INTERNATIONAL GAS UNION
UNION INTERNATIONALE DU GAZ

2025 WORLD LNG REPORT

Proudly Sponsored By

CNOOC

THE JAPAN GAS ASSOCIATION

Knowledge Partner

Rystad Energy

CARBON NEUTRALITY INITIATIVES OF

JAPANESE GAS COMPANIES

JAPANESE GAS COMPANIES ARE TACKLING THE CHALLENGE OF MAKING CITY GAS CARBON NEUTRAL

COLLABORATIVE OVERSEAS PROJECTS

ReaCH4 PROJECT

IN THE US(TEXAS)

The flagship project by Tokyo Gas, Toho Gas, Mitsubishi Corporation and Sempra Infrastructures to develop a world's first commercial scale e-methane supply chain. The project aims to produce e-methane to contribute to Japan's city gas demand, utilizing the existing Cameron LNG plant as well as other existing infrastructure.

e-methane PROJECT

IN MOOMBA (AUSTRALIA)

Collaboration among Osaka Gas Australia, Toho Gas, Santos, and Tokyo Gas to explore e-methane production at Moomba in Australia's Cooper Basin, leveraging Santos' decades of experience in upstream gas field development and operation. Aiming to start exporting e-methane to Japan in 2030 at the earliest.

PHOENIX GAS PROJECT

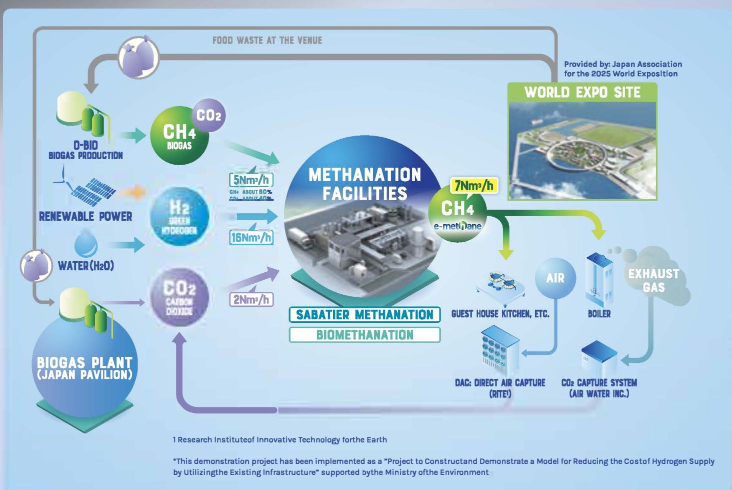
IN THE US (MIDWEST)

Osaka Gas and Tallgrass are collaborating on an innovative world-scale e-methane project aimed at delivering e-methane by 2030 to meet Japan's growing energy demands. This pioneering initiative will integrate with Tallgrass' assets and leverage the abundant CO_2 resources of the U.S. Midwest. By effectively utilizing existing infrastructure for transportation within the U.S. and exporting e-methane to Japan via Freeport LNG in Texas, the project positions itself as a vital contributor to the global energy transition, promoting sustainability and enhancing energy security for future generations.

OSAKA GAS Daigas Group

METHANATION DEMONSTRATION AT THE EXPO 2025 OSAKA, KANSAI

A demonstration is currently underway at the Expo site, focusing on producing e-methane and utilizing it in gas equipment on site. This production utilizes CO_2 contained in the biogas derived from food waste at the Expo site, CO_2 captured from gas equipment and the atmosphere, and green hydrogen produced using renewable energy, as feedstock of e-methane.



TOKYO GAS

DEMONSTRATION OF METHANATION USING CO_2 FROM A WASTE TREATMENT PLANT

Tokyo Gas launched a verification test for methanation in 2021 to assess the performance of decarbonization technologies.
In partnership with the City of Yokohama, we are evaluating the feasibility of Carbon Capture and Utilization (CCU), which captures CO_2 from flue gas.

TOHO GAS

FIRST USE OF e-methane AS A FEEDSTOCK FOR CITY GAS

In collaboration with Chita City in Aichi Prefecture, we have begun an e-methane production demonstration using biogas-derived CO_2 and hydrogen produced by electricity from cryogenic power generation.
The e-methane produced in this demonstration is used as a city gas feedstock for the first time in Japan.

THE JAPAN GAS ASSOCIATION

Table of Contents

Empower a Beautiful Life
Explore Energy for the Future

中国海油
CNOOC

赋能美好，探源未来

WHO WE ARE

- China National Offshore Oil Corporation (CNOOC), established as a state-owned mega company with the approval of the State Council on 15 February 1982, is the largest offshore oil and gas producer in China.
- The company assets are located in more than 20 countries and regions around the globe.
- In 2024, the company recorded a net oil and gas production of 726.8 million BOE. (from CNOOC Limited official website).

WHAT WE DO

- Oil & Gas Exploration and Development
- Engineering and Technical Services
- Refining and Marketing
- Gas and Power
- Financial Services

COMPANY RANKINGS

- No. 56th in 2024 Fortune Global 500
- A-level by the SASAC for 20 consecutive years

CNOOC Semi-submersible Production Platform "Shenhai-1" Energy Station

MESSAGE FROM THE PRESIDENT OF THE INTERNATIONAL GAS UNION

Dear Colleagues,

I am pleased to present the 16th annual edition of the IGU World LNG report.

The 2025 IGU World LNG Report offers a comprehensive and authoritative review of the global LNG industry and markets during another dynamic year for this rapidly evolving sector of the Gas industry.

Global LNG's growth trajectory continued in 2024, marked by a further 2.4% increase in LNG trade, the addition of 6.5 MTPA of liquefaction capacity, and the debut of two new exporting markets – Mexico and Congo. Following the market turbulence at the start of this decade, global LNG prices continued to moderate in 2024, driven by consumer demand in Asia, where gas remains a clean, premium fuel for enhancing the energy mix and ensuring energy security.

Despite the significantly lower price environment, a colder winter in the northern hemisphere compared to 2023 and the need to fill storage began to drive prices up in the second half of 2024. This market rebalancing clearly highlights that LNG market conditions remain tight as the market anticipates significant additional supply capacity in the latter half of this decade. Meanwhile, the global LNG market equilibrium is fragile and sensitive to uncertainties from both supply and demand sides. In addition to these market and project dynamics, considerable uncertainty in geopolitics, trade, and regulatory policy characterises today's energy landscape. This year's edition analyses the key risks, opportunities, and technological innovations that will shape the future of the global LNG market.

Despite the turbulent background, we are confident that the LNG sector will continue to develop and evolve to meet customers' needs and respond to the many changes in global energy dynamics. We also believe that the growing demand for natural gas in emerging markets, the increasing diversification of market participants, the expansion of infrastructure, and the development of innovative technology will all continue to drive the LNG market.

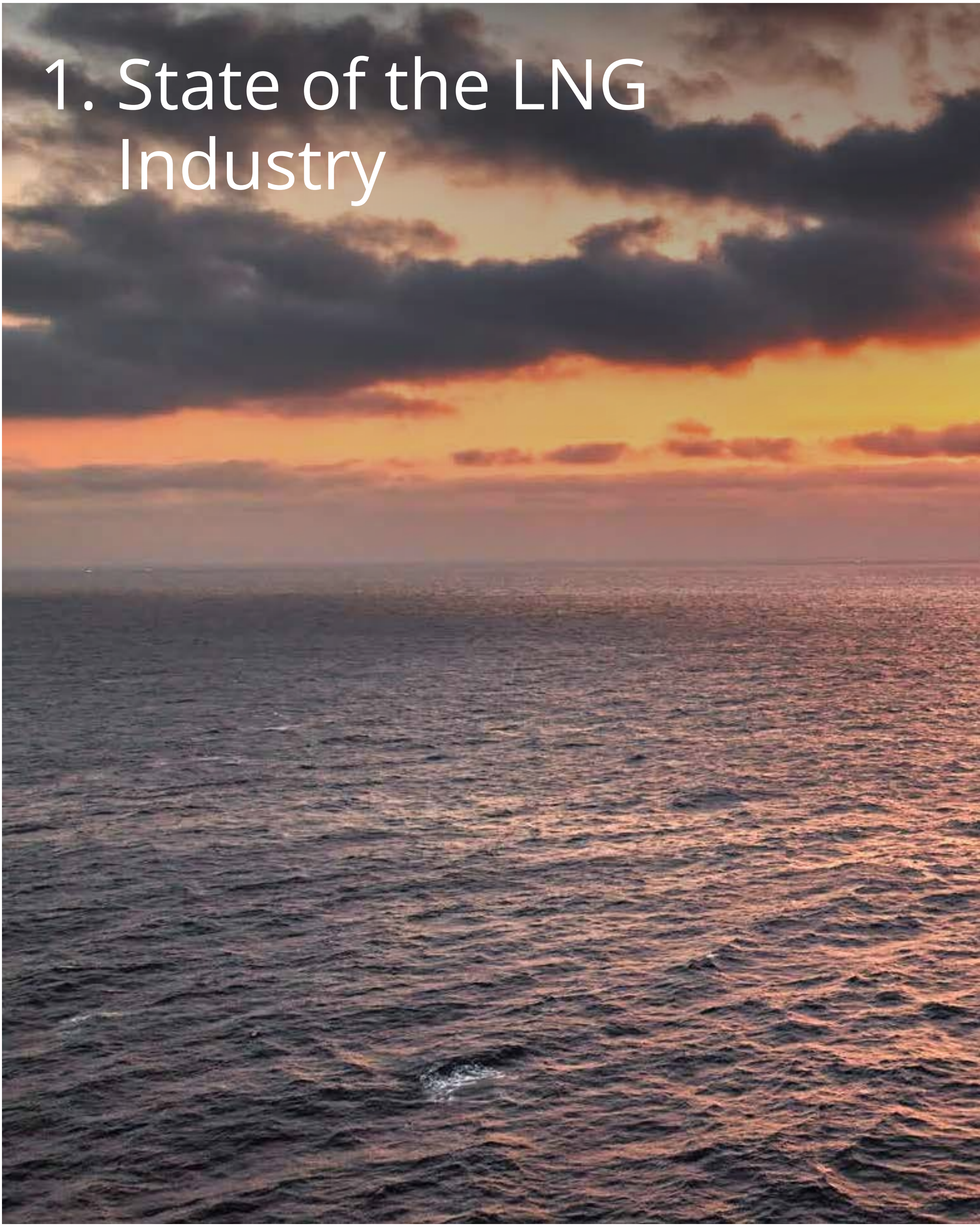
I am particularly proud to see that the LNG industry continues to show remarkable flexibility in navigating these global developments and is investing in the infrastructure necessary to ensure energy security and access across various global regions, including Europe, which is still facing the repercussions of the substantial reduction in Russian imports.

As the world moves toward a lower emissions future, nations seek ways to achieve their climate commitments while keeping energy affordable, available, and secure. LNG is an invaluable tool that continues to gain traction as an affordable and reliable option for growing energy markets looking to displace higher-emitting fuels. LNG will also be critical in providing greater resiliency by offering baseload generating capacity for the rapidly increasing electricity demand in markets with a growing share of variable renewables.

Sincerely,

Li Yalan
President of the
International Gas Union

1. State of the LNG Industry



Courtesy CNOOC

LNG Trade

411.24 MT
Global LNG trade
in 2024

Global liquefied natural gas (LNG) trade grew by 2.4% in 2024 to 411.24 million tonnes (MT), connecting 22 exporting markets with 48 importing markets. Despite muted spot demand in late 2024, LNG trade expanded due to increased liquefaction capacity and rising exports from several key producers, including the United States, Russia, Indonesia, and Australia.

Asia Pacific remained the largest exporting region with 138.91 MT in 2024, adding 4.10 MT over 2023. The Middle East continued as the second-largest exporting region with 94.25 MT, slipping by 0.44 MT from 2023. North America was the third-largest exporting region, growing by 4.11 MT to 88.64 MT, driven primarily by increased US output and the startup of the Plaquemines facility. Mexico and Congo joined the ranks of LNG exporters in 2024 with new floating LNG (FLNG) production.

On the import side, Asia saw the largest increase in 2024, rising by 12.48 MT Year-on-Year (YOY) to 117.97 MT, followed by Asia Pacific with a 9.77 MT gain to 165.09 MT. The rise was driven by high gas-for-power demand due to heatwaves, alongside lower LNG prices in early 2024, encouraging more spot buying by price-sensitive markets. China remained the largest importer, with imports rising by 7.45 MT to 78.64 MT. India imported 26.15 MT in 2024 versus 21.96 MT in 2023, a 4.19 MT (19.1%) increase. Japan and South Korea imported 67.72 MT and 47.01 MT, respectively, both showing moderate gains.

In contrast, European imports declined sharply, falling 21.22 MT year-on-year to 100.07 MT, driven by high storage levels at the start of the year, sluggish demand, and steady pipeline flows. The UK saw the largest individual decline, down 6.48 MT to 8.03 MT in 2024. Imports to France dropped by 3.75 MT, Spain imported 3.49 MT less, while the Netherlands took in 2.98 MT less LNG than in 2023.

Price Trends

Platts JKM benchmark averaged
$11.91/ mmBtu
in 2024

Global LNG prices stabilised further in 2024, with Platts Japan/Korea Marker (JKM) – Asia's key LNG benchmark – averaging $11.91 per million British thermal units (mmBtu), down 13.5% from 2023 and below long-term oil-linked contract prices for much of the year. Reduced price volatility, with JKM's 30-day rolling volatility average falling to 45%, supported record spot trading activity and improved forward market confidence. Price levels were subdued in the first half of the year amid mild winter weather and high inventories but strengthened in the fourth quarter due to geopolitical tensions and tightening supply expectations.

Demand rebounded in Asia, with China and India posting strong YOY growth in spot LNG imports, driven by heatwaves, infrastructure expansions, and greater reliance on gas-for-power. Traditional North Asian buyers like Japan and South Korea showed mixed trends, with limited overall growth but increased activity from smaller players and traders. Southeast Asian markets also boosted spot procurement, with around two-thirds of spot trades linked to the JKM index.

In contrast, European LNG imports declined to their lowest level since 2021 as high renewable output, strong pipeline supply, and narrower price differentials limited spot buying. However, flexibility improved, with spot and short-term imports rising to 50% of total volumes. The JKM–NWE (Northwest Europe) price spread narrowed to $1.15/mmBtu, reflecting intensified inter-basin competition, while growing derivatives and physical trade volumes highlighted the continued evolution of LNG market structures.

Liquefaction Plants

494.4 MTPA

Global liquefaction capacity at the end of 2024

Global LNG liquefaction capacity grew by 6.5 million tonnes per annum (MTPA) in 2024 to a total of 494.4 MTPA by year-end. This growth was driven by the start-up of Plaquemines LNG trains 1-8 (T1–T8) in the United States (4.5 MTPA), Altamira FLNG in Mexico (1.4 MTPA), and Congo's Marine XII FLNG project (0.6 MTPA). The US maintained its position as the leading market for operational liquefaction capacity, reaching 97.5 MTPA. Australia and Qatar followed, with capacity of 87.6 MTPA and 77.1 MTPA, respectively. These three markets alone account for over half of global capacity. Despite capacity growth, the global average utilisation rate decreased slightly to 86.7% from 88.7% in 2023, due to maintenance, power disruptions, and a series of mechanical outages across various facilities.

Final investment decision (FID) activity declined significantly in 2024. Only 14.8 MTPA of new liquefaction capacity reached FID, the lowest annual approval volume since 2020 and well below the 58.8 MTPA greenlighted in 2023. Key projects to receive FID included Ruwais LNG in the UAE (9.6 MTPA), Cedar FLNG in Canada (3.0 MTPA), Genting FLNG in Indonesia (1.2 MTPA), and Marsa LNG in Oman (1.0 MTPA). Three out of these four projects reflect an industry-wide pivot toward lower-emission LNG, integrating solutions such as renewable energy sourcing, electric motor-driven trains, and carbon capture and storage (CCS). Ruwais LNG is set to become one of the first LNG export terminals in the Middle East powered entirely by electricity from the national grid. Similarly, Marsa LNG aims to source 100% of its electricity from a solar farm and will also offer LNG bunkering services to help reduce emissions in the shipping sector.

Decarbonisation continues to play an increasingly central role in liquefaction project development. Across the sector, stakeholders are advancing electrification, CCS integration, and alternative fuels like e-methane. Cedar LNG in Canada, majority-owned by the Haisla Nation, will use hydropower for its operations, while Ichthys LNG in Australia is assessing a CCS injection project in collaboration with Chubu Electric. Tokyo Gas and Mitsui completed a bio-LNG shipment from Cameron LNG to Japan in March 2024, demonstrating the potential for synthetic and renewable gas integration into the LNG value chain. However, challenges persist: Rio Grande LNG in the US has dropped its CCS plans for now, citing permitting delays, and Australia's Gorgon LNG continues to face storage reservoir limitations for CO_2 injection despite having the infrastructure in place.

FLNG capacity also saw further expansion, with Marine XII FLNG in Congo and Altamira Fast LNG in Mexico entering operation in 2024. As of early 2025, total operational FLNG capacity stands at 14.35 MTPA. FLNG has become a flexible, lower-footprint alternative to onshore liquefaction, particularly attractive in environmentally sensitive areas or where infrastructure is limited. New FLNG projects are proposed in 15 markets, with standardised second-generation FLNG units gaining market traction for their shorter lead times and lower capital intensity.

Technology innovation in liquefaction continues to evolve. Air Products technologies maintained their market dominance with 66% of global operational capacity in 2024. However, ConocoPhillips' Optimised Cascade process continues to expand its share, particularly in the US, with further adoption planned at projects such as Corpus Christi Stage 3. Newer modular technologies, such as New Fortress Energy's Fast LNG, deployed at Altamira, are also gaining relevance, especially for small and medium-scale developments. As demand for low-carbon, flexible LNG grows, technology choice, emissions footprint, and project adaptability will remain key differentiators for new liquefaction ventures.

Proposed New Liquefaction Plants

1,122 MTPA

Proposed aspirational liquefaction capacity in pre-FID stage at the end of 2024

As of the end of 2024, 1,121.9 MTPA of liquefaction capacity was in the pre-FID stage. North America continued to dominate proposed capacity, accounting for 648.4 MTPA, with 366.9 MTPA in the US, 227.3 MTPA in Canada, and 54.2 MTPA in Mexico. This was followed by Russia (170.4 MTPA), Africa (133.3 MTPA), Asia Pacific (67.0 MTPA), and the Middle East (66.5 MTPA). Around 36.3 MTPA is proposed in other regions.

While the Russia-Ukraine conflict continues to reshape global gas flows and drive interest in new liquefaction capacity, many pre-FID projects face uncertainty due to economic headwinds, regulatory hurdles, and rising pressure to align with decarbonisation targets. The US saw a temporary pause in LNG export approvals for non-Free Trade Agreement (FTA) markets early in 2024, but this was lifted under the new administration, with projects like Commonwealth LNG securing new export authorisations. In Canada, west coast projects are strategically well-positioned to serve Asian markets, but development is constrained by infrastructure and permitting challenges, particularly regarding First Nations land access.

Elsewhere, Russia's LNG expansion strategy remains ambitious, but geopolitical isolation and sanctions raise significant barriers to project execution. In Africa, the pre-FID pipeline has grown substantially, led by Mozambique, though several major projects are delayed due to security concerns and financing risks. In Asia Pacific, Australia continues to lead with 45.5 MTPA of proposed capacity, though most projects are still in early planning stages. Indonesia's Abadi LNG project (9.5 MTPA), now featuring a CCS component, remains the region's most advanced proposal. Despite a broad pipeline of projects and strong interest across multiple regions, only a fraction of the 1,121.9 MTPA in proposed capacity is likely to advance. Market conditions, policy developments, and the growing importance of emissions reduction will continue to determine which projects move forward in the years ahead.

Regasification Terminals

1,064.7 MTPA

Global nominal regasification capacity at the end of 2024

Global LNG regasification capacity stood at 1,064.7 MTPA across 47 markets at the end of 2024. During the year, 17 projects came online – 10 new terminals, six expansions, and one reactivation – adding a total of 66.6 MTPA. The largest single addition was the 9.9 MTPA Mukran LNG project in Germany, followed by China's 6.1 MTPA Huizhou LNG 1 and three 6 MTPA projects: Chaozhou Huaying LNG 1 and Tianjin PipeChina LNG 2 in China, and Para LNG Floating Storage and Regasification Unit (FSRU) in Brazil. Notably, Egypt rejoined the LNG import market with the restart of Ain Sokhna FSRU. This global capacity growth came as existing and emerging markets continued to expand LNG infrastructure to strengthen supply security and meet growing demand.

While the number of commissioned or restarted projects in 2024 (17) matched that of 2023, the nature of the additions shifted. Floating-based terminals continued to gain ground due to their flexibility and faster deployment timelines, accounting for over half of the new capacity. By region, Asia led with 25.1 MTPA of additions, all from China, followed by Europe at 22.3 MTPA and Latin America at 13.8 MTPA. Africa and Asia Pacific added 2.9 MTPA and 2.4 MTPA, respectively. Out of the 66.6 MTPA total, 44.5 MTPA came from new terminals, 19.1 MTPA from expansions, and 2.94 MTPA from the restart of Egypt's Ain Sokhna.

