in storage for the month increased to 104.2 bcm, representing 99% of the total storage capacity of the region. In contrast, the US continued its net injection, with the storage levels rising to 108.1 bcm, equivalent to 81% of the country's capacity. In Asia, the estimated combined volume of LNG in storage in Japan and South Korea rose to 13.5 bcm.

Energy prices: Gas and LNG spot prices in Europe and Asia rose for the fourth consecutive month in November 2023. The increase in spot prices was influenced by an uptick in European gas demand for heating amidst colder temperatures. However, there was also downward pressure from brimming EU storage levels, robust LNG supply, high Norwegian pipeline gas supply and sluggish Asian LNG demand. The average TTF spot price stood at $13.7/MMBtu, reflecting a modest increase of 2% m-o-m. In addition, the average NEA spot LNG price experienced a 1% m-o-m increase, reaching $15.4/MMBtu. In the upcoming months, temperatures across Europe and Asia will remain the key determinant for spot prices.

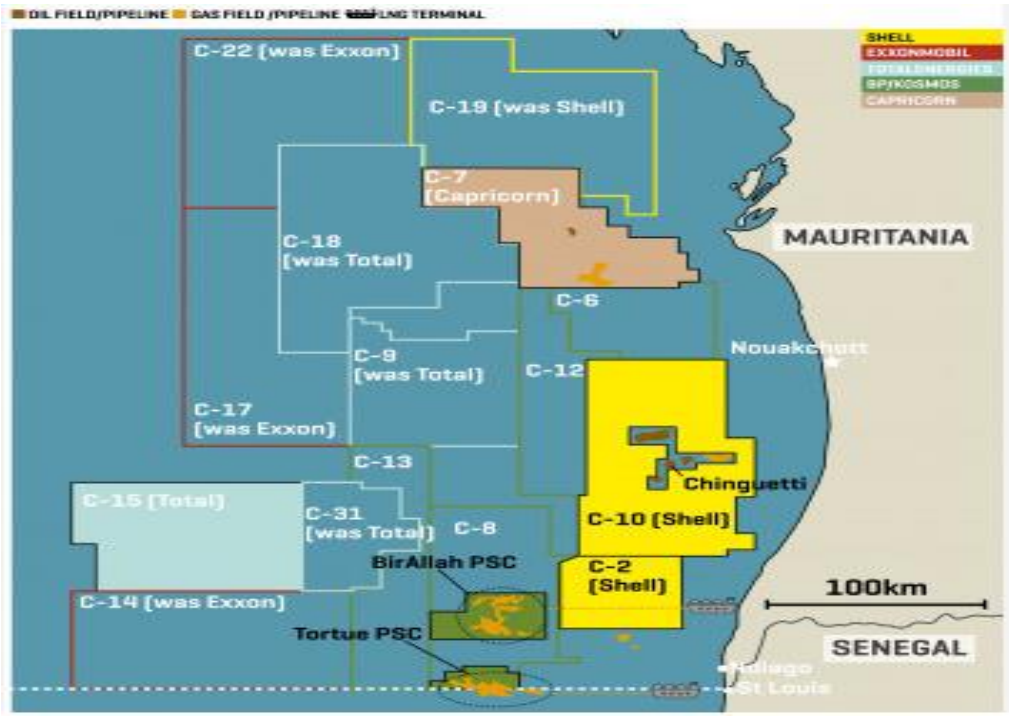
Feature article: Mauritania, a New Player in the Gas Market

During its 25th Ministerial Meeting, the GECF welcomed the Islamic Republic of Mauritania as its newest member. This represented an important milestone for the Forum's strategy of outreach, dialogue and cooperation. This further signifies Mauritania's position, as a new player in the gas markets.

The major developments in the Mauritanian gas market started in April 2015, when Kosmos Energy made a major offshore gas discovery in Block C-8 in the Greater Tortue Ahmeyim (GTA) concession, which lies in the maritime area straddling Senegal and Mauritania. This was followed in November 2015 by a second major discovery in the northern part of the same block in the Bir-Allah concession through the exploration well Marsouin-1. In October 2019, further exploration success in the same concession was achieved through the well Orca-1. As a result of these and other discoveries, the total gas-in-place volume in the country has reached 2.1 tcm, providing more than sufficient gas reserves to support the development of an LNG plant (Figure 1).

By the end of 2018, BP, along with its partner Kosmos Energy and National Oil Companies Société des Pétroles du Sénégal (PETROSEN) and Société Mauritanienne Des Hydrocarbures (SMH), approved the Final Investment Decision (FID) for Phase 1 of cross-border Greater Tortue Ahmeyim development project as an initial phase for a multi-phase development approach. The Greater Tortue Ahmeyim project will produce gas from an ultra-deepwater subsea system through floating production, storage and offloading (FPSO) vessel, which will act as a gas processing facility with a capacity of 5.2 bcma.

Figure 1: Mauritania's Natural Gas Concessions



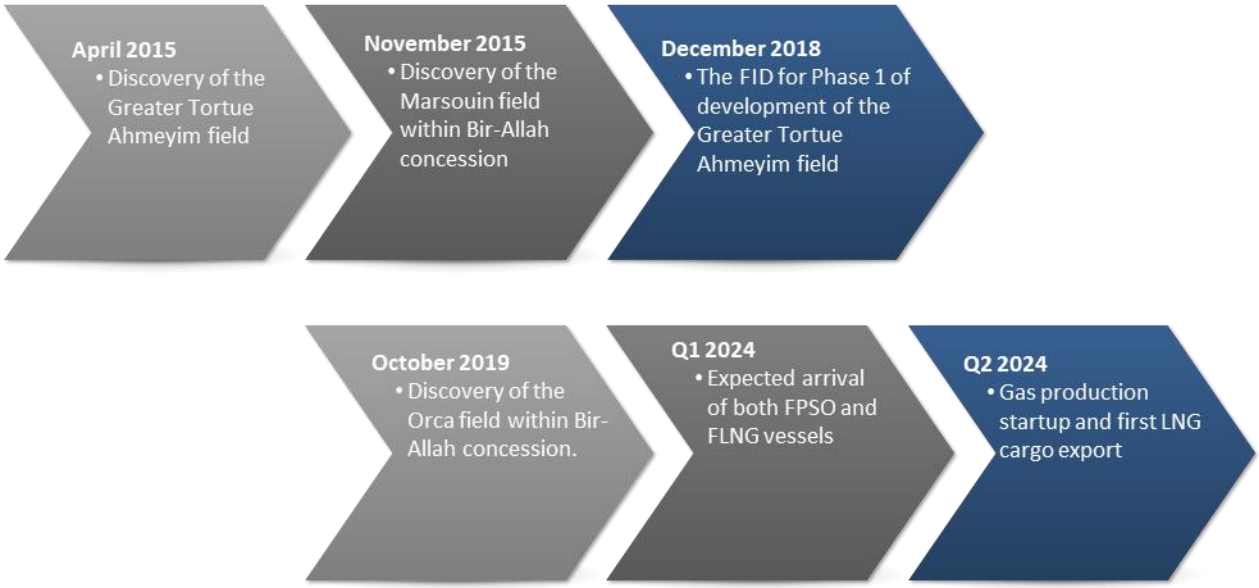
Source: MEES, retrieved from https://www.mees.com/country/mauritania

The produced gas will then be transferred to a floating liquefied natural gas (FLNG) facility at a nearshore hub located on the Mauritania and Senegal maritime border. The FLNG project is a joint project between the two countries, involving the same stakeholders as the GTA

development project, with BP serving as the operator. The FLNG, boasting a capacity of 2.3 Mtpa, reached FID in 2018 concurrently with the FID for the upstream development.

Mauritania is poised to join the club of LNG exporters in 2024 with the initiation of the GTA FLNG Phase 1 project. This facility is slated to start its export operations in the second quarter of 2024 (Figure 2). Previously, Kosmos Energy secured a 20-year Sale and Purchase Agreement (SPA) with BP, covering the entire first phase output of this project. By October 2023, the project had reached 90% completion. The FPSO set sail from the COSCO shipyard in China in January 2023, with its arrival anticipated in the first quarter of 2024. Additionally, the FLNG Gimi, having left Seatrium shipyard in Singapore in November 2023, is also expected to reach its destination in the first quarter of 2024.

Figure 2: Mauritania Gas Market Developments Timeline



Source: GECF Secretariat

Furthermore, there is consideration for a second phase of the GTA project, although its design is still being evaluated. This phase aims to increase liquefaction capacity by 2.5-3 Mtpa and is projected to require an investment of approximately 5 billion USD. There is potential for further expansion of the project to reach up to 10 Mtpa in later stages.

Mauritania is also considering the development of the Bir-Allah gas project for LNG exports. A planned onshore LNG project, which could have an ultimate LNG capacity of about 10 Mtpa, would utilise gas from the Bir-Allah area in Mauritania's C-8 block. FIDs on the expansion of the GTA project and development of the Bir-Allah project are targeted in the short term.

The development of these projects in the country may not only boost gas exports, but also trigger domestic gas consumption, while bolstering national economic and social development. In terms of energy consumption, oil is the dominant energy source followed by biomass and hydropower, with no current natural gas consumption. Notably with the development of the GTA project, Mauritania has the potential to mitigate energy poverty and increase energy access for its population by allocating a part of the gas production for domestic consumption. While gas exports may provide substantial foreign currency revenues,

a focus on the utilization of gas for meeting domestic energy demand has the potential to facilitate a rise in living standards in the country.

In this context, Mauritania is working on developing a CCGT power plant of 225 MW in Ndiago zone near Ndiago port, with power generation planned to start in 2026. This power plant will use 0.35 bcma of domestic gas provided from GTA phase 1, with gas transported from the GTA onshore delivery point to the power plant location through a 10 km pipeline.

Notably, Mauritania's proactive engagement with the global energy market and potential investors was on full display at the MSGBC 2023 Energy Conference held in November 2023 in Nouakchott, under the title "Scaling Energy Opportunities in Africa's Frontiers". This event is poised to be a cornerstone in showcasing the nation's energy investment opportunities and fostering partnerships that could give a boost to the Mauritanian energy production. HE Eng. Mohamed Hamel, Secretary General of the GECF, delivered a keynote speech at the conference, where he welcomed Mauritania to the GECF family and endorsed the steps taken by the country on the journey of harnessing its natural gas resources for the betterment of its people.

1 Global Perspectives

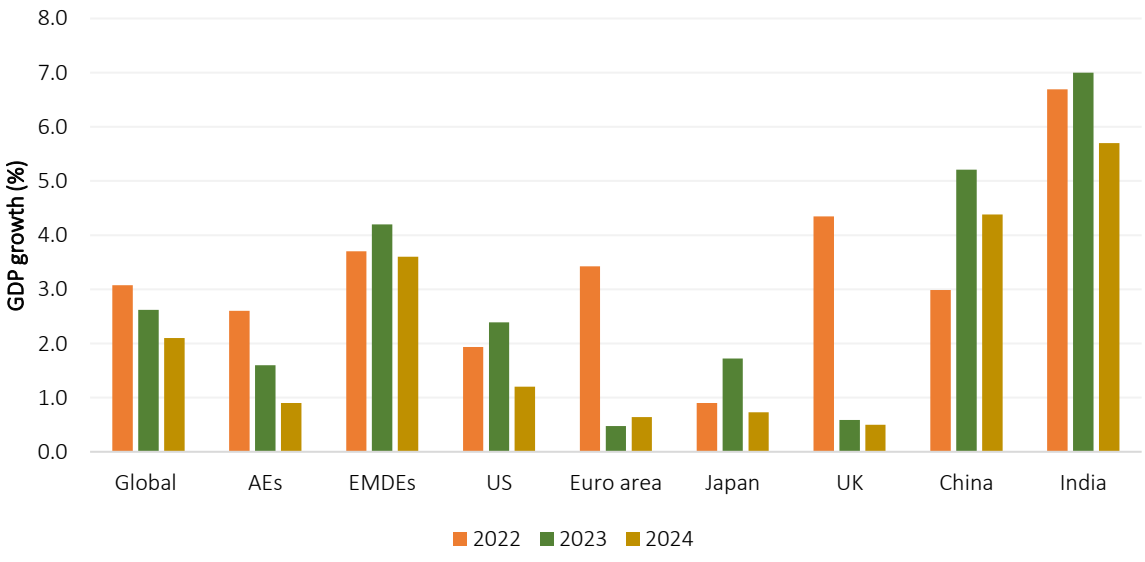
1.1 Global Economy

In its World Economic Prospects December 2023 report, Oxford Economics maintained its projection for global GDP growth at 2.6% for 2023. However, the anticipation of a slowdown in economic growth next year prompted a downward revision in the global GDP growth forecast for 2024 by 0.1 percentage points to 2.1%. This revision is attributed to the impacts of tightening monetary policies and inflationary pressures (Figure 3).

The outlook for GDP growth in Advanced Economies (AEs) has been maintained at 1.6% for 2023 and 0.9% for 2024. In the US, the GDP growth forecast for 2023 remains unchanged at 2.4%, while the projection for 2024 has been revised upward by 0.2 percentage points to 1.2%. Economic growth in the US is expected to moderately slow in Q4 2023 as consumer spending decelerates. In the Euro area, the GDP growth projection has also been maintained at 0.5% and 0.6% for 2023 and 2024, respectively. The Euro area will continue to face multiple headwinds, including contractionary monetary policy and weak industrial activity, but a gradual recovery is anticipated to begin in 2024. Similarly, in Japan, GDP growth forecasts for 2023 and 2024 remain at 1.7% and 0.7%, respectively. Slower growth in Japan in 2024 reflects anticipated weak external demand.

The GDP growth in Emerging Markets and Developing Economies (EMDEs) has been revised upward by 0.1 percentage points to 4.2% in 2023. Meanwhile, the forecast for 2024 remains at 3.6%. In the case of China, the GDP growth projections have been maintained at 5.2% for 2023 and 4.4% for 2024. China's economic growth will be supported by stronger industrial activity and fiscal stimulus, although the property sector remains the largest downside risk. Additionally, in India, the GDP growth forecast for 2023 has been revised upward by 0.3 percentage points to 7%, while GDP growth for 2024 remains at 5.7%.

Figure 3: GDP growth forecast

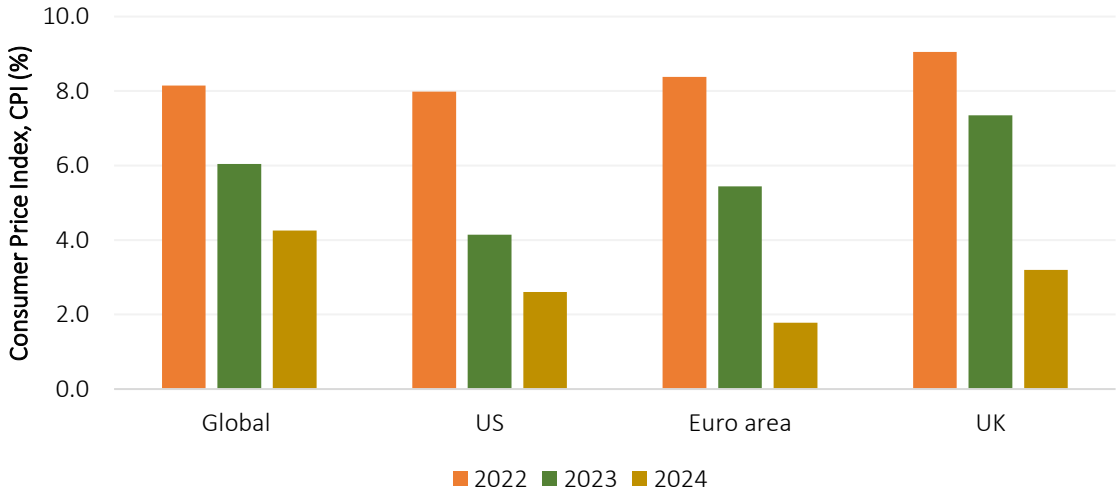


Source: GECF Secretariat based on data from Oxford Economics

The OECD's Economic Outlook Report November 2023 has recently been released, offering valuable insights into the current global and regional economic prospects, as well as the critical factors that are set to influence the immediate trajectory of the global economy. The OECD predicts global GDP growth of 2.9% in 2023, reflecting a downward revision from its earlier forecast of 3% in September 2023. In addition, the OECD forecasts global GDP growth of 2.7% in 2024. Following a stronger-than-expected performance at the beginning of the year, the OECD anticipates a moderate slowdown in global economic growth as the effects of tightening financial conditions and weak trade growth become more apparent. The report also highlights the growing divergence across economies, with growth in the emerging economies generally holding up better than in the advanced economies.

Inflation rates continue to ease in major advanced economies; however, trends are expected to diverge more significantly next year. In November 2023, inflation in the Euro area was estimated at 2.4%, reaching a 28-month low, and decreasing from 2.9% in October 2023. According to the latest forecast from Oxford Economics, global inflation is projected to decrease from 8.1% in 2022 to 6% in 2023, followed by a further reduction to 4.3% in 2024. Specifically, in the US, inflation is projected to average 4.1% in 2023, with a decline to 2.6% in 2024. In the Euro area, inflation is anticipated to average 5.4% in 2023, followed by a subsequent decline to 1.8% in 2024. The UK is expected to experience inflation averaging 7.4% in 2023, before decreasing to 3.2% in 2024 (Figure 4).

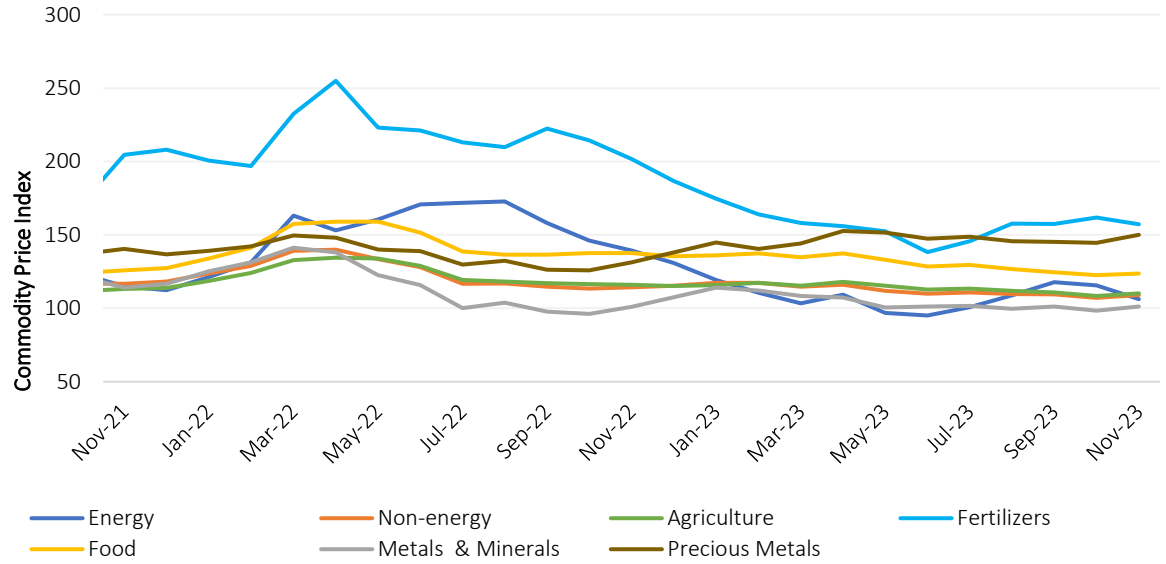
Figure 4: Inflation rates



Source: GECF Secretariat based on data from Oxford Economics

In November 2023, commodity prices in the energy sector declined for the second consecutive month. The energy price index decreased by 8% m-o-m, and was 24% lower y-o-y. This was primarily attributed to the decline in oil and coal prices during the month. From January to November 2023, the energy price index was 31% lower y-o-y. Meanwhile, the non-energy price index increased by 2% m-o-m, but was 5% lower y-o-y. This was driven by the agriculture and the metals and minerals sectors, whose price indices increased by 2% and 3% m-o-m, respectively. Additionally, the fertilizer price index reversed gains from the previous month, decreasing by 3% m-o-m, however, it remained 22% lower y-o-y. From January to November 2023, the non-energy price index was 10% lower y-o-y (Figure 5).

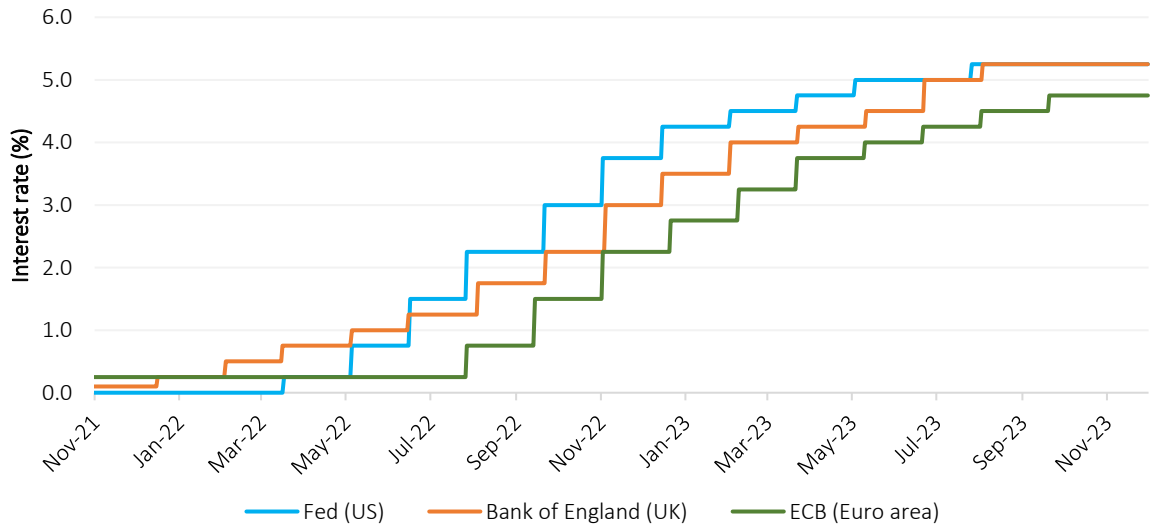
Figure 5: Monthly commodity price indices



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%).

The US Federal Reserve (Fed) continued to hold its benchmark interest rate steady within the range of 5.25% to 5.50% in November 2023. The last rate hike by the Fed occurred in July 2023 (Figure 6). Similarly, the Bank of England (BOE) maintained its key interest rate at 5.25%, following the last increase in August 2023. The European Central Bank (ECB) also held its key interest rates on the main refinancing operations, marginal lending facility and deposit facility to 4.5%, 4.75% and 4%, respectively, after the last increase in September 2023. While interest rate increases may be on hold, rate reductions by the Fed may not begin until late 2024.

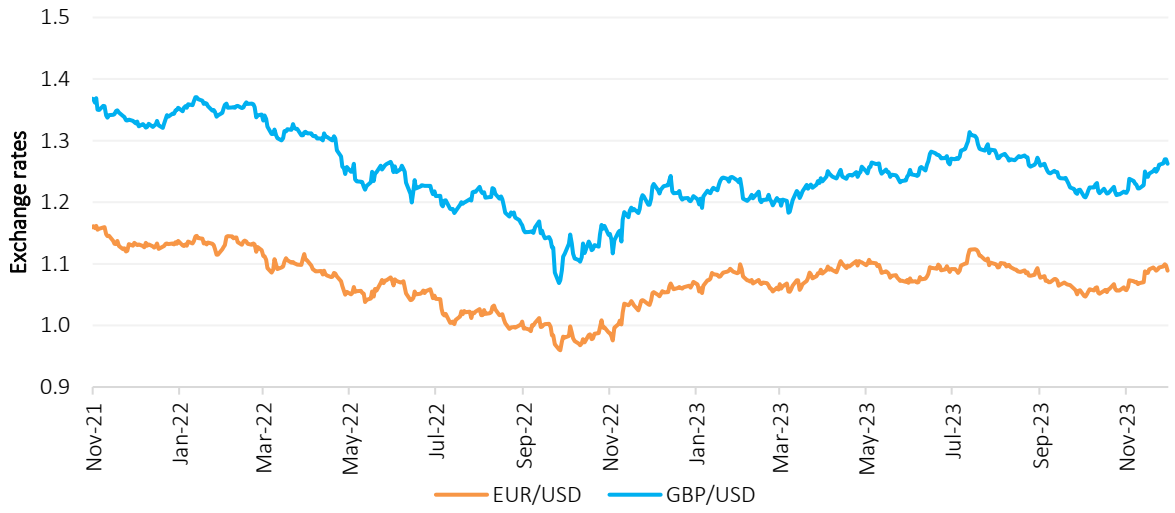
Figure 6: Interest rates in major central banks



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

In November 2023, the euro appreciated against the US dollar, resulting in an average exchange rate of $1.0819. This represented a 2% m-o-m increase and a 6% y-o-y increase. Similarly, the British pound also strengthened against the US dollar in November 2023, as the average exchange rate reached $1.2433 reflecting a 2% increase m-o-m and 6% increase y-o-y (Figure 7).

Figure 7: Exchange rates



Source: GECF Secretariat based on data from Refinitiv Eikon

1.2 Other Developments

Asia Pacific Economic Cooperation (APEC) Summit: The APEC Economic Leaders' Meeting took place on November 17, 2023, in San Francisco, United States under the theme "Creating a Resilient and Sustainable Future for All." The leaders endorsed the Golden Gate Declaration, a consensus document aimed at advancing efforts to achieve APEC economies' ambitious sustainability and inclusion objectives. In this declaration, the leaders acknowledged that, *"more intensive efforts are needed for economies to accelerate their clean, sustainable, just, affordable, and inclusive energy transitions through various pathways, consistent with global net-zero greenhouse gas emissions / carbon neutrality by or around mid-century, while taking into account the latest scientific developments and different domestic circumstances. In doing so, we endeavor to unleash a new era of decent jobs, investment, economic growth, and ensure energy, security, resilience, and access in the region. We recall our commitment to rationalize and phase out inefficient fossil fuel subsidies that encourage wasteful consumption, while recognizing the importance of providing those in need with essential energy services."* In addition to the APEC Economic Leaders' Meeting, APEC Economic Leaders' Week included the Finance Ministers' Meeting, the APEC Ministerial Meeting and the APEC CEO Summit.

Furthermore, a joint China-US statement on energy and climate, namely the Sunnylands Statement on Enhancing Cooperation to Address the Climate Crisis, was issued following a key meeting between President Xi Jinping and President Joe Biden on the sidelines of the Summit. The statement reaffirmed their commitment to collaborating with each other and other nations to tackle the climate crisis. In addition, both countries reiterated their

commitment to the implementation of the April 2021 China-US Joint Statement Addressing the Climate Crisis and the November 2021 China-US Joint Glasgow Declaration on Enhancing Climate Action in the 2020s. China and the US decided to operationalize the Working Group on Enhancing Climate Action, to engage in dialogue and cooperation to accelerate concrete climate actions during this decade. The Working Group will concentrate on areas of cooperation identified in the Joint Statement and the Joint Declaration. Concerning the energy transition, they plan to restart bilateral dialogues on energy policies and strategies and conduct exchanges on mutually agreed topics. Both countries aim to advance at least five large-scale CCUS projects each by 2030.

Asia Pacific Climate Week: The Asia Pacific Climate Week took place on November 13-17, 2023, in Johor Bahru, Malaysia. This was the final event of UNFCCC's Regional Climate Weeks, which brought together leaders of governments, businesses, international organizations and civil society in each region to explore ways to reduce greenhouse gas emissions. Similar events were held in Africa, Middle East and Latin America and the Caribbean in September and October.

EU regulation on methane emissions: On November 15, 2023, the European Parliament and Council reached a provisional agreement on the first-ever EU Regulation aimed at reducing methane emissions from the energy sector in Europe and its global supply chains. If enacted, the regulation would compel the oil, gas and coal industries to accurately measure, monitor, report and verify their methane emissions in accordance with the highest monitoring standards, and take necessary actions to reduce them. Additionally, the regulation aims to address methane emissions from hydrocarbon imports. In this context, starting from January 2027, the methane regulation will require that new import contracts for oil, gas, and coal can only be concluded if the same monitoring, reporting, and verification obligations applicable to EU producers are adhered to by exporters.

EU emergency measures extension: On November 28, 2023, the European Commission proposed a 12-month extension of the emergency measures introduced last year in response to the energy crisis. The three measures proposed for extension included the gas solidarity measures (due to expire December 30, 2023), the Market Correction Mechanism (MCM) (due to expire February 1, 2024) and the rules related to permit-granting for renewable energy projects (due to expire June 30, 2024). The Commission's proposal must be approved by the Council and does not necessitate the endorsement of the European Parliament.