Despite the added capacity, global regasification utilisation fell slightly to 38.6% in 2024 from 40.1% in 2023, continuing a downward trend from 42.8% in 2022. Lower utilisation was driven by tepid demand in major markets like Europe and Asia Pacific, high LNG inventories, and a continued shift toward renewables. Europe saw a particularly sharp decline, with average utilisation sliding to 41% from 54% the previous year, well below the 73.8% peak in 2022. Asia's utilisation held relatively steady around 43 to 44%.

Among 2024's notable projects, China stood out as the largest contributor to new capacity with seven new or expanded terminals, adding 25.1 MTPA. These included major onshore facilities such as Huizhou LNG 1, Chaozhou Huaying LNG 1, and expansions like Tianjin PipeChina LNG 2. In Latin America, Brazil brought online three new floating storage and regasification units (FSRUs) – Para LNG, Sao Paulo LNG, and Terminal Gas Sul – adding 13.8 MTPA collectively. Egypt's Ain Sokhna FSRU resumed imports in June 2024, marking the market's return as an LNG importer.

Europe continued to fast-track LNG import infrastructure, particularly floating-based projects. Germany led with three FSRU startups totalling 13.6 MTPA, and Belgium added 4.7 MTPA via the Zeebrugge expansion. Greece added 4 MTPA with the Alexandroupolis FSRU. The continent's ongoing preference for FSRUs reflects their deployment speed and lower capital cost. Between 2025 and 2027, Europe is expected to bring another 55.9 MTPA of capacity online, primarily in Germany, Italy, and Greece. However, lower demand, mild weather, and strong renewable output continue to weigh on utilisation across the region.

In contrast, Asia and Asia Pacific remain focused on onshore terminals, which allow for larger capacity builds and better integration with domestic pipeline networks. China continues to dominate newbuilds, with 38 projects under construction expected to add 143.8 MTPA by 2030. India also has several new terminals and expansions underway, totalling 27 MTPA. However, in South and Southeast Asia, several planned terminals face delays due to uncertain demand, limited infrastructure, and high price sensitivity. Despite recovering LNG prices in 2024, investor caution remains high in these regions.

While long-term fundamentals in Asia remain supportive – especially with Southeast Asia expected to become a net gas importer by the 2030s – short-term challenges persist. Price volatility, competition from alternative fuels, and policy uncertainty limit near-term utilisation potential. The Philippines and Vietnam remained new entrants to the LNG market in 2024, having brought their first terminals online in 2023. Nevertheless, concerns around affordability and infrastructure may limit utilisation growth in the near term, particularly in newer LNG-importing nations.

Floating and Offshore Regasification

207.3 MTPA

Global floating and offshore regasification capacity at the end of 2024

Global floating and offshore regasification capacity stood at 207.3 MTPA across 52 operational terminals at the end of 2024, accounting for roughly 20% of total global regasification capacity. Eight new floating-based terminals were commissioned during the year, adding 34.4 MTPA of new capacity. Europe led the additions with four new projects (17.6 MTPA), followed by Latin America with three (13.8 MTPA), and one additional project elsewhere. FSRUs remain a key solution for new and flexible LNG import capacity, especially amid shifting energy security needs and evolving market conditions.

Thirteen floating and offshore regasification terminals were under construction globally at the end of 2024, representing 41.1 MTPA of future capacity. Asia and Asia Pacific lead with 21 MTPA under development, followed by Europe (9.8 MTPA), Latin America (6.1 MTPA), and Africa (4.2 MTPA). Around 62% of this capacity is expected to come online in 2025, with projects underway in Germany, Italy, Estonia and Cyprus. FSRUs have played a growing role in expanding LNG access in recent years, with 16 out of 47 LNG-importing markets now relying solely on floating and offshore facilities, and another 11 using a combination of floating and onshore infrastructure.

LNG Shipping

742 Vessels
LNG fleet
at the end of 2024

The LNG shipping market in 2024 was shaped by modest growth in trade and a substantial increase in vessel supply. A total of 7,065 LNG trade voyages were recorded during the year, up just 0.9% from 2023 – broadly in line with stagnant LNG production. By contrast, the active LNG carrier fleet expanded significantly, reaching 742 vessels by the end of 2024, including 48 FSRUs and 10 FSUs. This was a 7.5% YOY increase, with 64 vessels delivered in 2024. The fleet expansion outpaced trade growth, contributing to an oversupplied market and pushing down freight rates across the board.

Following a peak in July–August 2024, when two-stroke vessels west of Suez fetched up to $94,000/day, charter rates collapsed to just over $20,000/day by December – barely covering operating costs. Steam turbine vessels dropped further to $6,000–$7,000/day. The oversupply of vessels was exacerbated by tightness in the European market, which kept Atlantic Basin vessels within the Atlantic, weighing on tonne-mile demand.

Trade routes remained impacted by logistical disruptions. Drought conditions in Panama during 2023 limited canal transits, forcing some US cargoes to reroute via the Cape of Good Hope. Though rainfall improved canal operations by early 2024, most LNG carriers still opted for other routes. Adding to complications were the tensions which escalated around the Red Sea, as Houthi attacks on vessels prompted LNG ships to avoid the Suez Canal. This resulted in Atlantic origin cargoes opting to go through the Cape of Good Hope in order to deliver to destinations in the Pacific. Some market dislocation was mitigated through swaps and optimised routing strategies, although the availability of a growing fleet outpacing liquefaction growth meant that there were marginal impacts of the trade route disruptions on charter rates.

On the technology front, eXpanded Diesel Fuel (X-DF) propulsion systems remain the dominant choice for newbuilds, with about 209 vessels under construction at the end of 2024. Orders for ME-GA engines surged through 2023 and early 2024 but slowed after MAN announced in October it would cease ME-GA production due to tightening regulations for nitrogen oxide emissions (NOx) by the International Maritime Organisation (IMO). The shift toward efficient, low-emission two-stroke engines continues, with at least 209 X-DF and 83 M-type, Electronically Controlled, Gas Admission (ME-GA) units on order, alongside 21 M-type, Electronically Controlled, Gas Injection (ME-GI) systems.

LNG Bunkering Vessels and Terminals

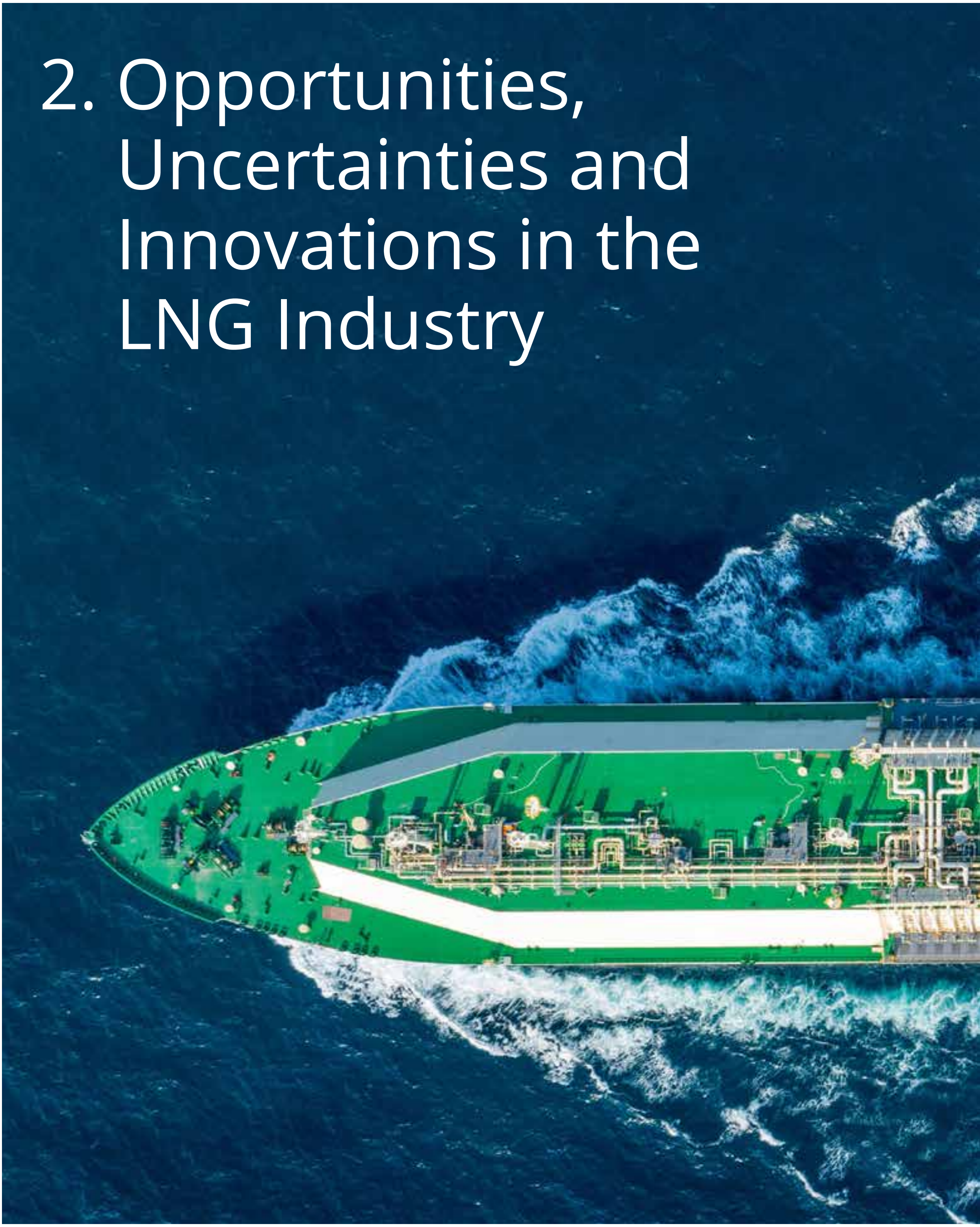
56 Units
Global operational LNG
bunkering vessel fleet
at the end of 2024

Global LNG prices continued to be volatile in 2024, with declines in the first half driven by mild weather and strong renewable output, followed by increases later in the year amid geopolitical tensions and storage concerns. Despite this, LNG maintained its price advantage over oil-based marine fuels, supporting its ongoing adoption as a bunker fuel. Structural factors like its environmental benefits and compatibility with bio and liquefied e-methane also reinforced its role as a transitional fuel in the shipping sector.

The global LNG bunkering fleet grew to 56 operational vessels by the end of 2024 with further support from expanding infrastructure and regulatory drivers such as the IMO's ban of heavy fuel oil in Arctic shipping and the EU's FuelEU Maritime regulation. The average capacity of the active fleet increased to around 8,800 cubic metres (cm), while the current order book – now at 23 vessels – averages roughly 15,460 cm, reflecting a steady shift toward larger, more efficient units.

Courtesy Samsung Heavy Industries

2. Opportunities, Uncertainties and Innovations in the LNG Industry



Courtesy CNOOC

Today's LNG market is poised to evolve rapidly as commercial, political, regulatory, and environmental factors offer opportunities – but it is also fraught with uncertainty. Commercially, LNG demand is projected to grow on the back of both established and emerging markets and sectors, with an opportunity to expand to an ever-larger number of market participants enabled by progressing technology and the expansion of LNG infrastructure. Politically, LNG enjoys support in multiple key markets and has become a bargaining chip in trade negotiations, which brings both risks and opportunities to global LNG market development. Geopolitics provide an uncertain backdrop as armed conflicts continue to affect not only global LNG trade routes but also the availability of competing pipeline gas. The LNG industry is contributing to global decarbonisation by replacing more emissions-intensive energy carriers, and newer LNG projects and carrier vessels implement innovative technologies to reduce emissions across the full LNG supply chain. This should further cement LNG as a long-term solution to sustainability as well as energy security.

2.1 OPPORTUNITIES IN THE LNG MARKET

Next wave of liquefaction capacity: At the end of 2024, some 210.3 MTPA of liquefaction capacity was either under construction or approved for development and another 1,121.9 MTPA of aspirational capacity was in the pre-FID stage. After seven consecutive years of single-digit global liquefaction capacity growth, the next major capacity wave is scheduled to arrive in 2026, with 53.7 MTPA mostly from North America (31.1 MTPA) and the Middle East (15.6 MTPA). Between 2026 and 2028, global liquefaction capacity is set to increase by around 170 MTPA. This significant capacity growth could cause a price reduction and spark a surge in LNG demand, particularly from price-sensitive companies in China, India, and other parts of Asia and Asia Pacific.

New markets, new technologies: Even as importers across Europe, Asia, and Asia Pacific accounted for 93.2% of all LNG imports in 2024, the LNG landscape is evolving and expanding. Former LNG exporter Egypt imported 2.7 MT and is expected to be a net importer for years to come. Outside the legacy demand centres, Brazil boosted LNG imports nearly fivefold to 2.9 MT and Colombia lifted imports from 0.8 MT to 2.1 MT in 2024, while Mexico and Congo entered the exporter ranks.

Technology plays a major role in tapping new LNG markets: Floating solutions for LNG regasification, storage, and production are characterised by speedy and highly flexible deployment or redeployment and lower upfront investment than onshore facilities, making LNG imports and exports more accessible even for smaller or remote demand centres of less than 1 MTPA. As a result, floating storage and regasification units (FSRUs) have been a blueprint for short-notice ramp-up of regasification capacity, deployed not only by various European markets to stem the sudden decline in Russian pipeline flows in the wake of the Russia-Ukraine conflict but also by emerging markets like Egypt, Colombia, and especially Brazil. Meanwhile, the FSRUs' supply-side equivalent, floating liquefied natural gas (FLNG) facilities, have enabled the ascension of Mexico and Congo as exporting markets.

Just as floating solutions compare to onshore terminals, the conversion of conventional carriers promises lower upfront investment and faster deployment than newbuilds. Especially older, inefficient carriers with outdated propulsion systems and higher boil-off are natural conversion candidates, especially in a market environment with low spot charter rates and high LNG spot prices. With more than 70 steam turbine carriers older than 21 years, there are plenty of candidates among the global LNG carrier fleet.

Surging gas-for-power demand from data centres: Power demand growth is hardly a new development. Once entirely driven by fundamental economic forces such as population growth, industrialisation, and urbanisation, the electrification of transport and industry, amid an increasing focus on decarbonisation, has further propelled power demand in developed markets. While power demand growth does not necessarily equate to an increase in gas-fired capacity, data centres have emerged as a demand sector for which gas is especially attractive. This fast-growing sector has demanding uptime standards, restricting annual downtime to a maximum of five minutes and fifteen seconds. Because of this, most data centres operate with grid connection plus back-up, as grid connections support energy reliability and have an established regulatory framework.

The combination of deployment speed, reliability, cost, and load matching capabilities makes gas-fired power plants very attractive compared to alternative sources such as nuclear and geothermal as well as renewables backed up by batteries. While the US will likely remain the leader in data centre development, thanks to its plentiful gas resources and plethora of tech companies, the impact of data centres on power demand is set to make its impact felt also in other markets.

Political tailwinds: The natural gas and LNG industry enjoys political tailwinds in several markets. One of US President Donald Trump's first actions in office was to end the pause in issuance of LNG export permits to non-free trade agreement (FTA) markets introduced under the previous Biden administration. The first project to receive conditional non-FTA approval under the Trump administration was Commonwealth LNG (8.4 MTPA). Restarted permitting and the favourable political climate could expedite the sanctioning of up to 70 MTPA of new US LNG capacity which had been delayed by the permitting pause.

In several key customer markets, among them Japan, India, and Indonesia, governments are devising or implementing strategies leaning more heavily on LNG to reduce greenhouse gas emissions (GHG) and increase energy security. Some importers including the European Union, Japan, and South Korea have signalled willingness to discuss increased imports of US LNG to avoid or dampen newly erected trade barriers to one of their key economic partners.

2.2 UNCERTAINTIES IN THE LNG MARKET

Project risk: Sustained low prices associated with the arrival of the next wave of LNG capacity could spark a surge in LNG demand. However, the outlook is clouded by the risk of delays and cost overruns in new supply and expansion projects emanating from factors such as geopolitics, trade policy, inflation, and labour shortages.

In Russia, Arctic LNG 2 has been significantly affected by sanctions. Train 1 temporarily started production but shut down again after sanctions blocked all attempts to sell cargoes. Train 2 and 3 have been significantly delayed. In Senegal and Mauritania, Greater Tortue Ahmeyim FLNG (2.5 MTPA) started producing LNG after experiencing several delays. Even operating plants face risk, as evidenced by the US Office of Foreign Assets Control (OFAC) sanctioning the Russian Arctic LNG projects Portovaya LNG (1.5 MTPA) and Vysotsk LNG (0.66 MTPA). The delayed influx of supply or its removal from the market could lead to elevated LNG spot prices which could lower spot purchases or even mute LNG demand in the longer term. In Asia, most of the demand risk lies in India's and China's energy mix and economic outlook. When prices were elevated in late 2024, the price arbitrage for US cargoes into Asia was firmly shut as China and India shunned significant spot procurement.

Trade restrictions and tariffs: The second Trump administration is continuing the trade policy of the first Trump administration, imposing or threatening to impose tariffs. As of early 2025, trade policies between different nations remain highly dynamic with changes across multiple fronts in a short period of time. Not only could retaliatory tariffs impact US LNG exports, but they could also reduce global LNG demand by slowing growth and industrial activity, for instance in China, as witnessed during President Trump's first presidency.

Conversely, the removal of trade restrictions on Russia, for instance as part of a US-brokered ceasefire agreement or peace deal with Ukraine, could result in the return of limited volumes of Russian pipeline gas to Europe via Ukraine or alternative routes. Depending on volumes, a comeback could reduce European LNG demand over an extended period and alter the global market balance.

Global LNG transit routes: The global LNG trade is susceptible to disruptions at maritime chokepoints. Such disruptions, whether due to geopolitical tensions or weather conditions, can affect transit routes and prices. The Suez Canal is a major artery for global trade and the preferred route for LNG deliveries from Qatar to Europe and from the US and Russia to Asia. All vessels passing through the Suez Canal must transit the Red Sea and the Bab-El-Mandeb Strait, following the onset of the Middle East conflict. This has led to a shift in shipping patterns as vessels were rerouted around the Cape of Good Hope. A ceasefire agreement in the region could pave the way towards an end of hostilities and restore pre-conflict shipping patterns, but uncertainties regarding the implementation of an agreement remain.

The Strait of Hormuz, situated between Iran and Oman, is the only connection between LNG supplies from Qatar and the UAE and global markets. This strategic waterway has been affected by Iran sporadically seizing trade vessels, and any escalation could expose it to further risk of disruption. The Panama Canal, the preferred route for US LNG exports to Asia, faced major disruptions in 2023 as drought conditions reduced water levels in the Gatun Lake section of the canal. In addition, the US administration has signalled an interest in restoring control of the Panama Canal, which could add uncertainty.

Methane emission regulations: To drive action on methane mitigation and make GHG emission regulations more comprehensive, some LNG importers have moved to regulate methane emissions. The EU's methane regulation affects domestic production as well as imports, threatening financial fines in cases of non-compliance. While not explicitly targeting methane, the EU's Corporate Sustainability Due Diligence Directive (CSDDD) mandates the measurement of environmental impact and adoption of a climate action plan in line with the Paris Agreement and European Climate Law. Besides the EU, major Asian LNG markets Japan and South Korea are seeking transparency on methane emissions through their CLEAN initiative. US methane regulations passed under former President Biden, including a methane waste emissions charge and a mandate to monitor wells and stop flaring, are now being rolled back by the Trump administration. A risk therefore exists that uncertainty over rapidly changing or misaligned methane regulations could disrupt global LNG trade flows.

Market	Regulation	Scope	Resulting obligation	Entry into force
European Union	Corporate Sustainability Due Diligence Directive (CSDDD)	EU companies: 1,000+ employees, €450+ million global net turnover Non-EU companies: €450+ million EU net turnover	Identify and address potential and actual environmental impact Adopt and enact climate transition plan in line with Paris Agreement and European Climate Law	2027 to 2029
	Reduction of methane emissions in the energy sector	Coal, oil and gas companies operating in or exporting to the EU	Mandatory leak detection and repair Ban on venting and flaring practices Methane transparency requirement on imports	2025 to 2030
US	EPA's Final Rule to Reduce Methane and Other Harmful Pollution from Oil and Natural Gas Operations	US oil and gas production, processing, transmission, and storage	Eliminate routine flaring from new wells and reduce flaring from existing wells Comprehensive monitoring for methane leaks from well sites and compressor stations Emission reductions from high-emitting equipment like controllers, pumps, and storage tanks	Repealed by President Trump's administration
	Waste Emissions Charge	US oil and gas companies	Pay fee for methane emissions above certain threshold	

Source: Rystad Energy

Note: List of policies is not exhaustive

2.3 INNOVATIONS IN LNG GREENHOUSE GAS EMISSION REDUCTION MEASURES

LNG demand is projected to stay on a long-term growth trajectory on the back of a strong increase in demand from markets in Asia and Asia Pacific. Although LNG contributes to global decarbonisation efforts by serving as a substitute for coal in power generation or for fuel oil in shipping, the LNG industry also needs to address emissions from its own supply chain. Cost inflation notwithstanding, these ongoing decarbonisation efforts continue to manifest themselves in an ever more efficient LNG fleet and innovative emission reduction measures undertaken by LNG projects worldwide.