COP28 UN Climate Conference: COP28 took place over the period November 30 – December 12, 2023, in Dubai, United Arab Emirates. Global leaders pledged $700 million to the Loss and Damage Fund (previously established at COP27). This fund aims to provide financial assistance to the countries that are most vulnerable and most negatively impacted by climate change. The Secretary General of the GECF, Eng Mohamed Hamel delivered a statement at the event, highlighting the need *"to support financing for natural gas projects and the scaling-up of cleaner technologies, such as carbon capture, utilization, and storage. This is crucial for a just, inclusive, and orderly energy transitions that satisfy the need for sustainable development, energy security, and energy affordability."*

2 Gas Consumption

2.1 Europe

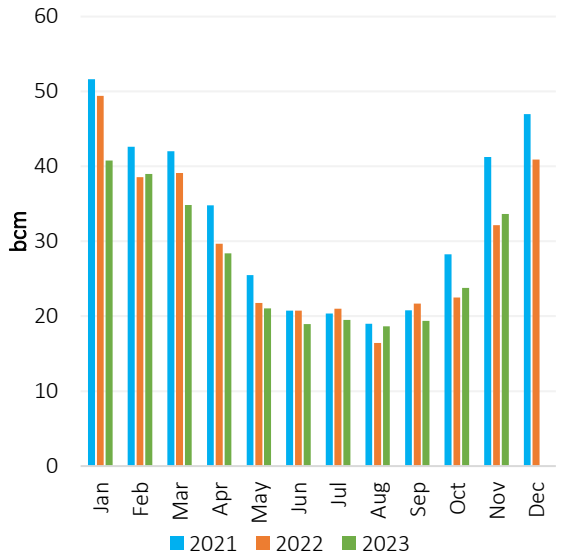
2.1.1 European Union

In November 2023, gas consumption in the EU witnessed its second consecutive month of growth. This increase, amounting to 4.7% y-o-y and totalling 33.6 bcm (Figure 8), was primarily driven by the residential and industrial sectors. The growth in consumption can be attributed to colder than normal temperatures across Europe, which led to higher heating demand in the residential sector. Additionally, there was a recovery in industrial sectors as gas prices decreased over the year. This resulted in a gradual improvement in industrial demand across several EU countries, although it has not yet reached the levels observed in previous years.

In the realm of electricity production, gas-based generation in the EU saw a 17% y-o-y decline, while total electricity production rose by 4%, reaching 212 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 for the month. Nuclear, hydro, solar, and wind power generation registered considerable yearly increases of 7%, 47%, 15% and 22%, respectively. Conversely, electricity generated from coal experienced a substantial decrease of 22% y-o-y, equivalent to 8 TWh (Figure 9). In the power mix, renewables constituted the largest share at 33%, followed by nuclear (23%), gas (16%), hydro (15%) and coal (13%).

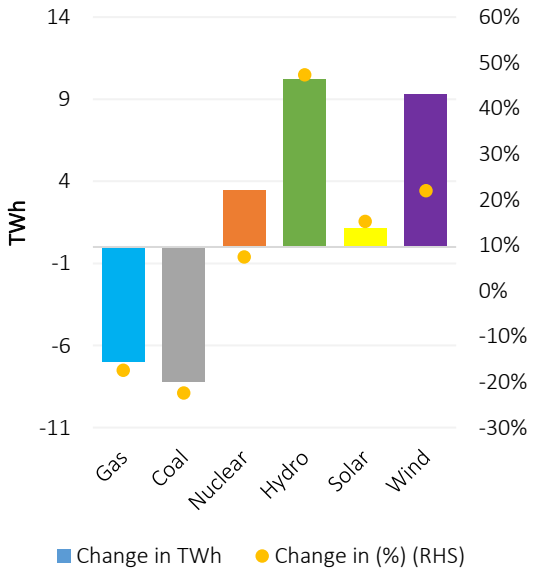
From January to November 2023, the EU's overall gas consumption fell by 4.8% y-o-y, totalling 298 bcm.

Figure 8: Gas consumption in the EU



Source: GECF Secretariat based on data from Entsog and McKinsey

Figure 9: Trend in electricity production in the EU in November 2023 (y-o-y change)

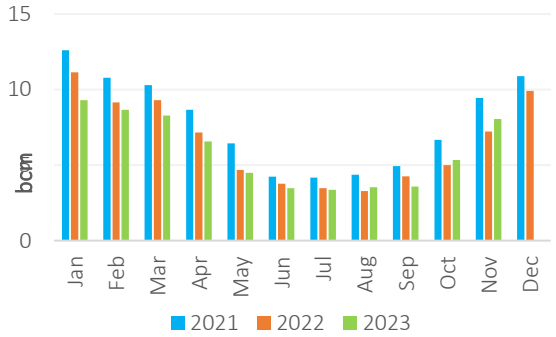


Source: GECF Secretariat based on data from Ember

2.1.1.1 Germany

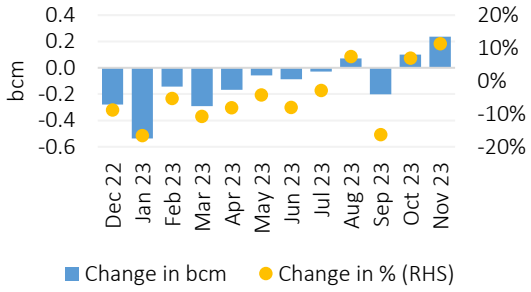
In November 2023, Germany witnessed a significant rebound in gas consumption across all sectors (power generation, residential, and industrial) for the second consecutive month, witnessing 11% y-o-y increase, with consumption reaching 8 bcm (Figure 10). This increase was observed in the residential, power generation and industrial sectors, with respective y-o-y rises of 9%, 14%, and 11%. Several factors contributed to this growth: the cold weather experienced during the month; a resurgence in industrial gas consumption driven by lower gas prices; the phase-out of nuclear power leading to increased reliance on natural gas for power generation; and a policy shift from coal to gas (Figure 11).

Figure 10: Gas consumption in Germany



Source: GECF Secretariat based on data from Refinitiv

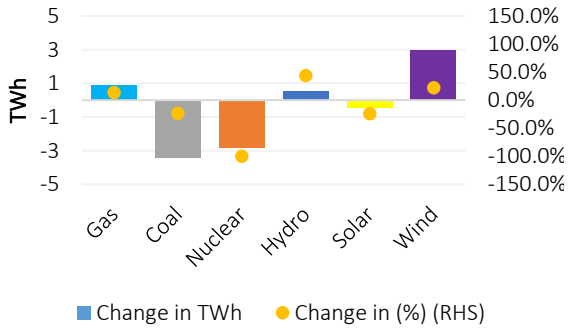
Figure 11: Trend in gas consumption in the industrial sector in Germany (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

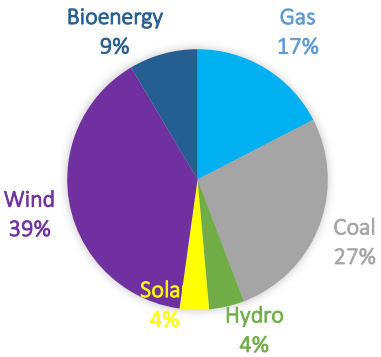
Gas-fired power generation experienced a 14% y-o-y increase, despite a 4.7% decrease in overall electricity production, which totalled 41 TWh. Concurrently, hydro and wind energy generation saw significant y-o-y increases of 44% and 22%, respectively. In contrast, electricity production from coal and solar decreased by 23% and 24% y-o-y, respectively. These shifts were largely attributed to unfavourable weather conditions impacting solar energy generation and the completion of nuclear phase-out in Germany (Figure 12). In the energy mix, renewables continued to dominate, comprising 52% of the total, followed by coal at 27%, gas at 17%, and hydro at 4% (Figure 13).

Figure 12: Trend in electricity production in Germany in November 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 13: German electricity mix in November 2023



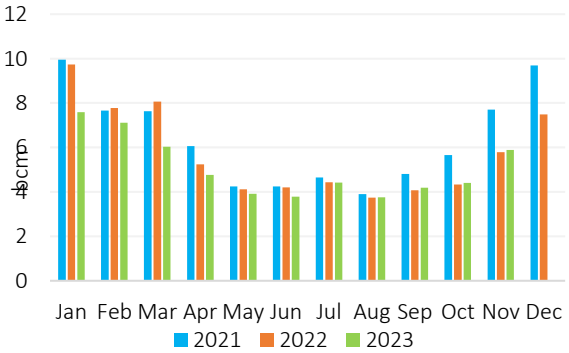
Source: GECF Secretariat based on data from Refinitiv and Ember

From January to November 2023, Germany's overall gas consumption decreased by 5.6% y-o-y, reaching 65 bcm.

2.1.1.2 Italy

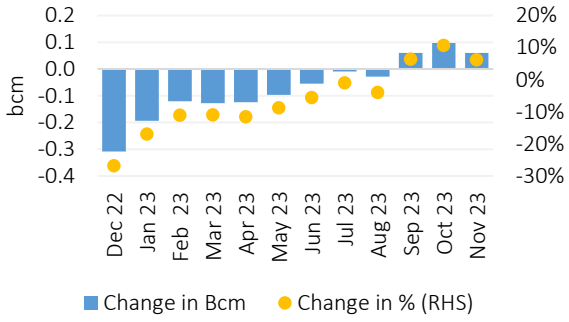
In November 2023, Italy experienced a 1.9% y-o-y increase in gas consumption, totalling 5.9 bcm (Figure 14). The industrial and residential sectors saw rises in consumption of 6.2% and 10%, respectively, reaching 1 bcm and 1.3 bcm, respectively. This growth was primarily driven by colder-than-normal temperatures recorded in Italy, where the average temperature was 0.5 degrees lower than the November average. Additionally, there was a resurgence in industrial activity, spurred by a slowdown in gas prices (Figure 15). Notably, after 20 consecutive months of y-o-y declines, the industrial sector recorded its third consecutive month of increased gas consumption, reaching 1 bcm. However, it is important to note the decline in natural gas consumption in the power generation sector, largely attributed to an increase in hydroelectric, solar and wind energy production. A significant factor behind this boost in hydro output was the heavy rainfall recorded in the country during the first week of the month, providing favourable conditions for hydroelectric power generation and enhancing wind energy production.

Figure 14: Gas consumption in Italy



Source: GECF Secretariat based on data from Snam

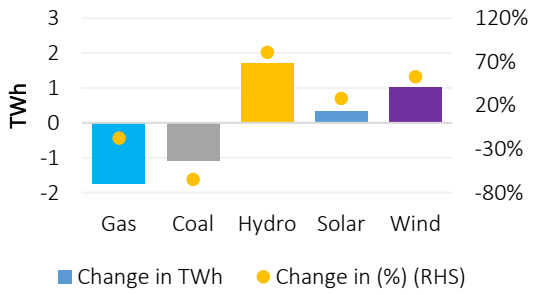
Figure 15: Trend in gas consumption in the industrial sector in Italy (y-o-y change)



Source: GECF Secretariat based on data from Snam

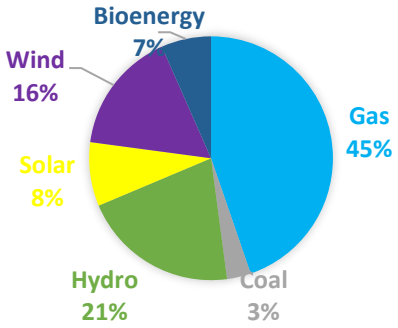
Gas-based electricity production fell by 18% y-o-y. Despite this, the total electricity production increased by 0.2% y-o-y, reaching 18.3 TWh. Additionally, there was a notable y-o-y increase in energy generation from hydro (81%), wind (53%), and solar (28%) (Figure 16). Meanwhile, gas continued to be the dominant fuel in the power mix, accounting for 45% of the total, followed by renewables (31%), hydro (21%), and coal (3%) (Figure 17).

Figure 16: Trend in electricity production in Italy in November 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv and Ember

Figure 17: Italian electricity mix in November 2023



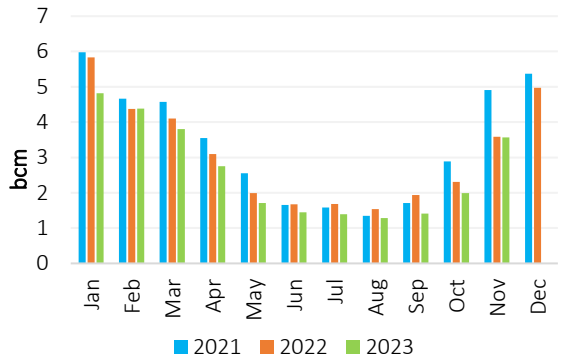
Source: GECF Secretariat based on data from Refinitiv and Ember

From January to November 2023, Italy's overall gas consumption decreased by 9% y-o-y, reaching 56 bcm.

2.1.1.3 France

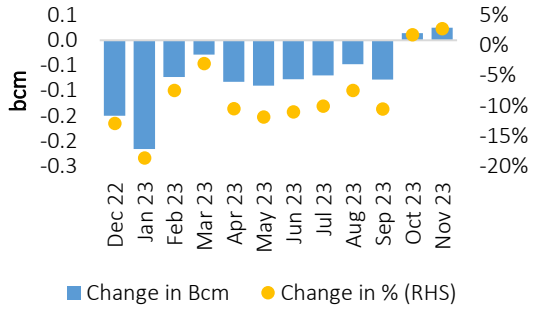
In November 2023, France's gas consumption experienced a 0.5% y-o-y decrease, totalling 3.6 bcm. This represented the ninth consecutive month of decline following a brief surge in February 2023 (Figure 18). The primary driver of this reduction was a significant drop in gas usage in the power generation sector. This decline is linked to a 28% and 74% increase in nuclear and hydro power output compared to the previous year. In contrast, both the residential and industrial sectors reported increases in gas consumption. The residential sector's consumption rose by 11% y-o-y to 1 bcm, while the industrial sector saw a 2.8% y-o-y increase, reaching 2.3 bcm. (Figure 19).

Figure 18: Gas consumption in France



Source: GECF Secretariat based on data from GRTgaz

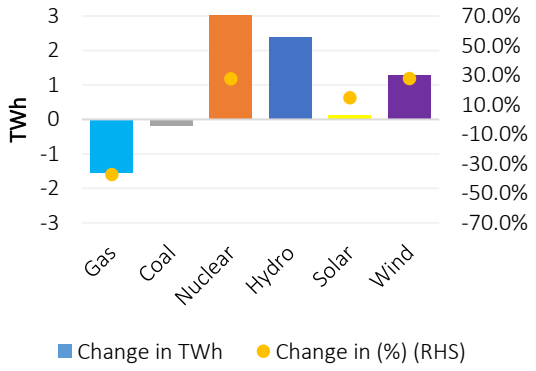
Figure 19: Trend in gas consumption in the industrial sector in France (y-o-y change)



Source: GECF Secretariat based on data from GRTgaz

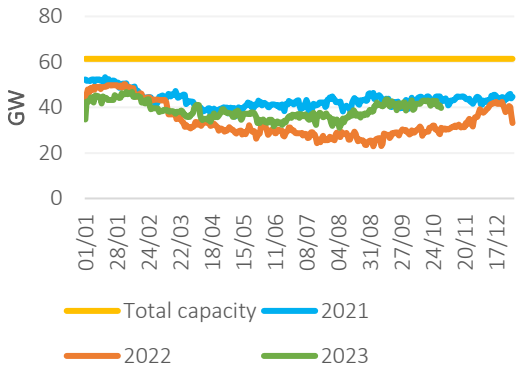
Electricity production from gas witnessed a 37% y-o-y decrease, while the total electricity production in France increased by 23% y-o-y, reaching 43 TWh. This period also marked a significant recovery in nuclear power generation, which rose by 28% y-o-y. The availability of nuclear capacity increased by 40% y-o-y (Figure 21). According to forecasts from the French EDF utility program, the coming months are expected to see further increases in nuclear availability. Additionally, there were higher levels of electricity production from hydro (up 74% y-o-y), solar (up 15%) and wind (up 28%). Conversely, electricity production from coal fell by 76% y-o-y (Figure 20). In France's energy mix, nuclear power continued to dominate, comprising 64% of the total, followed by renewables (17%), hydro (13%), and gas (6%).

Figure 20: Trend in electricity production in France in November 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

Figure 21: French nuclear capacity availability



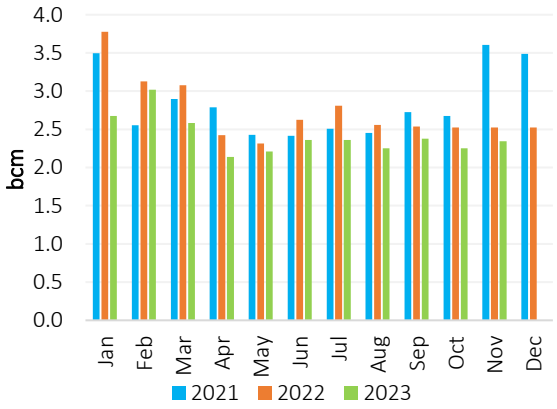
Source: GECF Secretariat based on data from Refinitiv and RTE

From January to November 2023, France's gas consumption decreased by 11% y-o-y, totalling 28.5 bcm.

2.1.1.4 Spain

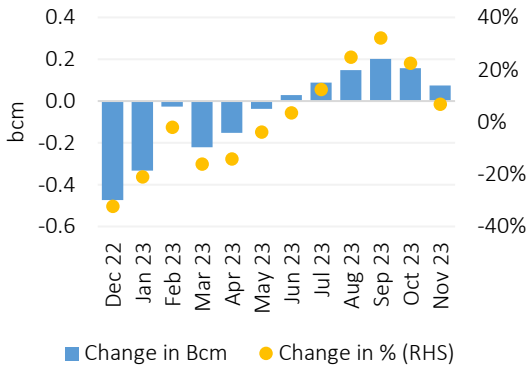
In November 2023, Spain saw a 7% y-o-y decline in its gas consumption, amounting to 2.3 bcm. This reduction was mainly attributed to decreased gas usage in power generation, influenced by heightened production from hydro, wind and solar energy sources, along with a decrease in electricity exports to France (Figure 22). In contrast, the industrial sector marked its sixth straight month of expansion, registering a 6.7% y-o-y increase (Figure 23). This uptick in growth was driven by elevated gas consumption across various industries, notably in refineries (67% y-o-y increase), pharmaceuticals (21%) and metallurgy (9%).

Figure 22: Gas consumption in Spain



Source: GECF Secretariat based on data from Enagas

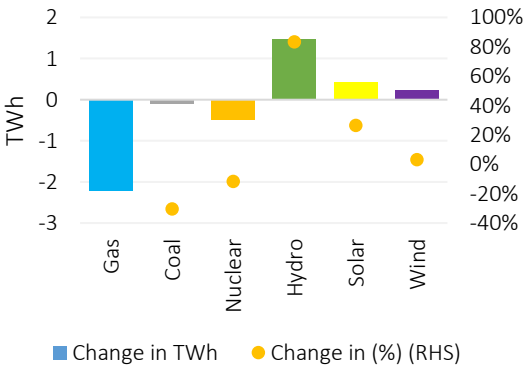
Figure 23: Trend in gas consumption in the industrial sector in Spain (y-o-y change)



Source: GECF Secretariat based on data from Enagas

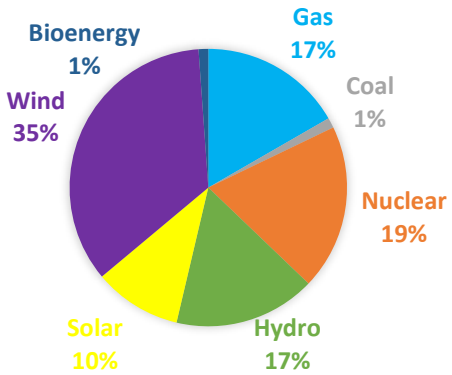
Electricity generation from gas experienced a 41% y-o-y decrease, while the overall electricity production in the country dropped by 4% y-o-y, totalling 19.5 TWh. Additionally, there were notable reductions in electricity production from coal and nuclear sources, decreasing by 30% and 12%, respectively. In contrast, significant increases were observed in electricity generation from renewable sources: hydroelectric power surged by 84% y-o-y, solar by 27%, and wind by 3% (Figure 24). Renewables maintained the dominant position in the power mix, accounting for 46% of the total, followed by nuclear (19%), gas (17%), hydro (17%) and coal (1%) (Figure 25).

Figure 24: Trend in electricity production in Spain in November 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember and Ree

Figure 25: Spanish electricity mix in November 2023



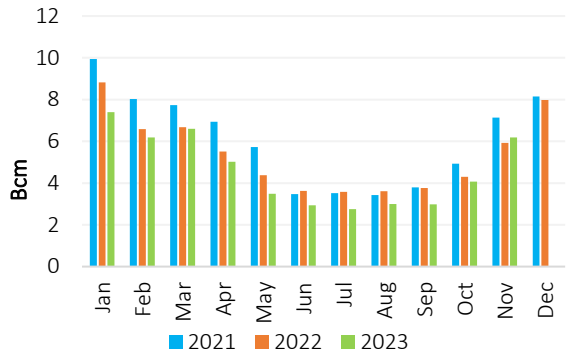
Source: GECF Secretariat based on data from Ember and Ree

From January to November 2023, Spain's gas consumption decreased by 12% y-o-y to reach 27 bcm.

2.1.2 United Kingdom

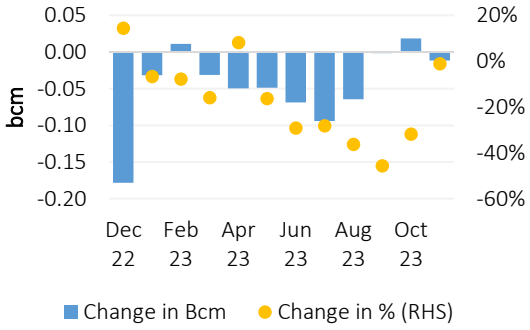
In November 2023, following a fifteen-month downward trend, gas consumption in the UK experienced a 4.3% y-o-y increase, amounting to 6.2 bcm (Figure 26). This rise was predominantly driven by heightened gas usage in the residential sector, attributed to colder than normal temperatures recorded during the month. Conversely, gas consumption in both the industrial and power generation sectors witnessed declines. Specifically, the industrial sector's consumption decreased by 7% to 0.16 bcm, while the power generation sector recorded a 19% drop, totalling 1.3 bcm (Figure 27).

Figure 26: Gas consumption in the UK



Source: GECF Secretariat based on data from Refinitiv

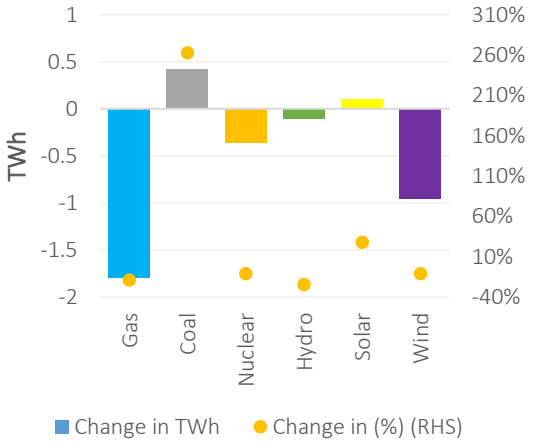
Figure 27: Trend in gas consumption in the industrial sector in the UK (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

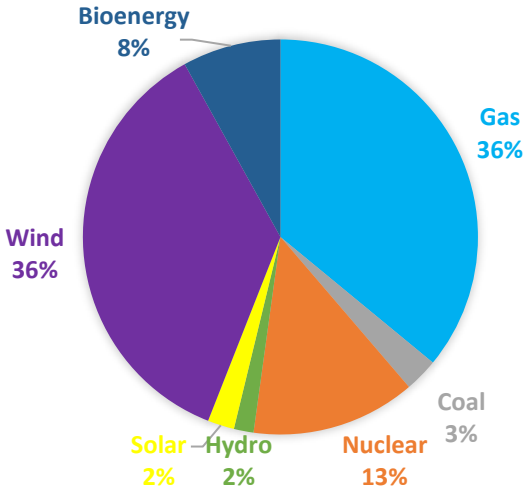
In the UK, electricity production from gas saw a 19% y-o-y decrease, contributing to a total electricity production drop of 9.5% y-o-y, which equated to 21 TWh. There were also declines in electricity generation from nuclear, hydro and wind sources, falling by 11%, 24%, and 11% y-o-y, respectively. In contrast, coal and solar energy production experienced significant increases, surging by 260% and 28% y-o-y, respectively (Figure 28). Within the power mix, renewables took the lead, comprising 46% of the total electricity production. This was followed by gas at 36%, nuclear at 13%, coal at 3% and hydro at 2%. (Figure 29).

Figure 28: Trend in electricity production in UK in November 2023 (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

Figure 29: UK electricity mix in November 2023



Source: GECF Secretariat based on data from Refinitiv

From January to November 2023, the UK's gas consumption fell by 11% y-o-y, totalling 51 bcm.

2.2 Asia

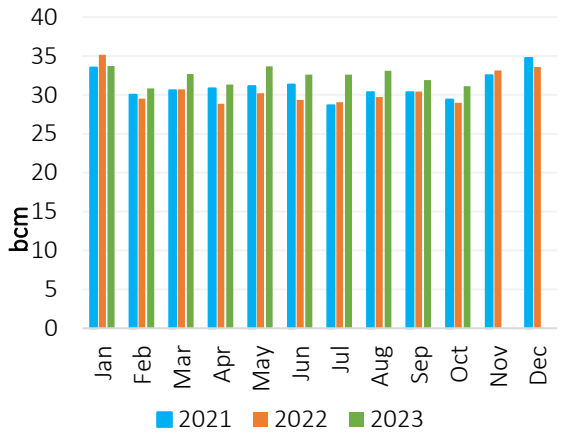
2.2.1 China

In October 2023, China's apparent gas demand, encompassing pipeline imports, LNG imports, and domestic production, rose by 7.4% compared to the previous year, reaching 31 bcm (Figure 30). This increase in natural gas consumption is linked to the revival of economic activities following the relaxation of stringent COVID-19 lockdown restrictions.

Electricity production from gas in China increased by 8% y-o-y, while the total electricity production rose by 7.4%, reaching 737 TWh. The month witnessed a significant surge in electricity generation from hydro (23%), solar (31%), and coal (4%) (Figure 31). Coal remained the dominant fuel in the power mix, accounting for 59% of the total, followed by hydro (17%), renewables (16%), nuclear (5%) and gas (3%).

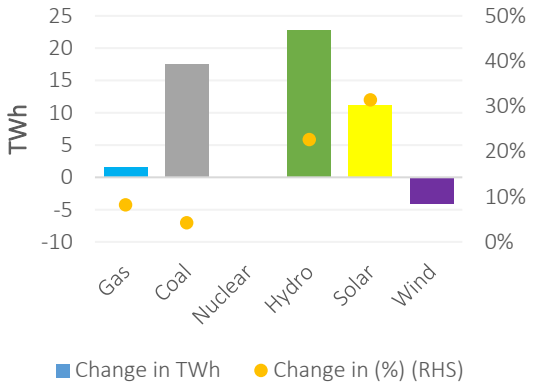
From January to October 2023, China's gas consumption rose by 7.2% y-o-y to 324 bcm.

Figure 30: Gas consumption in China



Source: GECF Secretariat based on data from Refinitiv

Figure 31: Trend in electricity production in China in in October 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember

2.2.2 India

In October 2023, India's gas consumption marked its tenth consecutive month of growth with a 31% y-o-y increase, reaching 6.1 bcm (Figure 32). This increase was primarily driven by the power generation, refinery and petrochemical sectors, which registered growth of 45%, 100% and 121% y-o-y, respectively. In India, the reliance on LNG imports for meeting natural gas demands was 48% of the country's total consumption, according to initial data from the oil ministry. This is an increase from 41% in the previous year.

In October, power consumption surged to 139.94 TWh, marking a 22% increase y-o-y. India's coal and gas-based power plants are operating at full capacity. The power ministry has prolonged its earlier instructions for utilities to augment coal imports and has directed gas-based utilities to function at maximum capacity. Natural gas in India is primarily utilised in the gas distribution network, notably for piped natural gas in homes and compressed natural gas in vehicles. Within the sectoral breakdown, the fertilizer sector accounted for the largest share at 37%, followed by city gas distribution (20%), power generation (13%), refining (5%) and the petrochemical sector (2%) (Figure 33).

Figure 32: Gas consumption in India

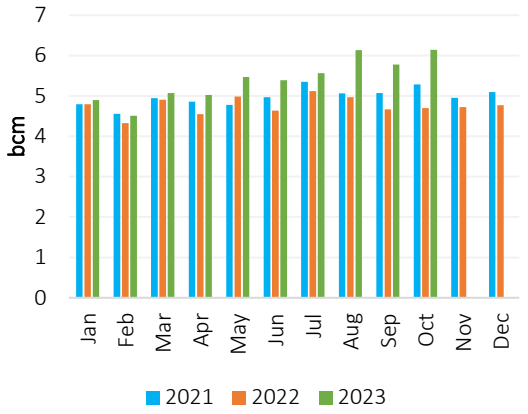
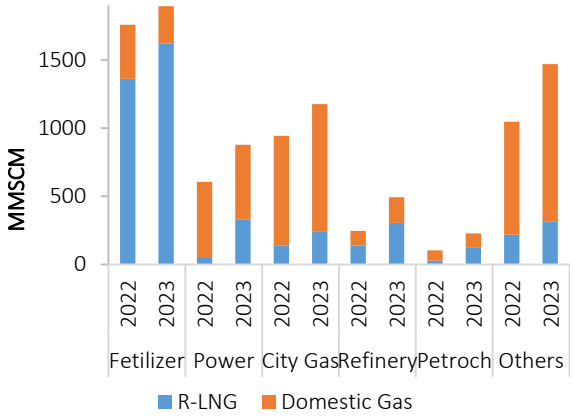


Figure 33: India's gas consumption by sector in Oct



Source: GECF Secretariat based on data from PPAC

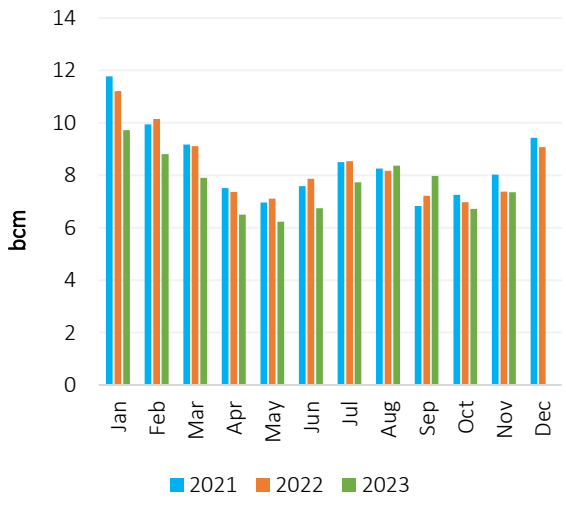
From January to October 2023, India's total gas consumption grew by 13% y-o-y to 54 bcm.