Electrification of LNG compression mitigates emissions by lowering the emission intensity of the power used in the compression process. Compared to a conventional industrial gas turbine, electricity from the national grid can reduce emissions substantially, and electricity from a nuclear plant or firmed renewable installation can almost eliminate compression emissions. Beyond CO_2 emission reduction, electric drives have the added advantage of significantly reducing feedgas intake and limiting fugitive methane emissions – however, they also make facilities more susceptible to power outages.

An all-electric concept is already used by Freeport LNG (15.3 MTPA) in the US and at Norway's Hammerfest LNG (4.3 MTPA). The concept is also being implemented in Canada at Woodfibre LNG (2.1 MTPA). Three projects that took FID in 2024 are planning to operate electrically, fuelled by renewable energy: Ruwais LNG (9.6 MTPA) in the UAE, Marsa LNG (1 MTPA) in Oman, and Cedar FLNG (3 MTPA) in Canada. Several pre-FID projects also feature electric drives in their development concept, including Papua LNG (4 MTPA) in Papua New Guinea, Ksi Lisims FLNG (12 MTPA) and LNG Canada phase 2 (14 MTPA) in Canada, and Freeport LNG Train 4 (5.1 MTPA) and Cameron LNG Train 4 (6.75 MTPA) in the US. Papua LNG has been reconfigured to a modular concept of four 1 MTPA trains featuring electric drives.

LNG-linked CCS mitigates emissions by either extracting CO_2 from upstream components or capturing post-combustion CO_2 from the liquefaction process. Hammerfest LNG (1 MTPA of CCS) pioneered carbon capture and storage (CCS) implementation in 2008, while Gorgon LNG[1] (4 MTPA of CCS) and Qatar's Ras Laffan Complex (2 MTPA of CCS) have been operating since 2019. Santos' Moomba facility (2 MTPA of CCS) started operations in 2024.

Courtesy CNOOC

[2] Chevron launched an optimisation project to realise the full potential of its carbon capture system near Barrow Island, Australia, which has been limited by reservoir challenges.

The LNG-linked CCS project pipeline indicates over 35 MTPA of CCS capacity by 2030 with the addition of Bonaparte CCS at Ichthys (2.5 MTPA) and Bayu Undan (10 MTPA) in Australia, 7 MTPA as part of QatarEnergy's LNG expansion, around 2.7 MTPA at Tangguh in Indonesia, 3.3 MTPA for the Kasawari gas field in Malaysia, and 1 MTPA at the Elk-Antelope gas field at Papua LNG. The CCS project pipeline could grow further as projects at earlier stages of development pursue this emission reduction option to secure financing and ensure project longevity through the energy transition. Abadi LNG's revised development plan entails a CCS component, and CCS solutions are advanced by US operators Venture Global (0.5 MTPA per plant), Sempra (2 MTPA at Cameron LNG), and Commonwealth LNG. However, projects can also be withdrawn, as evidenced by Rio Grande LNG dropping its 5 MTPA CCS project.

Bio-LNG and **liquefied e-methane** mitigate emissions by replacing natural gas with renewable or synthetic natural gas, respectively. Chemically identical to fossil-origin natural gas, both technologies are entirely inter-operable with existing infrastructure and can support the decarbonisation of hard-to-abate sectors like shipping and industry. Tokyo Gas and Mitsui in 2024 delivered 40,000 cm of bio-LNG from landfill gas in the US through the Cameron LNG terminal to Japan. Santos, Tokyo Gas, Toho Gas, and Osaka Gas started production at their e-methane pilot project and launched a pre-FEED study on a project to produce 0.3 MTPA of e-methane in Australia and export it to Japan. Further, a global 'e-NG' coalition of companies from various sectors, including international heavyweights like TotalEnergies, Shell, and INPEX, has been formed to support the role of e-methane in the energy transition. For both bio-LNG and liquefied e-methane, price competitiveness will be the key challenge for project developers.

Table 2.1: Upcoming emission reduction measures (electrification and CCS) in LNG projects

Market	Emission Reduction Technology	Project	Project Capacity (MTPA)	CCS Capacity (MTPA of CO2)
Canada	Electric drive	Woodfibre LNG	2.1	
Canada		Cedar FLNG	3.0	
Canada		Ksi Lisims FLNG	12.0	
Canada		LNG Canada phase 2	14.0	
Norway		Hammerfest LNG	4.3	
UAE		Ruwais LNG	9.6	
Oman		Marsa LNG	1.0	
US		Freeport LNG Train 4	5.1	
US		Cameron Train 4	6.8	2.0
US		Calcasieu Pass	10.0	0.5
US		Plaquemines	20.0	0.5
US		Calcasieu Pass 2	20.0	0.5
Papua New Guinea		Papua LNG	4.0	1.0
Australia	CCS	Bonaparte (Ichthys)	8.9	2.5
Australia		Bayu Undan (Darwin)	3.5	10.0
Qatar		QatarEnergy LNG expansion	NA	7.0
Indonesia		Tangguh	11.4	2.7
Indonesia		Abadi	9.5	In planning
Malaysia		Kasawari (MLNG)	27.0	3.3
US		Commonwealth	8.4	In planning

Source: Rystad Energy

Note: Project list is not exhaustive

3 LNG Trade

Global LNG trade increased to **411.2 MT**[1] in 2024, an increase of **9.8 MT**.

1st

The US remained the largest exporter in 2024 with a total of

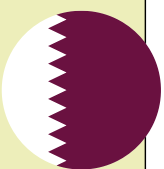
88.4 MT

of exports (+3.9 MT vs. 2023)

2nd

Australia was the second largest exporter, exporting

81.0 MT



3rd

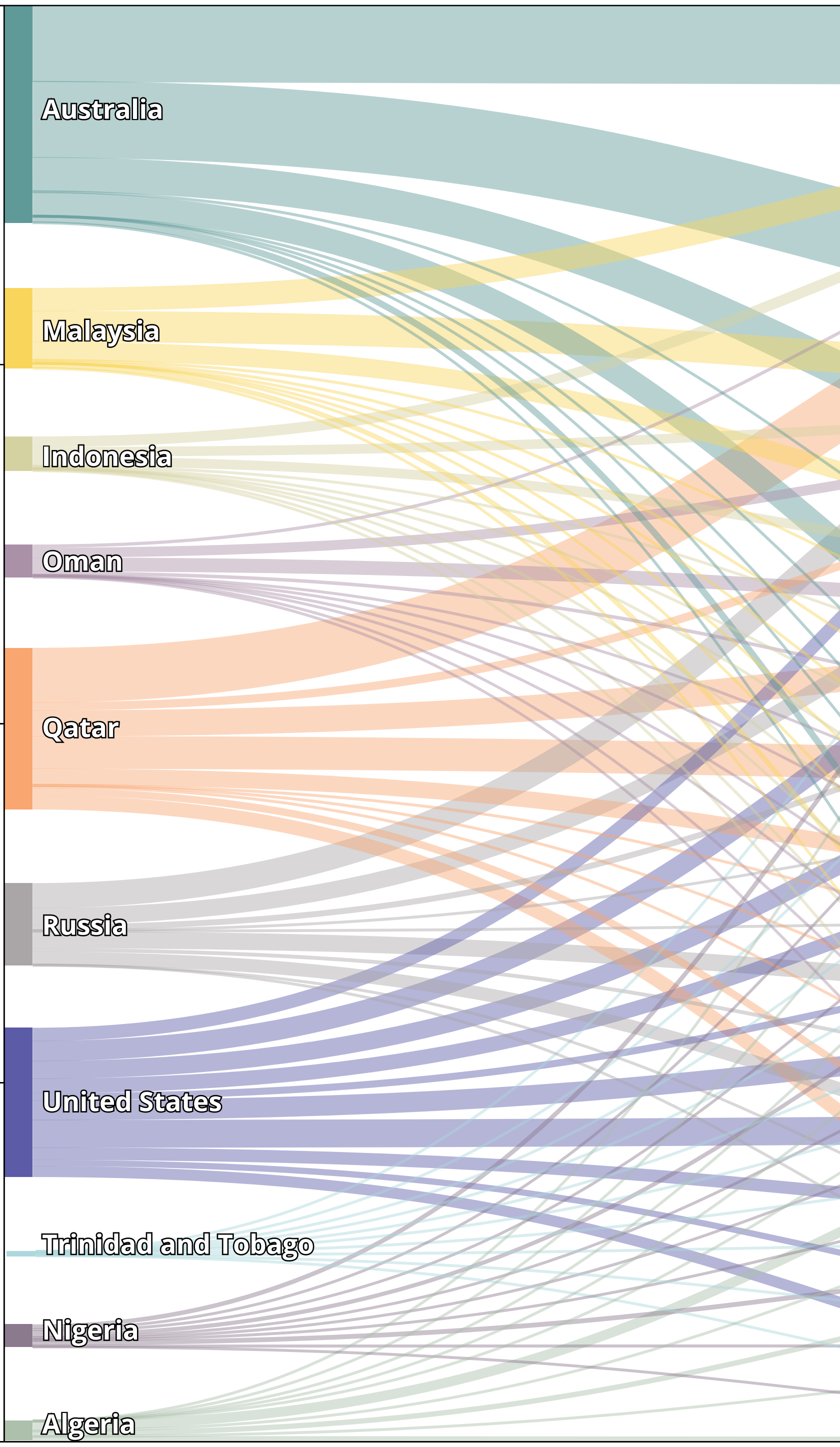
Qatar exported

77.2 MT

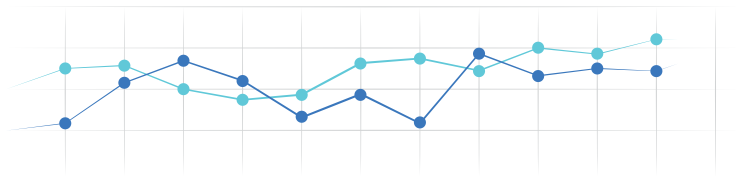
4th

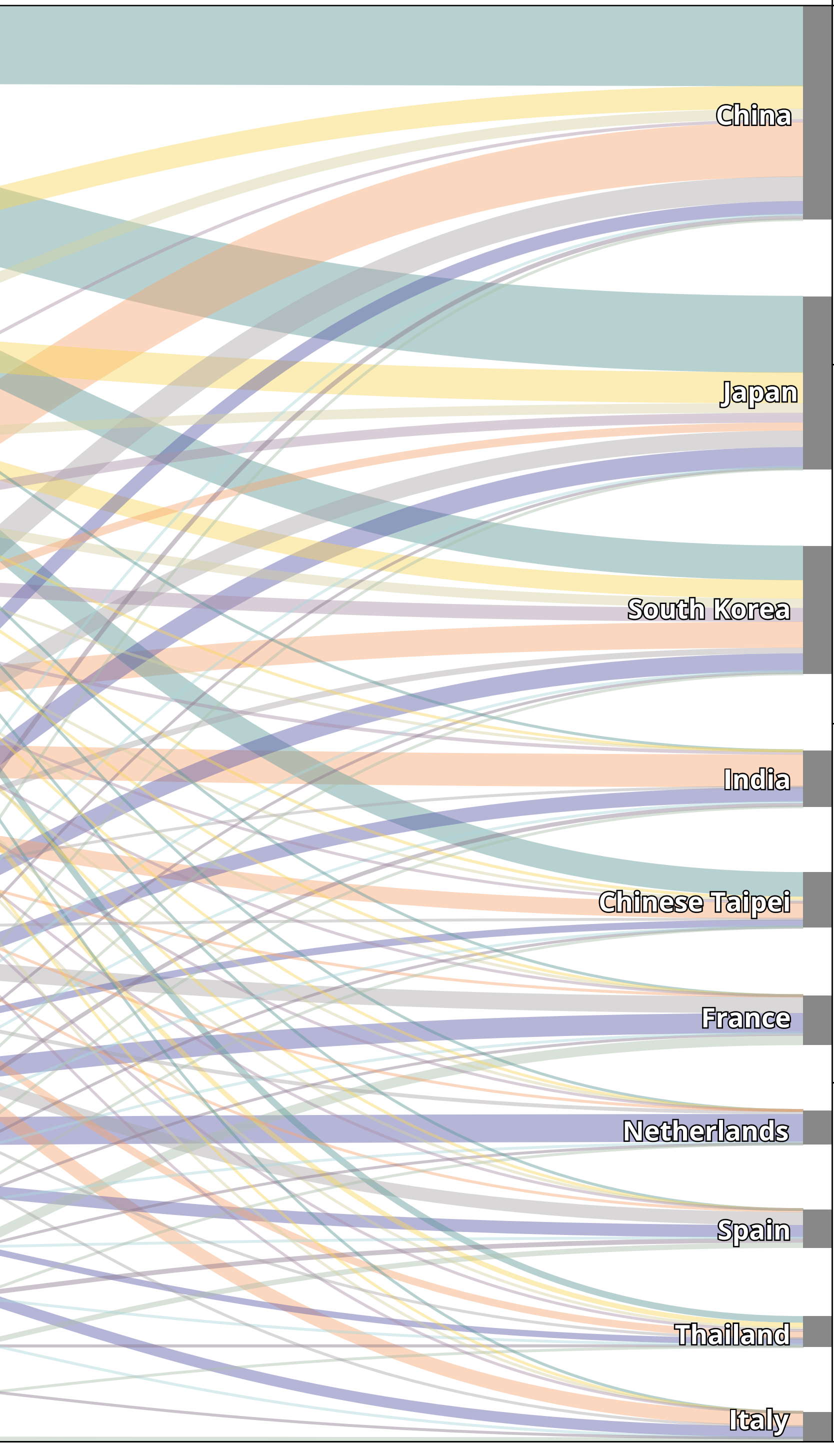
Russia remained the world's fourth largest exporter at

33.5 MT



[1] Source: Rystad Energy and GIIGNL. Owing to data source and methodology change, some historical trade numbers have been restated.





China retained its place as the largest importer with a total of

78.6 MT

of imports

(+7.5 MT vs. 2023)

Japan imported

67.7 MT

(+1.6 MT vs. 2023)

The largest global LNG trade flow route continues to be intra-Asia Pacific trade

96.8 MT

India imported 4.2 MT more than in 2023

26.1 MT

European imports declined to

100.1 MT

(-21.2 MT vs. 2023)

The diagram only represents trade flows between the top 10 exporters and top 10 importers.

3. LNG Trade

Global LNG trade in 2024 grew to 411.24 MT, originating from 22 exporting markets and finding its way to 48 importing markets. Re-export loading in 2024 shrank by 3.01 MT, amounting to 4.96 MT for the year. High-level changes in 2024 include rising exports from North America (+4.11 MT) and Asia Pacific (+4.10 MT), with imports over 2023 shifting from Europe (-21.22 MT) to Asia (+12.48 MT) and Asia Pacific (+9.77 MT).

Courtesy H-Line Shipping

3.1 OVERVIEW

The 9.82 MT increase in 2024 LNG trade was largely driven by rising output from the United States (+3.89 MT), Russia (+2.16 MT), Indonesia (+2.02 MT), Australia (+1.48 MT), as well as from Trinidad and Tobago (+1.38 MT). On the import side, volumes over the previous year shifted to China (+7.45 MT), India (+4.19 MT), Egypt (+2.65 MT), Brazil (+2.28 MT) and South Korea (+1.84 MT). Accommodating continuous growth of the LNG industry, global liquefaction capacity rose to 494.4 MTPA at the end of 2024 from 488.0 MTPA a year earlier. Regasification capacity grew to 1064.7 MT from 998.1 MT in the same period.

Asia Pacific continues to dominate LNG exports with 138.91 MT exported in 2024, up from 134.80 MT in 2023. The Middle East remained the second-largest LNG export region, despite a 0.44 MT YOY decrease to 94.25 MT. North America shows the largest annual export growth (+4.11 MT), bringing the annual LNG export volume to 88.64 MT.

The United States led global LNG exports in 2024 with 88.42 MT, rising from 84.53 MT in 2023, followed by Australia, whose exports inched up to 81.04 MT from 79.56 MT. Qatar continues to be the world's third-largest LNG exporter, though the volume slipped to 77.23 MT from 78.22 MT. Russian exports added 2.16 MT to 33.53 MT in 2024, and was followed by Malaysia with exports of 27.73 MT.

Asia Pacific was the largest volume taker in 2024, with imports rising by 9.77 MT to 165.09 MT. Lower prices at the beginning of the year opened the door for several price-sensitive markets to absorb cargoes. Asia overtook Europe as the second-largest import region as its imports climbed by 12.48 MT to 117.97 MT in 2024, the largest volume increase for any region. While imports into Asia Pacific and Asia rose largely due to high gas-for-power demand for cooling, European LNG imports in 2024 declined over ample storage at the beginning of the year, sluggish natural gas consumption, and strong pipeline gas flow from Norway and Russia. Consequently, European LNG imports declined by 21.22 MT over 2023, marking 100.07 MT in 2024.

Import flow into the UK declined by 6.48 MT YOY, ending at 8.03 MT of imports for 2024. Similarly, France, Spain, the Netherlands and Belgium saw imports drop by 3.75 MT, 3.49 MT, 2.98 MT and 1.51 MT, respectively, in 2024. Conversely, LNG flow into China added 7.45 MT and Indian imports rose by 4.19 MT as both markets experienced heatwaves and heightened gas-for-power demand.

Chinese imports totalled 78.64 MT, followed by Japan with 67.72 MT and South Korea with 47.01 MT. Jointly, these three markets accounted for nearly half of global LNG imports (47.0%) in 2024.

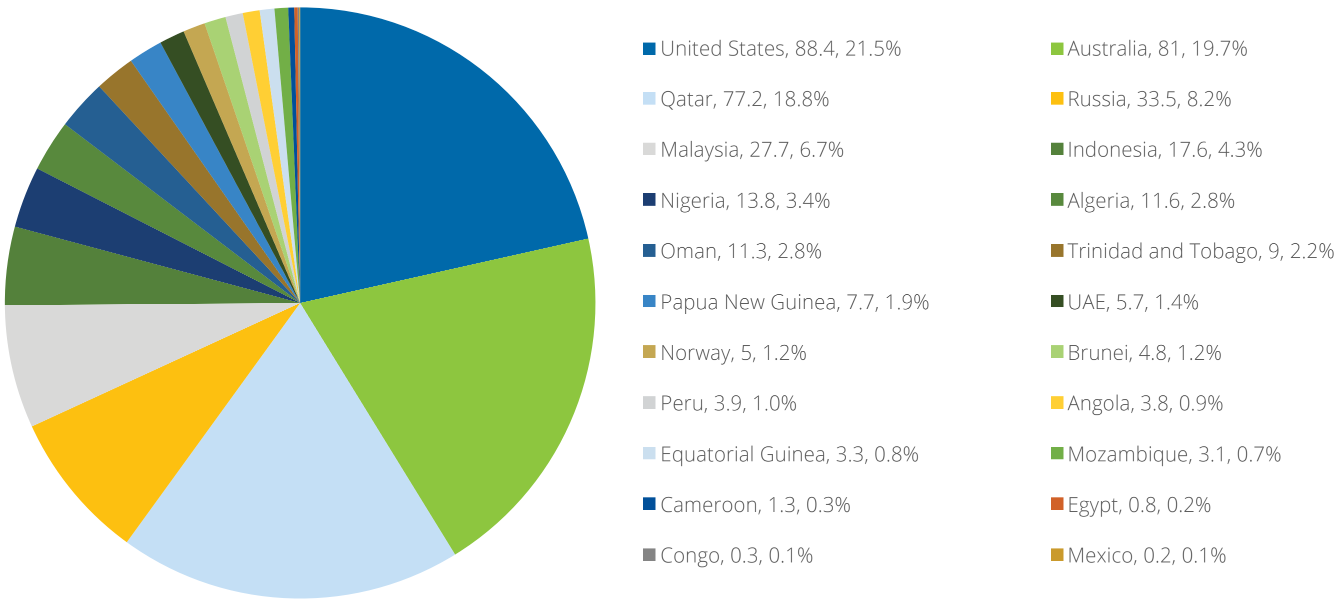
Global LNG trade	LNG exporters and importers	LNG re-exports
+9.82 MT Growth in global LNG trade	The United States (+3.89 MT), Russia (+2.16 MT) and Indonesia (+2.02) drove export growth in 2024	Total re-exports amounted to 4.96 MT in 2024
Global LNG trade reached a new record of 411.24 MT in 2024, up 2.4% from 2023	Egypt (-2.79 MT), Algeria (-1.44 MT), and Qatar (-0.99 MT) had the largest decrease in 2024 exports	Europe dominated re-export loading in 2024 with 2.29 MT, followed by Asia Pacific (1.91 MT)
Europe had the largest change in net imports, falling by 21.22 MT, while imports into Asia and Asia Pacific added 12.48 MT and 9.77 MT, respectively	China (+7.45 MT), India (+4.19 MT), Egypt (+2.65 MT) and Brazil (+2.28 MT) had the largest import growth in 2024	Asia Pacific remained the largest receiver of re-exports in 2024 (2.01 MT), followed by Europe (1.25 MT) and Asia (1.06 MT)
Asia Pacific extends its lead as the most significant import region with 165.09 MT of imports in 2024	The UK (-6.48 MT), France (-3.75 MT), Spain (-3.49 MT) and the Netherlands (-2.98 MT) had the largest decrease in net imports in 2024	

Source: Rystad Energy (2024 trade data) and GIIGNL (2023 trade data)

Courtesy Alpha Gas

3.2
LNG EXPORTS BY MARKET

Figure 3.1: 2024 LNG exports and market share by export market (MT)

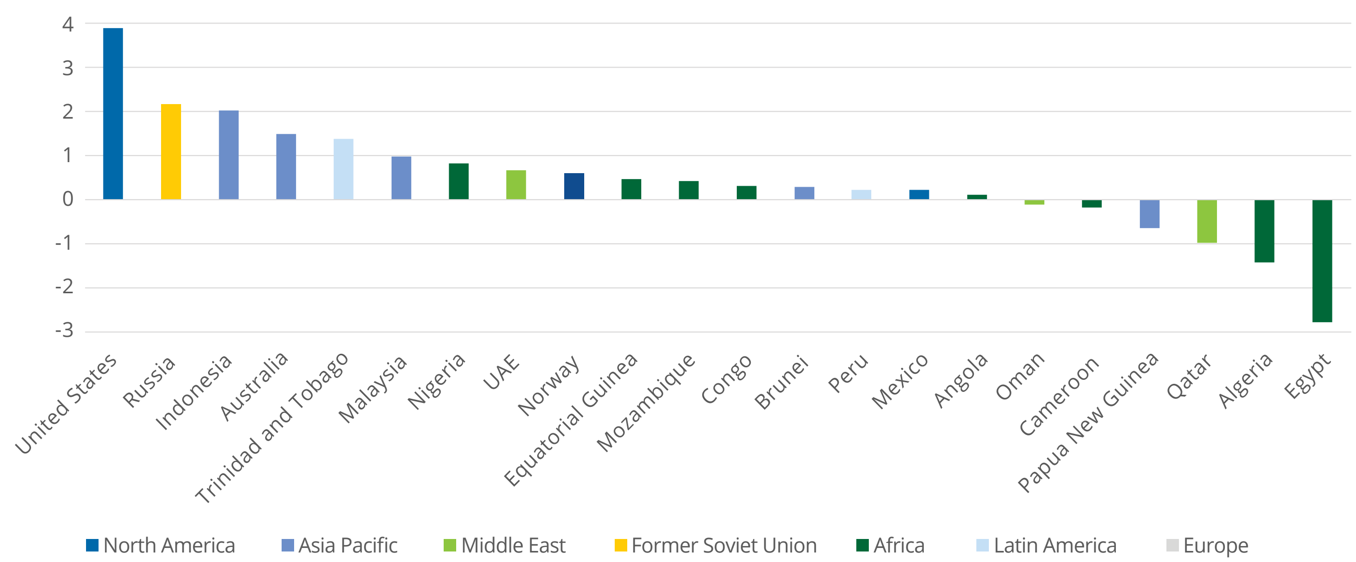


Source: Rystad Energy

Despite delays in new projects, the US defended its position as the world's largest LNG exporter in 2024, exporting a total of 88.42 MT, equal to 21.5% of global LNG output and up 3.89 MT from 2023. The increase was mainly driven by reduced June maintenance at Sabine Pass in 2024 compared with 2023, and partially by the startup of the Plaquemines export facility in late 2024. With the addition of Plaquemines, total annual US liquefaction capacity climbed to 97.5 MT in 2024 from 93.0 MT in 2023.

Australia maintained its position as the second-largest exporter with export volumes of 81.04 MT in 2024, up 1.48 MT from the previous year, comprising 19.7% of global exports. Exports from Australia Pacific LNG rebounded from export disruptions in late 2023 due to a power outage at a loaded carrier, while the Ichthys and Gorgon facilities faced outages in 2024.

Figure 3.2: 2024 incremental LNG exports by market relative to 2023 (in MT)



Source: Rystad Energy and GIIGNL

Qatar's exports slipped by 0.99 MT to a total of 77.23 MT in 2024, largely on par with the market's nameplate capacity of 77.1 MT. Qatar's 18.8% share of global LNG exports brings the joint LNG exports of the three largest exporters in 2024 to 60.0%, down 0.4 percentage points from 2023. Meanwhile, Russia had the second-largest export growth over 2023, seeing volumes grow 2.16 MT to 33.53 MT in 2024, 8.2% of global exports. Malaysian LNG exports climbed 0.97 MT to 27.73 MT in 2024 (6.7% of global exports), driven by improved feed gas supply from greenfield gas projects. Mexico and Congo joined the list of exporting markets in 2024 as FLNGs came online – Altamira LNG in Mexico and Congo Marine XII FLNG in Congo.

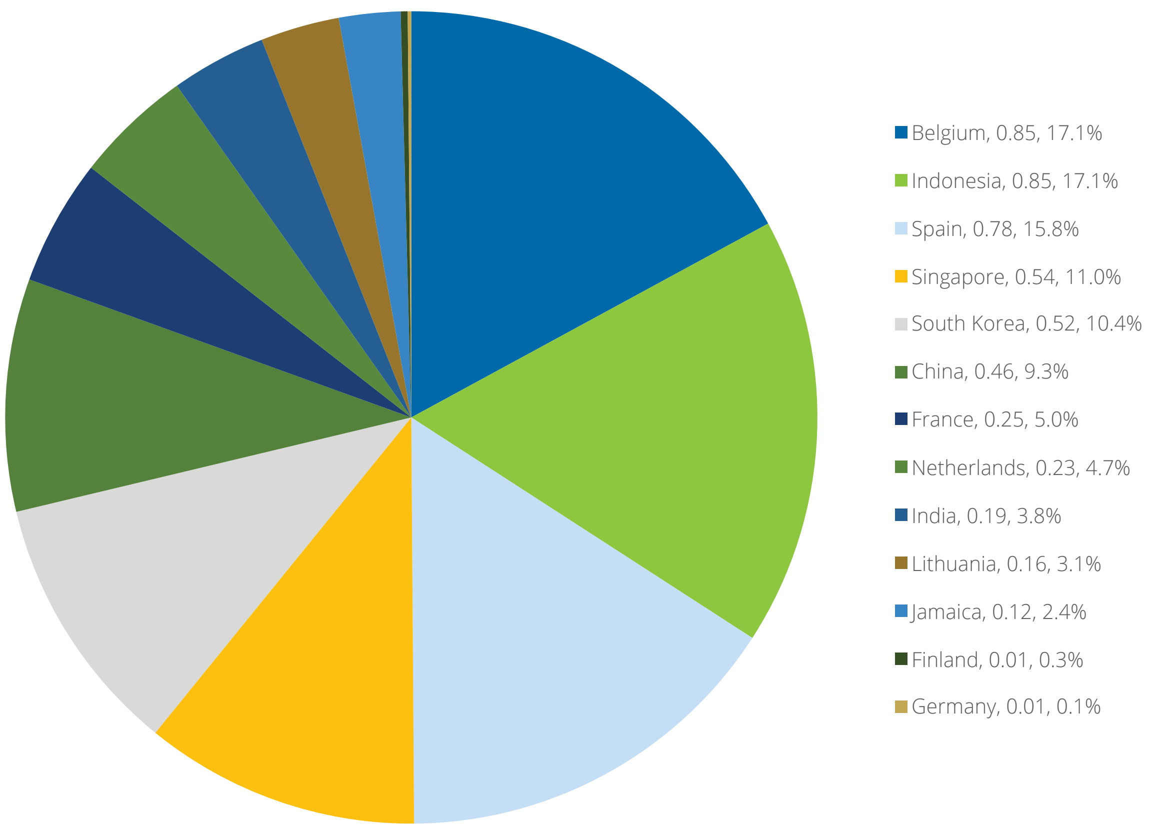
Of all 22 export markets, six recorded a decline in exports in 2024, while 16, including newcomers Mexico and Congo, showed an increase. As in 2023, the largest decline came from Egypt (-2.79 MT), whose exports dropped by 3.41 MT in 2023 due to rising domestic demand and falling supply. Algeria had the second-largest decline in LNG exports in 2024, dropping 1.44 MT to 11.59 MT, due to maintenance. Apart from the US, Australia, and Russia, markets with larger export increases included Indonesia (+2.02 MT), Trinidad and Tobago (+1.38 MT), Malaysia (+0.97 MT), and Nigeria (+0.82 MT).

The balance between export regions shifted somewhat in 2024. Asia Pacific defended its prime position with 138.91 MT, followed by the Middle East with 94.25 MT. Export growth was most significant in Asia Pacific and in North America, where Mexico joined the side of LNG exporters. The regions gained 4.10 MT and 4.11 MT over 2024, respectively, ending at 138.91 MT in Asia Pacific and 88.64 MT in North America. Exports fell by 2.31 MT to 37.98 MT in Africa, driven by declining output in Egypt and Algeria.

Re-export trade dropped by 37.7% to 4.96 MT in 2024, amounting to 1.2% of global LNG trade[2]. At the same time, the number of markets performing re-export loading fell to 13 from 21 last year. Europe and Asia Pacific continue to be the regions with most re-exports loaded, indicating shares of 46.1% for Europe and 38.4% for Asia Pacific. Belgium (0.85 MT), Indonesia (0.85 MT), and Spain (0.78 MT) hold the top three positions for re-exporting LNG in 2024, followed by Singapore (0.54 MT), South Korea (0.52 MT), and China (0.46 MT). Unlike in 2023, India also re-loaded cargoes in 2024, through the Kochi terminal.

Markets that received re-exports fell to 25 in 2024 from 32 in 2023, with China (0.88 MT), South Korea (0.77 MT) and Japan (0.59 MT) as the largest re-export takers. Egypt joined the list of markets receiving re-exports in 2024 following a further decline in production and rising need for imports. Asia Pacific (2.01 MT), Europe (1.25 MT) and Asia (1.06 MT) were the three regions receiving the most re-exports in 2024. The absorption of re-exports in Europe more than halved in 2024, in line with overall falling absorption of LNG cargoes in Europe for the year.

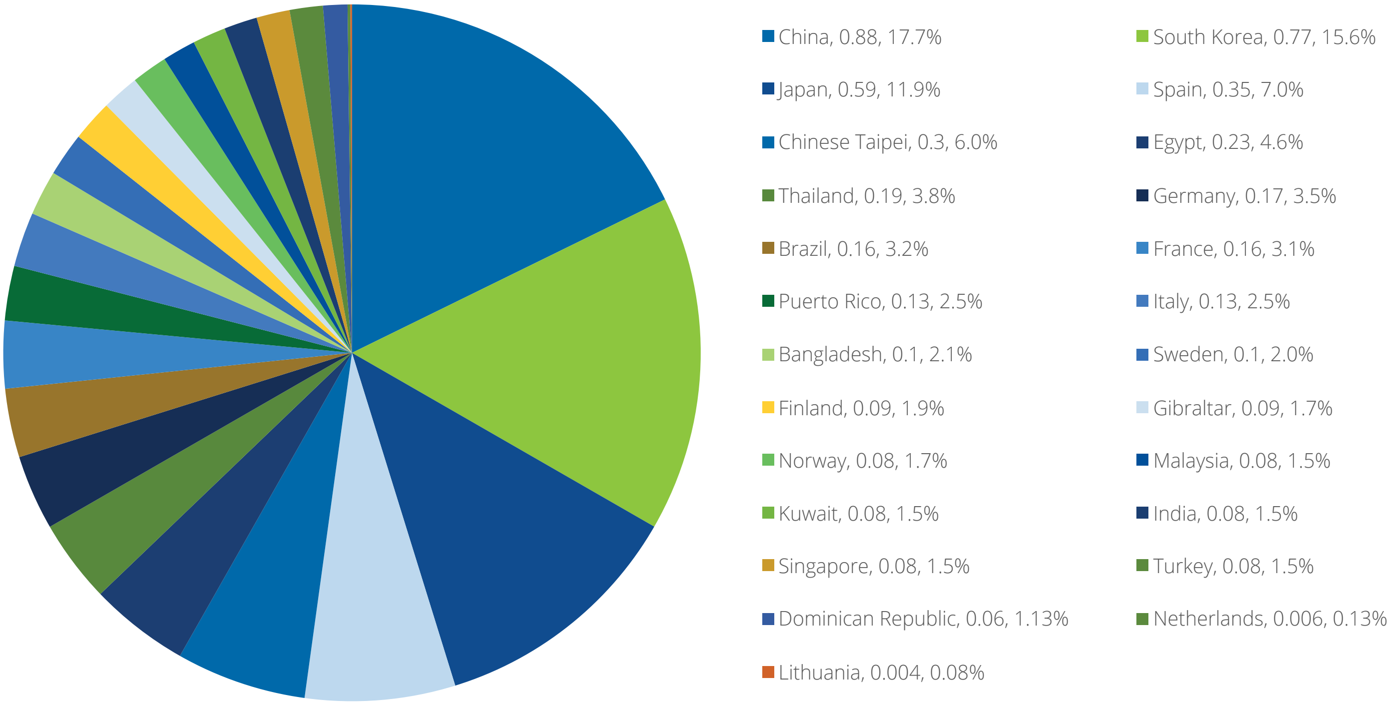
Figure 3.3: Re-exports loaded by re-loading market in 2024 (MT)



Source: Rystad Energy

[2] Note that only non-domestic re-export trade is considered.

Figure 3.4: Re-exports received in 2024 by receiving market (MT)



Source: Rystad Energy

Courtesy CNOOC

3.3
NET LNG IMPORTS BY MARKET

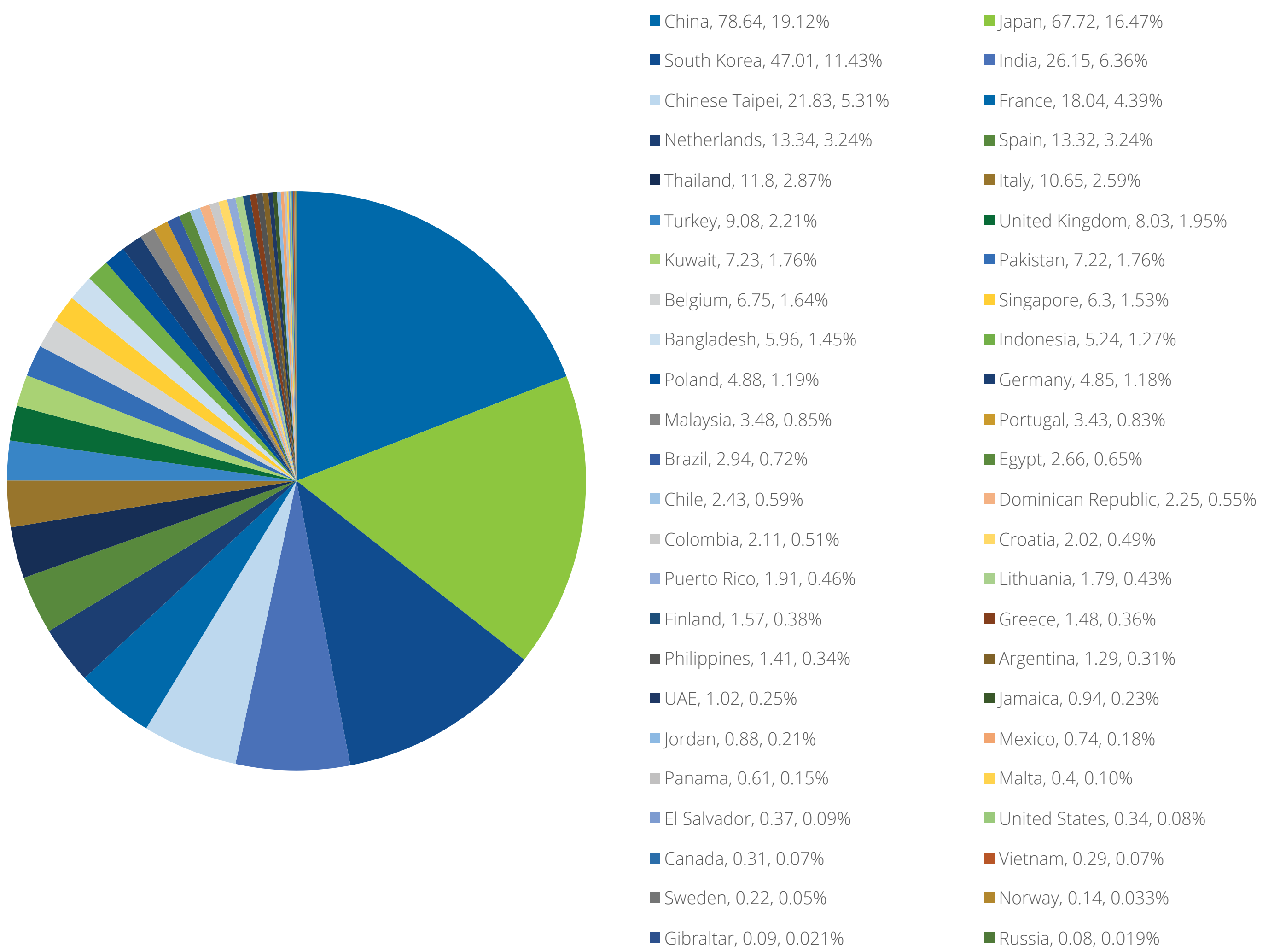
LNG imports were received by 48 markets globally in 2024. Despite limited spot demand, China widened its lead as the largest market for LNG cargoes as imported volumes climbed by 7.45 MT to 78.64 MT. Japan was the second-largest importer with volumes adding 1.61 MT to 67.72 MT, while South Korea had a similar import gain of 1.84 MT to 47.01 MT. Both markets experienced higher temperatures during the summer, leading to an increase in spot buying, followed by ample inventories, and limited hunger for spot cargoes towards the end of 2024.

Jointly, China, Japan, and South Korea accounted for nearly half of global LNG imports in 2024 (47.0%). In fact, the five largest importers of 2024 are located in either Asia or Asia Pacific. India, plagued by heatwaves during the summer, had the second-largest nominal increase in LNG imports in 2024 (+4.19 MT) to an annual total of 26.15 MT. Chinese Taipei (21.83 MT) joined the top five list of importers 2024 as its imports rose by 1.67 MT, thereby overtaking France. Brazil had the third-largest YOY increase as its cargo absorption surged by 2.28 MT to 2.94 MT in 2024. As for Colombia, whose imports rose by 1.34 MT to 2.11 MT in 2024, Brazil's increase was largely driven by a 44% growth in gas-for-power demand following drought and weak hydropower output.

Europe saw pipeline gas flows climb 6.1% in 2024, adding 11.5 bcm to 200.1 bcm. Consequently, LNG imports into the European market in 2024 declined, with absorption into the UK falling by as much as 6.48 MT to 8.03 MT. France, the sixth-largest global LNG importer, saw annual volumes drop by 3.75 MT to 18.04 MT, partly due to a further 11.4% increase in nuclear electricity output.

LNG inflow into the Netherlands, Spain and Italy declined by 2.98 MT, 3.49 MT, and 1.20 MT, respectively. Germany, despite adding nearly 10 MT of annual regasification capacity at the Mukran LNG terminal, has not seen any major uptick in imports yet. In fact, LNG inflow into Germany slipped by 0.25 MT to 4.85 MT in 2024.

Figure 3.5: 2024 LNG imports and market share by market (MT)



Source: Rystad Energy

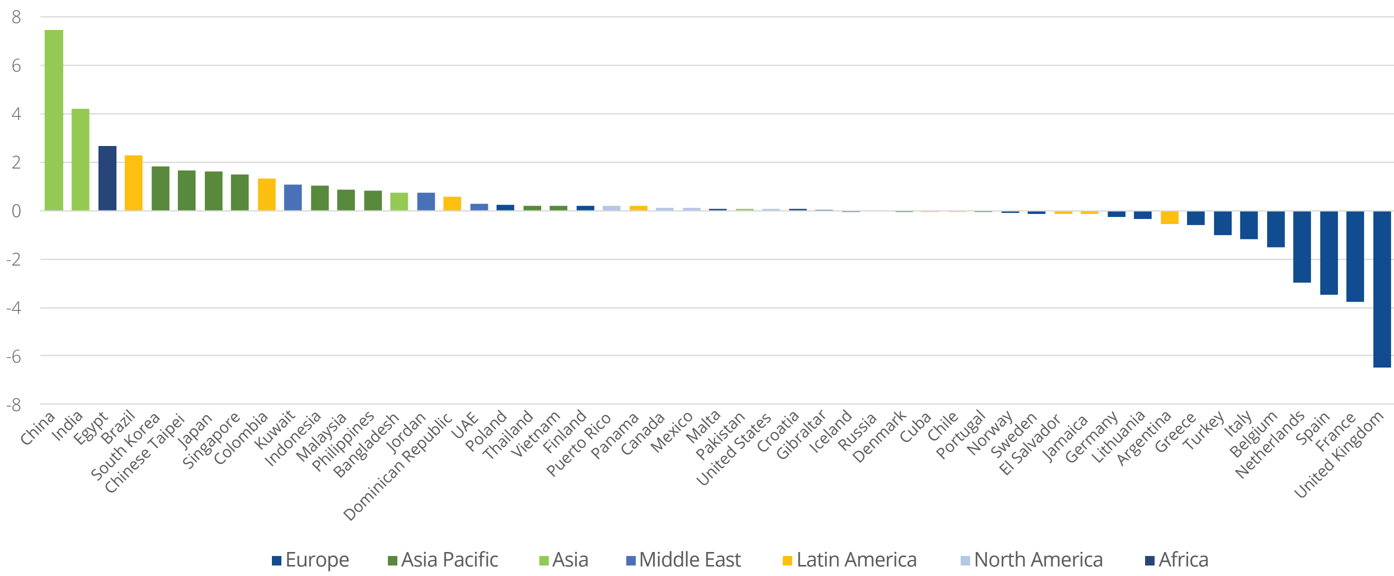
After their first unloading in 2023, LNG imports into Vietnam and Philippines further increased in 2024, as Vietnam took in 0.29 MT (+0.22 MT) and the Philippines received 1.41 MT (+0.81 MT). LNG imports into Singapore grew by 1.49 MT to 6.30 MT, feeding surging demand for data centres. LNG imports into Kuwait went up by 1.09 MT to 7.23 MT as a result of heightened gas-for-power demand during the summer, while Jordan took an additional 0.75 MT compared to 2023, bringing total imports to 0.88 MT, largely for consumption in Egypt.