2.2.3 Japan

In November 2023, Japan's gas consumption saw a slight 0.5% y-o-y decrease, amounting to 7.3 bcm (Figure 34). This drop was primarily due to a 7.6% y-o-y reduction in gas usage within the city gas sector. In contrast, gas consumption in the power generation sector remained virtually unchanged from the previous year. The month also recorded a considerable 73% y-o-y increase in Japan's Heating Degree Days (HDD), a metric assessing heating demand, which averaged 3.4, indicating a higher need for heating compared to last year. Additionally, nuclear power availability was 40% higher in November 2023 than in the same month the previous year, which played a role in decreasing the dependence on gas for power generation (Figure 35).

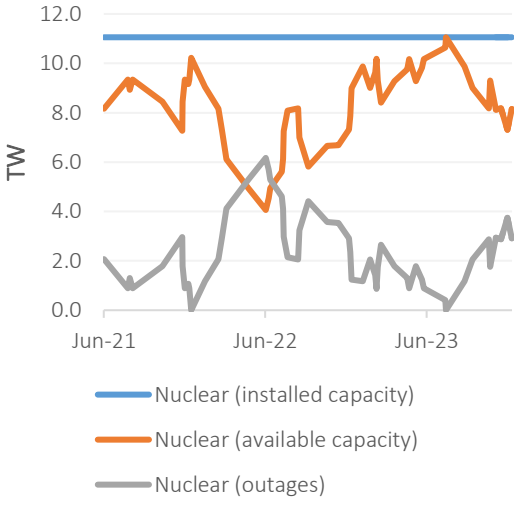
From January to November 2023, the total gas consumption in Japan declined by 7.8% y-o-y, totalling 84 bcm.

Figure 34: Gas consumption in Japan



Source: GECF Secretariat based on data from Refinitiv

Figure 35: Nuclear availability in Japan



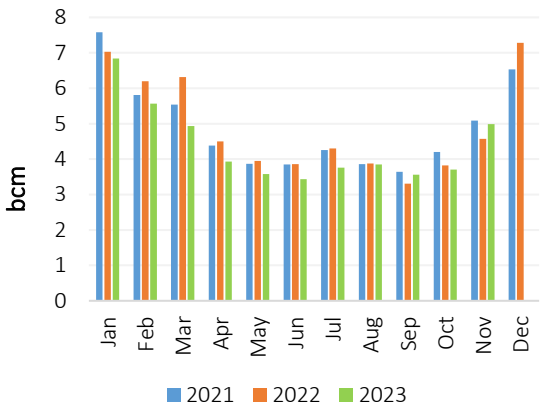
Source: GECF Secretariat based on data from Refinitiv

2.2.4 South Korea

In November 2023, South Korea's gas consumption saw a 9% y-o-y increase, totalling 5 bcm. This surge was mainly propelled by a notable 19% rise in gas usage within the city's town gas sector. The power generation sector also showed a modest uptick in gas consumption (0.1%) (Figure 36). The Heating Degree Days (HDD) in South Korea averaged 8.6 during November, representing a significant 55% y-o-y increase, highlighting a greater need for heating compared to the previous year (Figure 37).

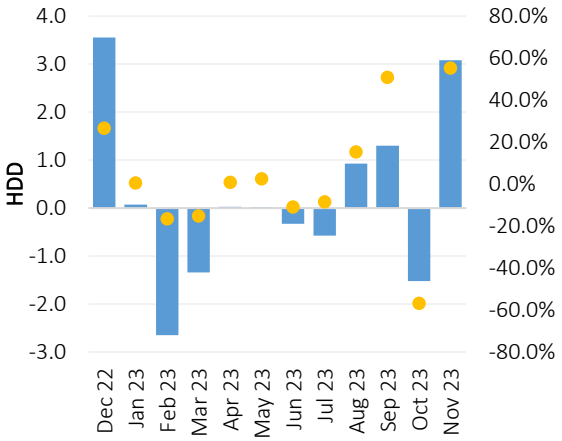
From January to November 2023, South Korea's gas consumption dropped by 7% y-o-y to 48 bcm.

Figure 36: Gas consumption in South Korea



Source: GECF Secretariat based on data from Refinitiv

Figure 37: HDD in South Korea (y-o-y change)



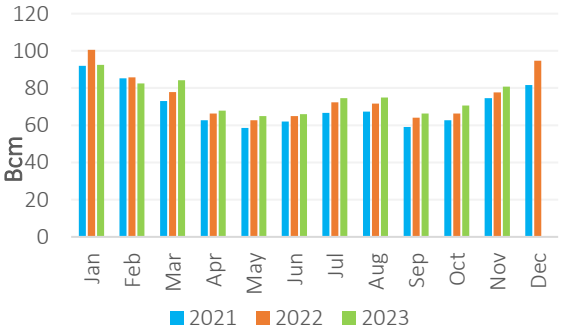
Source: GECF Secretariat based on data from Refinitiv

2.3 North America

2.3.1 US

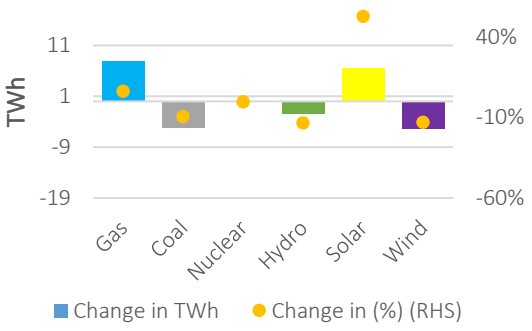
In November 2023, the US witnessed a 4% y-o-y increase in gas consumption, reaching 81 bcm (From January to November 2023, US gas consumption increased by 1.9% y-o-y to 822 bcm.

Figure 38: Gas consumption in the US



Source: GECF Secretariat based on data from EIA and Refinitiv

Figure 39: Electricity production in the US in November 2023 (y-o-y change)



Source: GECF Secretariat based on data from Ember and Refinitiv

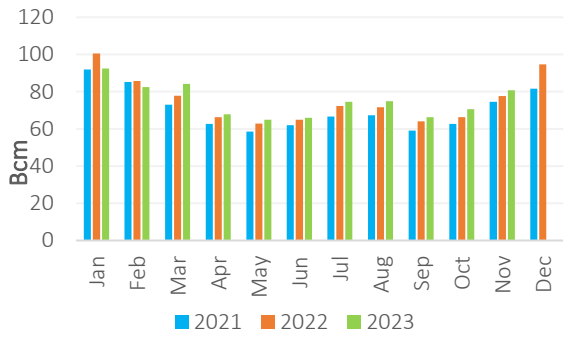
). The significant rise in the power generation sector can be attributed to the ongoing reduction of coal power plants, a consequence of the falling prices of natural gas. Additionally, the residential and commercial sectors registered modest increases in gas consumption, with

2.4% and 2.3% y-o-y growth, respectively. The industrial sector also reported a 1.5% y-o-y increase, totalling 21 bcm.

Electricity generation from gas experienced a 6% y-o-y increase, contributing to an overall rise in electricity production of 0.2%. The month was marked by a decline in generation from coal, nuclear, hydro, and wind, which decreased by 9%, 0.3%, 13% and 13%, respectively. On the other hand, solar energy production saw a significant surge, increasing by 53% y-o-y (Figure 39). In the power mix, gas continued to lead with a 42% share, followed by nuclear (19%), renewable energy sources (18%), coal (16%) and hydro (5%).

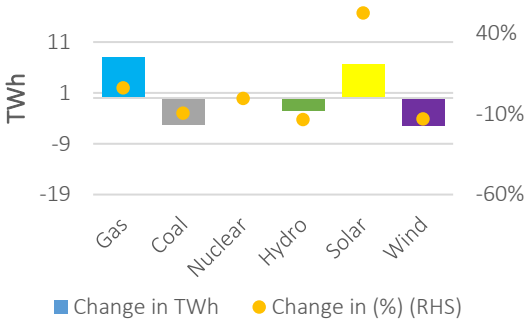
From January to November 2023, US gas consumption increased by 1.9% y-o-y to 822 bcm.

Figure 38: Gas consumption in the US



Source: GECF Secretariat based on data from EIA and Refinitiv

Figure 39: Electricity production in the US in November 2023 (y-o-y change)

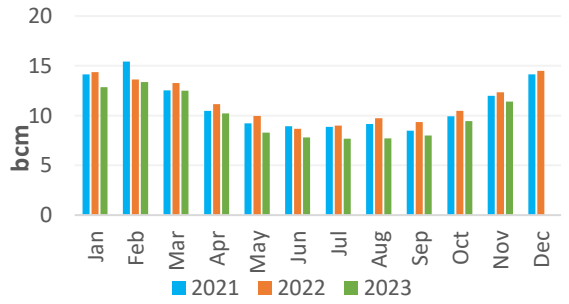


Source: GECF Secretariat based on data from Ember and Refinitiv

2.3.2 Canada

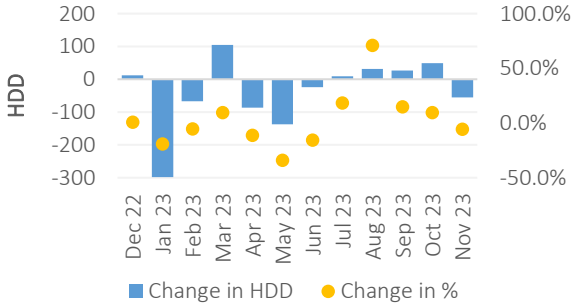
In November 2023, Canada experienced a 7.6% y-o-y decrease in gas consumption, dropping to 11 bcm (From January to November 2023, Canada's gas consumption fell by 10% y-o-y to 109 bcm.

Figure 40: Gas consumption in Canada



Source: GECF Secretariat based on data from Refinitiv

Figure 41: HDD in Canada (y-o-y change)

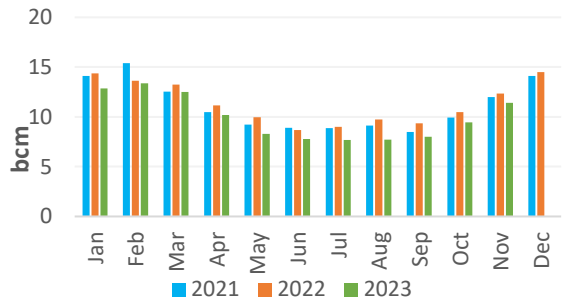


Source: GECF Secretariat based on data from Refinitiv

). This decline was mainly due to an 11% reduction in gas usage across the combined industrial and power generation sectors. However, in contrast, the commercial sector experienced a 2% y-o-y increase in gas consumption. Meanwhile, the residential sector maintained the same level of gas usage as the previous year. The Heating Degree Days (HDD) in Canada averaged 923 for November, indicating a 5.7% decrease compared to the same period last year (Figure 41).

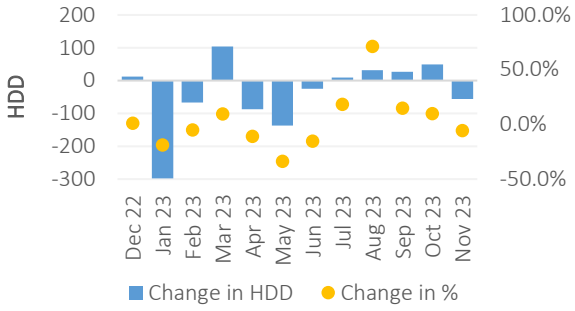
From January to November 2023, Canada's gas consumption fell by 10% y-o-y to 109 bcm.

Figure 40: Gas consumption in Canada



Source: GECF Secretariat based on data from Refinitiv

Figure 41: HDD in Canada (y-o-y change)



Source: GECF Secretariat based on data from Refinitiv

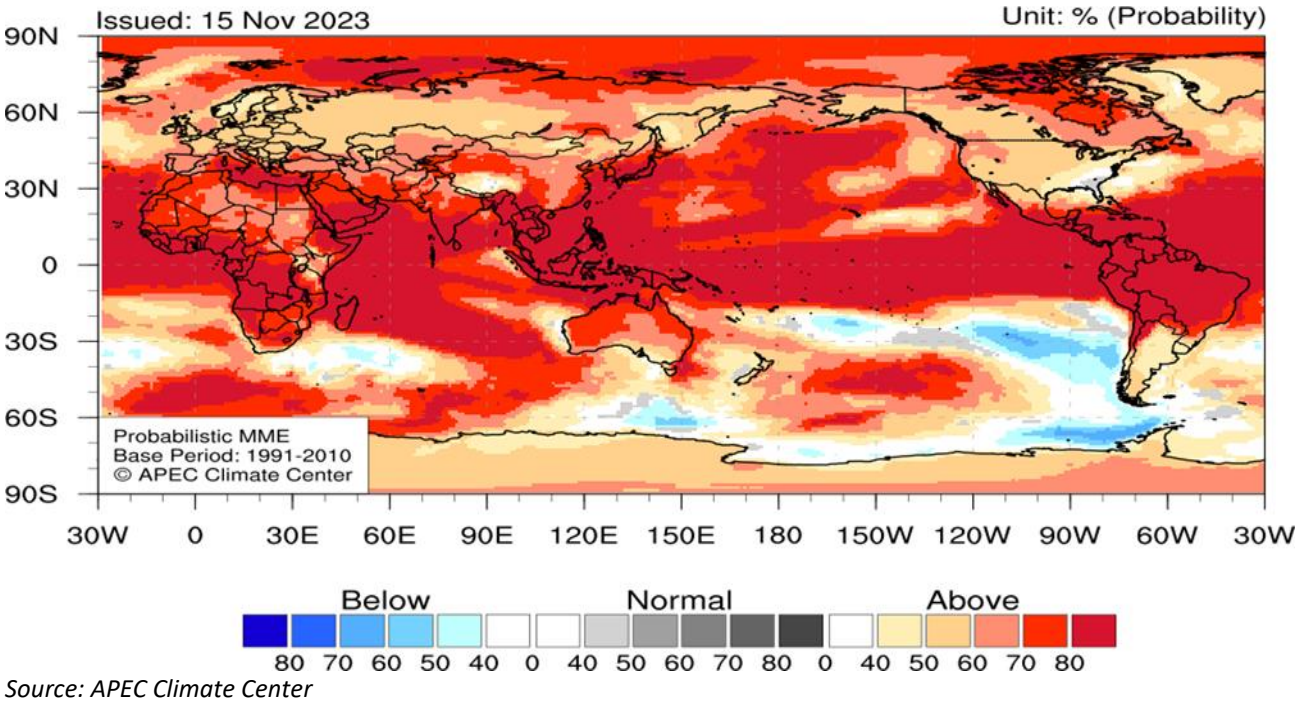
2.4 Weather Forecast

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 December 2023 to February 2024

According to the Climate Outlook by the APEC Climate Center published on November 15, 2023 (Figure 42), a pronounced likelihood of experiencing above normal temperatures is predicted for most of the globe (excluding for some region of the southeastern South Pacific) for the period December 2023 to February 2024.

Figure 42: Temperature forecast December 2023 to February 2024

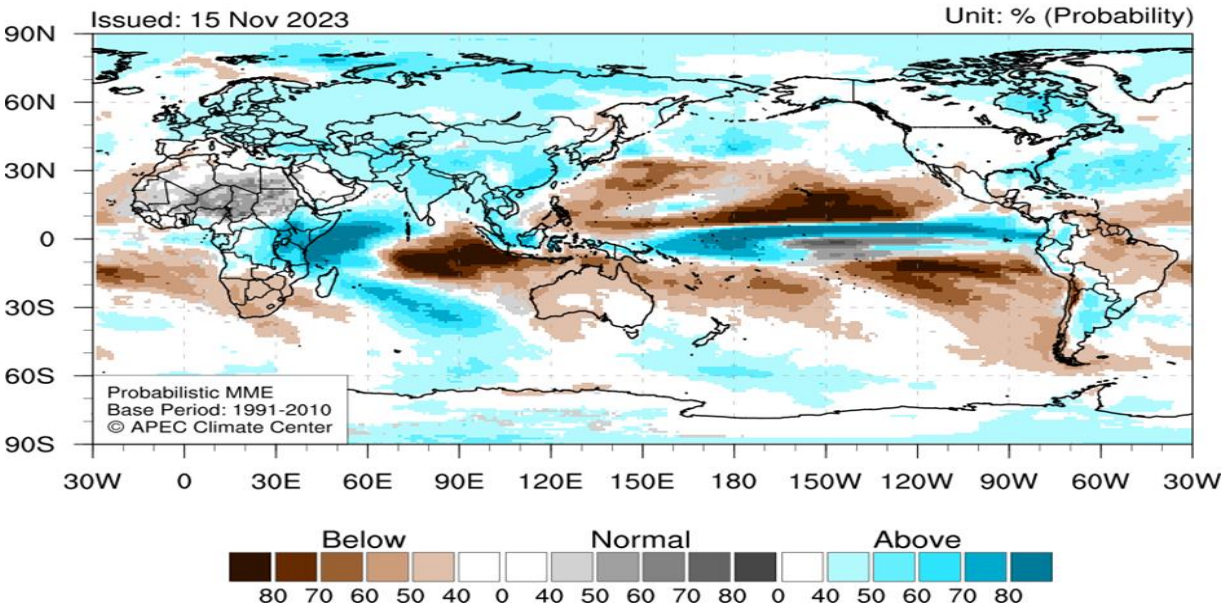


Source: APEC Climate Center

2.4.2 Precipitation Forecast for December 2023 to February 2024

According to the Climate Outlook by APEC Climate Center published on November 15, 2023 (Figure 43), above normal precipitation is expected for the western equatorial Pacific, off-equatorial North Pacific, horn of Africa, the Arctic, Eurasia, and southern South America. While below normal precipitation is expected central off-equatorial North Pacific, eastern off-equatorial South Pacific, the eastern Indian Ocean, the western tropical North Pacific, western tropical South Pacific, tropical South Atlantic, the subtropical North Atlantic, northeastern South America, and northern Australia for the period December 2023 to February 2024.

Figure 43: Precipitation forecast December 2023 to February 2024



Source: APEC Climate Centre

3 Gas Production

3.1 Global

The forecast for global gas production in 2023 indicates a slight increase of 0.7% (Table 1). This rise is mainly expected in regions such as North America, the Middle East, and Asia Pacific, while Europe, Africa and the CIS regions may potentially witness a decrease in production. Non-GECF countries are anticipated to enhance their gas production by 2.5%, reaching a total of 2,395 bcm. In this scenario of growth, the US is set to play a significant role, with a projected growth of 41 bcm over the previous year, largely due to increased associated gas production from shale oil fields. Additionally, the Middle East is expected to see a notable increase in gas production of approximately 18 bcm, with Iran, Qatar and Saudi Arabia being the primary contributors.

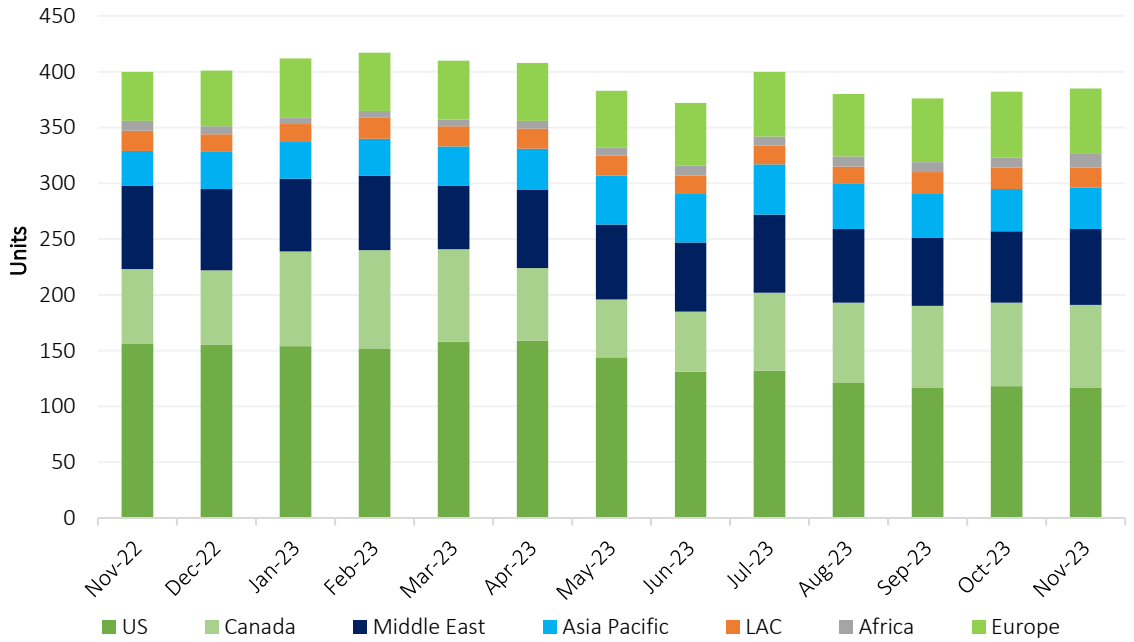
Table 1: Global gas production forecast by region (bcm)

Region	2021	2022	2022 Revision*	2023	2023 Revision*
Africa	258	253	0.1%	251	-1.8%
Asia Pacific	643	648	0.1%	657	0.0%
CIS	910	812	0.0%	783	0.7%
LAC	157	162	1.3%	162	2.1%
Europe	225	233	0.3%	217	-2.1%
Middle East	669	682	-0.1%	700	0.0%
North America	1165	1229	0.1%	1280	0.0%
World	4026	4020	0.07%	4049	0.0%
GECF	1759	1683	0.2%	1654	-0.1%
non-GECF	2267	2336	0.0%	2395	0.1%

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

In November 2023, the global count of gas drilling rigs, indicative of upstream activity, saw a m-o-m rise of 3 units, bringing the total to 385 rigs. This was a decrease from the 400 rigs recorded in November 2022, showing a y-o-y drop of 15 units. The decline was primarily due to a reduction in gas rigs in the US, as shown in (Figure 44). Conversely, the recent monthly increase was largely fuelled by the Middle East and Africa, where operational gas rigs rose by 4 units in each region.

Figure 44: Trend in monthly global gas rig count



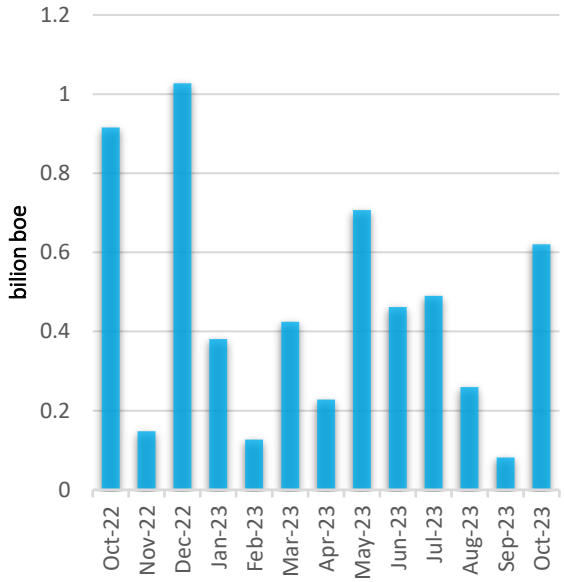
Source: GECF Secretariat based on data from Baker Hughes
Note: Excludes data for Eurasia and Iran

In October 2023, the total volume of gas and liquids discovered amounted to 620 million barrels of oil equivalent (boe). Of this, natural gas represented the majority, accounting for 79% (84 bcm), while oil constituted 21% (130 million boe). This marked a rebound from the record low in monthly discovered volumes in September 2023 (83 million boe). However, it still represented an annual decrease in volumes (compared to the 915 million boe discovered in October 2022). The cumulative volume of discoveries in the period January to October 2023 reached 4.2 billion boe, compared to discovered volumes of 6.1 billion boe for the same period in 2022. This resulted in an average monthly discovered volume of 420 million boe in the first ten months of 2023 (Figure 45). The decline in discovered volumes in 2023 reflects the challenges confronting global exploration activity. Approximately 72% of the total discoveries were made offshore.

In October 2023, 6 new discoveries were announced, 5 of which were offshore. Asia Pacific held the major share in the new discovered volumes with 77%, followed by LAC and North America with 14% and 8%, respectively. No significant discoveries were reported in Africa and the Middle East. (Figure 46).

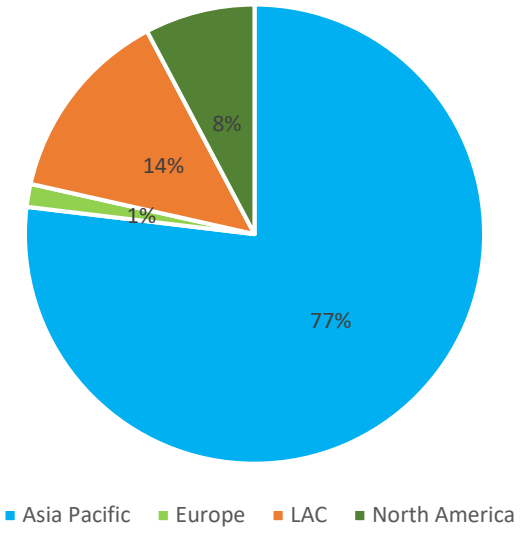
The Geng North gas discovery, off the coast of East Kalimantan, Indonesia, was the largest hydrocarbon discovery announced in October 2023. The discovery was made by the exploration well, Geng North-1, drilled at depth of 5025m. According to Eni's release, Geng North is estimated to contain about 5 tcf of gas in place (142 bcm) and more than 400 million bbl of condensate. In addition, Eni is considering the option of a fast-track development utilising a Floating Production, Storage and Offloading (FPSO) vessel, targeting the establishment of production hub in the northern part of the Kutei Basin, with gas then linked to the Bontang LNG terminal.

Figure 45: Monthly gas and liquid discovered volumes



Source: GECF Secretariat based on Rystad Energy Ucube

Figure 46: Discovered volumes in October 2023 by region

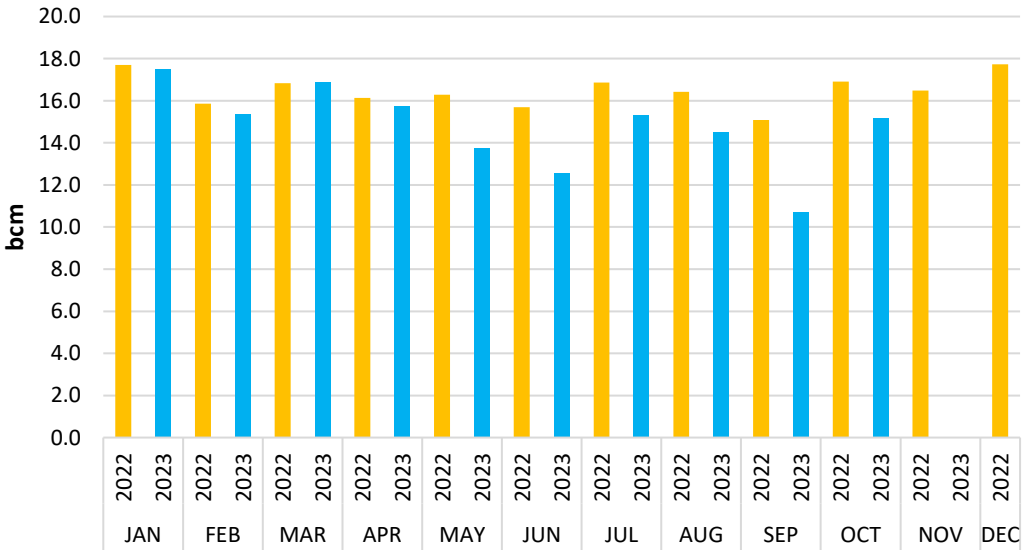


Source: GECF Secretariat based on Rystad Energy Ucube

3.2 Europe

In October 2023, Europe's gas production experienced a y-o-y decrease of 10%, culminating in an overall production of 15.2 bcm (Figure 47). This decline primarily stemmed from reduced output from Norway, the Netherlands and the UK, the region's key producers, . Furthermore, the projected total gas production for 2023 is anticipated to be 16 bcm lower than the preceding year.