On the regional level, Asia Pacific and Asia dominated LNG imports in 2024. Asia Pacific imported 165.09 MT or 40.1% of the global total, while imports to Asia were 117.97 MT or 28.7% of the total. The joint import share for both regions amounted to 68.8% (+3.9 percentage points), responding to elevated cooling demand and heatwaves. Lower prices in the first few months of 2024 further contributed to rising imports into Asia and Asia Pacific, with more price-sensitive markets turning to spot buying. Europe maintained its position as the second-largest import region in 2024 despite a drop to 100.07 MT from 121.29 MT in 2023.

Europe's lower imports in 2024 were largely due to high underground storage levels at the beginning of the year (86.1% on 1 January) following a second mild European winter in a row. Strong pipeline flows from Norway and Russia further limited the appetite for LNG, before depleting storages and the expiration of the transit agreement between Russia and Ukraine at the end of 2024 led to a ramp-up in LNG imports, leading into higher LNG imports for 2025. Emerging bullish sentiment in the second half of 2024 was further supported by high gas-for-power demand in Europe, driven by low renewable output and several 'Dunkelflaute' events – specific weather conditions that include weaker-than-normal wind and no generation from solar PV – in November and December 2024. The average utilisation rate at European regasification terminals dropped to 42% in 2024 from 54% in 2023.

Latin America's LNG imports rose by 3.53 MT to 12.95 MT last year, driven by low hydropower output, while imports into the Middle East added 2.13 MT to 9.13 MT.

Figure 3.6: 2024 incremental LNG imports by market relative to 2023 (MT)



Source: Rystad Energy and GIIGNL

3.4 LNG INTERREGIONAL TRADE

Regional concentration of global LNG trade further increased in 2024. Cargo absorption into Asia rose 12.48 MT to 117.97 MT and added 9.77 MT to 165.09 MT in Asia Pacific. Meanwhile, cargo flow into Europe dropped by 21.22 MT to 100.07 MT for the year. Consequently, the relative share of Asia and Asia Pacific in global imports climbed to 40.1% and 28.7%, up from 38.7% and 26.3%, respectively, while the share of European LNG imports declined to 24.3% from 30.2% in 2023.

Flows within Asia Pacific dominated LNG trade in 2024 with a total of 96.76 MT. Intra-regional trade was led by exports from Australia, Malaysia, and Indonesia within this region. While Australia exported 53.86 MT into the region, Malaysia contributed 19.91 MT, and 13.45 MT originated from Indonesia, up 2.54 MT from the previous year. Australia exported 25.86 MT to Japan, 11.63 MT to South Korea, and 8.26 MT to Chinese Taipei. Flows from Australia to Japan slightly declined from 2023 (-1.75 MT), while exports to South Korea increased (+0.89 MT). Malaysia exported 10.51 MT to Japan and 6.26 MT to South Korea, while exports to Chinese Taipei amounted to only 1.01 MT.

Australia drove the bulk of imports into the Philippines, contributing 0.59 MT of a total 1.41 MT absorbed by the market in 2024. Indonesia's domestic trade rose by 1.01 MT to 5.07 MT in 2024, making it at the same time the largest increase in interregional trade within Asia Pacific. While intra-regional trade within Asia Pacific increased by 1.79 MT in 2024 over 2023, imports from North America to Asia Pacific rose by 4.75 MT YOY to 19.18 MT, while imports from Africa climbed 2.16 MT to 6.65 MT.

North American exports to Europe declined rapidly in 2024, sliding by 10.28 MT from 2023. Even so, North American deliveries into Europe remained the second-largest interregional trade route for 2024 at 46.35 MT. The US accounted for nearly all European imports from North America, with the addition of one cargo from Mexico's Altamira facility into the Netherlands.

The Netherlands, with its well-connected market in continental Northwest Europe, is the region's largest taker of North American LNG with a total of 9.40 MT in 2024, down 2.57 MT from 2023. France took the second-largest number of cargoes with imports of 6.76 MT in 2024, down 3.30 MT from 2023. The UK had the largest decline in North American LNG imports, dropping 3.58 MT to 5.23 MT in 2024, though the market remained the third-largest taker in the North America-Europe trade. Germany's imports from North America changed only slightly to 4.35 MT in 2024, whereas Turkey's imports rose by 1.00 MT to 3.84 MT, in line with plans to form a regional gas hub. Consistent with the decline of US cargoes to Europe, the region's imports from Africa fell 7.46 MT to 18.21 MT, while imports from the Middle East dropped by 4.95 MT to 10.64 MT in 2024.

Trade between the Middle East and Asia totalled 45.99 MT and was the third-largest interregional trading route for LNG in 2024, followed by imports from Asia Pacific into Asia at 41.80 MT. Total imports into Asia climbed by 11.74 MT to a total of 117.56 MT in 2024. While flows into Asia were relatively small from North America (10.29 MT), Africa (10.03 MT), and Russia (8.49 MT), exports from North America recorded the largest YOY increase (+3.63 MT), followed by increases from Africa (+3.02 MT), the Middle East (+2.70 MT), and Asia Pacific (+2.53 MT). Correspondingly for Asia, imports in 2024 rose the most from Australia (+2.48 MT), largely driven by a 2.69 MT increase from Australia to China. Year-on-year additions from the US amounted to 3.63 MT, followed by Qatar (+2.28 MT), Nigeria (+1.45 MT) and Angola (+1.09 MT).

Middle Eastern exports into Asia Pacific was the fourth-largest interregional trading pair for 2024 with 32.17 MT, up 1.11 MT from the previous year, dominated by Qatar (21.49 MT) and Oman (8.84 MT). African exports into Europe fell by 7.46 MT but rose into Asia (+3.02 MT) and Asia Pacific (+2.16 MT). African flows into Asia in 2024 (10.03 MT) were dominated by Angola (2.01 MT), Equatorial Guinea (1.41 MT), and Mozambique (1.37 MT), while Mozambique (1.69 MT), Nigeria (2.79 MT), and Equatorial Guinea (1.20 MT) were the largest drivers of trade from Africa to Asia Pacific.

Russian LNG in 2024 shifted towards Europe (+2.61 MT) to see total absorption in Europe amount to 16.89 MT, followed by flows to Asia Pacific (7.92 MT) and Asia (8.49 MT). Russian LNG trade into the two latter regions in 2024 slipped by 0.31 MT and 0.14 MT, respectively, over 2023.

Courtesy CNOOC

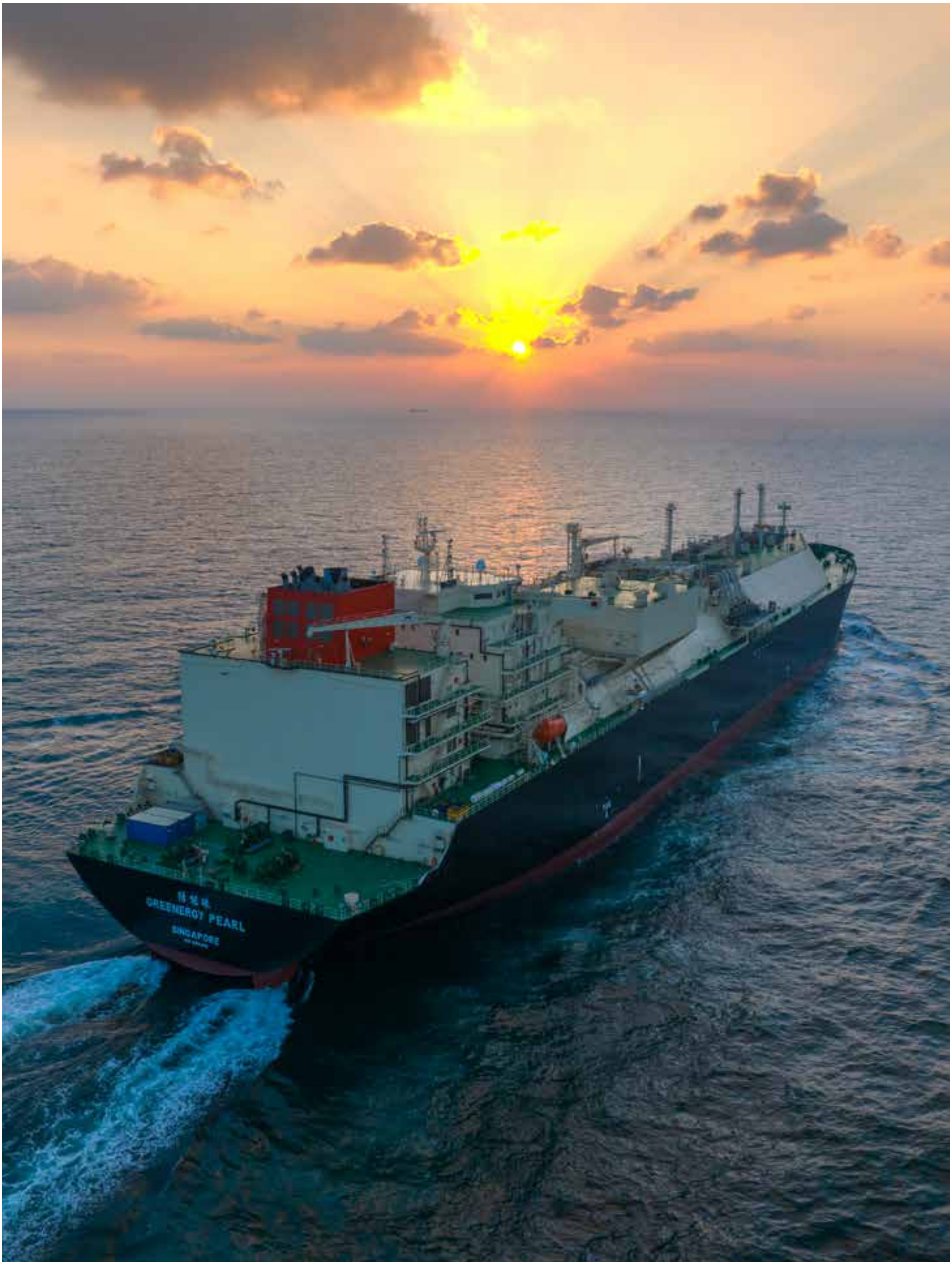
Table 3.1: LNG trade between regions, 2024 vs 2023 (MT)

Exporting region / Importing Region		Asia Pacific	Middle East	North America	Africa	Russia	Latin America	Europe	**Total**
Asia Pacific	2023	95.0	31.1	14.4	4.5	8.2	1.6	-	**154.8**
	2024	96.8	32.2	19.2	6.7	7.9	2.3	-	**165.0**
Europe	2023	0.1	15.6	56.6	25.7	14.3	5.1	4.3	**121.7**
	2024	-	10.6	46.3	18.2	16.9	4.3	4.8	**101.1**
Asia	2023	39.3	43.3	6.7	7.0	8.6	1.0	-	**105.8**
	2024	41.8	46.0	10.3	10.0	8.5	1.0	-	**117.6**
Latin America	2023	0.0	0.1	5.6	1.5	0.1	2.5	0.0	**9.9**
	2024	-	-	8.7	0.8	-	3.3	-	**12.9**
Middle East	2023	0.2	4.6	0.7	1.2	0.1	0.1	-	**6.9**
	2024	0.0	5.4	1.7	1.6	0.2	0.1	-	**9.1**
North America	2023	0.2	-	0.5	0.3	-	1.1	0.0	**2.1**
	2024	0.3	-	0.3	0.3	-	2.0	0.2	**3.2**
Africa	2023	-	-	-	0.1	-	-	-	**0.1**
	2024	-	-	2.0	0.3	-	0.1	-	**2.4**
Russia	2023	-	-	-	-	0.1	-	-	**0.1**
	2024	-	-	-	-	0.1	-	-	**0.1**
Total	**2023**	**134.8**	**94.7**	**84.5**	**40.3**	**31.4**	**11.4**	**4.4**	**401.4**
	2024	**138.9**	**94.2**	**88.6**	**38.0**	**33.5**	**12.9**	**5.0**	**411.2**

Source: Rystad Energy and GIIGNL
Note that interregional trade does not account for re-exports.

Figure 3.7: LNG trade between regions, 2024

Source: Rystad Energy



Courtesy CNOOC

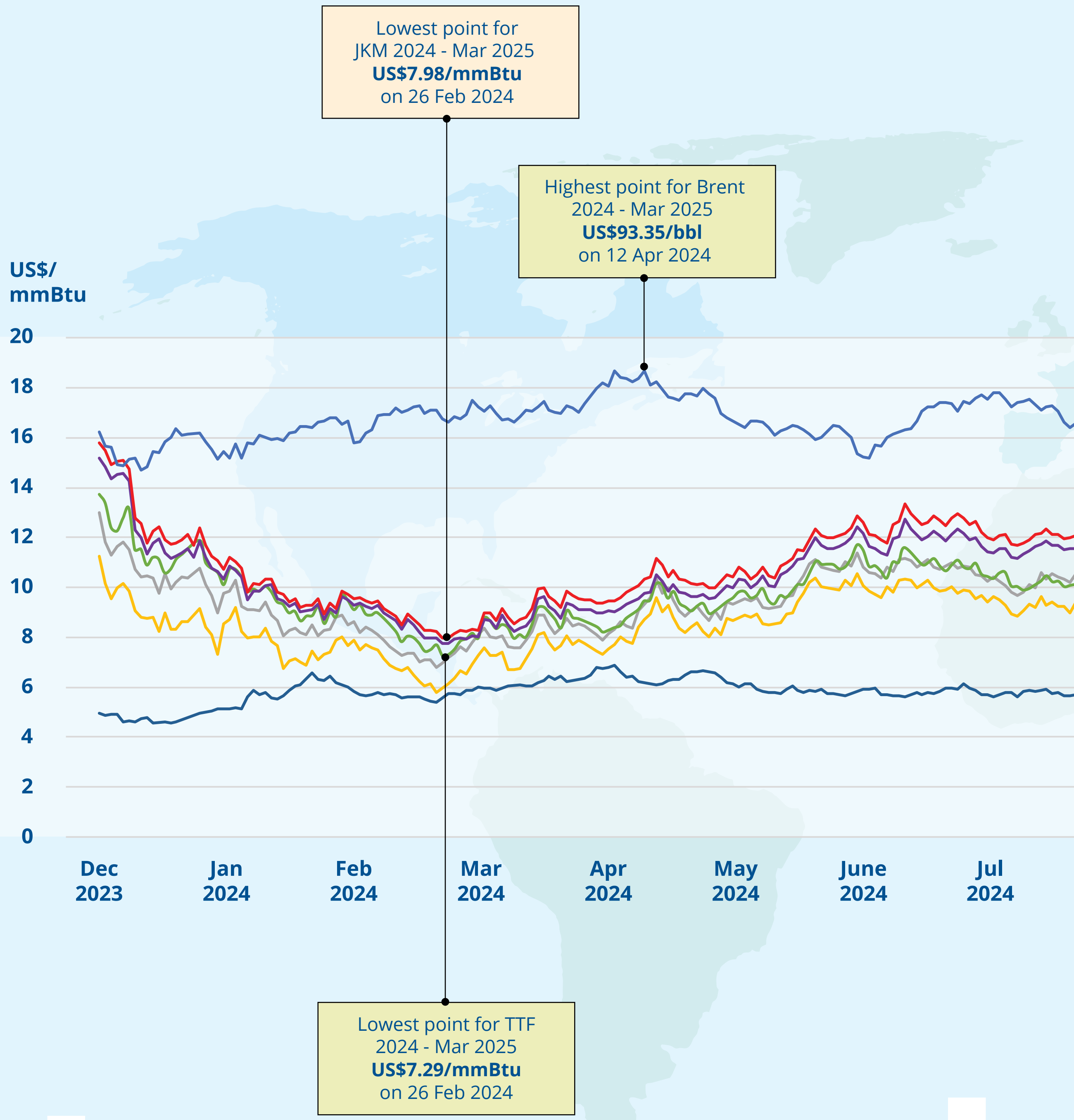
Table 3.2: LNG trade volumes between markets, 2024 (MT)

Markets	Algeria	Angola	Australia	Brunei	Cameroon	Egypt	Equatorial Guinea	Indonesia	Malaysia	Mozambique	Nigeria	Norway	Oman
China	0.04	-	27.03	0.72	0.15	0.14	0.25	3.59	7.82	0.84	1.50	-	1.09
India	-	1.95	0.15	-	0.77	-	0.94	0.08	-	0.54	1.39	-	1.18
Pakistan	-	-	-	-	-	-	-	0.07	-	-	0.65	-	-
Bangladesh	0.08	0.07	-	-	-	-	0.22	0.07	-	-	0.44	-	-
Asia	0.11	2.01	27.18	0.72	0.92	0.14	1.41	3.81	7.82	1.37	3.98	-	2.27
Japan	0.06	-	25.86	2.85	0.06	-	0.39	3.25	10.51	0.08	0.54	-	3.33
South Korea	-	-	11.63	0.59	0.21	0.08	0.22	3.25	6.26	0.23	0.90	-	4.70
Chinese Taipei	-	-	8.26	0.41	-	-	0.22	0.79	1.01	0.08	0.30	-	0.27
Thailand	0.09	0.48	2.21	0.14	-	-	0.14	0.69	1.68	0.19	0.55	-	0.54
Singapore	-	-	2.04	-	-	-	-	0.14	0.22	1.05	-	-	-
Indonesia	-	-	0.47	-	-	-	-	5.07	0.10	-	0.11	-	-
Malaysia	-	-	2.79	-	-	-	-	0.05	0.09	0.06	-	-	-
Philippines	-	-	0.59	-	-	-	0.22	0.14	-	-	0.38	-	-
Vietnam	-	-	-	0.13	-	-	-	0.07	0.03	-	-	-	-
Asia Pacific	0.15	0.48	53.86	4.11	0.27	0.08	1.20	13.45	19.91	1.69	2.79	-	8.84
France	3.32	0.14	-	-	-	0.08	0.08	-	-	-	0.72	0.79	-
Spain	1.79	0.14	-	-	-	-	-	-	-	-	1.61	0.32	-
Netherlands	0.09	0.14	-	-	-	-	0.08	-	-	-	0.15	0.93	-
United Kingdom	0.35	0.28	-	-	-	0.15	0.08	-	-	-	0.15	0.27	-
Italy	1.32	0.21	-	-	-	0.06	0.08	-	-	-	-	-	-
Turkey	3.94	-	-	-	0.08	0.17	0.15	-	-	-	0.07	0.06	-
Belgium	-	-	-	-	-	-	-	-	-	-	0.08	0.00	-
Germany	-	0.14	-	-	-	-	-	-	-	-	-	0.20	-
Poland	-	-	-	-	-	0.08	-	-	-	-	-	0.14	-
Portugal	-	-	-	-	-	-	-	-	-	-	1.68	-	-
Lithuania	-	-	-	-	-	-	-	-	-	-	0.07	0.83	-
Greece	0.10	-	-	-	-	-	-	-	-	-	-	0.15	-
Croatia	0.36	-	-	-	-	-	-	-	-	-	0.08	-	-
Finland	-	-	-	-	-	-	-	-	-	-	-	1.01	-
Sweden	-	-	-	-	-	-	-	-	-	-	-	0.06	-
Malta	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway	-	-	-	-	-	-	-	-	-	-	-	0.02	-
Gibraltar	-	-	-	-	-	-	-	-	-	-	-	-	-
Denmark	-	-	-	-	-	-	-	-	-	-	-	-	-
Iceland	-	-	-	-	-	-	-	-	-	-	-	-	-
Europe	11.27	1.04	-	-	0.08	0.53	0.46	-	-	-	4.60	4.77	-
Chile	-	-	-	-	-	-	0.07	-	-	-	-	-	-
Argentina	0.06	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Republic	-	-	-	-	-	-	-	-	-	-	-	-	-
Jamaica	-	-	-	-	-	-	-	-	-	-	0.63	-	-
Colombia	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	-	-	-	-	-	-	-	-	-	-	0.08	-	-
El Salvador	-	-	-	-	-	-	0.01	-	-	-	-	-	-
Panama	-	-	-	-	-	-	-	-	-	-	-	-	-
Cuba	-	-	-	-	-	-	-	-	-	-	-	-	-
Latin America	0.06	-	-	-	-	-	0.08	-	-	-	0.71	-	-
Puerto Rico	-	-	-	-	-	0.04	-	-	-	-	0.28	0.15	-
Mexico	-	-	-	-	-	-	-	0.31	-	-	-	-	-
United States	-	-	-	-	-	-	-	-	-	-	-	0.07	-
Canada	-	-	-	-	-	-	-	-	-	-	-	-	-
North America	-	-	-	-	-	0.04	-	0.31	-	-	0.28	0.21	-
Kuwait	-	0.27	-	-	0.06	-	0.08	0.04	-	-	1.21	-	0.21
UAE	-	-	-	-	-	-	-	-	-	-	-	-	-
Jordan	-	-	-	-	-	-	-	-	-	-	-	-	-
Middle East	-	0.27	-	-	0.06	-	0.08	0.04	-	-	1.21	-	0.21
Egypt	-	-	-	-	-	-	0.08	-	-	-	0.23	-	-
Africa	-	-	-	-	-	-	0.08	-	-	-	0.23	-	-
Russia	-	-	-	-	-	-	-	-	-	-	-	-	-
Former Soviet Union	-	-	-	-	-	-	-	-	-	-	-	-	-
2024 Exports	**11.59**	**3.81**	**81.04**	**4.83**	**1.33**	**0.78**	**3.30**	**17.61**	**27.73**	**3.06**	**13.79**	**4.99**	**11.32**
2023 Exports	13.03	3.70	79.56	4.55	1.53	3.57	2.83	15.59	26.75	2.66	12.97	4.39	11.43

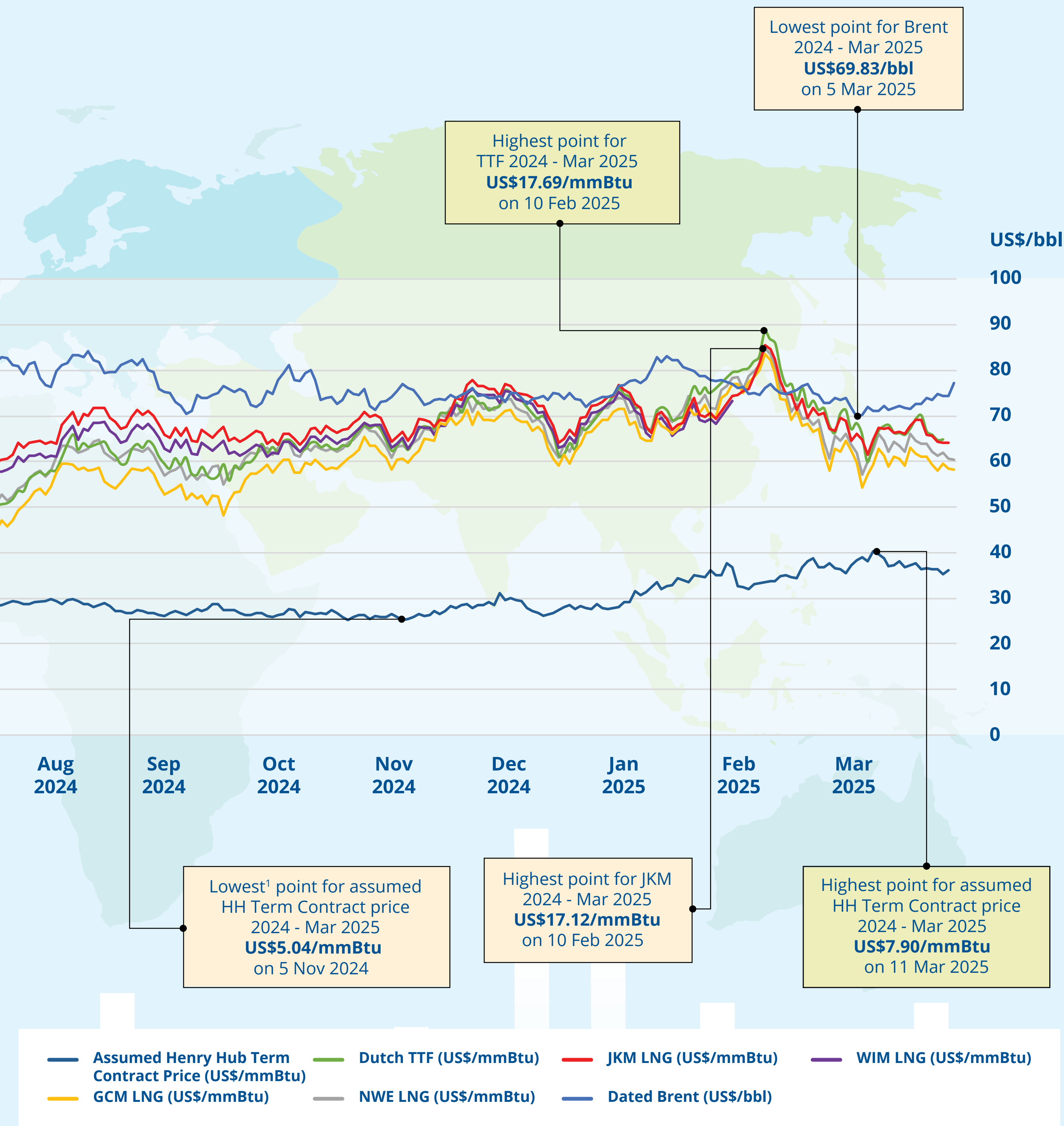
Source: Rystad Energy and GIIGNL

Papua New Guinea	Peru	Qatar	Russia	Trinidad & Tobago	UAE	United States	Mexico	Congo	Re-exports Received	Re-exports Loaded	2024 Net Imports	2023 Net Imports
2.27	0.37	18.43	8.42	0.23	0.84	4.49	-	-	0.88	-0.46	78.64	71.19
-	-	11.01	0.08	0.36	2.86	4.95	-	-	0.08	-0.19	26.15	21.96
-	-	6.40	-	-	-	0.03	-	0.07	-	-	7.22	7.15
-	-	4.16	-	-	-	0.82	-	-	0.10	-	5.96	5.20
2.27	0.37	40.02	8.49	0.59	3.70	10.29	-	0.07	1.06	-0.65	117.97	105.50
3.61	0.46	2.77	5.64	0.07	0.86	6.80	-	-	0.59	-	67.72	66.12
0.52	0.94	8.79	2.00	-	0.44	6.00	-	-	0.77	-0.52	47.01	45.17
1.25	0.38	5.49	0.28	-	0.42	2.38	-	-	0.30	-	21.83	20.16
-	0.06	2.47	-	0.14	0.13	2.09	-	-	0.19	-	11.80	11.58
-	-	1.91	-	0.26	-	1.14	-	-	0.08	-0.54	6.30	4.81
-	-	-	-	-	-	0.34	-	-	-	-0.85	5.24	4.19
0.04	-	-	-	-	-	0.37	-	-	0.08	-	3.48	2.60
-	-	-	-	-	-	0.07	-	-	-	-	1.41	0.60
-	-	0.06	-	-	-	-	-	-	-	-	0.29	0.08
5.42	1.84	21.49	7.92	0.47	1.84	19.18	-	-	2.01	-1.91	165.09	155.32
-	0.23	0.29	5.66	0.07	-	6.76	-	-	0.16	-0.25	18.04	21.80
-	0.08	0.82	4.48	0.15	-	4.20	-	0.17	0.35	-0.78	13.32	16.81
-	0.91	-	1.28	0.59	-	9.37	0.03	-	0.01	-0.23	13.34	16.33
-	0.38	0.61	-	0.53	-	5.23	-	-	-	-	8.03	14.51
-	-	4.79	0.07	0.22	-	3.71	-	0.07	0.13	-	10.65	11.85
-	-	-	0.53	0.17	-	3.84	-	-	0.08	-	9.08	10.09
-	-	2.32	4.32	-	-	0.88	-	-	-	-0.85	6.75	8.26
-	-	-	-	-	-	4.35	-	-	0.17	-0.01	4.85	5.10
-	-	1.80	-	0.08	-	2.78	-	-	-	-	4.88	4.63
-	-	-	0.23	0.05	-	1.47	-	-	-	-	3.43	3.46
-	-	-	-	0.11	-	0.93	-	-	0.004	-0.16	1.79	2.14
-	-	-	0.14	-	-	1.10	-	-	-	-	1.48	2.06
-	-	-	-	0.38	-	1.19	-	-	-	-	2.02	1.96
-	-	-	0.12	-	-	0.36	-	-	0.09	-0.014	1.57	1.36
-	-	-	0.06	-	-	-	-	-	0.10	-	0.22	0.34
-	-	-	-	0.29	-	0.12	-	-	-	-	0.40	0.32
-	-	-	0.01	-	-	0.02	-	-	0.08	-	0.14	0.21
-	-	-	-	-	-	-	-	-	0.09	-	0.09	0.05
-	-	-	-	-	-	-	-	-	-	-	0.00	0.02
-	-	-	-	-	-	-	-	-	-	-	0.00	0.0009
-	1.60	10.64	16.89	2.65	-	46.32	0.03	0.23	1.25	-2.29	100.07	121.29
-	-	-	-	1.34	-	1.03	-	-	-	-	2.43	2.45
-	-	-	-	0.26	-	0.97	-	-	-	-	1.29	1.85
-	-	-	-	0.04	-	2.16	-	-	0.06	-	2.25	1.66
-	-	-	-	-	-	0.41	0.02	-	-	-0.12	0.94	1.09
-	-	-	-	0.93	-	1.18	-	-	-	-	2.11	0.77
-	-	-	-	0.36	-	2.35	-	-	0.16	-	2.94	0.66
-	-	-	-	0.36	-	-	-	-	-	-	0.37	0.50
-	-	-	-	-	-	0.61	-	-	-	-	0.61	0.43
-	-	-	-	-	-	-	-	-	-	-	0.00	0.02
-	-	-	-	3.29	-	8.70	0.02	-	0.21	-0.12	12.95	9.42
-	-	-	-	1.19	-	-	0.13	-	0.13	-	1.91	1.72
-	0.08	-	-	0.15	-	0.16	0.03	-	-	-	0.74	0.63
-	-	-	-	0.28	-	-	-	-	-	-	0.34	0.27
-	0.03	-	-	0.27	-	-	-	-	-	-	0.31	0.18
-	0.11	-	-	1.89	-	0.16	0.17	-	0.13	-	3.30	2.79
-	-	4.29	0.15	0.08	-	0.76	-	-	0.08	-	7.23	6.14
-	-	0.79	-	-	0.15	0.07	-	-	-	-	1.02	0.73
-	-	-	-	-	-	0.88	-	-	-	-	0.88	0.13
-	-	5.08	0.15	0.08	0.15	1.71	-	-	0.08	-	9.13	7.00
-	-	-	-	0.08	-	2.05	-	-	0.23	-	2.66	0.01
-	-	-	-	0.08	-	2.05	-	-	0.23	-	2.66	0.01
-	-	-	0.08	-	-	-	-	-	-	-	0.08	0.09
-	-	-	0.08	-	-	-	-	-	-	-	0.08	0.09
7.69	**3.91**	**77.23**	**33.53**	**9.04**	**5.70**	**88.42**	**0.22**	**0.30**	**4.96**	**-4.96**	**411.24**	**-**
8.35	3.69	78.22	31.36	7.66	5.04	84.53	-	-	7.97	-7.97	-	401.42

4 Price Trends



Source: S&P Global Commodity Insights



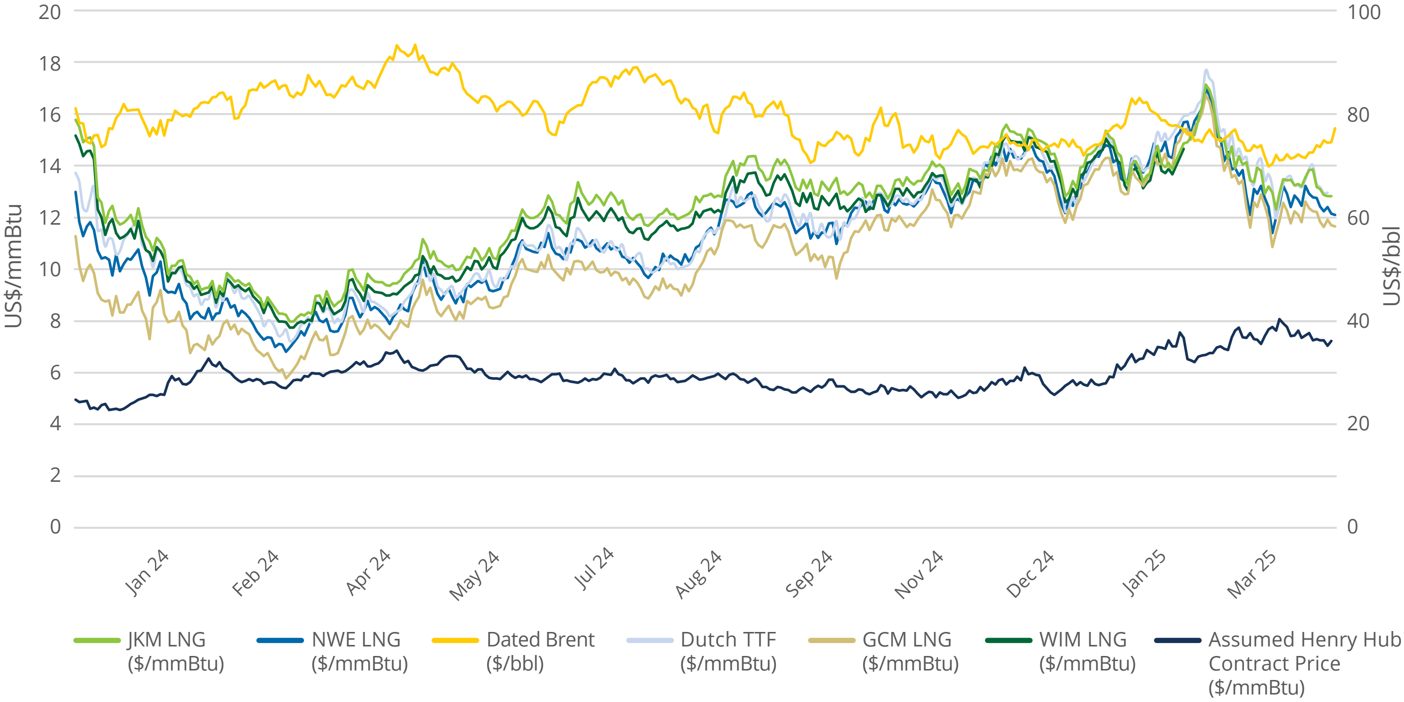
[1] The assumed HH Term Contract prices in the 2025 IGU World LNG report are based off the NYMEX HH Singapore close.

4. Price Trends

Courtesy CNOOC

Global LNG spot trading activity rose to record highs last year, aided by relative price stability and lower price levels—particularly in the first half of the year. Cargo competition between Asia and Europe continued to be intense amid limited new supply additions, even as freight rates fell to multi-year lows. The price arbitrage for US cargoes into Asia was shut across the second half of 2024, as China and India shunned significant spot procurement and European markets focused on replacing Russian gas with LNG.

Figure 4.1: Comparison of major LNG, pipeline gas and oil benchmarks, December 2023 to end-March 2025



Source: S&P Global Commodity Insights

4.1 ASIA PACIFIC LNG PRICE TRENDS

The Platts JKM benchmark, which reflects LNG cargoes delivered into Northeast Asia, averaged $11.91 per mmBtu in 2024, marking a 13.52% fall from 2023. JKM prices ranged between $7.98 per mmBtu and $15.59 per mmBtu in 2024, narrowing from their range of $8.40 per mmBtu to $23.90 per mmBtu the year before, continuing the trend of falling spot price volatility from 2023.

LNG prices started the year on a weak note amid a warm northern winter and high inventories but firmed on geopolitical risks in the fourth quarter as Russian gas supply coming through Ukraine was expected to stop from 2025. More stable LNG prices boosted spot market activity due to reduced price risks, lower exchange margin requirements, and greater predictability of forward price changes. The 30-day JKM rolling volatility averaged 45% in 2024, compared to 77% in 2023. This was lower than that of gas hub prices such as TTF, which averaged 49%, and Henry Hub, which averaged 75%.

Asia Pacific posted the largest growth in LNG demand last year, with overall imports increasing by 6.5% YOY[2]. Mainland China led the growth with a YOY increase of 22% in spot imports to meet high LNG demand fuelled by hotter summer temperatures, new regasification terminals, and additional above-ground storage capacity. India was also a major contributor, posting a substantial 19% YOY increase in total LNG demand driven by heatwaves. Higher temperatures also supported increased summer spot buying in South Korea to meet higher power demand amid coal and nuclear capacity constraints. In Japan, despite limited total LNG demand growth, the expiration of long-term contracts increased purchasing activity from smaller buyers and traders.

Elsewhere, buyers from emerging markets in Southeast Asia also ramped up spot LNG imports and quickly embraced index-linked pricing. According to tender data collected by S&P Global Commodity Insights, approximately 66% of total spot purchases were conducted on a JKM-linked basis versus flat prices.

Asia LNG trading fundamentals in 2024 were influenced by three factors: shifting inter-basin price differentials; supply disruptions; and the continued evolution of LNG contracts to include more flexible terms. Lower global LNG prices in the first half of 2024 encouraged the price-sensitive Asian markets, such as China and India, to raise spot volumes. With Asia reporting ample inventories amid a milder winter and Europe's gas balance shored up by strong storage levels through the 2023/2024 winter, spot prices across the globe were lower YOY in the first four months of 2024, with JKM prices falling an average of 49% compared to a year before.

[2] LNG trade information in the Price Trends chapter is made consistent with the rest of the report.

Summer heatwaves throughout Asia then caused a spike in LNG demand, widening regional price premiums. Strong power demand and weakening domestic gas production drove Egypt to become a net LNG importer. After importing only one cargo in 2023, Egypt received 2.66 MT of cargoes in 2024 and exported 0.78 MT in 2024, before halting exports in May, down from 3.57 MT in 2023.

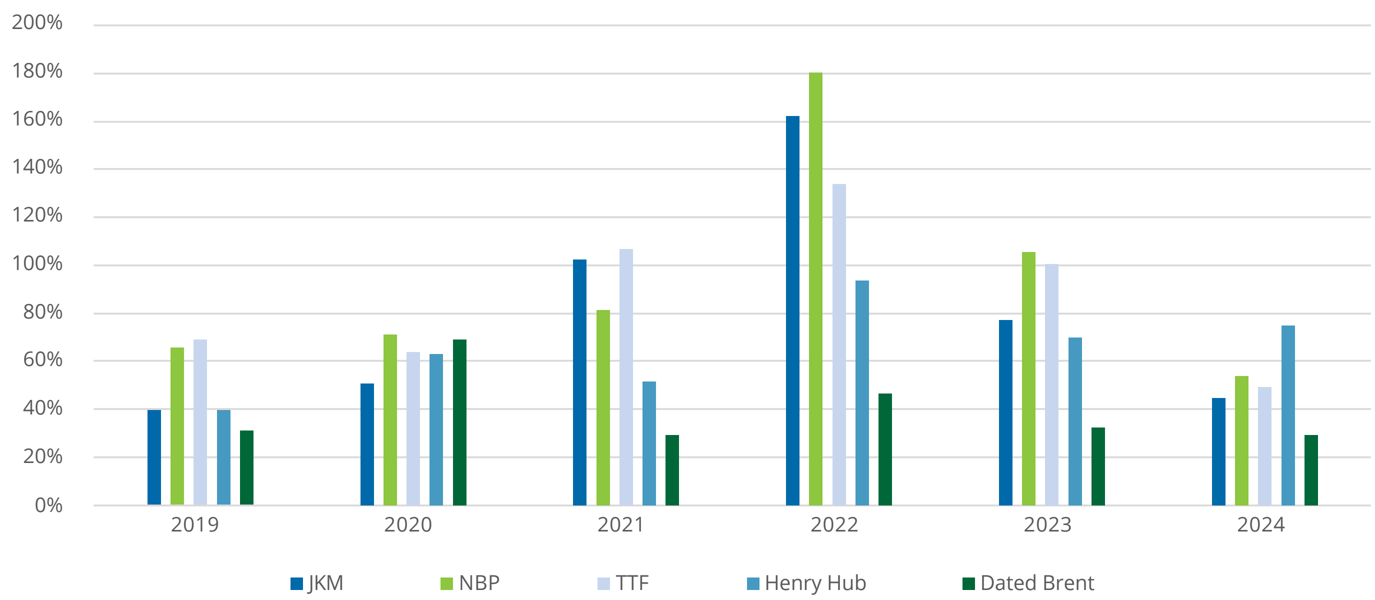
Global supply disruptions further lent support to prices, reflected by unplanned outages at several key facilities, including Brunei LNG, Petronas' Bintulu LNG Complex in Sarawak, East Malaysia, Chevron's Gorgon LNG facility, and INPEX's Ichthys project, both in Western Australia, among others. The increased Asian demand prompted a reshuffling of LNG trade among basins, as European LNG traders capitalised on the growing arbitrage opportunities with Asia, shifting volumes away from Europe, eastward.