Figure 47: 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*

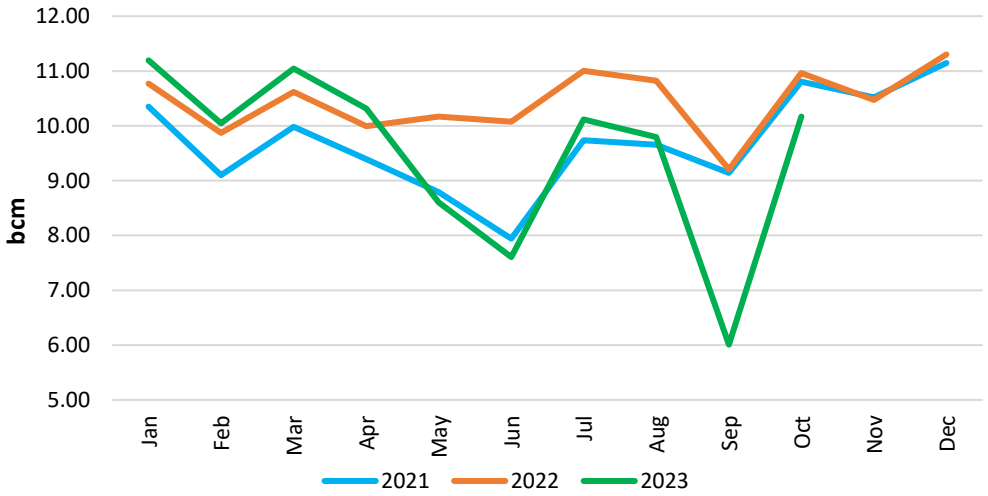
3.2.1 Norway

Preliminary data from the Norwegian Petroleum Directorate showed a y-o-y reduction of 7% in Norway's gas production for October 2023, amounting to 10.17 bcm, as seen in (Figure 48). Consequently, the total gas production from January through October accumulated to 94.9 bcm.

Furthermore, ConocoPhillips announced the production startup from the Tommeliten gas field in the North Sea in November, six months ahead of schedule. The production concept was made using two subsea facilities, tied back into the Ekofisk Complex in the North Sea. It is estimated that the field contains approximately 150 million boe (26 bcm), out of which gas constitutes approximately 70%, while the remaining part is condensate.

Regarding maintenance activities, November 2023 witnessed a brief unplanned maintenance outage in the 25.8 mcm/d Aasta Hansteen gas field which reduced its output capacity to the level of 10 mcm/d for a period of 2 days. This reduction in output was compensated by an elevated capacity from the 153 mcm/d Kollsnes processing plant.

Figure 48: Trend in gas production in Norway



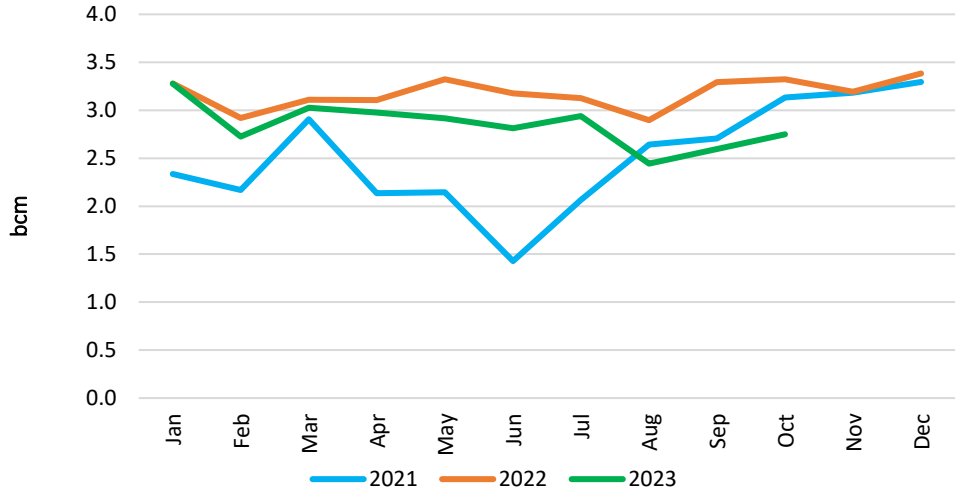
Source: GECF Secretariat based on data from Refinitiv and Norwegian Petroleum Directorate

3.2.2 UK

October 2023 witnessed a 17% y-o-y decline in the UK's gas production, resulting in a total output of 2.75 bcm, as illustrated in (Figure 49). From January to October, the cumulative gas production reached 28.7 bcm, marking a 10% drop from the corresponding period in the previous year.

In November, the UK Government announced a new energy regulation that would mandate the North Sea Transition Authority (NSTA), the regulator overseeing the process of granting new oil and gas exploration and production licences in the North Sea, to invite applications for new North Sea oil and gas licensing rounds on an annual basis. The new regulation would prioritise the domestic oil and gas production over imports and recognize their crucial role in the transition to a net zero target.

Figure 49: Trend in gas production in the UK



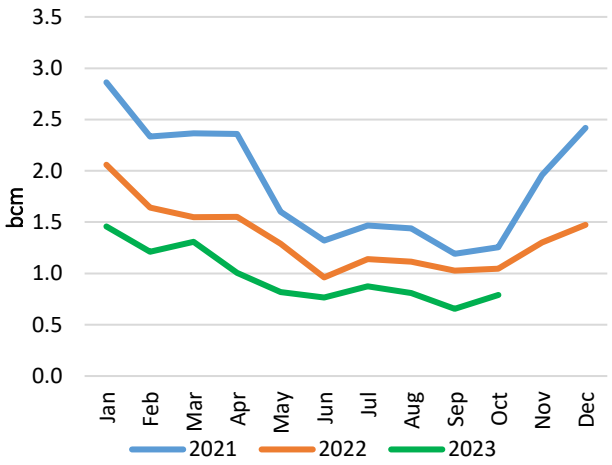
Source: GECF Secretariat based on data from Refinitiv

3.2.3 Netherlands

October 2023 saw the Netherlands experiencing a 24% decrease in gas production compared to the same month in the previous year, with a production level of 0.79 bcm, as shown in (Figure 50).

The total gas production from January to October 2023 was 9.7 bcm, a 27% decrease relative to the same timeframe in 2022. The main reason for this decline in Dutch gas production is the decreasing output from its mature fields and the cessation of production at the Groningen field.

Figure 50: Trend in gas production in the Netherlands



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

3.3 Asia

3.3.1 China and India

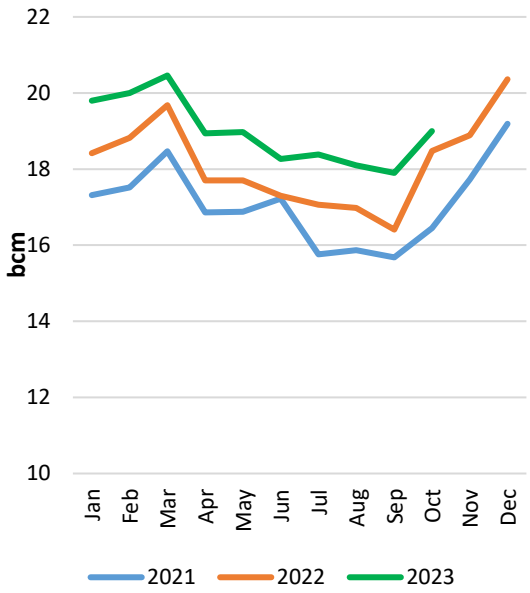
In October 2023, China experienced a y-o-y increase of 3% in its gas production, achieving a volume of 19 bcm (Figure 51). Additionally, the cumulative gas production from January to October showed a 6% increase compared to the previous year, amounting to 189.8 bcm. The country also registered a coal-bed methane (CBM) production of 1.2 bcm for the month.

Furthermore, in November 2023, the Chinese state oil and gas company CNOOC announced the production startup of the first phase of its Bozhong 19-6 condensate gas project. The field is located in the central Bohai sea off the coast of eastern China and planned to reach 37,000 barrels of oil equivalent per day (boepd) at its peak production in 2024 (2.3 bcma). It is

worth noting that the project is the first operational condensate gas field with a proved in-place volume of over 200 bcm in Bohai Bay.

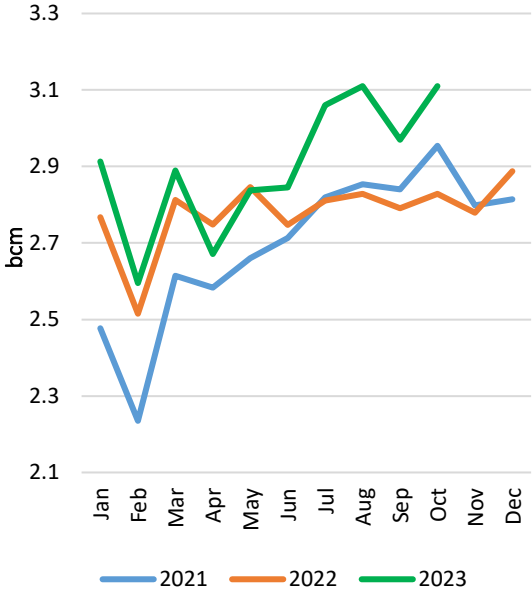
In October 2023, India observed a 10% increase in gas production from the previous year, leading to a total output of 3.11 bcm (Figure 52). From January to October 2023, the cumulative gas production reached 29 bcm, which is a 5% increase when compared to the same period in the previous year.

Figure 51: Trend in gas production in China



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

Figure 52: Trend in gas production in India



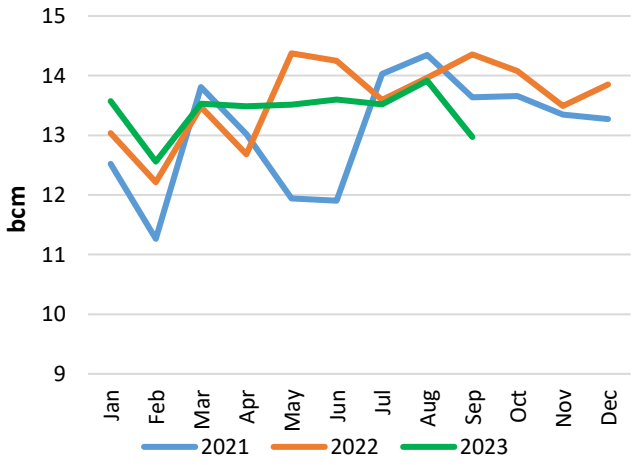
Source: GECF Secretariat based on data from Refinitiv, Ministry of Petroleum (India)

3.3.2 Australia

According to data from the Australian Department of Energy, the country's gas production in September 2023 reached 13 bcm, representing a 6.8% decline y-o-y (Figure 53). From January to September, there was a 1% y-o-y contraction in the cumulative gas production, reaching a volume of 120.9 bcm.

It is worth noting that, in November, the state of West Australia released a new bid round for 8 onshore oil and gas exploration blocks, located within the Canning, northern Carnarvon, Amadeus and Perth basins, with various acreages. The successful bidder would be granted an exploration licence for a period of 6 years.

Figure 53: Trend in gas production in Australia



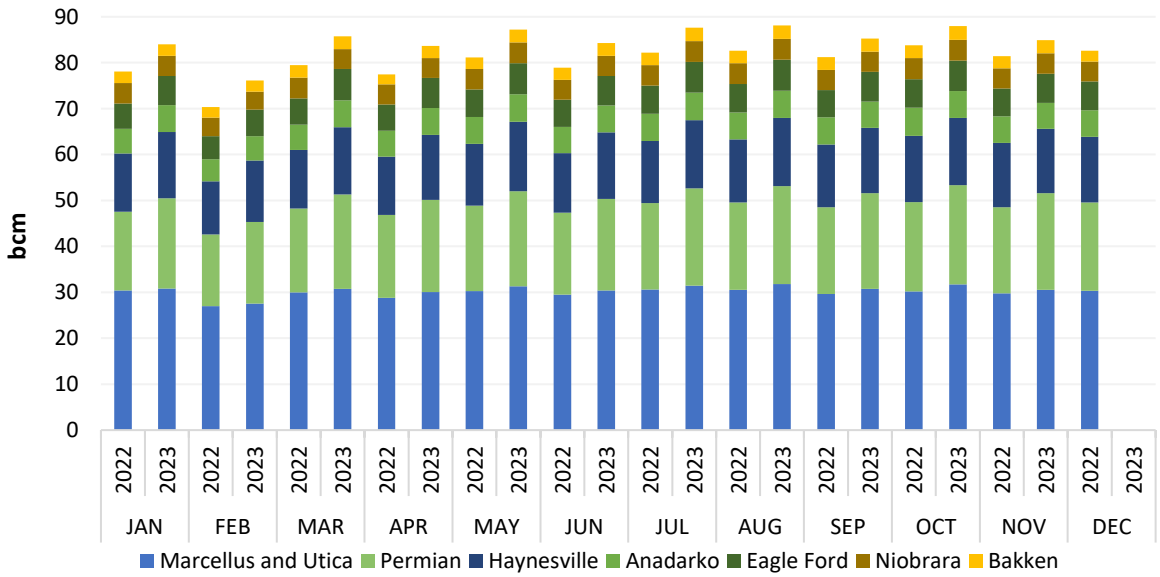
Source: GECF Secretariat based on data from the Australian Department of Energy

3.4 North America

3.4.1 US

In November 2023, the seven key shale gas-producing regions in the US—Anadarko, Appalachian, Bakken, Eagle Ford, Haynesville, Niobrara, and Permian—experienced a 4% y-o-y increase in production, achieving a total of 84.9 bcm (Figure 54). The Appalachian region, which includes the Marcellus and Utica shale formations, accounted for 36% of the total production. Additionally, the Permian shale oil field witnessed a 12% y-o-y rise in associated gas production, reaching 21 bcm, which constituted 25% of the total shale gas output.

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



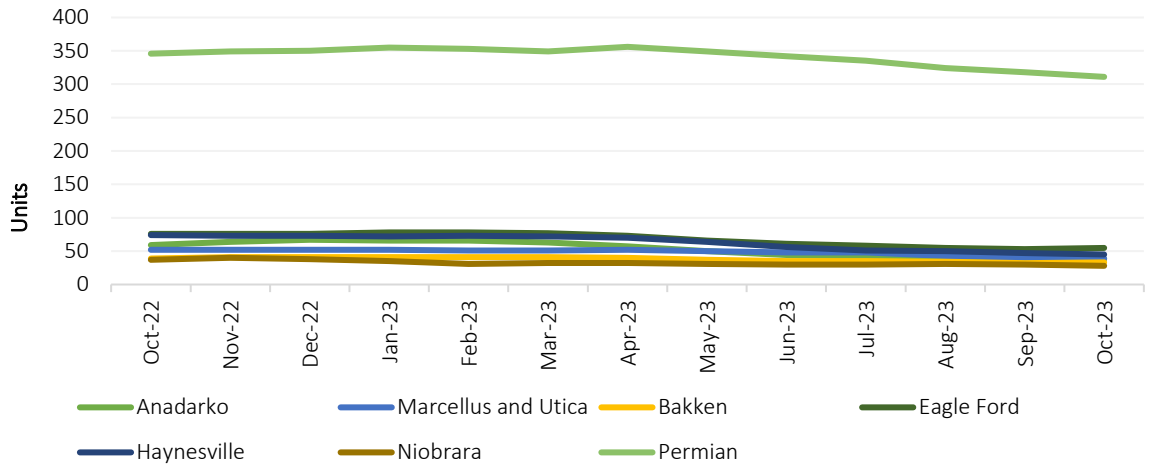
Source: GECF Secretariat based on data from Refinitiv, EIA

As of October 2023, the total number of oil and gas drilling rigs in the seven key shale oil and gas regions in the US was 549. This number represents a decline of 8 rigs from September 2023 and a reduction of 134 rigs compared to October 2022 (Figure 55).

Additionally, in October 2023, the seven regions recorded a total of 4,524 drilled but uncompleted (DUC) wells. This figure shows a decrease of 157 wells from the count in September 2023 (Figure 56).

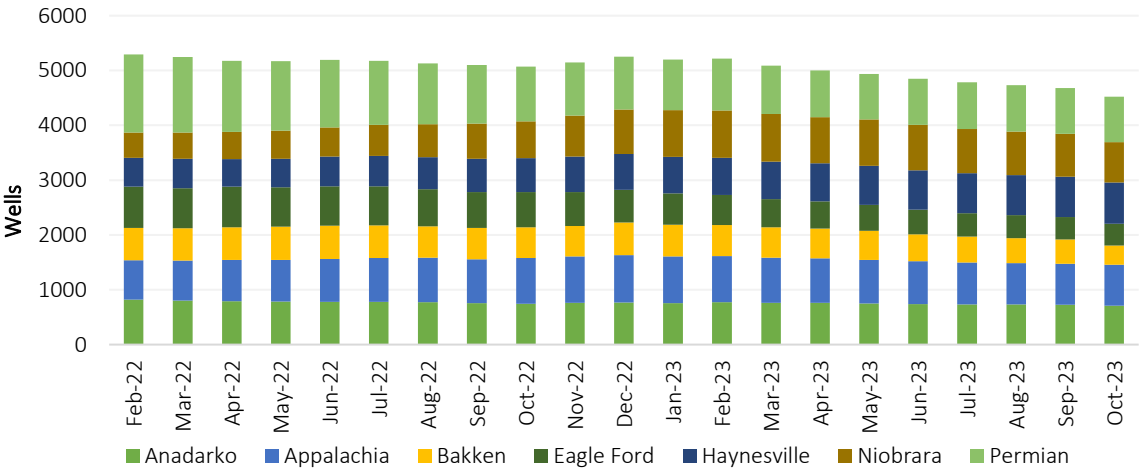
The EIA's November Drilling Productivity Report highlighted a decrease in new well gas production per rig both on a monthly and yearly basis, at 5.6% and 1.1% respectively (Figure 57). Consequently, the average new well gas production per rig across all regions was reduced to 5,571,000 cubic feet per day.

Figure 55: US shale region oil and gas rig count



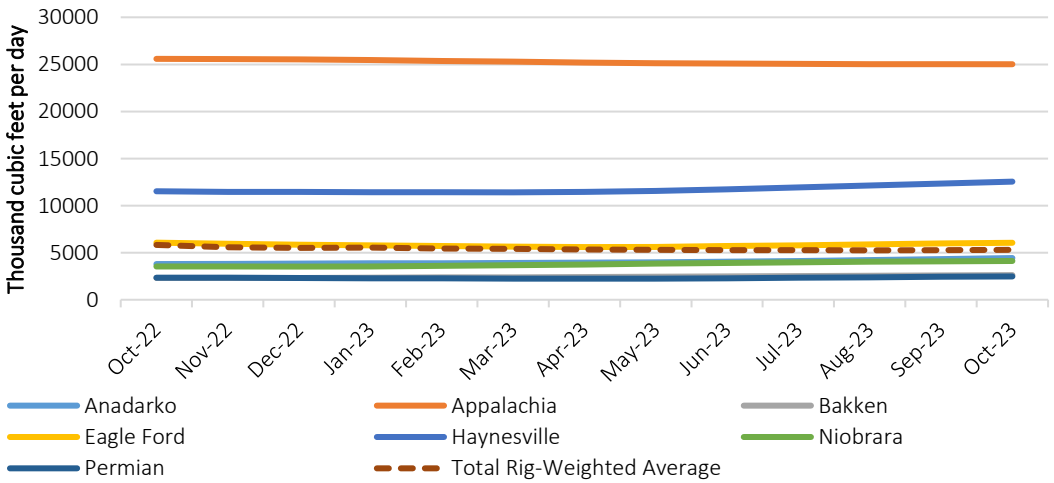
Source: GECF Secretariat based on data from Refinitiv and EIA

Figure 56: Drilled but uncompleted well (DUCs) counts in the US



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

Figure 57: New-well gas production per rig

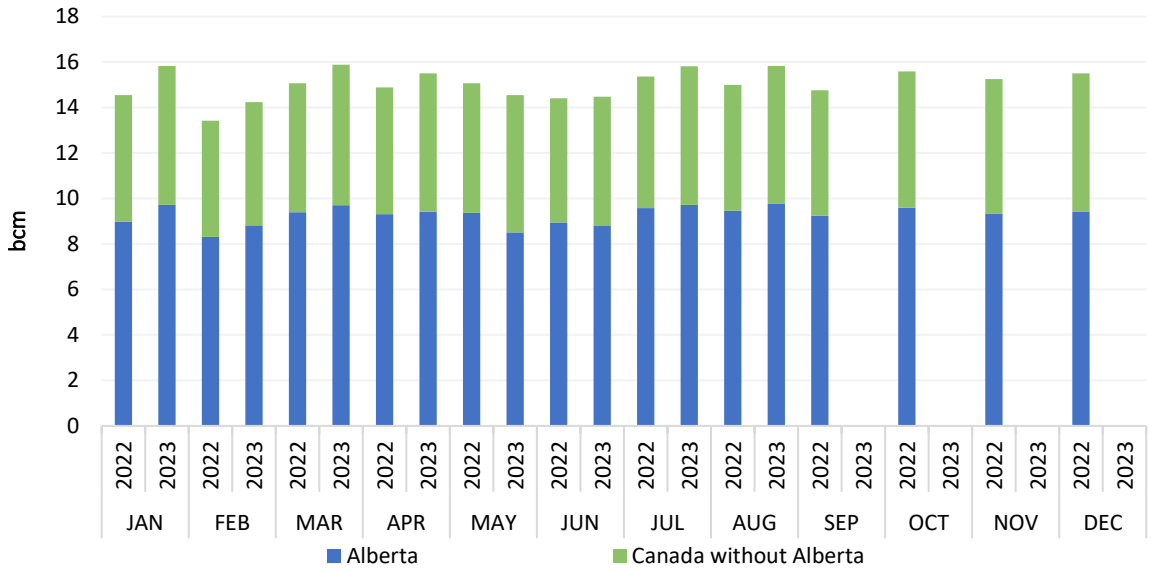


Source: GECF Secretariat based on data from Refinitiv, US EIA

3.4.2 Canada

The Canada Energy Regulator (CER) reports that in August 2023, Canada's gas production amounted to 15.8 bcm, marking a 6% y-o-y increase, primarily fuelled by the increased production in Alberta (Figure 58). The cumulative gas production from January to August showed a 4% y-o-y growth, totalling 122.1 bcm. Specifically, in August 2023, Alberta's gas production rose by 0.3 bcm, reaching 9.8 bcm.

Figure 58: Trend in gas production in Canada



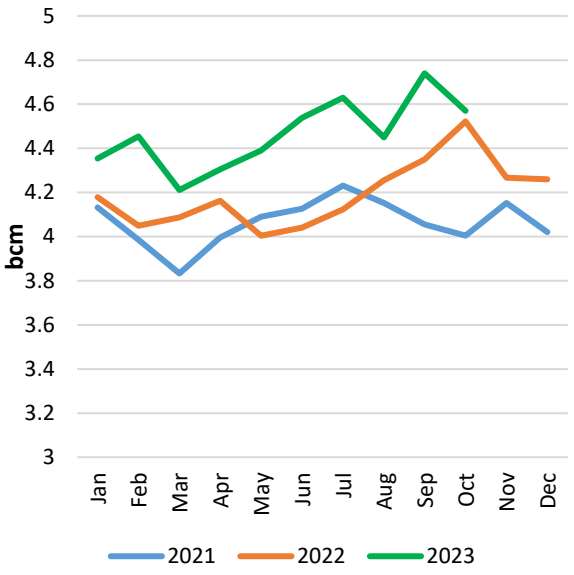
Source: GECF Secretariat based on data from the Canada Energy Regulator (CER)

3.5 Latin America and the Caribbean (LAC)

In Brazil, gross gas production reached 4.57 bcm in October 2023, according to data from the Brazilian National Agency of petroleum (ANP). This represented a 3.5% decline compared to a record high output level of 4.74 bcm, recorded in September 2023. However, it represented a 2.5% y-o-y increase compared to October 2023 (Figure 59). Approximately 55% of the produced gas was reinjected into reservoirs, the highest reinjection level achieved so far, Additionally, gas flaring witnessed an 11.8% m-o-m rise. In terms of distribution, offshore gas fields accounted for 86.2% of the gross monthly gas production, with the Tupi field in the Santos pre-salt basin emerging as the largest gas-producing field at 1.25 bcm (6% decline in production m-o-m). The FPSO facility in Guanabara in the shared Mero field was the highest gas producing facility with approximately 0.36 bcm, nearly mirroring the same level of the previous month.

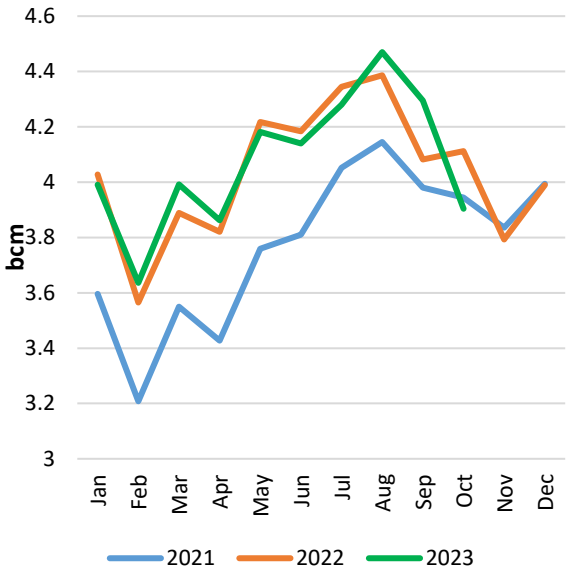
In Argentina, gross gas production reached a record high of 3.9 bcm in October 2023, based on data provided by the Argentinian Ministry of Economy. This represented a 9.1% m-o-m decrease compared to the 4.3 bcm output in September 2023. In addition, it constituted a 5% reduction compared to October 2022 (4.08 bcm) (Figure 60). The cumulative gas production from January to October 2023 amounted to 40.8 bcm, aligning closely with the production levels for the same period in 2022. Shale gas production amounted to 1.47 bcm in October 2023, representing 37.7% of the gross production while tight gas reservoir production was 0.46 bcm, accounting for 11.8% of the total gas production. The remaining part of production originated from the conventional gas fields.

Figure 59: Trend in gas production in Brazil



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

Figure 60: Trend in gas production in Argentina



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

3.6 Other Regions

Tanzania and Mozambique agreed to share the cross-border gas fields: According to a statement from Tanzania's Petroleum Upstream Regulatory Authority, Mozambique and Tanzania agreed on sharing the cross-border gas resources and to jointly work on their exploration and development. The two countries are planning to sign an MoU, highlighting their willingness for cooperation in the joint exploration and development of the shares resources and technological exchange in the area of LNG development. Tanzania and Mozambique possess significant volumes of gas resources, with Mozambique exporting its first LNG cargo in late 2022 and Tanzania developing a 10Mtpa LNG export terminal.

Eni started drilling a pivotal exploration well, offshore Egypt: According to Rystad Energy, Eni started drilling a key exploration well in the Mediterranean Sea, offshore Egypt. The exploration well Orion-1X is believed to unlock a potential gas-in-place of up to 280 bcm, in addition to 400 million bbl of condensate. The exploration play targeted by Orion-1X well include a potential extension of the Carbonate play, which was previously discovered in the massive Zohr gas field. This could open up a new area between Zohr and the Nile Delta formations. Eni holds a 70% stake in the block, with Energean holding the rest.

Saudi ARAMCO produced the first gas from its first unconventional tight gas project: In November, Saudi ARAMCO announced that production from the South Ghawar unconventional gas project started two months ahead of schedule, in a boost to the company's strategy of increasing gas production by 50% by 2030. South Ghawar's processing facility has a capacity of 300 million cubic feet per day and 38 thousand barrel of condensate per day. South Ghawar project is ARAMCO's first tight gas project and its second unconventional gas project after the North Arabia shale gas project in 2018. In addition, work is ongoing on the massive Jafurah unconventional gas development project, with production start-up planned for 2025.

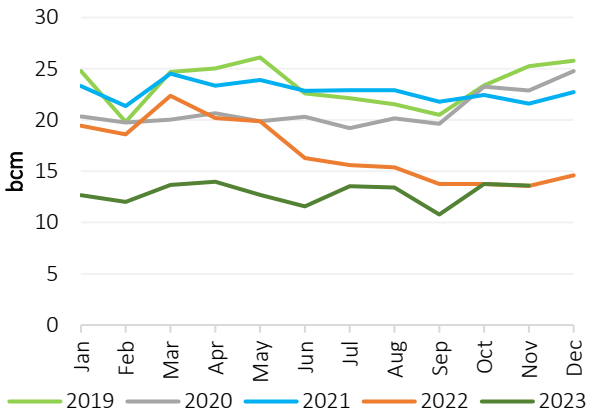
4 Gas Trade

4.1 Pipeline Natural Gas (PNG) Trade

4.1.1 Europe

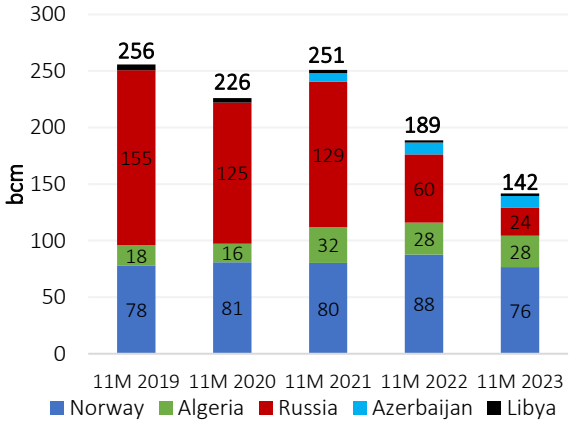
In November 2023, the EU imported 13.6 bcm of PNG, a modest 1% decline from the levels observed in the previous month, but the same volume as was achieved in November 2022 (Figure 61). Cumulative PNG volumes imported by the EU during the eleven months of 2023 reached 141.7 bcm, which represents a 25% deficit from the level reached during same point in 2022 (Figure 62). Barring the lower levels in September, which were due to maintenance activities in Norway, PNG imports to the region have largely stabilised since July (Figure 63).