Matching trends in the wider market, the Platts APAC cargo Market on Close[2] (MOC) process saw record activity on the year, with the volume of physical trades increasing from 4.36 MT in 2023 to 6.63 MT in 2024. Notably, the fourth quarter recorded the highest physical MOC activity, totalling 866 cargo bids, offers and trades driven by robust winter demand. On the Platts Derivatives MOC, traded derivatives volumes posted a 65% increase on the year to 8.77 MT.

Similarly, LNG derivatives trading activity on exchanges increased 49.92% YOY to reach just under 186 MT.

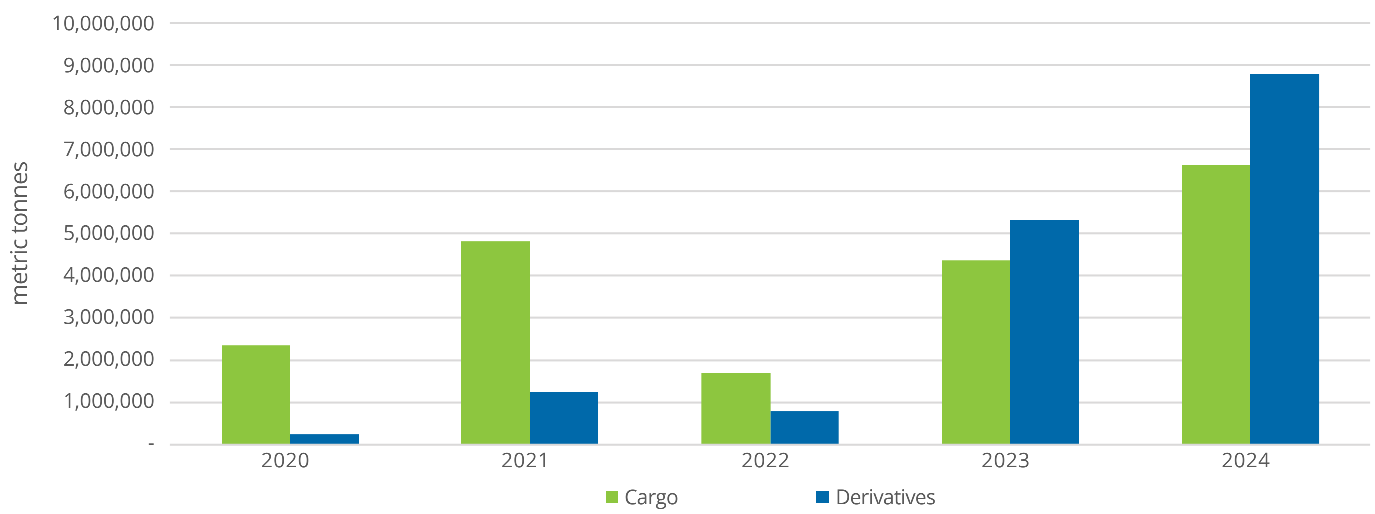
Asian spot LNG prices trended upward towards the end of 2024 as supply security concerns in Europe weighed on the expiration of the five-year Russia-Ukraine transit agreement at the end of 2024.

Figure 4.2: Comparison of 30-day moving annualised volatility of price benchmarks, 2019 to 2024



Source: S&P Global Commodity Insights

Figure 4.3: Platts LNG cargo and derivatives MOC trades, 2020 to 2024



Source: S&P Global Commodity Insights

[2] Platts LNG MOC is the price assessment process used to determine Platts JKM and other LNG benchmark prices published by S&P Global Commodity Insights, where market participants report bids, offers and trades on a real-time basis.

4.2 ATLANTIC LNG PRICE TRENDS

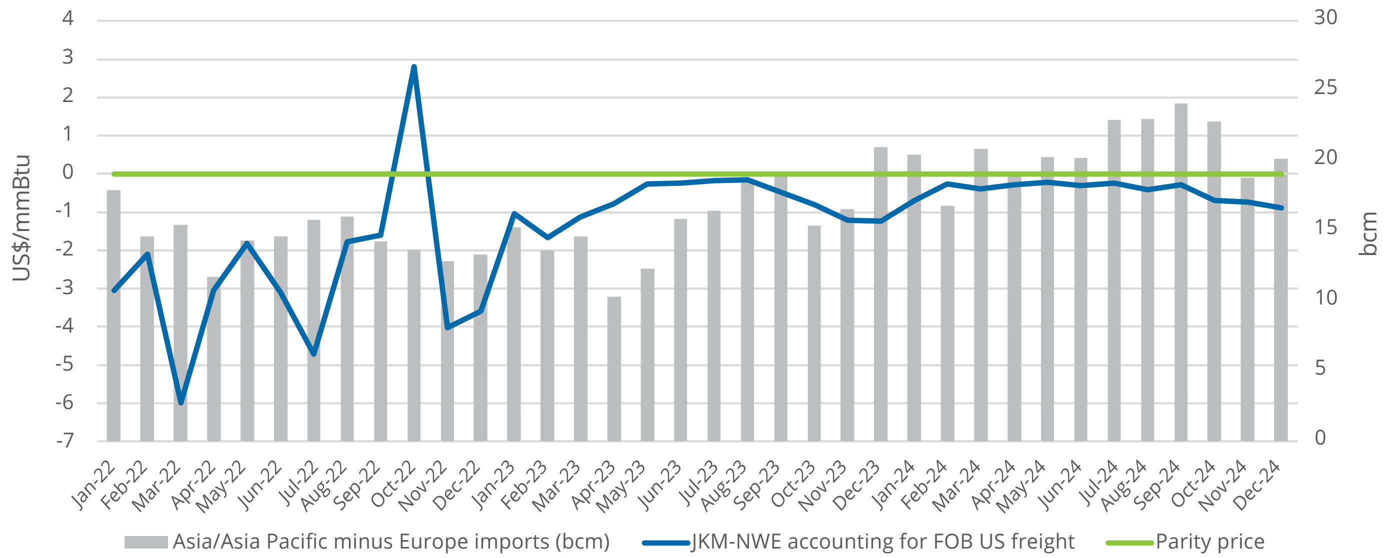
In 2024, Europe maintained its competitiveness in the global market to attract LNG cargoes with the bulk of flexible US LNG volumes still delivered to the continent. Increasing reliance on renewables, including wind and solar generation, across Northwest Europe and the Mediterranean reduced demand for LNG cargoes. Additionally, strong nuclear and hydro output coupled with relatively narrow differentials between European natural gas and LNG prices led to relatively lower imports of LNG on the year. Europe imported 100.07 MT of LNG in 2024, around 21.22 MT less than the volume in 2023. European LNG imports in 2024 were the lowest year levels procured since 2022.

The most significant drops in imports came from the UK, Spain and France, markets that saw a growing share of alternatives in their power mix. Notably, the reliance on wind generation and healthy pipeline flows led to the UK importing 8.03 MT in 2024, down from the 14.51 MT seen the year before. Meanwhile, solar generation and strong pipeline flows between the Iberian region and France pushed Spanish imports of LNG to 13.32 MT in 2024, down from 16.81 MT in 2023. France saw a downturn in imports driven by returning nuclear and hydro generation, which helped to ease imports from 21.8 MT in 2023 to 18.04 MT last year.

On the other hand, delays to US liquefaction projects and maintenance throughout the year created a tight spot supply situation over the year. This fuelled strength in prices on top of concerns over the expiry of the Russia-Ukraine gas transit agreement.

However, favourable LNG arbitrage economics and strong pipeline flows helped Europe meet its annual storage targets. Norwegian gas production hit a record high of 124 bcm in 2024, surpassing the 122.8 bcm record set in 2022. Notably during the year, Norway's pipeline gas exports to landed markets in Northwest Europe in December topped 10 bcm for the first time since July but were still slightly down YOY. Deliveries amounted to 10.09 bcm in December, up 3% compared with November but down 5% on the year. Exports for 2024 as a whole were strong, however, with pipeline deliveries up 8% YOY at 113 bcm.

Figure 4.4: US to Asia/Asia Pacific LNG price differences vs volume shift, January 2022 to December 2024



Source: S&P Global Commodity Insights

Investment in European regasification infrastructure continued to grow in 2024, with regasification capacity rising by 22.3 MTPA, lower than the 26.2 MTPA growth in capacity in 2023. The increased availability of supply from the new capacity allowed Europe the flexibility to procure spot LNG volumes during periods of maintenances and periods of heightened supply uncertainty. Imports of LNG on the spot or short-term market grew from 29% of total imports to 50% in 2024, according to estimates from S&P Global Commodity Insights.

The rapid build-out in LNG regasification capacity across Europe narrowed the differentials between northern continent European pipeline gas hub prices and LNG prices. In 2024, the Platts NWE LNG benchmark averaged $0.26 per mmBtu below the Dutch Title Transfer Facility (TTF) gas hub price, compared to an average discount of $1.02 per mmBtu in 2023. At some points during summer months, Platts NWE was even at a premium to the TTF.

The relationship between LNG markets across basins saw shifts in 2024, highlighting the fierce competition between the Atlantic and Pacific. The JKM – Platts Northwest Europe (NWE) price difference in 2024 was $1.15 per mmBtu, versus $1.59 per mmBtu the year prior. Strong demand from Europe sparked NWE prices to flip to a premium versus JKM in November as Russia halted gas supplies to Austria. The strength in European prices saw US LNG exports continue to favour the continent: around half of US LNG was delivered to Europe in 2024, slightly lower than the two-thirds in the previous year.

In terms of other significant consumption regions within the Atlantic Basin, Latin America showed signs of increased activity, particularly as Brazil and Colombia sought additional cargoes to mitigate the effects of drought on hydroelectric power generation. Brazilian imports of LNG rose from 660,000 tonnes in 2023 to 2.94 MT in 2024, while Colombia's imports rose from 770,000 tonnes to 2.11 MT over the same period.

CONCLUSION

Overall, LNG markets continue to see further developments, with competition between Europe and Asia for LNG volumes intensifying, as Europe's reliance on LNG for its gas supply persists, marking a significant shift in market dynamics following the end of Russian gas flows via Ukraine.

As a result, spot activity increased significantly in 2024, and the market's flexibility continued to improve even during times of supply uncertainty and evolving geopolitical risks including the expiry of Russian gas flowing through Ukraine, maintenances across key pipeline and liquefaction supply projects, as well as tariff challenges across global markets.

At the start of 2025, strong LNG supply into Europe has resulted in a gradual widening of NWE and TTF, with the NWE-TTF differential averaging $0.38 per mmBtu in the first two months of 2025.

The summer injection season is set to be a key factor this year in monitoring the developments between JKM and NWE differentials as Europe looks to LNG to replace Russian gas volumes, and Asian markets procure more cargoes to meet cooling needs.

Courtesy Dynagas

5 LNG Liquefaction Plants

Global liquefaction capacity reached **494.4 MTPA** in 2024.

Capacity Additions for 2024

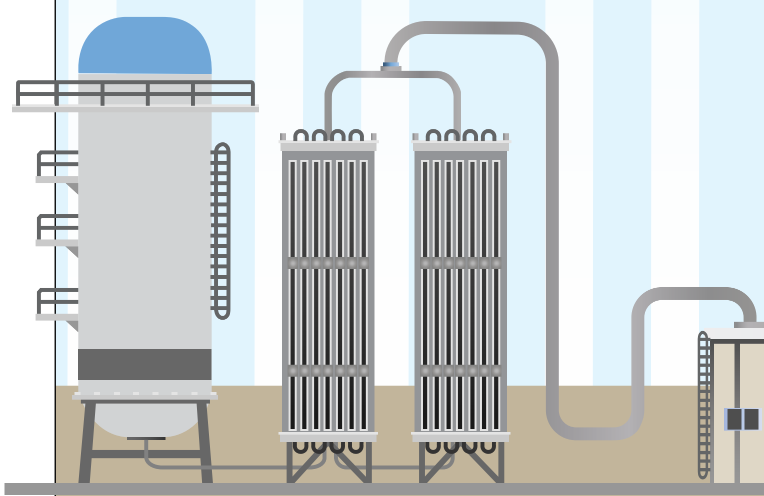
6.5 MTPA
of liquefaction capacity brought online

1.3%
year-on-year growth vs 2023

United States
97.5 MTPA
Market with the highest liquefaction capacity

Australia
87.6 MTPA

Qatar
77.1 MTPA



Pre-FID

1,121.9 MTPA
of liquefaction capacity currently in pre-FID stage

366.9 MTPA
from the US

170.4 MTPA
from Russia

227.3 MTPA
from Canada

57.2 MTPA
from Mozambique

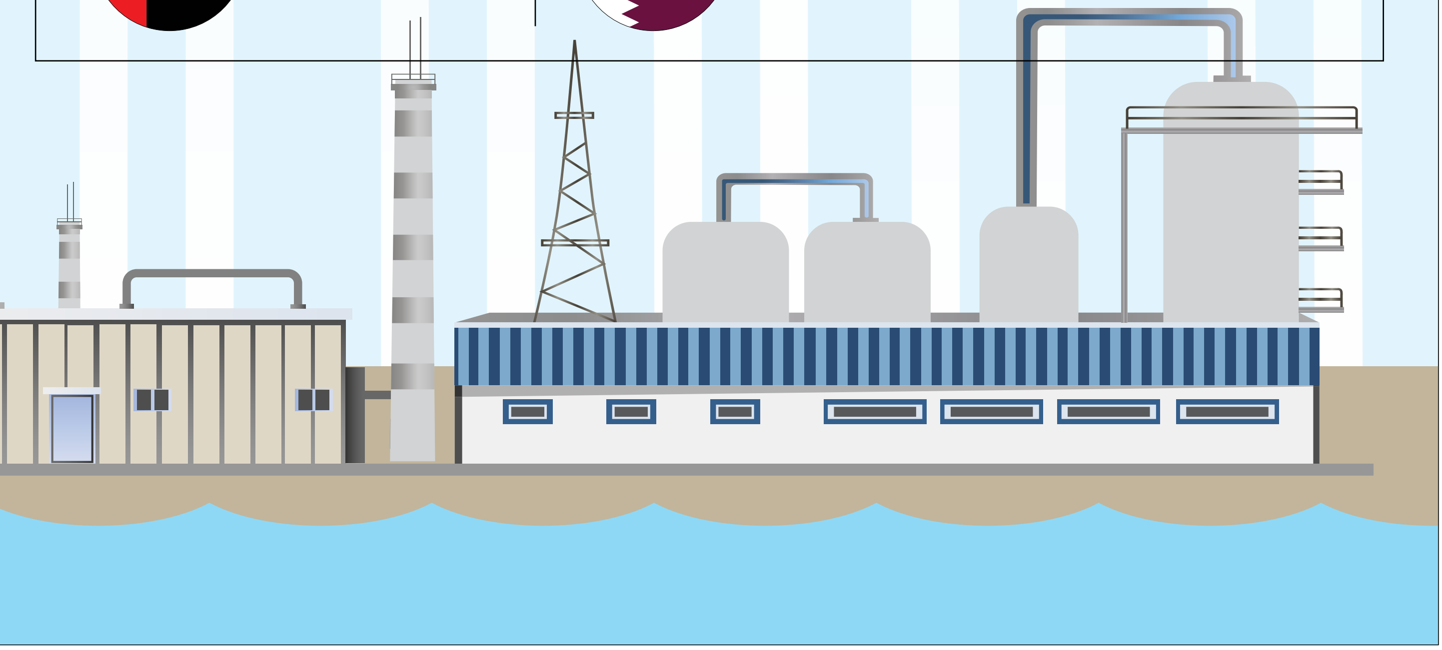
FIDs and Under Construction

FID in 2024
14.8 MTPA

210.3 MTPA
of liquefaction capacity under construction or approved for development as of Dec 2024

Ruwais LNG

QatarEnergy LNG Train 8-13



5. Liquefaction Plants

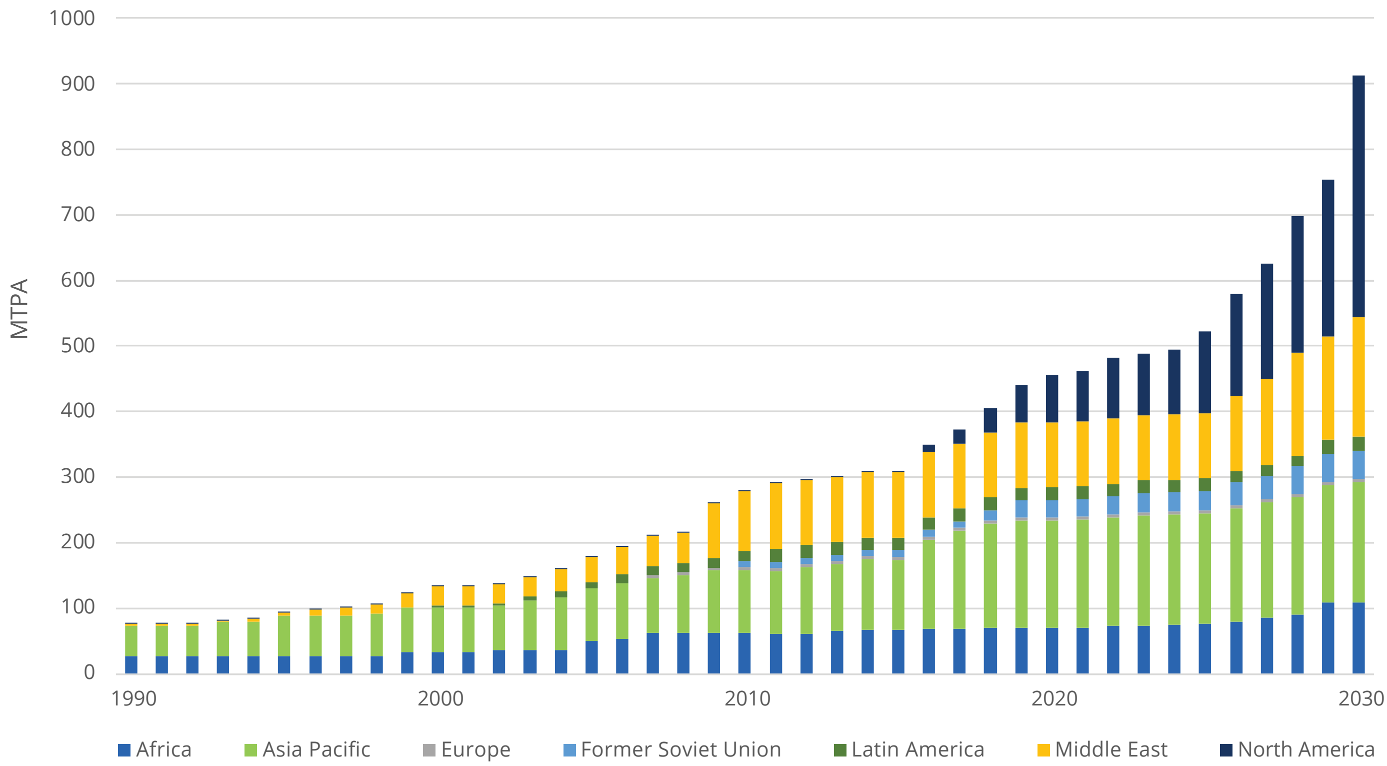
A total of 6.5 MTPA of liquefaction capacity was added in 2024, pushing global liquefaction capacity to 494.4 MTPA. The average global utilisation rate in 2024 was 86.7%, a reduction from 88.7% in 2023, mainly due to weather impacts, maintenance and mechanical faults. At the end of 2024, four liquefaction projects reached FID, bringing the total approved capacity of liquefaction projects to 210.3 MTPA.