Figure 61: Monthly PNG imports to the EU



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 62: Year-to-date EU PNG imports by supplier

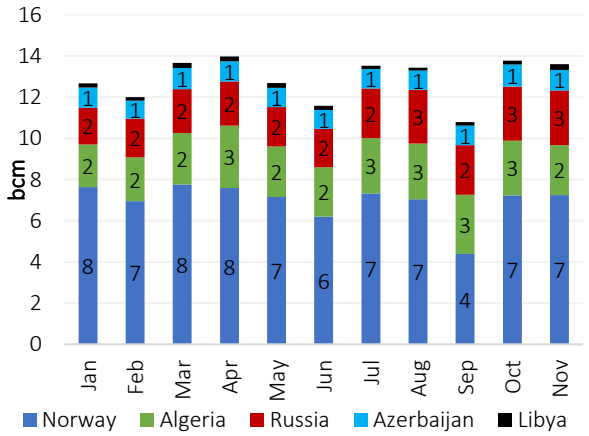


Source: GECF Secretariat based on data from McKinsey and Refinitiv

The supply dynamic to the EU has also steadied out in 2023 thus far, with Norway accounting for 54% of pipeline gas supply, followed by Algeria with 20% and Russia with 17%. During the period January to November 2023, imports from Russia fell by 60% y-o-y (36 bcm), while imports from Norway fell by 13% y-o-y (11 bcm). PNG imports from Algeria, Azerbaijan and Libya were virtually unchanged y-o-y.

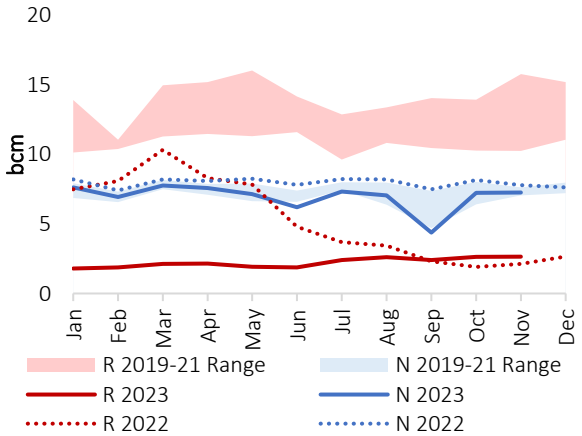
With just one more month remaining in 2023, PNG imports from Norway have averaged 7.0 bcm per month, compared with 8.0 bcm in 2022 and 7.2 bcm in the years 2019 to 2021. At the same time, the average PNG imports from Russia reached 2.2 bcm per month in 2023, compared with 5.5 bcm in 2022 and 12.4 bcm in the years 2019 to 2021 (Figure 64).

Figure 63: Monthly EU PNG imports by supplier



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 64: EU PNG supply from Russia and Norway



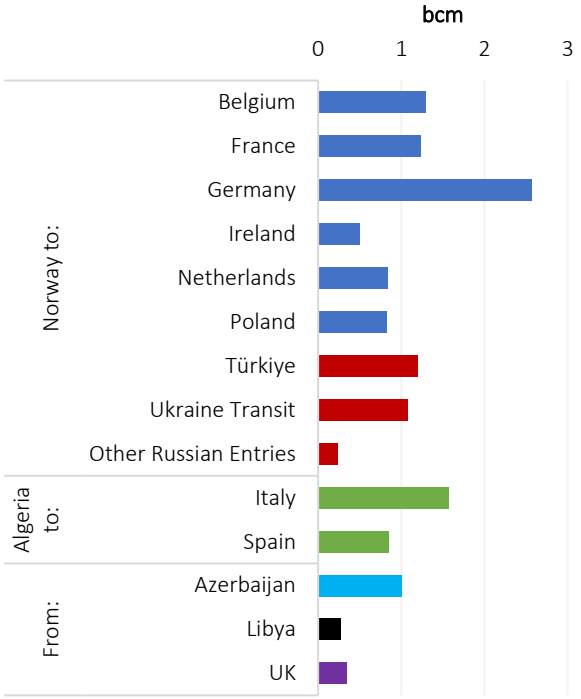
Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 65 shows the PNG imports to the EU via the major supply routes in November 2023.

Norway's PNG exports to Germany and Poland increased by 8% and 17% m-o-m, respectively, while supply to France and the Netherlands experienced declines of 11% and 17%, respectively. Russian flows via Turkstream contracted by 11% m-o-m, but volumes delivered via Ukraine and other entries increased by 2% and 3%, respectively. Net PNG flows from the UK to Europe have remained at a consistently low level since underground storage sites passed 90% capacity, reaching just 0.3 bcm in November.

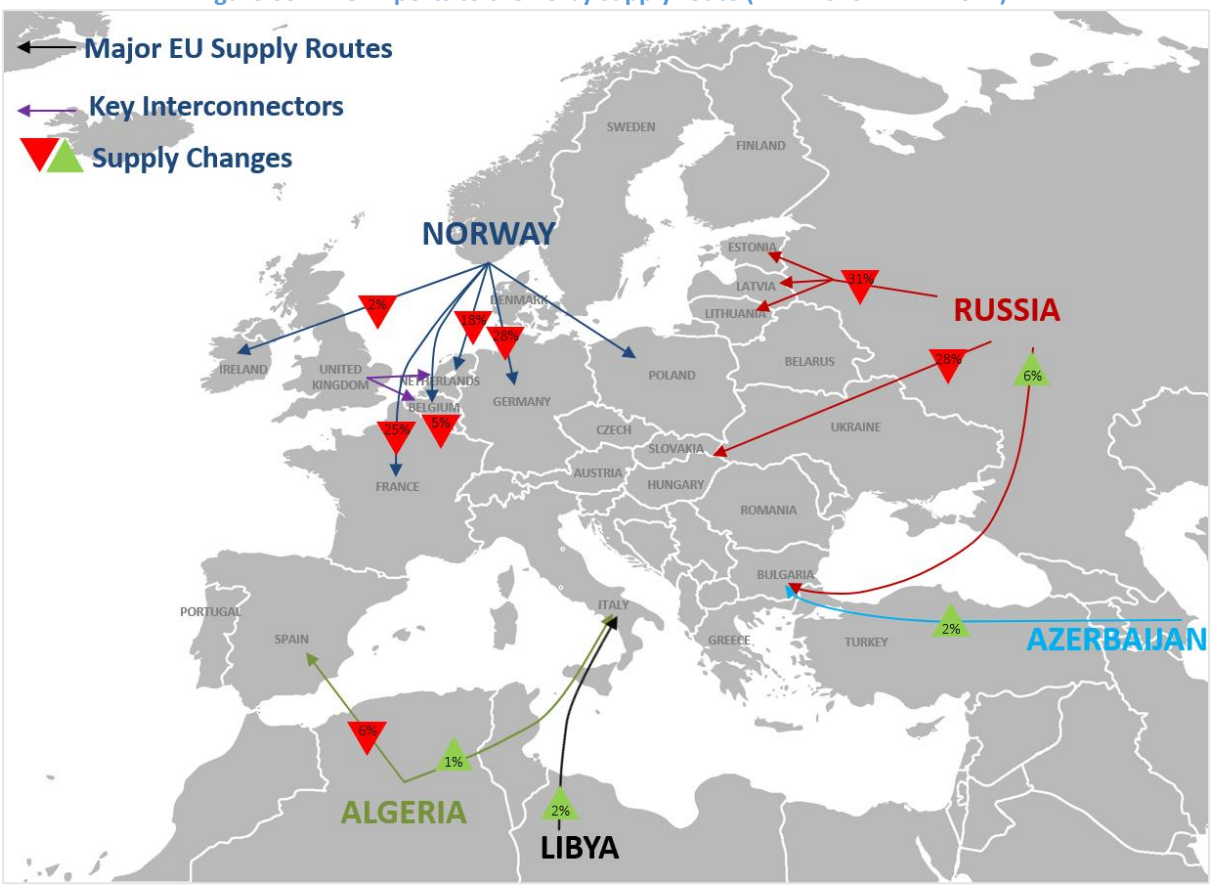
Figure 66 compares the PNG imports to the EU via major supply routes during the eleven months of 2023, with the same period in 2022. Russia has shifted its focus heavily, with exports via Turkstream growing by 6% y-o-y. Norway however recorded declines along all supply routes.

Figure 65: EU PNG imports by supply route, in November 2023



Source: GECF Secretariat based on data from McKinsey and Refinitiv

Figure 66: PNG imports to the EU by supply route (11M 2023 v 11M 2022)

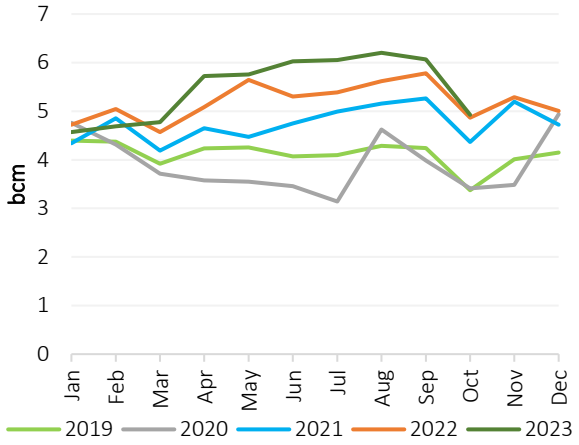


Source: GECF Secretariat based on data from McKinsey and Refinitiv

4.1.2 Asia

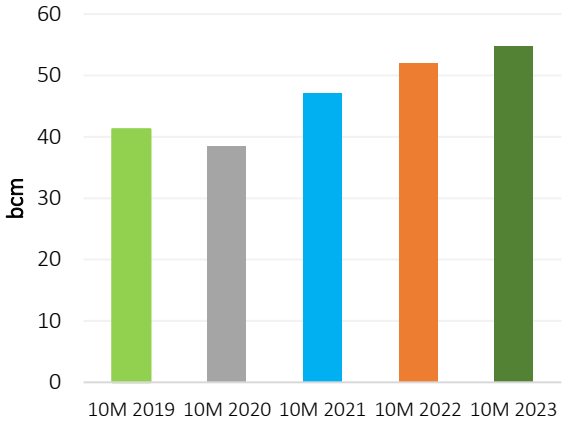
Following several months sustained at a high level, the monthly PNG import to China in October 2023 fell by 19% m-o-m. At 4.9 bcm for the month, this quantity was 1% higher than one year ago (Figure 67). The share of PNG in China's total imports fell to 41%, even as total gas imports also declined during the month. During the ten months of 2023, total PNG imports reached 54.8 bcm, representing a 5% increase compared with the same period in 2022 (Figure 68). The average monthly import rate in 2023 thus far was 5.5 bcm, up from 5.2 bcm in 2022.

Figure 67: Monthly PNG imports in China



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

Figure 68: Year-to-date PNG imports in China

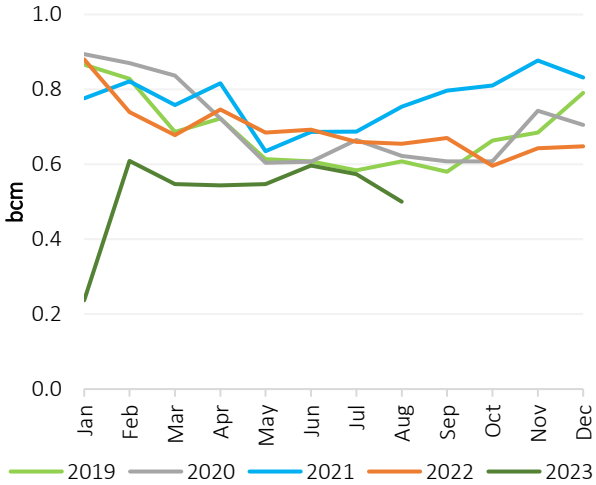


Source: GECF Secretariat based on data from Refinitiv and General Administration of Customs China

Singapore is the second largest market for pipeline gas in the region, importing from Indonesia and Malaysia. In August 2023, total PNG imports reached 0.50 bcm, which was a 13% fall m-o-m and was 24% less than the level of one year previously (Figure 69). Cumulative PNG imports after eight months of 2023 totalled 4.2 bcm, 28% less compared to same period in 2022.

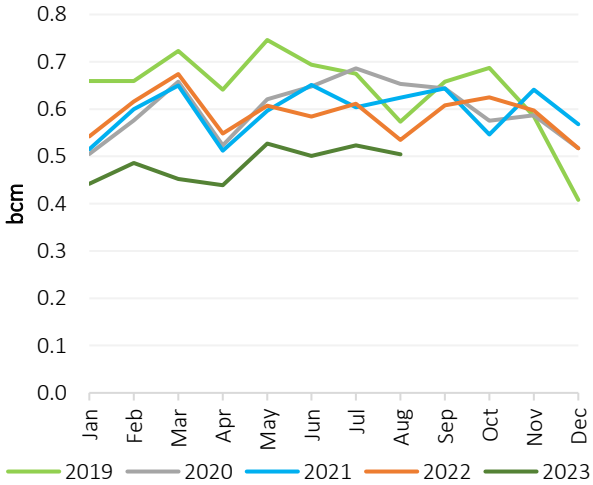
Furthermore, Thailand imported 0.50 bcm from Myanmar in August 2023. This volume was 4% less than the previous month and 6% lower y-o-y (Figure 70). From January to August 2023, cumulative imports fell by 18% y-o-y to reach 3.9 bcm.

Figure 69: Monthly PNG imports in Singapore



Source: GECF Secretariat based on data from JODI Gas

Figure 70: Monthly PNG imports in Thailand

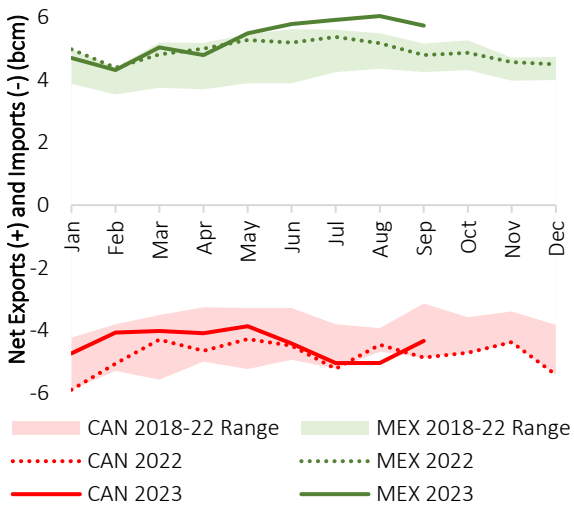


Source: GECF Secretariat based on data from JODI Gas

4.1.3 North America

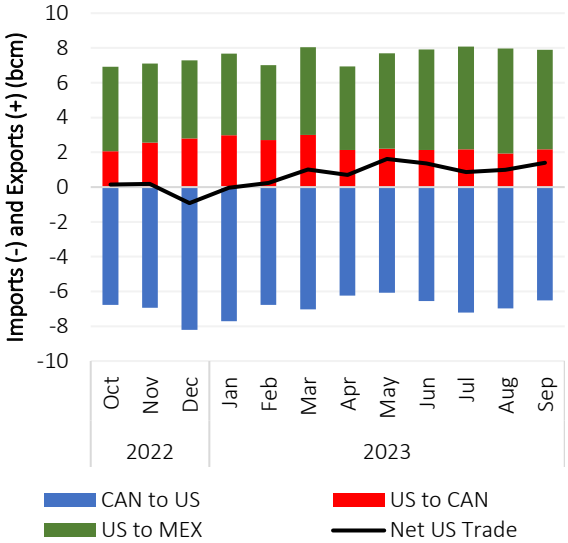
PNG exports from the US to Mexico continued at a high level, reaching 5.7 bcm in September 2023 (Figure 71). This quantity was 5% lower than in the previous month, but represented a 20% increase y-o-y. Net PNG imports from Canada were 4.3 bcm, a decline of 14% m-o-m and 11% y-o-y. After nine months of 2023, net PNG imports from Canada to the US fell by 8% y-o-y, while exports to Mexico rose by 6%. In September, 1.4 bcm of net PNG flowed in the direction from the US to the other countries (Figure 72). The average monthly flows in the region in 2023 were 6.8 bcm from Canada to the US, 2.4 bcm from the US to Canada and 5.3 bcm from the US to Mexico.

Figure 71: Historical net PNG trade in the USA



Source: GECF Secretariat based on data from US EIA

Figure 72: Monthly US PNG trade



Source: GECF Secretariat based on data from US EIA

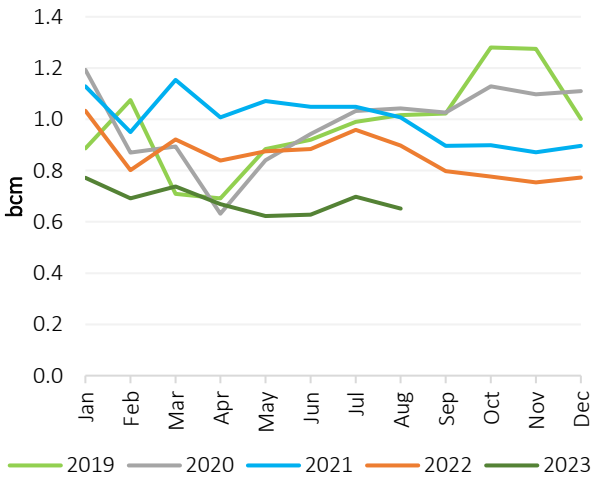
4.1.4 Latin America and the Caribbean

Bolivia is the largest exporter of pipeline gas in this region, supplying to Brazil and Argentina. In August 2023, total PNG exports declined by 7% m-o-m to reach 0.65 bcm (Figure 73). PNG exports have been much lower in 2023, and the August quantity was 27% less than the level recorded one year ago.

Moreover, after eight months of 2023, a total of 5.5 bcm of PNG exports took place, a 24% drop relative to the volumes exported over the same eight-month period in 2022.

Argentina's PNG exports to Chile rose by 36% to reach 0.11 bcm in August 2023. Cumulative exports from January to August 2023 reached 1.5 bcm.

Figure 73: Monthly PNG exports from Bolivia



Source: GECF Secretariat based on data from JODI Gas

4.1.5 Other Developments

Pipeline gas exports from Tanzania to Uganda: The governments of Tanzania and Uganda have signed an agreement for the development of a gas pipeline project linking both nations. First proposed in 2016, this project will bring supply from gas fields in southern Tanzania, to power plants in Uganda. Tanzania holds some 58 tcf of recoverable gas, of which domestic production of gas accounts for over 60% of the local power generation mix. At the signing ceremony held on 9 November 2023, Tanzania's Energy Minister highlighted the importance of pipeline gas exports to increasing gas consumption and boosting exploration. Tanzania is also pursuing LNG exports, and is currently negotiating a joint project with Equinor, Exxon Mobil and Shell.

Azerbaijan to supply pipeline natural gas to Serbia: The governments of Serbia and Azerbaijan have recently concluded a memorandum of understanding and gas sales agreement between their respective national gas companies. In this deal, Serbia's Srbijagas will purchase 400 million cubic meters per year of pipeline gas supplied by Azerbaijan's SOCAR. Serbia currently imports pipeline gas from Russia, via both Hungary and Ukraine. This new supply route from Azerbaijan is made possible through the construction of the Bulgaria-Serbia interconnector. Supply is expected to commence in late 2024.

Mexico to construct gas pipeline to facilitate LNG exports: The Mexican state of Chihuahua has entered into an agreement with Mexico Pacific Limited to construct the Sierra Madre pipeline, a new gas pipeline. This crucial gas link will expand Mexico's overall pipeline gas imports from the United States and serve feedgas to its own LNG exports ambitions. The Sierra Madre pipeline will start at the border with the US and traverse the Mexican states of Chihuahua and Sonora, terminating at the Saguaro Energía LNG facility on the west coast. The pipeline is expected to have a capacity of 28.9 bcma, and the liquefaction terminal will produce 15 mtpa. The overall cost for both projects is estimated at $14 billion.

4.2 LNG Trade

4.2.1 LNG Imports

In November 2023, the global imports of LNG reached 35.38 Mt, marking a 2.8% y-o-y increase (0.96 Mt). This represents the highest monthly export volume since January 2023 (Figure 74). The notable surge in LNG imports was primarily fuelled by robust growth in the Asia Pacific LAC regions, compensating for a decline in imports in Europe (Figure 75). Over the period from January to November 2023, the cumulative global LNG imports expanded by 2.7% (9.62 Mt) y-o-y, reaching a total of 370.10 Mt driven by a resurgence in LNG imports in Asia Pacific.

Figure 74: Trend in global monthly LNG imports

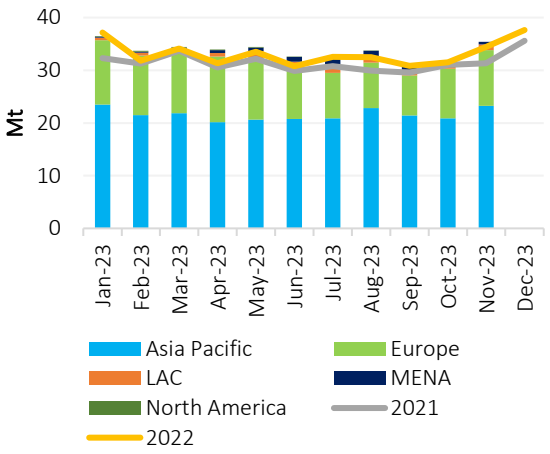
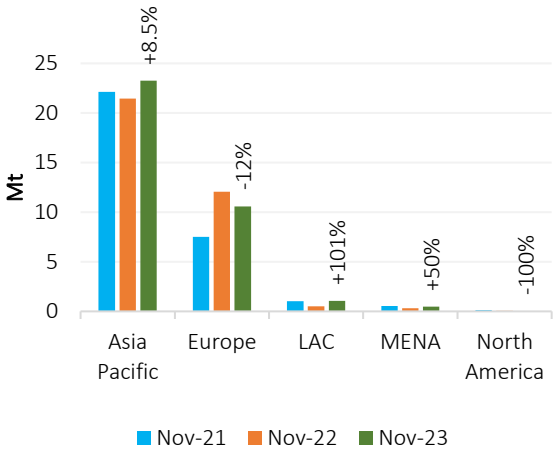


Figure 75: Trend in regional LNG imports



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.1 Europe

In November 2023, Europe experienced its fifth consecutive monthly decline in LNG imports, decreasing by 12% (1.47 Mt) y-o-y to reach 10.59 Mt (Figure 76). Elevated gas storage inventory levels, subdued gas demand and stronger pipeline gas supply influenced this decline in LNG imports in Europe. Furthermore, the widening spot LNG price differentials between Asia and Europe contributed to Asia Pacific maintaining its status as the premium LNG market. Greece, Portugal, Spain, Türkiye and the UK were the primary contributors to the overall decline in LNG imports, while Germany and the Netherlands witnessed substantial growth in imports (Figure 77). From January to November 2023, Europe's cumulative LNG imports remained relatively stable compared to the previous year, standing at 112.53 Mt.

In Greece, reduced gas consumption and increased pipeline gas imports from Russia were the key factors behind the decline in LNG imports. Portugal experienced a decrease due to lower gas consumption and ample gas storage inventory. Spain's LNG imports fell as a result of decreased gas consumption and a surge in pipeline gas imports from Algeria. In Türkiye, the decline in LNG imports was primarily attributed to a significant decrease in imports from Egypt, Nigeria and the US. The UK saw a sharp decline in LNG imports due to stronger pipeline gas imports from Norway and reduced pipeline gas exports to mainland Europe.

Conversely, Germany's LNG imports continued to grow, supported by increased gas consumption, reduced pipeline gas imports from Norway and the ongoing expansion of LNG imports through new terminals. In the Netherlands, higher gas consumption, coupled with weaker gas production and lower pipeline gas imports from the UK, contributed to the rise in LNG imports.

Figure 76: Trend in Europe's monthly LNG imports

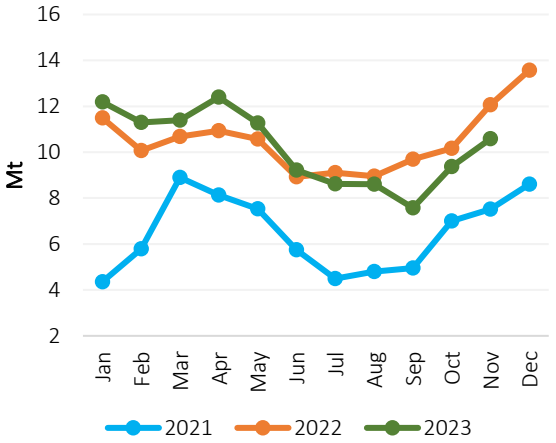
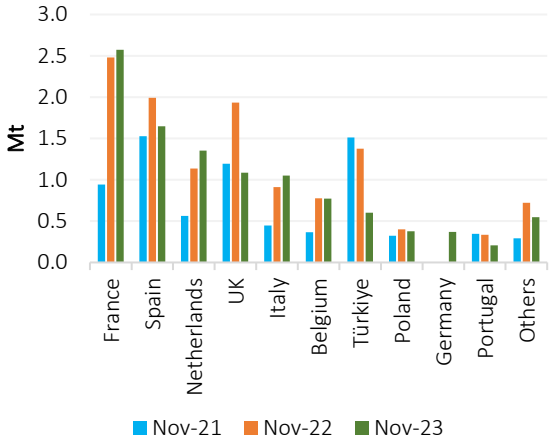


Figure 77: Top LNG importers in Europe



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.2 Asia

In November 2023, LNG imports within the Asia Pacific region experienced a notable 8.5% y-o-y increase, totalling 23.26 Mt, surpassing the import figures recorded in November 2021 (Figure 78). The heightened LNG imports were primarily driven by substantial increases in China, India, South Korea and Thailand, compensating for decreased imports in Japan (Figure 79). Between January and November 2023, the cumulative LNG imports in the Asia Pacific region reached 237.75 Mt, marking a 3.5% y-o-y increase of 8.07 Mt.

China's surge in LNG imports was primarily attributed to a post-COVID-19 rebound in gas demand, with imports from Australia experiencing a significant year-on-year increase. In India, robust gas demand and favourable spot prices contributed to a notable rise in LNG imports, with significant increases from Equatorial Guinea, Qatar, Russia and the United States. South Korea witnessed growth in LNG imports in November, driven by winter LNG restocking. Conversely, Thailand's increase in LNG imports was fuelled by a decline in domestic gas production and attractive spot LNG prices. On the flip side, Japan reported lower LNG imports, attributed to weakened gas demand due to higher nuclear availability and elevated LNG inventory levels.

Figure 78: Trend in Asia's monthly LNG imports

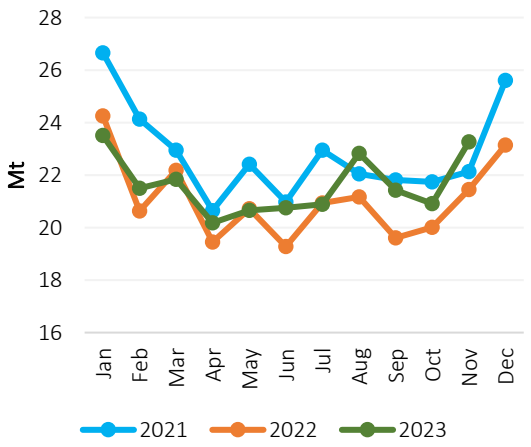
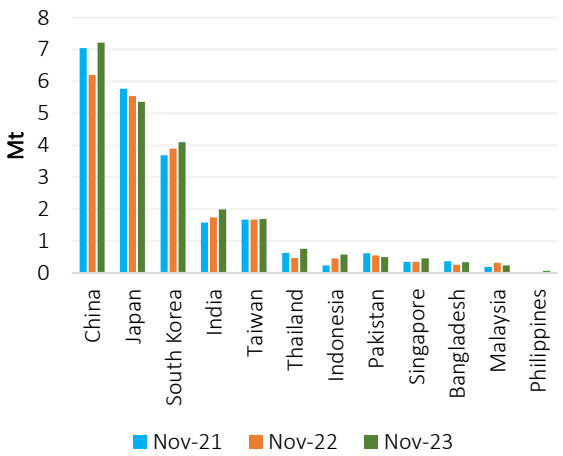


Figure 79: Top LNG importers in Asia Pacific



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.3 Latin America & the Caribbean (LAC)

In November 2023, LNG imports in the LAC region experienced a y-o-y doubling, increasing by 0.53 Mt to reach 1.06 Mt (Figure 80). The significant surge in LNG imports was primarily propelled by Brazil and, to a lesser extent, the Dominican Republic, El Salvador and Puerto Rico (Figure 81). From January to November 2023, the cumulative LNG imports in the LAC region exhibited a 13% y-o-y rise, totalling 11.52 Mt.

Brazil's increase in LNG imports was fuelled by heightened gas consumption in the electricity sector, a consequence of a heatwave in the country. In the Dominican Republic, the initiation of new gas-fired electricity plants in the first half of 2023 supported the upswing in LNG imports. El Salvador saw a rise in LNG imports driven by increased imports from Peru and Trinidad and Tobago. Furthermore, a reload of LNG from Spain contributed to the increase in LNG imports in Puerto Rico.

Figure 80: Trend in LAC's monthly LNG imports

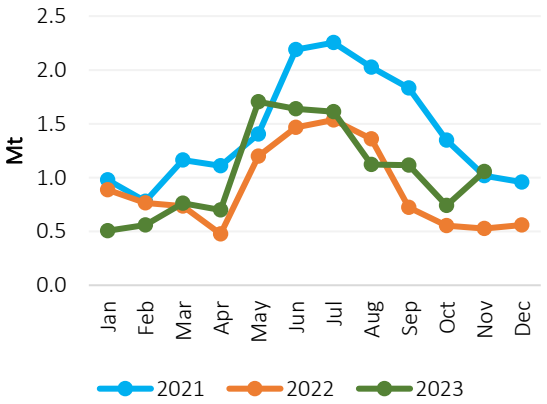
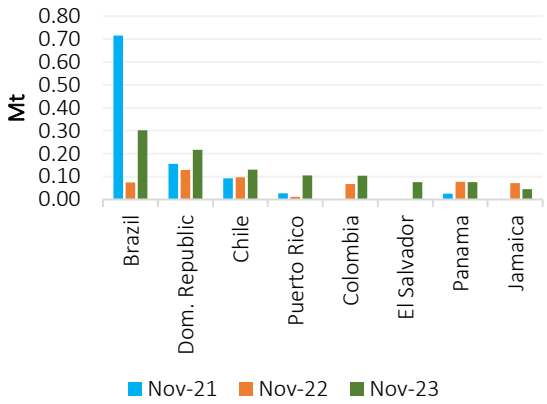


Figure 81: Top LNG importers in LAC



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.1.4 MENA

In November 2023, LNG imports in the MENA region experienced a substantial 50% y-o-y increase, totalling 0.48 Mt (Figure 82). This boost was facilitated by increased imports in Egypt and Kuwait (Figure 83). Over the period from January to October 2023, the cumulative LNG imports in the MENA region showed a 6.5% y-o-y growth, reaching 7.24 Mt. The heightened LNG imports from Oman played a significant role in bolstering Kuwait's overall LNG imports.

Figure 82: Trend in MENA's monthly LNG imports

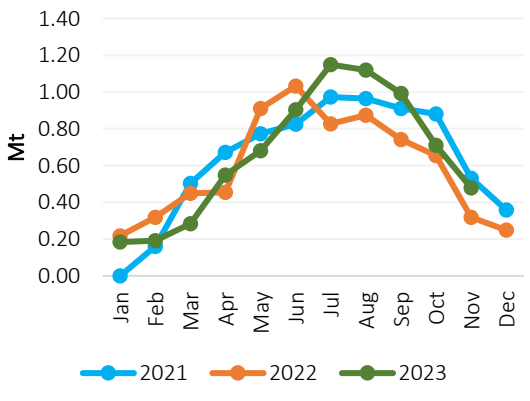
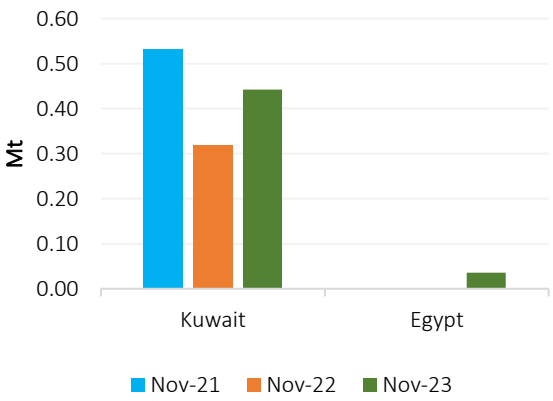


Figure 83: Top LNG importers in MENA



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2 LNG Exports

In November 2023, global LNG exports saw a slight uptick, increasing by 1.5% (0.52 Mt) y-o-y to reach 34.76 Mt (Figure 84). The rise in global LNG exports was propelled by non-GECF countries, compensating for declines in LNG exports from GECF member countries and LNG reloads. In terms of the global market share, non-GECF countries led with 51.5%, followed by GECF member countries with 47.0% and reloads with 1.5%. In comparison to November 2022, the market share of non-GECF countries increased from 48.2%, while the shares of GECF member countries and LNG reloads decreased from 49.8% and 2.0%, respectively. The top three LNG exporters in November were the US, Australia and Qatar (Figure 85).

From January to November 2023, the cumulative global LNG exports exhibited a 3.1% y-o-y increase, reaching 372.99 Mt.

Figure 84: Trend in global monthly LNG exports

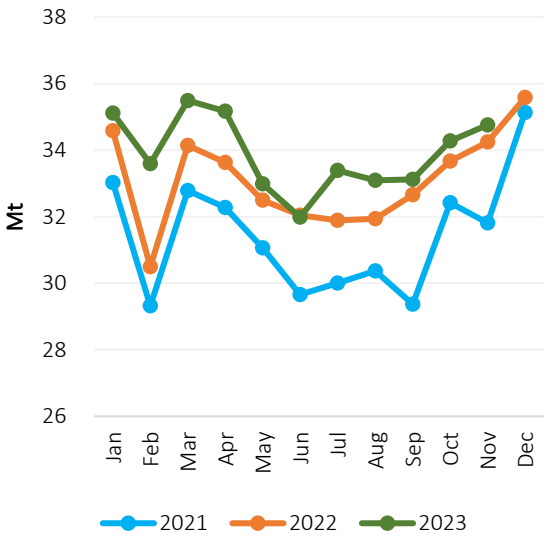
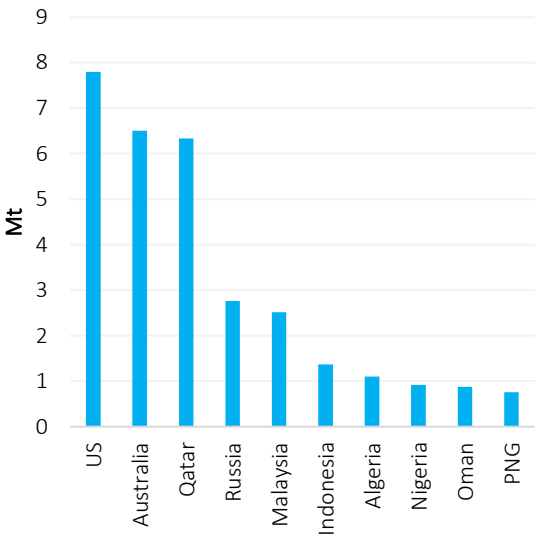


Figure 85: Top 10 LNG exporters in Nov 2023



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.1 GECF

In November 2023, LNG exports from GECF member countries and observers experienced a second consecutive monthly decline, decreasing by 4.2% (0.71 Mt) y-o-y to reach 16.33 Mt (Figure 86). This reduction was primarily influenced by decreases in exports from Egypt and Qatar, partially offset by increased exports from Malaysia, Mozambique and the United Arab Emirates (Figure 87). Between January and November 2023, the cumulative LNG exports from GECF member countries showed a marginal 0.1% y-o-y increase, totalling 179.18 Mt.

The decline in Egypt's LNG exports was attributed to a decrease in feedgas availability. Meanwhile, planned maintenance at the Qatargas 2 facility contributed to the reduced exports from Qatar. Conversely, the increase in Malaysia's LNG exports was supported by higher feedgas availability resulting from the repair of the Sabah-Sarawak gas pipeline to the Bintulu LNG facility. In Mozambique, the growth in LNG exports was driven by the ongoing ramp-up of the Coral South FLNG facility. Finally, a decrease in planned maintenance activity at the Das Island LNG facility, compared to November 2022, contributed to the boost in LNG exports from the United Arab Emirates.

Figure 86: Trend in GECF monthly LNG exports

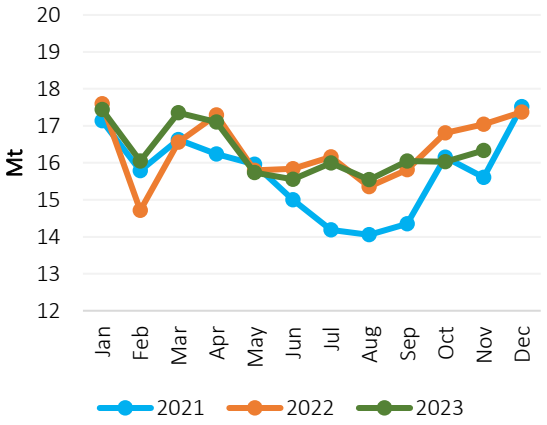
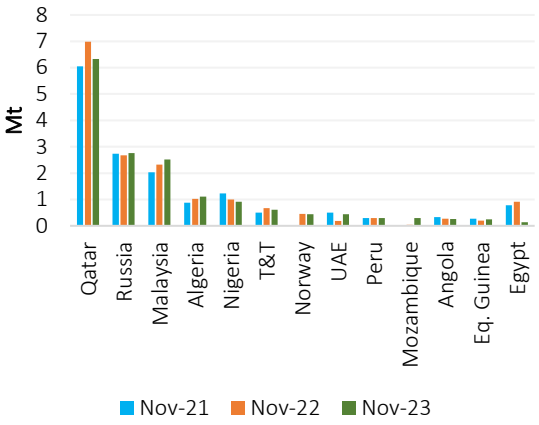


Figure 87: GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.2.2 Non-GECF

In November 2023, LNG exports from non-GECF countries jumped by 8.6% (1.41 Mt) y-o-y to an all-time high of 17.91 Mt (Figure 88). The robust increase in LNG exports was predominantly driven by the US and, to a lesser extent, Indonesia, which compensated for diminished exports from Australia (Figure 89). Over the period from January to November 2023, the cumulative LNG exports from non-GECF countries demonstrated a 5.5% (9.78 Mt) y-o-y growth, totalling 188.66 Mt.

In the US, heightened LNG exports from the Calcasieu Pass, Corpus Christi, Freeport and Sabine Pass LNG facilities contributed to the overall increase. The ramp-up in production at Calcasieu Pass LNG and the resumption of production at the Freeport LNG facility were key drivers behind the rise in exports from both facilities. Simultaneously, the production ramp-up at the Tangguh LNG train 3 facility played a role in boosting Indonesia's LNG exports. Conversely, reduced LNG exports from the APLNG, Gorgon, North West Shelf and Wheatstone LNG facilities resulted in a decline in Australia's LNG exports. At the APLNG facility, an LNG vessel experienced a power loss at the jetty, disrupting LNG loading, while an electrical outage affected LNG exports at the Gorgon LNG facility. Additionally, decreased feedgas availability impacted the LNG exports from the North West Shelf facility.

Figure 88: Trend in non-GECF monthly LNG exports

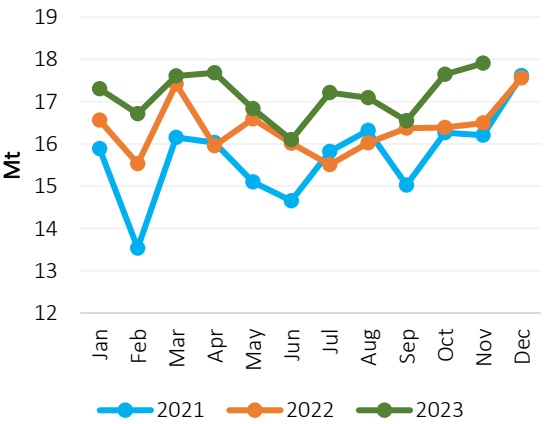
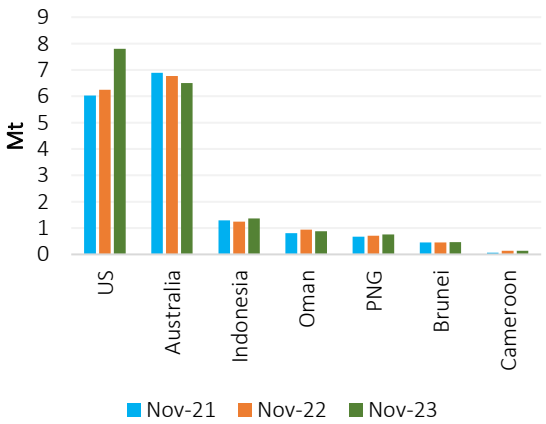


Figure 89: Non-GECF's LNG exports by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.3 Global LNG Reloads

In November 2023, global LNG reloads fell sharply by 27% (0.19 Mt) y-o-y to stand at 0.52 Mt (Figure 90). Weaker LNG reloads from Spain, and to a lesser extent from France, Malaysia and South Korea, drove this decline but was partially offset by higher LNG reloads from Brazil and China (Figure 91). From January to November 2023, the cumulative global LNG reloads jumped by 31% (1.21 Mt) y-o-y to 5.15 Mt.

A drop in intra-regional LNG trade in Europe, due to weak LNG demand, curbed Spain's LNG reloads. Meanwhile, weak spot LNG demand in China led to the reduction in LNG reloading activity in Malaysia and South Korea. On the other hand, China has been actively reselling LNG cargoes over the past few months due to a potential LNG oversupply in the country during this winter season. This was supported by the uptick in China's LNG reloads.

Figure 90: Trend in global monthly LNG reloads

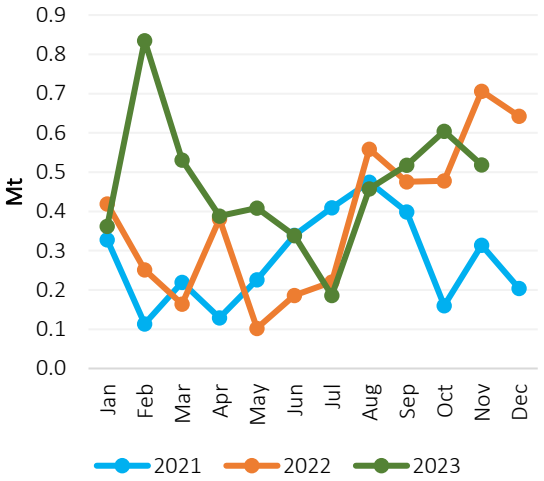
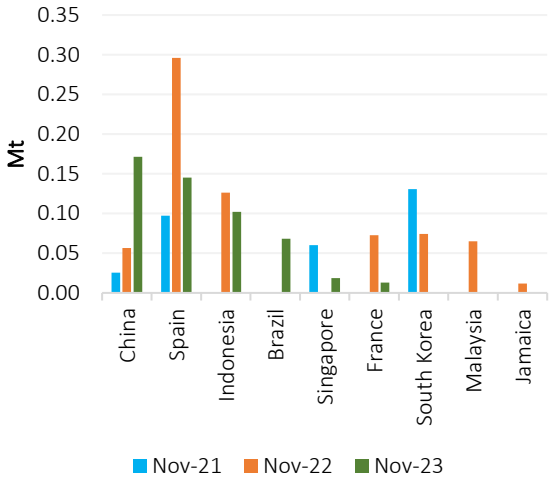


Figure 91: Global LNG reloads by country



Source: GECF Secretariat based on data from ICIS LNG Edge

4.2.4 Arbitrage Opportunity

In November 2023, the arbitrage for LNG reloads from Europe to Asia Pacific was closed. The absence of the arbitrage opportunity was attributed to the spot LNG price spreads between Asia Pacific and Europe holding a premium over the spot LNG shipping costs between both markets (Figure 92). However, the price spread between spot LNG prices in Asia Pacific and oil-indexed prices in Europe was at a premium over the spot LNG shipping cost.

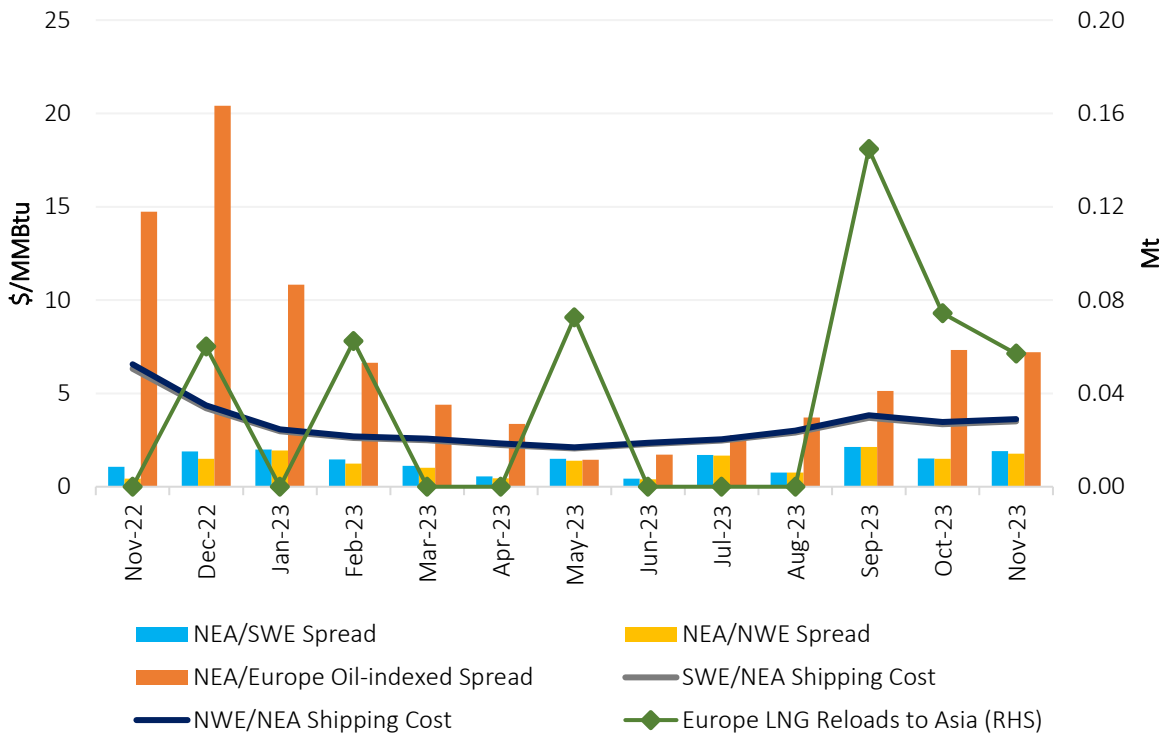
The price spreads between NEA/SWE and NEA/NWE jumped by 27% ($0.40/MMBtu) and 19% ($0.28/MMBtu) m-o-m to reach $1.91/MMBtu and $1.77/MMBtu, respectively. The stronger NEA spot LNG price and decline in European spot LNG prices led to the widening price spreads. Meanwhile, the price spread between spot LNG prices in Asia Pacific and oil-indexed prices in Europe fell by 1.5% ($0.11/MMBtu) m-o-m to $7.21/MMBtu.

In terms of the shipping costs for the NEA/SWE and NEA/NWE spot routes, they grew by 4.9% ($0.17/MMBtu) m-o-m each to $3.50/MMBtu and $3.63/MMBtu, respectively. However, it is important to note that shipping costs can vary depending on the specific vessels used. Medium to long-term chartered vessels may have lower costs compared to spot shipping rates.

Although the arbitrage for LNG reloads was closed, one cargo with 0.07 Mt of LNG was reloaded from Europe to the Asia Pacific region in November. The cargo was reloaded from the Sagunto LNG terminal in Spain and exported to Pyeongtaek, South Korea.

In comparison to November 2022, the NEA/SWE and NEA/NWE price spreads surged by 80% ($0.85/MMBtu) and 302% ($1.33/MMBtu) y-o-y, respectively. Conversely, the price spread between NEA spot LNG and European oil-indexed gas prices, as well as the NEA/SWE and NEA/NWE spot shipping costs declined by 51% ($7.53/MMBtu), 45% ($2.82/MMBtu) and 45% ($2.93/MMBtu) y-o-y, respectively.

Figure 92: Price spreads & shipping costs between Asia & Europe spot LNG markets

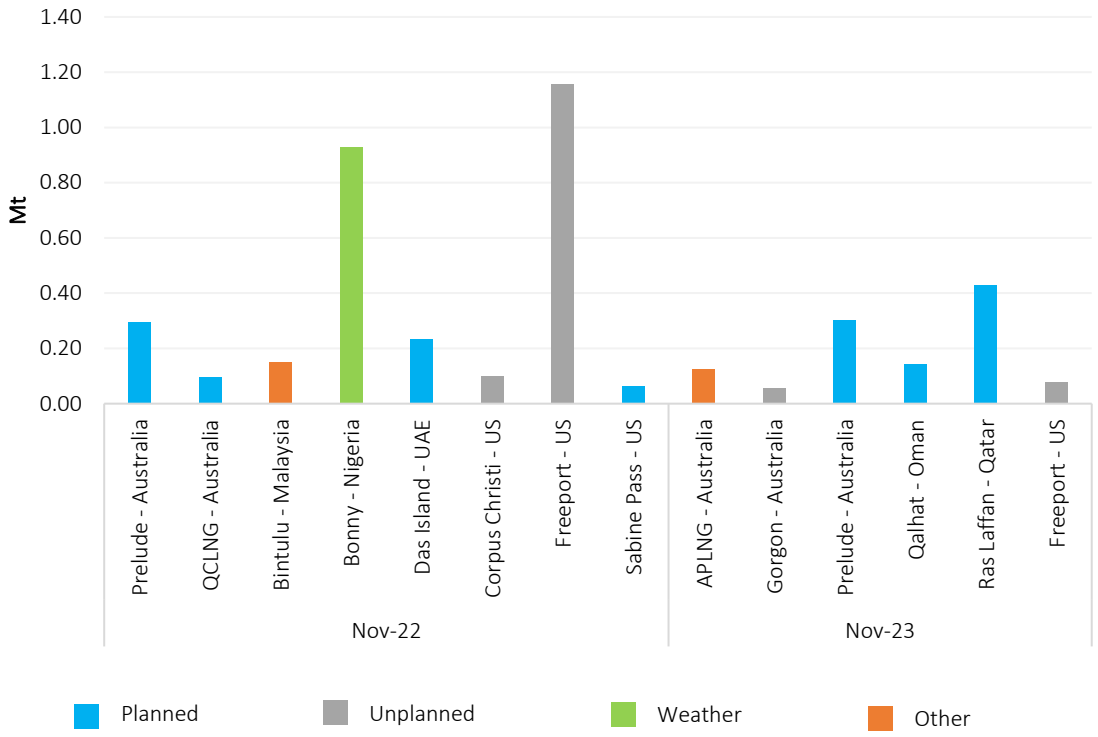


Source: GECF Secretariat based on data from GECF Shipping Model, Argus and ICIS LNG Edge

4.2.5 Maintenance Activity at LNG Liquefaction Facilities

In November 2023, the cumulative impact of scheduled maintenance, unplanned outages and other factors at liquefaction facilities worldwide stood at 1.13 Mt, which represents a significant decrease from 3.02 Mt in November 2022 (Figure 93) but increased from 0.78 Mt in October 2023. The main events at liquefaction facilities include planned maintenance at the Prelude FLNG facility in Australia, Qalhat LNG facility in Oman and Ras Laffan LNG facility in Qatar. Meanwhile, operations at the Gorgon LNG facility in Australia and Freeport LNG facility in the US were impacted by unplanned outages. Furthermore, as mentioned earlier, an LNG vessel experienced a power loss at the APLNG facility's jetty, which disrupted LNG loading from the facility.

Figure 93: Maintenance activity at LNG liquefaction facilities during November (2022 and 2023)



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

4.2.6 Other Developments

ADNOC plans to increase Das Island LNG facility's liquefaction capacity –ADNOC announced plans to increase the liquefaction capacity from its Das Island facility from 6 Mtpa to 6.9 Mtpa by 2028. The increased capacity will be achieved through debottlenecking of the existing three trains. This is currently the only LNG export facility in the country, but there are plans to develop the Ruwais LNG export facility in the medium term, possessing a capacity of 9.6 Mtpa.

Petrobangla will increase regasification capacity from its Excellence FSRU – Bangladesh's Petrobangla announced that it has embarked on a project to increase the regasification capacity from its Excellence FSRU from 3.75 Mtpa to 4.5 Mtpa. The FSRU stopped operations in November 2023 and headed to Singapore where upgrades to the FSRU will take place over the course of two months. The FSRU is expected to resume operations in February 2024.

Tango FLNG vessel arrives in Republic of Congo – The Tango floating LNG (FLNG) vessel, which will be utilised for the Congo LNG export facility, arrived in the Republic of Congo at the end of November 2023. The FLNG vessel, with a liquefaction capacity of 0.6 Mtpa, is owned by Eni and expected to start exports in December 2023. The Excalibur floating storage unit (FSU), which also arrived in November, will also be used for the export project.

In terms of LNG agreements, seven contracts were signed in November 2023, as shown in Table 2 below.

Table 2: New LNG sale agreements signed in November 2023

Contract Type	Exporting Country	Project	Seller	Importing Country	Buyer	Volume (Mtpa)	Duration (Years)
SPA	US	Sabine Pass Expansion	Cheniere	China	Foran Energy	0.9	20
SPA	Qatar	North Field South	QatarEnergy	China	Sinopec	3	27
SPA	Portfolio		Excelerate Energy	Bangladesh	Petrobangla	1	15
SPA	Algeria		Sonatrach	Türkiye	BOTAS	3.2	3
SPA	Oman	Qalhat LNG	Oman LNG	Portfolio	BP	1	9
SPA	Nigeria		Riverside LNG	Germany	Johannes Schuetze Energy Import AG	1.2	
SPA	US	Sabine Pass Expansion	Cheniere	Netherlands	OMV	0.85	

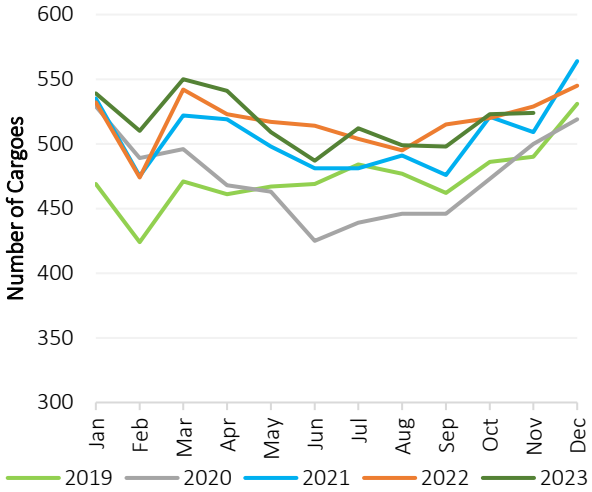
Source: GECF Secretariat based on Project Updates and News

4.2.7 LNG Shipping

In November 2023, there were 524 LNG shipments recorded globally, which was one more cargo than the previous month and represented a 1% decrease y-o-y (Figure 94). From January to November 2023, the total number of shipments reached 5,692, an increase of 27 cargoes from the same period in 2022 (Figure 95).

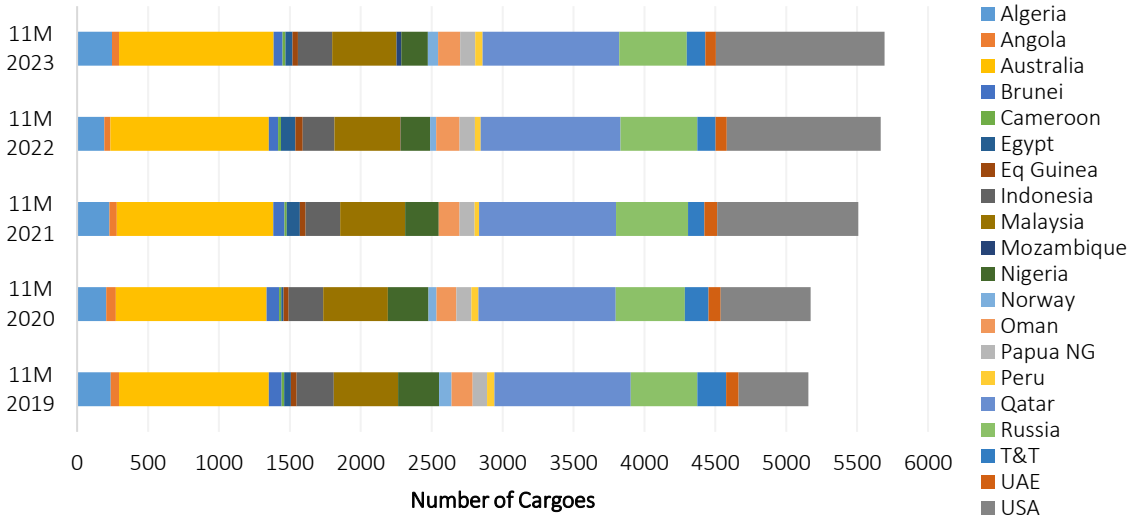
During this period, the US (103), Algeria (53) and Mozambique (33) recorded the largest increases in shipments compared with 2022 (Figure 96). The largest percentage increase in cargo exports were registered by Norway at 71%, followed by Algeria (28%) and Peru (21%).

Figure 94: Number of LNG export cargoes



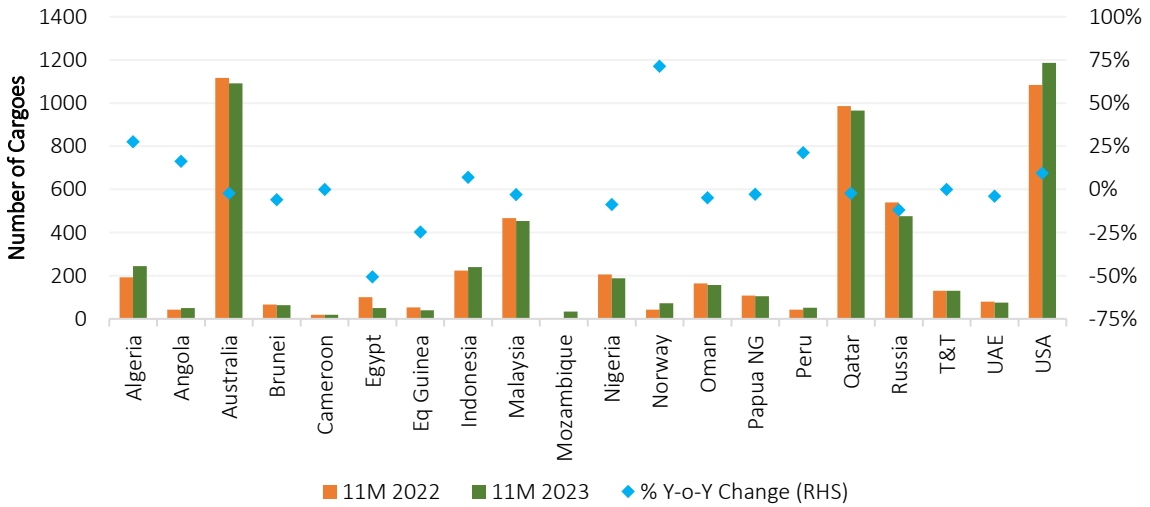
Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 95: Number of LNG cargoes by exporting country



Source: GECF Secretariat based on data from ICIS LNG Edge

Figure 96: Changes in LNG cargo exports

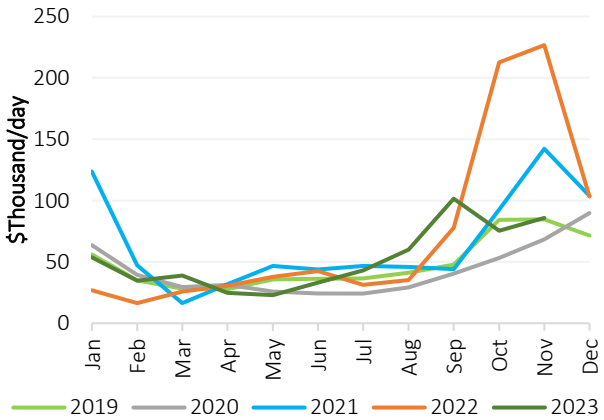


Source: GECF Secretariat based on data from ICIS LNG Edge

In November 2023, the monthly average spot charter rate for steam turbine LNG carriers jumped by 14% m-o-m to $85,700 per day (Figure 97). Unlike the high prices observed at this time of year in 2021 and 2022, this November's average rate was 62% lower y-o-y and was even $37,500 less than the five-year average price for the month. Average charter rates for the other segments of the global LNG carrier fleet also experienced an uptick during the month. The average spot charter rate for TDFE vessels rose by 14% m-o-m to reach $154,500 per day, while the average spot charter rate for two-stroke vessels increased by 11% m-o-m to reach $198,000 per day.

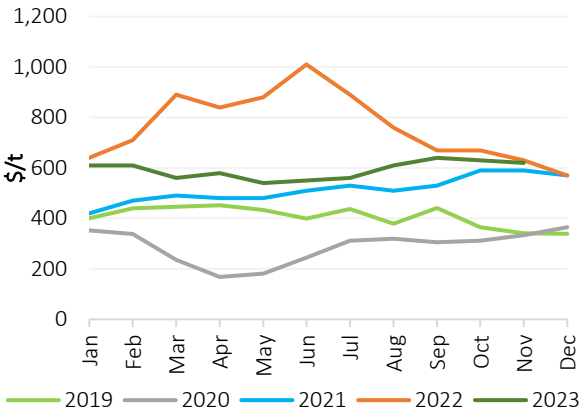
During this winter period thus far, the shipping market has not experienced the same level of tightness as in the previous two years, when charter rates skyrocketed past $100,000 per day. In fact, with storage levels in the EU going past 90% in August, and a return to full pipeline gas exports from Norway, charter rates have not yet returned to the peak observed in September. November 2023 was marked by small gains and losses in rates, attributed to the competing influences of a drawdown of floating cargoes around Europe and growing heating demand in Asia. As the winter progresses, there may be a potential for further gains in charter rates, driven by the seasonal demand, as well as the further reduction of Panama Canal slots. In November 2023, the average price of the leading shipping fuels was $620 per tonne (Figure 98), falling by 2% m-o-m, and 2% lower than one year ago.

Figure 97: Average LNG spot charter rate



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

Figure 98: 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 November 2023 is shown in Table 3.

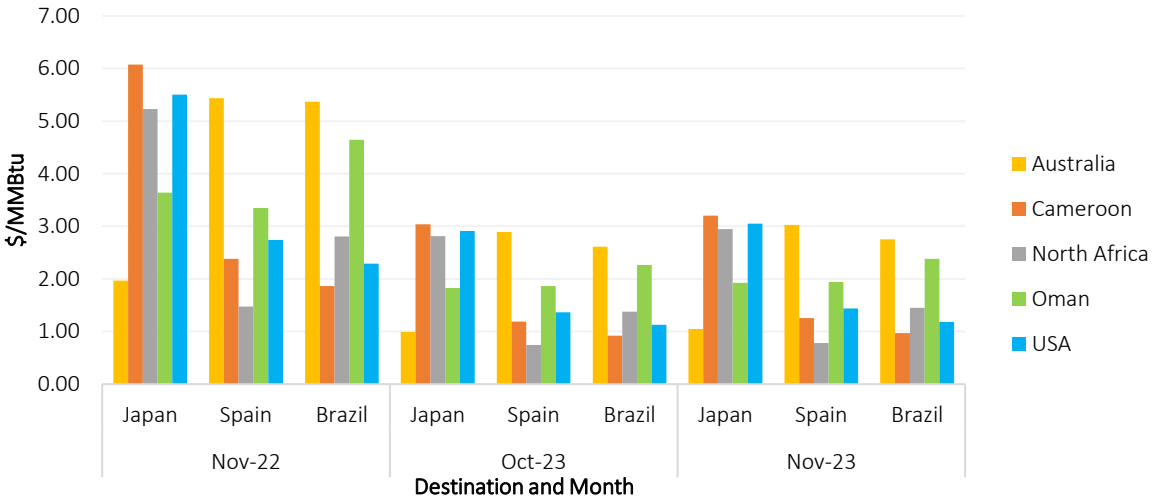
Table 3: Shipping costs for LNG spot cargoes from selected regions ($/MMBtu) – November 2023

		Destination						
LNG Supplier	To / From	Japan	China	India	UK	Spain	Argentina	Brazil
	Spot LNG delivered price	16.12	16.12	15.49	14.03	13.91	14.05	14.00
	Australia	1.05	1.11	1.27	3.14	3.03	2.50	2.75
	Cameroon	3.20	3.16	2.10	1.37	1.25	1.47	0.97
	North Africa	2.95	2.93	1.57	0.89	0.78	2.06	1.45
	Oman	1.92	1.79	0.39	2.05	1.94	2.40	2.38
	USA	3.05	3.37	3.22	1.48	1.44	1.97	1.19

Source: GECF Shipping Cost Model

When compared with the previous month, in November 2023, there were increases in the average LNG carrier spot charter rate and in the delivered spot LNG prices, while there was a slight decrease in the cost of LNG shipping fuels. As a result, a net increase in the LNG spot shipping costs for steam turbine carriers was observed by up to $0.16/MMBtu on certain routes relative to the previous month (Figure 99). When compared with November 2022, this month's average spot charter rate and delivered spot LNG prices were much lower, resulting in LNG shipping costs of up to $2.87/MMBtu lower.

Figure 99: LNG spot shipping costs for steam turbine carriers



Source: GECF Shipping Cost Model

Panama Canal transit auctions hit record high: The sustained low level of the Gatun Lake has forced the Panama Canal Authority to impose severe restrictions on the numbers and sizes of vessels that transit this important shipping artery. The majority of the global LNG carrier fleet utilize the neopanamax locks and are now limited to a maximum of two transits per day. As such, there has been sharp competition between shippers to secure these slots. Amidst the frenzy to reserve these limited sailings, a new record high bid for a transit slot was awarded for $3.975 million on 8 November 2023. This expense is in addition to the regular canal transit fees and highlights the thinning margins which may force ship owners to consider longer voyages to reach Asian markets.

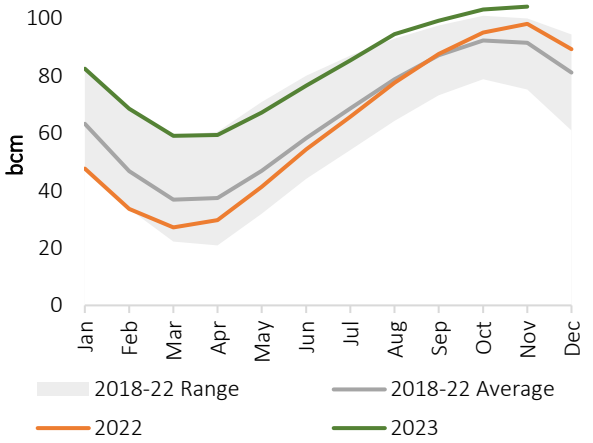
Two more LNG carrier orders at HHI: South Korean shipbuilding firm Hyundai Heavy Industries (HHI) received an order from an African company for the construction of two LNG carriers. These two carriers will have a capacity 174,000 m^3 each and are expected to be delivered by mid-February 2028. The order value was $530 million, placing the per-unit price tag at $265 million, in line with the upper end of the range of contemporary newbuild costs. However, this cost is well above the $229 million per vessel which QatarEnergy paid in its recent order for seventeen carriers. Over the course of 2023, HHI has now received orders for construction of 39 LNG carriers.

5 Gas Storage

5.1 Europe

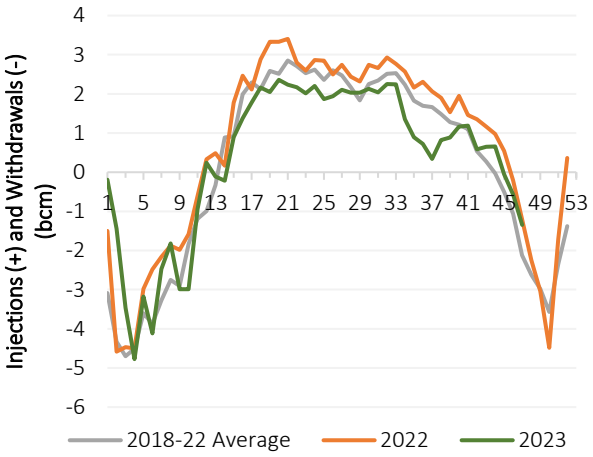
In November 2023, the average daily volume of gas in storage increased to 104.2 bcm or 99% filled capacity, up from 103.1 bcm in the previous month (Figure 100). When compared with one year ago, there were 6.0 bcm more gas in storage than in November 2022, and 12.6 bcm more gas in storage than the five-year average for the month. The net gas withdrawal season has begun in the region, with 1.2 bcm of gas injections into UGS facilities, and 5.3 bcm of gas taken out of storage. November 7 marked the first day out of a total of twenty-one, in which there were net gas drawdowns for this 2023/24 winter season.

Figure 100: Underground gas storage in the EU



Source: GECF Secretariat based on data from AGSI+

Figure 101: Weekly rate of EU UGS level changes



Source: GECF Secretariat based on data from AGSI+

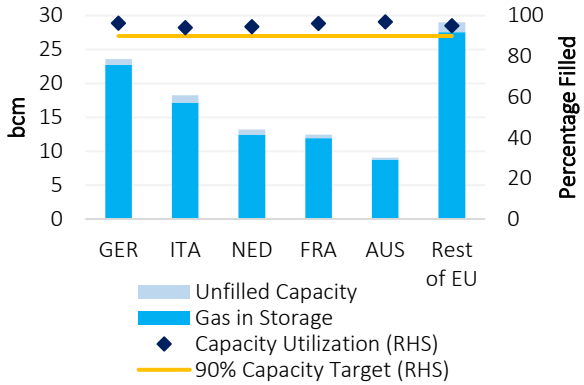
Over the course of the gas restocking season for 2023, there were 46 bcm of gas injections, compared with 70 bcm in 2022. Accordingly, the rate of gas storage was also much slower during this year than in 2022. Gas withdrawal has started earlier this year than in 2022, however, with a drawdown of 0.3 bcm/week in November 2023. In comparison, November 2022 was balanced with respect to storage levels, while the five-year average withdrawal rate for the month was 0.9 bcm/week (Figure 101).

The EU legislated that its member states must fill their respective UGS sites to a minimum level of 90% of capacity by November 1, while setting key checkpoints throughout the year. Similar to one year ago, EU member states went beyond this target, ensuring that they commenced this 2023/24 winter season with elevated storage levels.

The top EU countries for UGS capacity are Germany, Italy, Netherlands, France and Austria. Even with gas withdrawals having started in these countries, they have each finished the month of November with storage levels above 94% filled capacity (Figure 102).

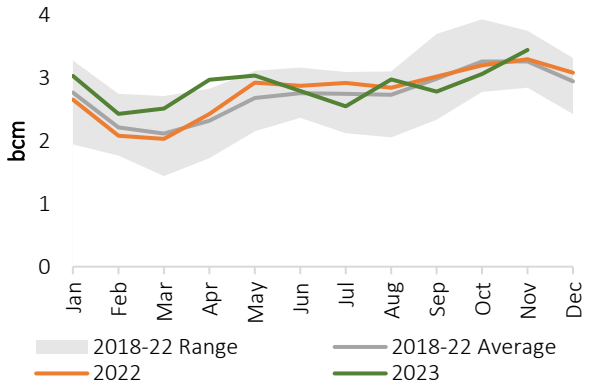
The EU has 5.0 bcm of LNG storage capacity, primarily concentrated in Spain (40%) and France (16%). In November, the combined amount of LNG stored in the EU countries was 3.4 bcm (Figure 103). This was an increase of 13% m-o-m and was 6% higher than the five-year historical average for that month.

Figure 102: UGS in EU countries as of Nov 30, 2023



Source: GECF Secretariat based on data from AGSI+

Figure 103: Total LNG storage in the EU

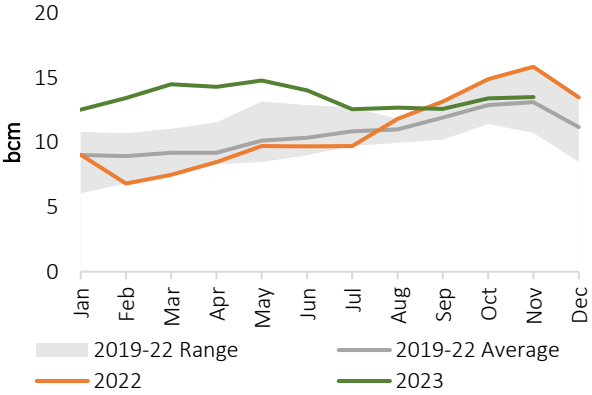


Source: GECF Secretariat based on data from ALSI

5.2 Asia

Japan and South Korea possess a combined capacity of 17 bcm of LNG storage. In November 2023, the combined level of LNG in storage rose by 1% m-o-m to an estimated 13.5 bcm (Figure 104). However, this quantity was still 15% lower than in the same month one year ago, but just 0.4 bcm below the four-year average. Storage in Japan and South Korea accounted for 6.6 bcm and 6.9 bcm, respectively. LNG imports, while rising with the seasonal demand, have been tempered by increasing nuclear availability.

Figure 104: LNG in storage in Japan and South Korea

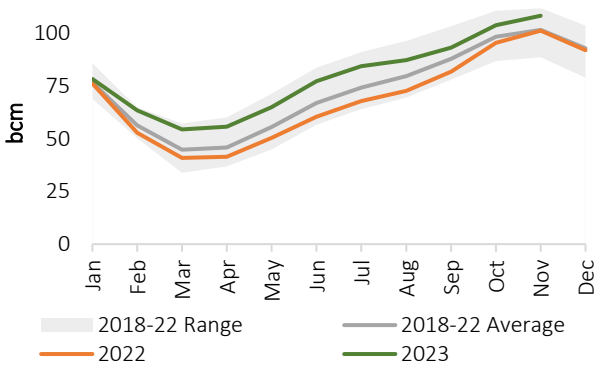


Source: GECF Secretariat based on data from Refinitiv

5.3 North America

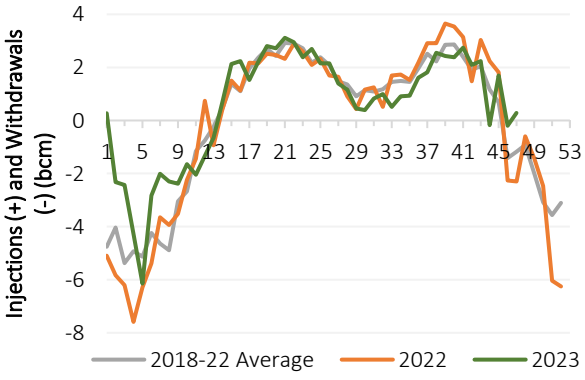
Unlike in the EU, the US continued net gas restocking in November, with the average daily volume of gas in storage rising to 108.1 bcm, up from 103.6 bcm in the previous month (Figure 105). This quantity was 7.1 bcm higher than one year ago, and 6.7 bcm more than the five-year historical average. With the US having 134 bcm of working gas storage capacity, the country's capacity utilization for the month pushed to 81%. However, the rate of stock build during the month was just 0.4 bcm per week, whereas net gas withdrawals had started in November 2022 at a rate of 0.1 bcm/week, and the five-year average rate of 0.2 bcm/week (Figure 106).

Figure 105: Underground gas storage in the US



Source: GECF Secretariat based on data from US EIA

Figure 106: Weekly rate of UGS changes in the US



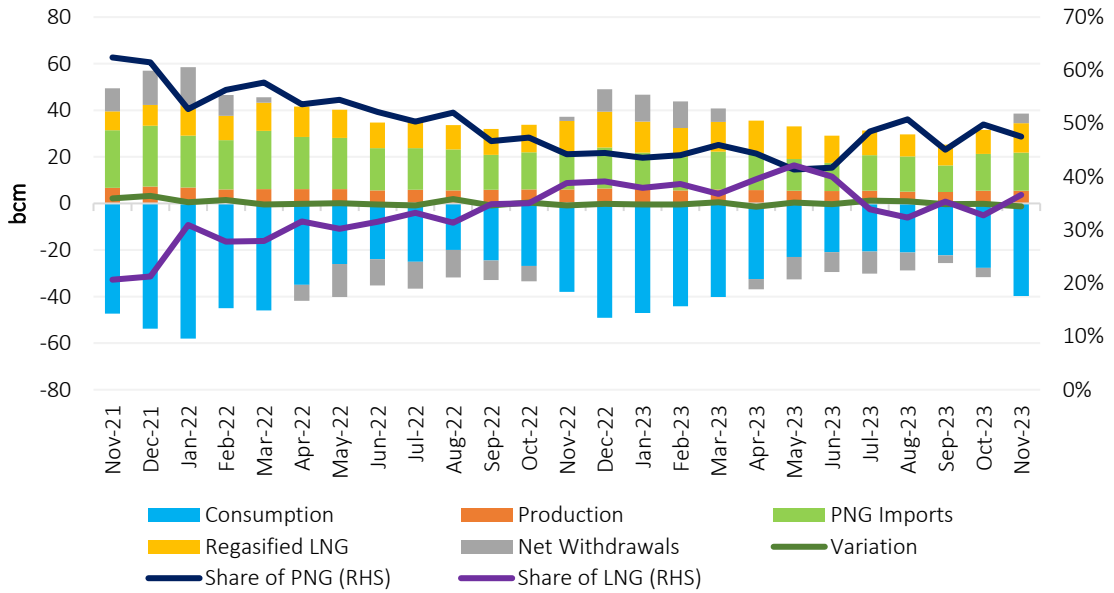
Source: GECF Secretariat based on data from US EIA

6 Gas Balance

6.1 EU + UK

In November 2023, the share of regasified LNG in the gas supply of the EU and UK stood at 37, representing an increase of 4% m-o-m. However, its share declined by 2% compared to November 2022. Meanwhile, the share of gas imports via pipelines declined by 3% m-o-m but rose by 4% y-o-y to stand at 48% (Figure 107). The higher share of regasified LNG in the region's gas supply was attributed to the stronger increase in LNG send-out compared to the increase in pipeline gas imports. Since 2022, there has been a shift from the reliance on PNG imports to LNG imports in the EU + UK, driven by the EU's targeted reduction in gas imports from Russia.

Figure 107: 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 November 2023.

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

	2022	Oct-22	Oct-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) Gas Consumption	417.40	38.00	39.80	368.30	339.35	5%	-8%
(b) Gas Production	72.73	5.99	5.43	66.27	61.01	-9%	-8%
Difference (a) - (b)	344.67	32.01	34.37	302.03	278.34	7%	-8%
PNG Imports	230.46	15.69	16.36	212.91	161.02	4%	-24%
Regasified LNG	146.57	13.78	12.60	131.12	130.43	-9%	-1%
Net Withdrawals	-31.79	1.72	4.18	-41.30	-14.37	144%	-65%
Variation	-0.57	0.82	1.22	-0.70	1.25		

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 Nov 2023 compared to Nov 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 August 2023.

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

	2022	Aug-22	Aug-23	YTD 2022	YTD 2023	Change* y-o-y	Change** 2023/2022
(a) OECD Gas Consumption	1805.4	130.3	133.4	1209.4	1175.0	2.4%	-2.8%
(b) OECD Gas Production	1671.8	142.6	144.2	1104.0	1128.8	1.2%	2.2%
Difference (a) - (b)	133.7	-12.3	-10.8	105.4	46.2	-12.3%	-56.1%
OECD LNG Imports	346.9	26.8	25.5	226.0	223.1	-4.7%	-1.3%
LNG Imports from GECF	161.8	13.3	10.6	105.3	100.1	-20.3%	-5.0%
LNG Imports from Non-GECF	185.1	13.5	15.0	120.7	123.1	10.6%	2.0%
OECD LNG Exports	223.2	18.2	19.6	146.2	157.1	7.9%	7.4%
Intra-OECD LNG Trade	152.7	11.2	12.5	99.0	103.2	12.0%	4.2%
OECD Pipeline Gas Imports	632.0	49.6	38.6	451.0	337.7	-22.2%	-25.1%
OECD Pipeline Gas Exports	565.1	45.4	39.4	391.0	329.0	-13.1%	-15.8%
Stock Changes and losses	56.9	25.2	15.9	34.5	28.4		

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

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

	2022	Oct-22	Oct-23	YTD-2022	YTD-2023	Change* y-o-y	Change** 2023/2022
(a) India Gas Consumption	60.96	4.81	5.45	50.21	51.51	13.3%	2.6%
(b) India Gas Production	33.46	2.83	3.11	27.79	29.02	10.0%	4.4%
Difference (a) - (b)	27.50	1.98	2.34	22.42	22.49	18.2%	0.3%
India LNG Imports	28.07	2.29	2.54	23.22	24.98	10.8%	7.6%
LNG Imports from GECF	22.15	1.53	1.89	18.50	19.41	24.1%	4.9%
LNG Imports from Non-GECF	5.92	0.76	0.64	4.72	5.56	-15.7%	17.8%
Stock Changes and losses	0.57	0.31	0.20	0.80	2.48		

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

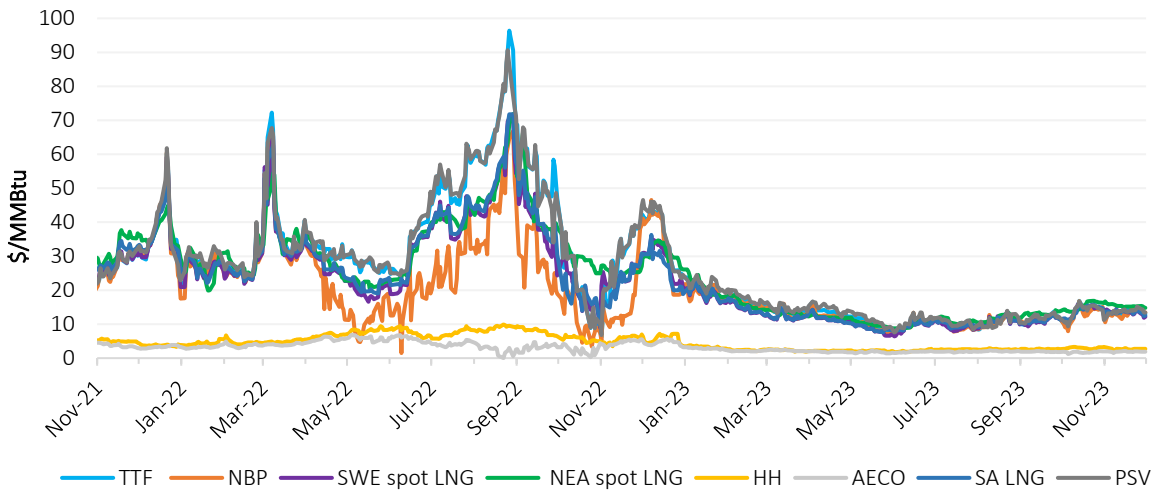
7 Energy Prices

7.1 Gas Prices

7.1.1 Gas & LNG Spot Prices

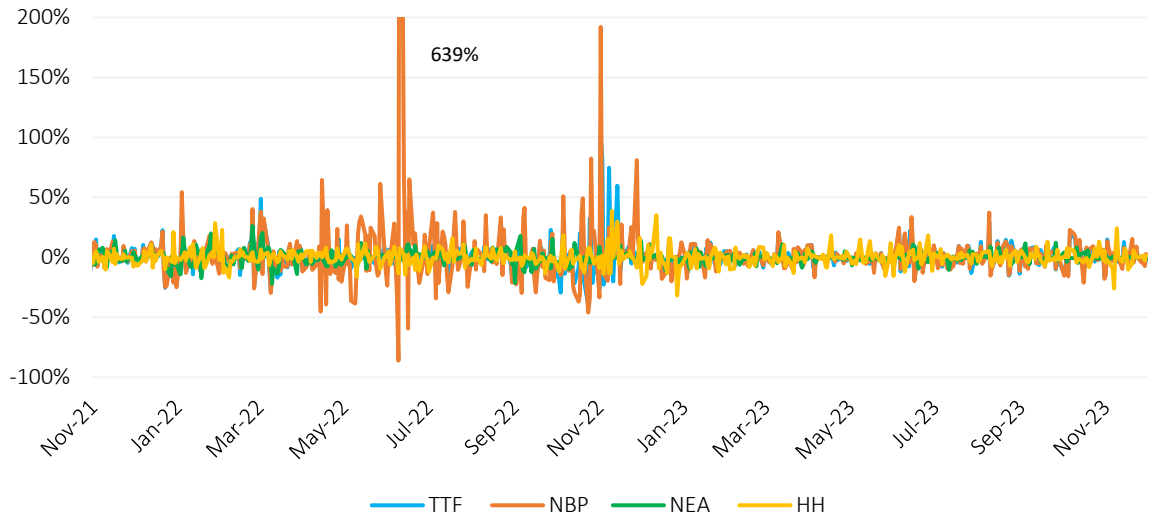
In November 2023, gas and LNG spot prices in Europe and Asia rose for the fourth consecutive month, but exhibited lower volatility compared to the previous month (Figure 108 and Figure 109). The increase in spot prices was influenced by an uptick in European gas demand for heating amidst colder temperatures. However, there was also downward pressure from brimming EU storage levels, robust LNG supply, high Norwegian pipeline gas supply and sluggish Asian LNG demand. In the upcoming months, temperatures across Europe and Asia will remain the key determinant for spot prices.

Figure 108: 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 109: Daily variation of spot prices

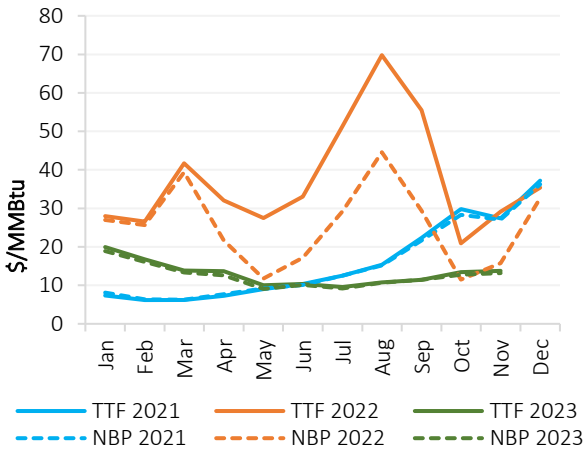


Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

7.1.1.1 European Spot Gas and LNG Prices

In November 2023, TTF spot gas prices averaged $13.73/MMBtu, reflecting a 2% increase m-o-m and 53% decrease y-o-y. In addition, NBP spot prices averaged $13.16/MMBtu, reflecting a 3% increase m-o-m and a 17% decrease y-o-y (Figure 110). The SWE spot LNG prices averaged $13.50/MMBtu in November 2023 (2% decrease m-o-m and 44% decrease y-o-y). As for the PSV spot price, it averaged $13.69/MMBtu in November 2023, a 1% increase m-o-m and a 54% decline y-o-y.

Figure 110: Monthly European spot gas prices



Source: GECF Secretariat based on data from Refinitiv Eikon

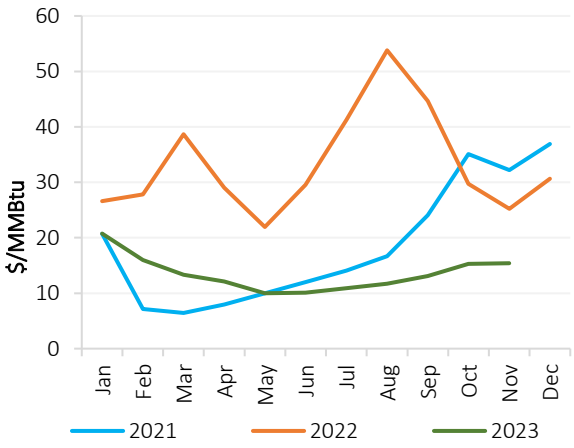
The increase in European gas and LNG spot prices was primarily driven by the ramp-up in demand from the residential sector. Furthermore, gas flows from the UK to NWE were constrained by maintenance activities on the IUK interconnector. Additionally, spot prices faced downward pressure from elevated EU storage levels (at 95% capacity), high Norwegian pipeline gas flows and robust LNG supply. The announcement from German market operator, Trading Hub Europe (THE), to sell gas from storage to the market also added some bearish sentiment. TTF spot prices experienced lower volatility compared to the previous month, with daily prices remaining below $15/MMBtu.

From January to November 2023, TTF and NBP averaged $13.04/MMBtu and $12.48/MMBtu, respectively, representing substantial declines of 66% and 51% y-o-y, respectively.

7.1.1.2 Asian Spot LNG Prices

In November 2023, the average North East Asia (NEA) spot LNG price experienced an increase of 1% m-o-m, reaching an average of $15.41/MMBtu. This represents a 39% decrease y-o-y (Figure 111).

Figure 111: Monthly Asian spot LNG prices



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

Asian LNG prices experienced a modest increase as soft market fundamentals persisted, and only isolated pockets of spot demand emerging in the region. Tepid demand in northeast Asia and healthy storage levels continued to weigh on prices. Daily NEA spot LNG prices dropped below $16/MMBtu at the beginning of the month.

From January to November 2023, the average NEA spot LNG price stood at $13.51/MMBtu, representing a 61% y-o-y decrease.

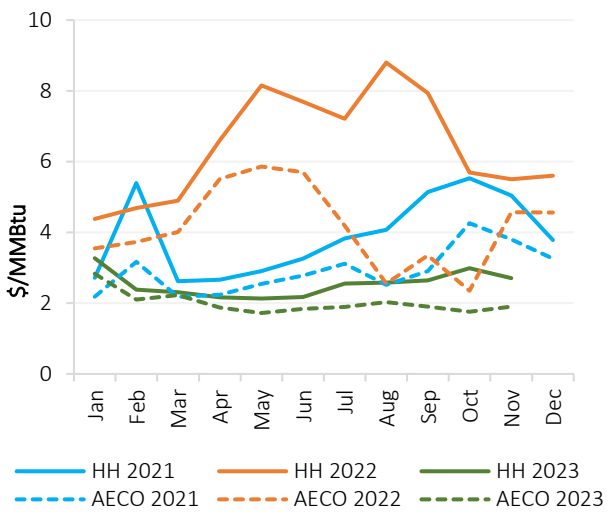
7.1.1.3 North American Spot Gas Prices

In November 2023, the HH spot gas price averaged $2.71/MMBtu, reflecting a decrease of 9% m-o-m. However, it was significantly lower y-o-y, dropping by 51%, compared to the average price of $5.50/MMBtu observed in November 2022. (Figure 112).

Henry Hub prices experienced some bearish movement driven by robust production growth and elevated gas storage levels, which remained above the five-year average. Moreover, daily HH spot prices fell below $3/MMBtu at the beginning of the month.

Similarly, in Canada, the AECO spot price averaged $1.90/MMBtu in November 2023, reflecting an increase of 8% m-o-m and a decrease of 58% y-o-y.

Figure 112: Monthly North American gas spot prices



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

From January to November 2023, the HH spot price averaged $2.54/MMBtu, representing a decline of 62% y-o-y. The AECO spot price averaged $2.01/MMBtu, marking a 51% y-o-y decrease.

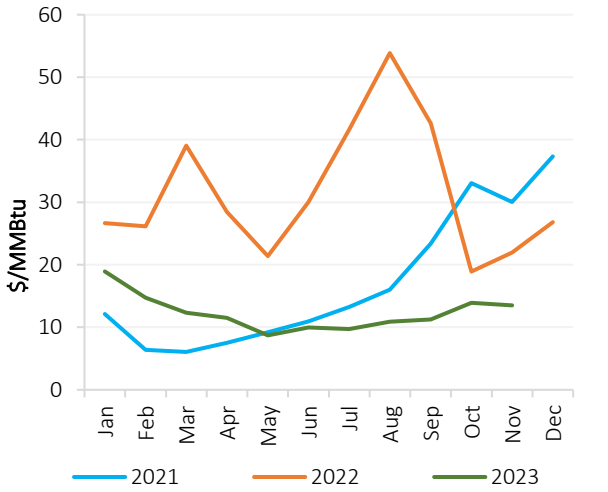
7.1.1.4 South American Spot LNG Prices

In November 2023, the South American (SA) LNG price experienced a 3% m-o-m decrease, averaging $13.48/MMBtu. However, this price was 39% lower compared to the average price of $21.94/MMBtu observed in November 2022 (Figure 113).

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 $13.91/MMBtu, $12.76/MMBtu and $13.76/MMBtu, respectively.

From January to November 2023, the SA LNG spot price averaged $12.31/MMBtu, marking a substantial 63% y-o-y decrease.

Figure 113: 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 November 2023, the average Oil-indexed I LNG price was $12.90/MMBtu, reflecting an increase of 2% m-o-m and a decrease of 17% y-o-y. Similarly, the Oil-indexed II LNG price averaged $10.30/MMBtu, showing an increase of 1% m-o-m and a decrease of 6% y-o-y (Figure 114). Furthermore, the Oil-indexed I prices held an average discount of $3/MMBtu over NEA spot LNG prices. In addition, the Oil-indexed II prices held an average discount of $5/MMBtu compared to the NEA spot LNG prices.

In Europe, the Oil-indexed III price averaged $8.20/MMBtu in November 2023, relatively stable m-o-m and a 24% y-o-y decrease (Figure 115). Moreover, the Oil-indexed III price held a discount of $5/MMBtu over the average SWE LNG.

From January to November 2023, the Oil-indexed I LNG price exhibited a 12% y-o-y decrease, while the Oil-indexed II LNG price showed a 15% y-o-y decrease. Additionally, the Oil-indexed III LNG price for the same period was 6% lower y-o-y.

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

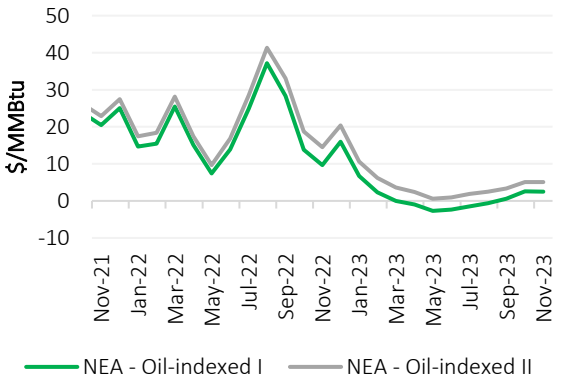
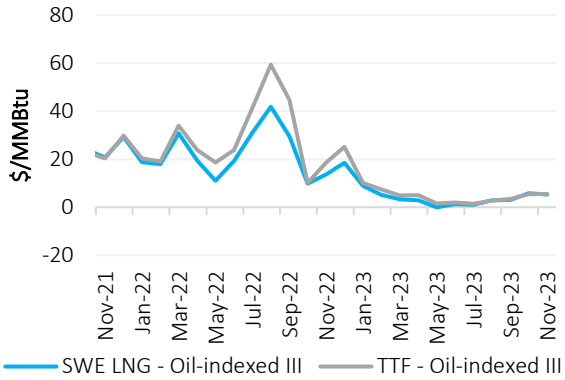


Figure 115: Europe: Spot and oil-indexed price spread



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 November 2023, the NEA-TTF price spread remained positive, but decreased slightly compared to the previous month. The average premium of NEA LNG spot price over the average TTF spot price was $1.68/MMBtu. Both benchmark prices experienced bullish movement during the month (Figure 116).

NBP traded at a discount of $0.57/MMBtu compared to TTF, which was lower than the average discount of $0.63/MMBtu in the previous month (Figure 117). The NBP-TTF spread remained negative but narrowed due to a tighter UK gas market as gas demand increased.

Furthermore, the NWE LNG-TTF spread turned negative, with the NWE LNG spot price trading at a discount of $0.09/MMBtu compared to TTF, indicating higher LNG sendout in the region (Figure 118). The NWE LNG-SA LNG price spread turned positive, averaging $0.16/MMBtu (Figure 119). Meanwhile, the NEA-HH and TTF-HH spreads both widened to $12.70/MMBtu and $11.02/MMBtu, respectively (Figure 120 and Figure 121). Asian and European spot prices held higher premiums over North American spot prices during the month.

Figure 116: NEA-TTF price spread

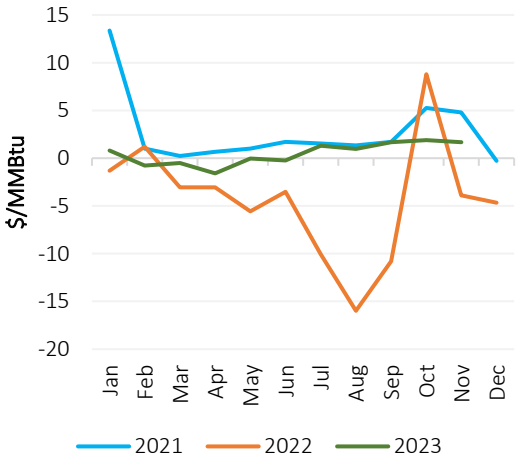


Figure 117: NBP-TTF price spread

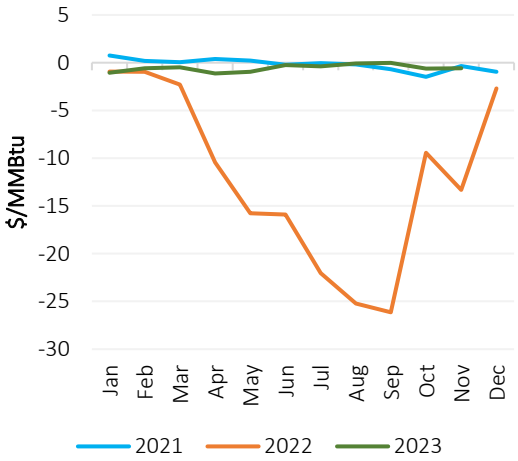


Figure 118: NWE LNG-TTF price spread

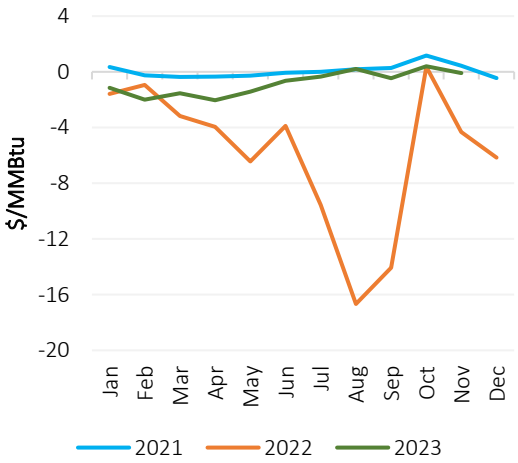


Figure 119: NWE LNG – SA LNG price spread

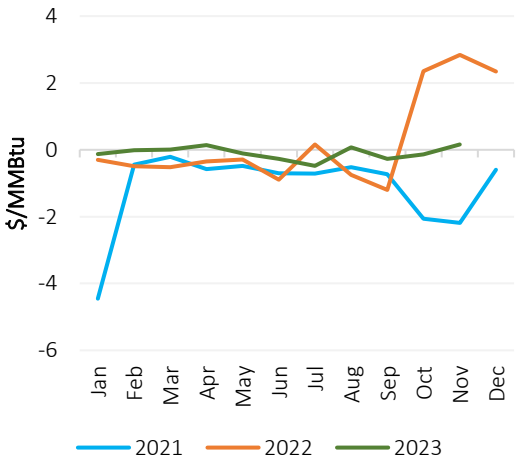


Figure 120: NEA-HH price spread

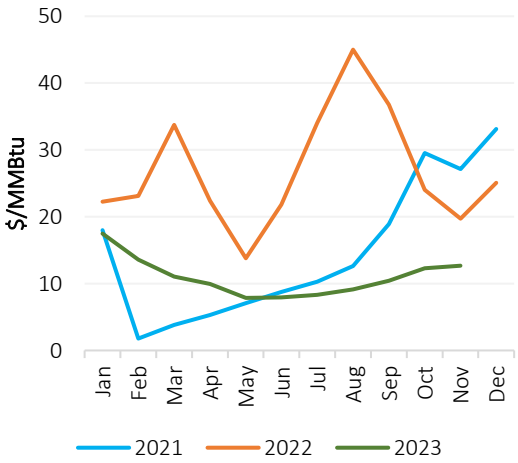
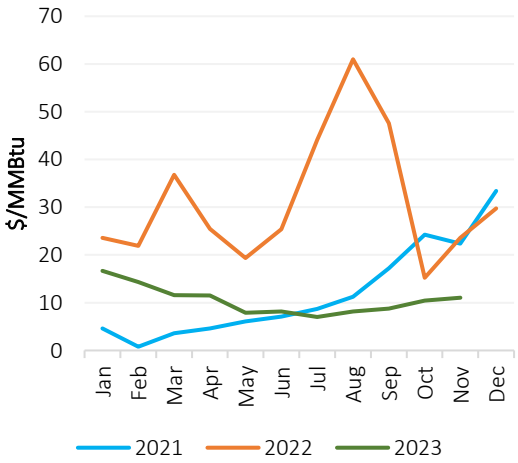


Figure 121: TTF-HH price spread



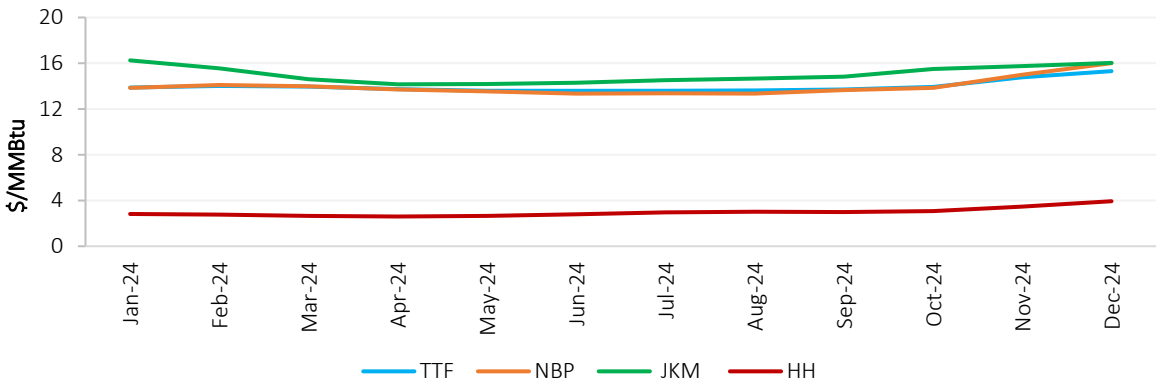
Source: GECF Secretariat based on data from Argus and Refinitiv Eikon

7.1.4 Gas & LNG Futures Prices

For the six-month period spanning from January to June 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 January 2024, JKM is expected to trade at a premium of $2.4/MMBtu compared to TTF. Subsequently, in February and March 2024, the JKM-TTF spread is projected to narrow to $1.5/MMBtu and $0.6/MMBtu, respectively. Additionally, in Q1 2024, the NBP-TTF spread is expected to be negligible, with both prices converging (Figure 122).

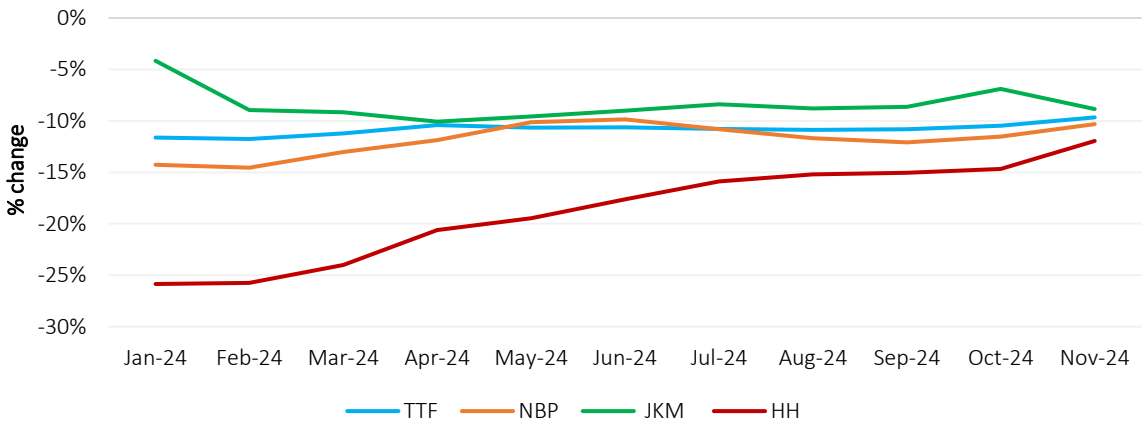
Moreover, for the six-month period from January to June 2024, gas and LNG futures prices for TTF, NBP and JKM (as of December 4, 2023) are lower than the futures prices expectations considered on November 5, 2023 (as reported in the GECF MGMR November 2023). Moreover, as of December 4, 2023, the average futures prices for TTF, NBP and JKM during the same six-month period are $13.79/MMBtu, $13.75/MMBtu and $14.84/MMBtu, respectively. Meanwhile, the average HH futures price is $2.72/MMBtu, which is also lower than previous expectations (Figure 123).

Figure 122: Gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Futures prices as of December 4, 2023.

Figure 123: Variation in gas & LNG futures prices



Source: GECF Secretariat based on data from Refinitiv Eikon
Note: Comparison with the futures prices as of November 5, 2023, as reported in GECF MGMR November 2023.

7.2 Cross Commodity Prices

7.2.1 Oil Prices

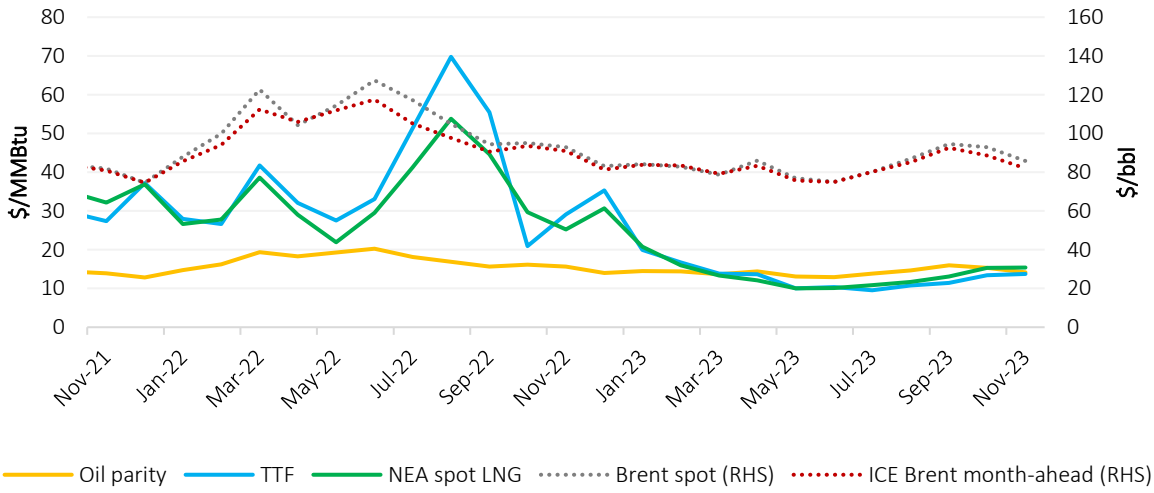
In November 2023, the average Brent spot price was $85.75/bbl, reflecting a decrease of 8% m-o-m and y-o-y (Figure 124). The Brent month-ahead price averaged $82.03/bbl, marking an 8% decrease m-o-m and a 10% decrease y-o-y.

Oil prices softened during the month due to easing concerns about potential oil supply disruptions in the Middle East. In addition, relatively weak global oil demand amidst ongoing economic challenges and lacklustre industrial activity exerted downward pressure on prices. However, oil prices were prevented from sliding further following the announcement by Saudi Arabia and Russia, at the beginning of the month, confirming their voluntary supply cuts until the end of December 2023. Moreover, on November 30, 2023, OPEC+ members agreed to deepen supply cuts voluntarily by a total of about 2.2 million bpd for early next year (including an extension of reductions by Saudi Arabia and Russia of 1.3 million bpd).

Furthermore, in November 2023, TTF spot prices traded at a lower discount to the oil parity price of $0.4/MMBtu. Meanwhile, NEA LNG spot prices held a premium of $1.3/MMBtu to the oil parity price, for the first time since February 2023.

From January to November 2023, the average Brent spot price was $84/bbl, representing a 17% decrease y-o-y. Similarly, the average Brent month-ahead price was $82.03/bbl, representing a 16% decrease y-o-y.

Figure 124: 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

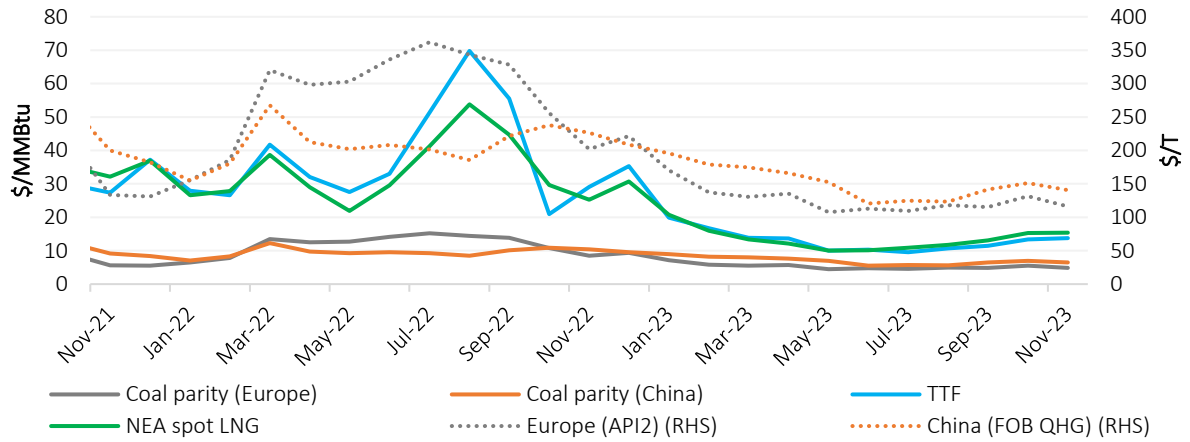
In November 2023, the European coal price (API2) averaged $116.29/T, decreasing by 12% m-o-m and 42% y-o-y. Meanwhile, in China, the QHG coal price averaged $140.43/T, reflecting declines of 7% m-o-m and 38% y-o-y (Figure 125).

Despite the seasonal increase in coal-fired power generation prompted by colder temperatures in Europe, coal prices declined during the month due to relatively weak demand and ample inventory levels in the region. Coal prices in China also failed to gain momentum.

The premium of TTF spot price over the API2 parity price increased by 12% m-o-m to $8.8/MMBtu in November 2023. Additionally, the premium of NEA spot LNG price over the QHG parity price increased by 7% m-o-m to $9.0/MMBtu.

From January to November 2023, the European API2 averaged $125.96/T, representing a 55% decrease y-o-y. Meanwhile, the Chinese QHG price averaged $151.81/T, which was 27% lower y-o-y.

Figure 125: 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.

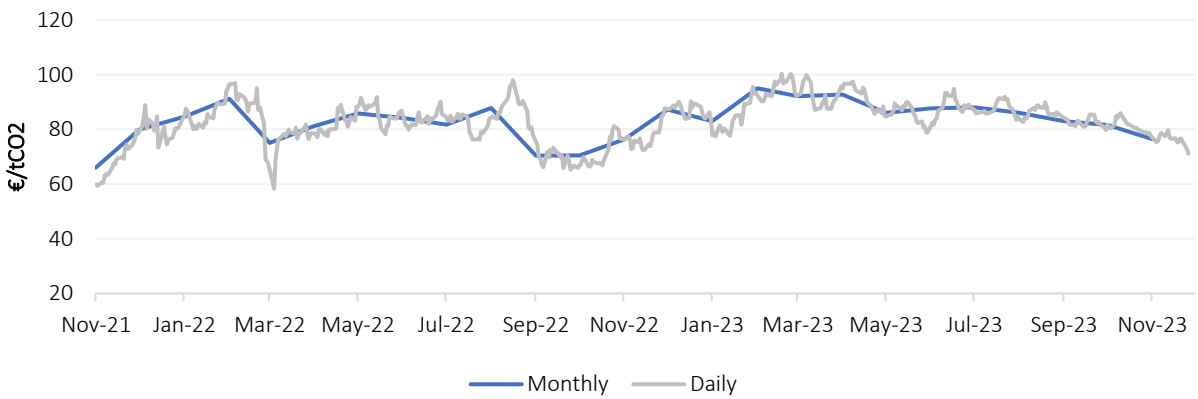
7.2.3 Carbon Prices

In November 2023, EU carbon prices averaged €76.43/tCO_2, reflecting a 6% decline m-o-m, and was relatively stable compared to the previous year (Figure 126).

EU carbon prices have steadily declined for the past four months. Moreover, daily EU carbon prices reached a 12-month low, falling below €75/tCO_2 at the end of November. The bearish movement was primarily attributed to high auction supply and offloading of surplus allowances from the industrial sector.

From January to November 2023, EU carbon prices averaged €86.50/tCO_2, representing an increase of 7% y-o-y.

Figure 126: EU carbon prices

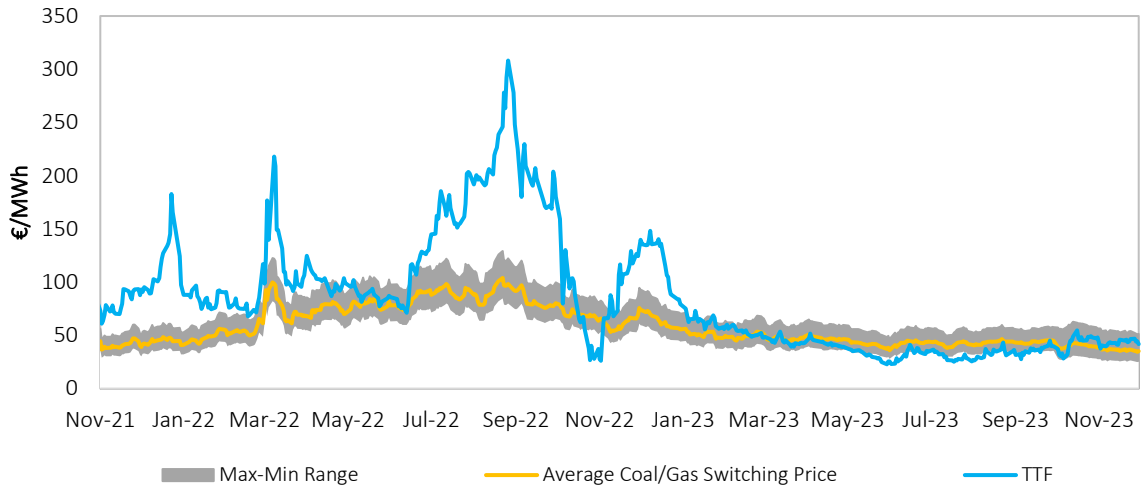


Source: GECF Secretariat based on data from Refinitiv Eikon

7.2.4 Fuel Switching

In November 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 10% m-o-m to reach €36.25/MWh, while the average TTF spot price increased. Consequently, the average monthly spread between the TTF spot price and the coal-to-gas switching price widened to €7/MWh (Figure 127). Looking ahead to January 2024, the TTF spot price is expected to remain above the average coal-to-gas switching price, as gas prices increase during the winter season. This may reduce the incentive for coal-to-gas switching in Europe.

Figure 127: 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

Germany: On November 15, 2023, Germany's gas market operator, Trading Hub Europe (THE) announced its intention to sell up to 37TWh of gas from storage to the market. This gas had been reserved in accordance with the Energy Industry Act. The law stipulates that THE must wait two weeks after notification before it can commence selling gas but must start no later than January 1, 2024. Considering withdrawals until March/April 2024, this move has the potential to add up to 300GWh/d of supply to the market. The majority of these volumes are expected to come from Rehden, where THE has been injecting since June 2022.

8 Abbreviations

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

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

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

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