Courtesy Samsung Heavy Industries


AMSUN

5.1 OVERVIEW

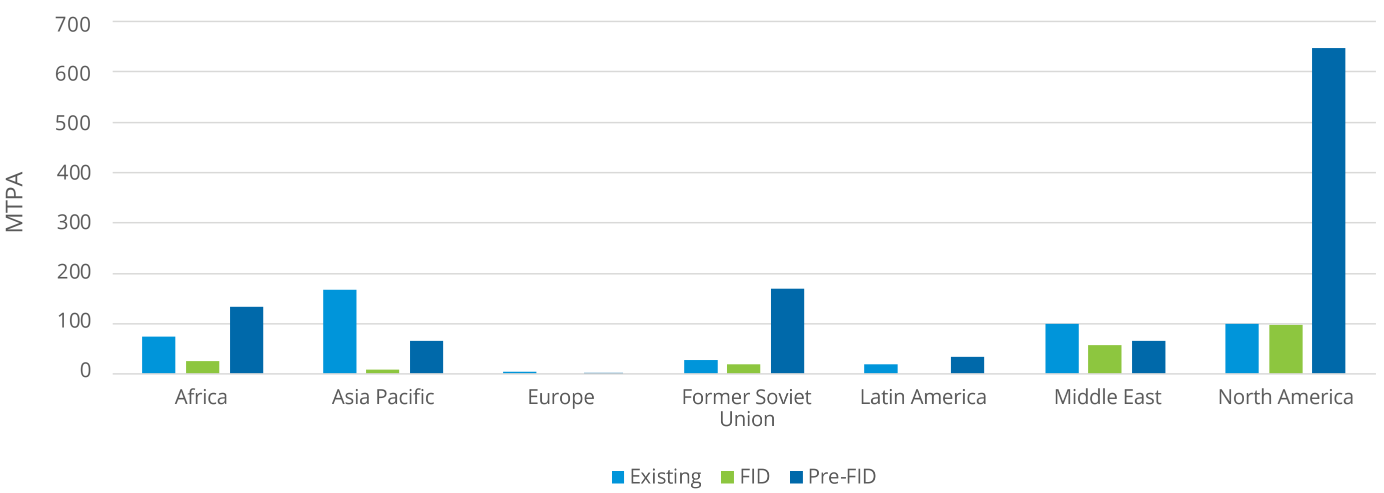
Figure 5.1: Global liquefaction capacity growth by region, 1990-2030



Source: Rystad Energy

A total of 6.5 MTPA of liquefaction capacity was brought online globally in 2024 with the addition of Plaquemines LNG T1-T8 (4.5 MTPA) in the US (assuming startup of all trains in the first four blocks for simplicity), Altamira LNG (1.4 MTPA) in Mexico, and Congo Marine XII FLNG (0.6 MTPA) in Africa. The US, Australia and Qatar still rank among the top three in terms of global operational liquefaction capacity.

Figure 5.2: Global liquefaction capacity by region and status, end-2024



Source: Rystad Energy

During 2024, 14.8 MTPA of liquefaction capacity was approved, which is a significant decrease compared to 58.8 MTPA in 2023 and the lowest since 2020. This was primarily contributed by Ruwais LNG (T1-T2, 9.6 MTPA) in the UAE, Cedar FLNG (3 MTPA) in Canada, Genting FLNG (1.2 MTPA) in Indonesia, and Marsa LNG (1 MTPA) in Oman. Ruwais LNG reached FID in June 2024. The project is now under construction, with a targeted startup in 2028. Cedar FLNG is Canada's first floating LNG export project and is the first in the world to be majority owned by an Indigenous community. It was approved on June 25, 2024, following its regulatory approval, firm offtake contracting and engineering progresses, and the completion of the long-haul feedstock pipeline (Coastal GasLink) to which Cedar FLNG will ultimately connect.

In June 2024, Wison New Energies secured a $962.8 million contract from Genting Oil & Gas for Genting FLNG, which will be Indonesia's first FLNG facility. The FLNG facility is now under construction, and first LNG is targeted in the third quarter of 2026. In April 2024, FID on Marsa LNG was announced. As an innovative integrated project, Marsa LNG combines upstream gas production, downstream gas liquefaction and renewable power generation. The project will be one of the lowest greenhouse gas (GHG) emission-intensity LNG plants ever built and it aims to be an LNG bunkering hub in the Middle East, providing an available and competitive alternative marine fuel to reduce the shipping industry's emissions.

The global energy sector has made decarbonisation a top priority, and the LNG industry is no exception. As a significant component of the global energy mix, decarbonising the LNG supply chain is essential for many industry players. The liquefaction stage presents a key opportunity to drive down emissions and reduce greenhouse gases. Three of the four projects that reached FID in 2024 are planning to run on renewable energy. Ruwais LNG and Marsa LNG have each taken a major step towards reducing emissions in the Middle East. Once operational, Ruwais LNG will be one of the first LNG export terminals in the Middle East and Africa to run on clean power. Its two trains will be powered by increasingly green electricity from the national grid, using electric motors instead of traditional natural gas turbines. Marsa LNG is also exploring electric-driven motors, with plans to source 100% of its electricity from a planned solar farm. Also as mentioned, its LNG production will be used as a marine fuel, helping to reduce emissions in the shipping industry. In Canada, Cedar LNG has announced its intention to use renewable electricity from BC Hydro, making it a potential leader in reducing emissions in the LNG sector. LNG Canada Phase 2 has yet to reach FID but plans to transition to electricity once it does. However, the project's electrification plans have been hindered by electricity constraints, which pose a significant challenge to its implementation.

INPEX, the operator of Ichthys LNG in Australia, has partnered with Chubu Electric Power Company to explore the feasibility of CCS between Japan and the Ichthys LNG project. For Rio Grande LNG in the US, the carbon capture plans were dropped, stating that the CCS project was not sufficiently developed to allow the Federal Energy Regulatory Commission (FERC) to review it at the time. Meanwhile, at the Gorgon LNG facility near Barrow Island in Western Australia, operators are facing challenges in realising the full potential of their carbon capture system. The issue lies not with the technology itself, but rather with the reservoir, which is limiting the amount of CO_2 that can be captured. To address this, Chevron is launching an optimisation project to re-inject more CO_2 into the reservoir.

As of the end of 2024, 1,121.9 MTPA of aspirational liquefaction capacity is in the pre-FID stage. Most proposed capacity is in North America (648.4 MTPA), with 366.9 MTPA situated in the US, 227.3 MTPA in Canada, and 54.2 MTPA in Mexico. This is followed by Russia (170.4 MTPA), Africa (133.3 MTPA), the Middle East (66.5 MTPA), and Asia Pacific (67.0 MTPA). About 36.3 MTPA of liquefaction capacity is proposed in the rest of the world. Overall, the market upheaval caused by the Russia-Ukraine conflict is likely to stimulate investment in additional liquefaction facilities as governments put more emphasis on increasing energy security while, at the same time, balancing decarbonisation goals in this fast-changing landscape. If all projects materialise, global liquefaction capacity would increase three-fold. However, a fair portion of pre-FID projects are not likely to progress due to the weak economic outlook and increasingly stringent environmental restrictions on fossil fuel projects.

5.2 GLOBAL LIQUEFACTION CAPACITY AND UTILISATION

Global operational liquefaction capacity totalled 494.4 MTPA as of the end of 2024, with an increase of 6.5 MTPA compared to 2023. The projects put into production in 2024 mainly include Plaquemines LNG T1-T8 (4.5 MTPA) in the US, Altamira LNG (1.4 MTPA) in Mexico, and Congo Marine XII FLNG (0.6 MTPA) in Africa. The average utilisation rate in 2024 was 86.7%[1], a slight decrease of 2.0 percentage points from 2023. There were some unplanned LNG outages in 2024, mainly due to mechanical faults and maintenance but also due to power outages and severe weather conditions. Despite outages, 12 out of 22 LNG exporting markets achieved higher-than-average utilisation rates in 2024, including Russia, Norway, Papua New Guinea, the UAE, Oman, Qatar, the US, Australia, Malaysia, and Equatorial Guinea. Meanwhile, some export facilities have been running below average – for example, the utilisation rate of the three Arzew plants in Algeria dropped from 90% in the early 2000s to 46% in 2024. This drop was jointly caused by the decrease in total LNG production and the increase in total liquefaction capacity.

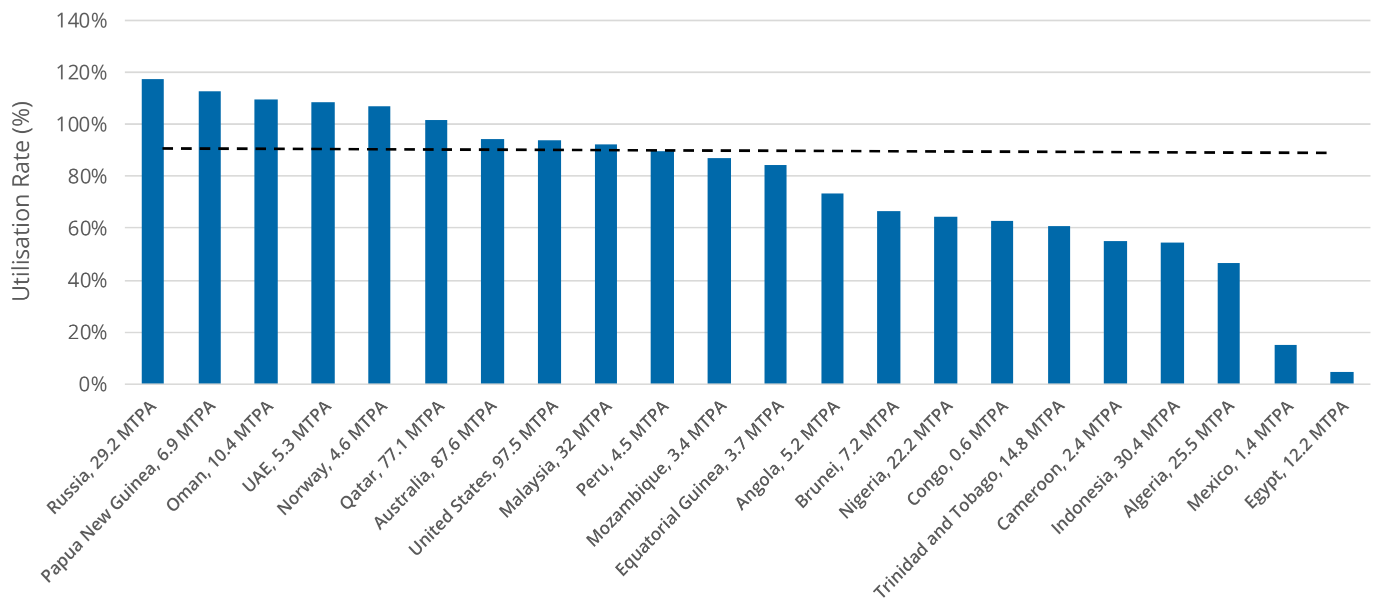
Liquefaction plants in the US operated at an average utilisation rate of 93.9% in 2024, a slight decrease from the previous year, but still demonstrating a robust performance. This performance was somewhat offset by the impact of operational disruptions at the Freeport LNG facility. Freeport LNG's capacity accounts for 15.6% of the total operational liquefaction capacity in the US. Notably, the Freeport LNG project has experienced repeated outages since its startup, with some resolved within hours while others lasted longer and had more significant consequences. The facility experienced 23 outages in 2024, of which 91% were unplanned. This led to a utilisation rate of 85%, significantly lower than the average utilisation level of liquefaction capacity in the US in 2024. Meanwhile, liquefaction plants in the Middle East ran at high utilisation rates over the year, with the UAE, Oman and Qatar performing at 108%, 109% and 102%, respectively.

[1] Utilisation is calculated on a pro-rated basis, depending on when the plants are commissioned or when the plants went offline due to outages, upstream supplies disruption or other factors. Only operational facilities are considered.

In Africa, the nameplate utilisation rate at the NLNG liquefaction plant in Nigeria averaged 65% in 2024, with a slight increase compared to 2023. This plant has repeatedly declared force majeure due to unresolved issues in regional security, especially pipeline theft and sabotage. Force majeure on some cargo loadings was declared in October 2022 initially due to extensive flooding, but as of September 2024, it had yet to be lifted. Exports from Egypt has been reversed due to growing domestic gas shortages, and its two LNG export facilities remain offline. LNG exports were down 78.1% YOY in 2024 at just 0.78 MT with no cargoes loaded since May of that year.

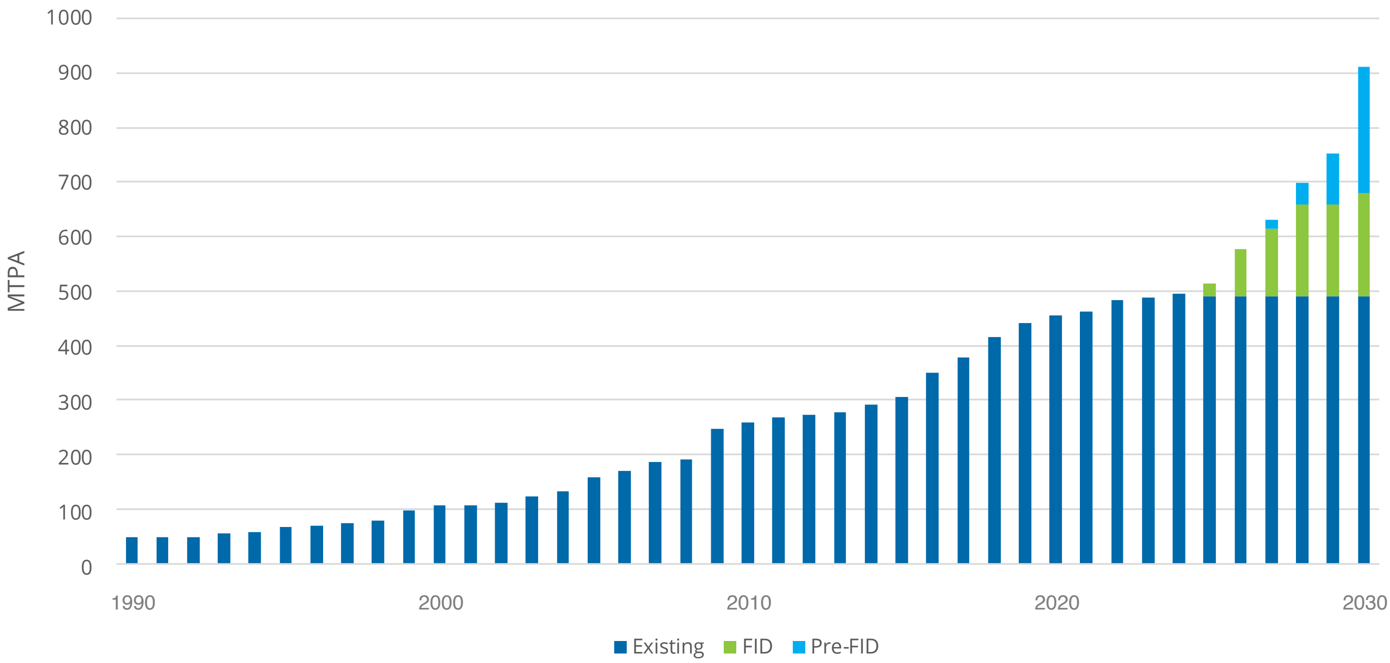
In Australia, Santos and Tamboran Resources have entered into a non-binding memorandum of understanding (MoU) to complete technical studies relating to the option of sending Beetaloo Basin gas to the Darwin LNG (DLNG) facility to support a Train 2 expansion. The studies will evaluate options for supplying gas to DLNG, which has a nominal approved 10 MTPA capacity, with the expansion opportunity up to around 6 MTPA. On January 22, 2025, Woodside announced that the second train at North West Shelf LNG (NWS LNG) was taken offline in preparation for permanent retirement. The maturation of current sources of feedstock and a lack of sizeable new sources that can be developed in the near term have pushed down production at the liquefaction plant. NWS has operated below nameplate capacity since 2020, with full-year utilisation reaching 81% in 2024, the lowest since operations at the plant began in 2008.

Figure 5.3: Global liquefaction capacity utilisation, 2024 (capacity is pro-rated)



Source: Rystad Energy

Figure 5.4: Global liquefaction capacity development, 1990-2030



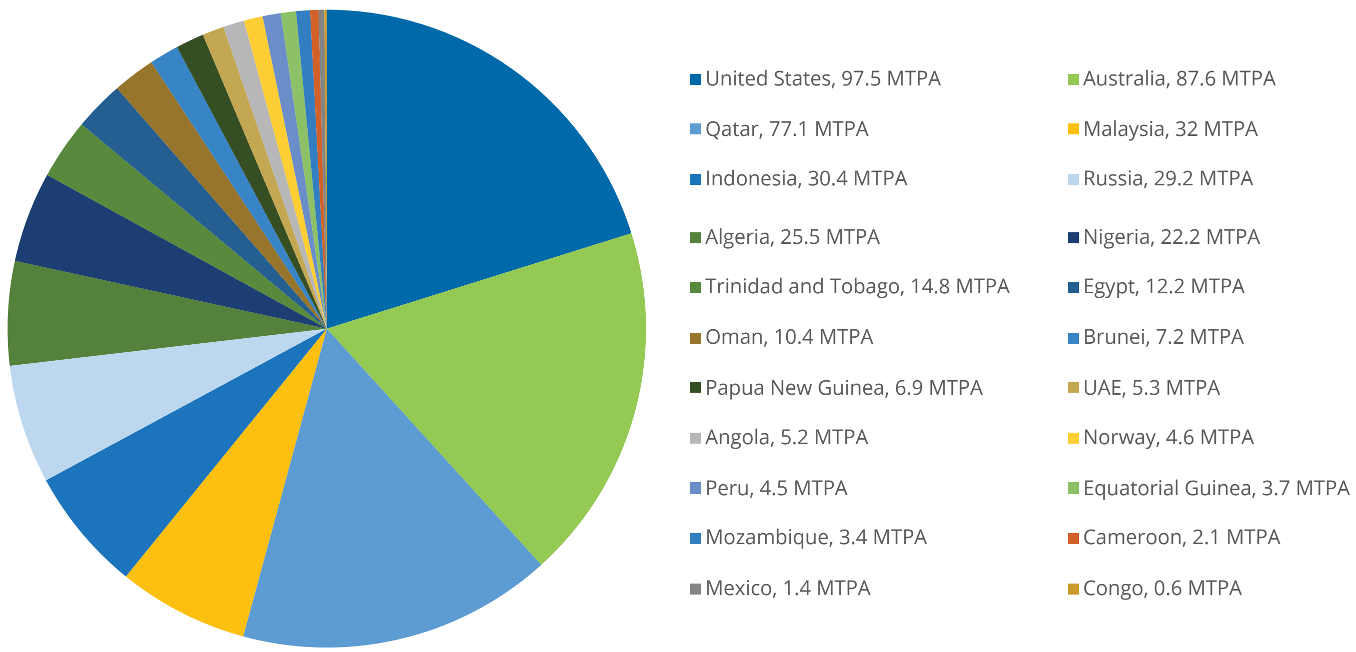
Source: Rystad Energy

5.3
LIQUEFACTION CAPACITY BY MARKET

Operational

As of the end of 2024, there were 22 markets operating LNG export facilities. The US remained the market with the largest operational liquefaction capacity, at approximately 97.5 MTPA, with an increase of 4.5 MTPA compared to 2023. Australia and Qatar ranked second and third with 87.6 MTPA and 77.1 MTPA, respectively, maintaining the same capacity as the previous year. The top three LNG export markets currently represent more than half of global liquefaction capacity.

Figure 5.5: Global operational liquefaction capacity by market, end-2024



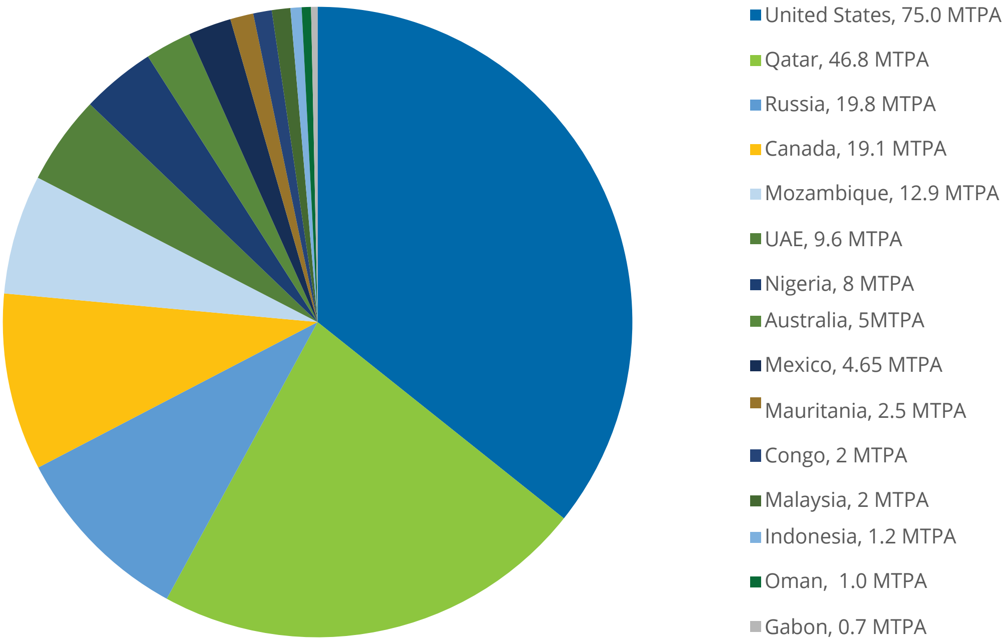
Source: Rystad Energy

Under construction/FID

As of the end of 2024, 210.3 MTPA of liquefaction capacity is either under construction or approved for development, of which approximately 45% is in North America. In 2024, a total of 14.8 MTPA of liquefaction capacity was approved, mostly contributed by Ruwais LNG (T1-T2, 9.6 MTPA) in the UAE, Cedar FLNG (3 MTPA) in Canada, Genting FLNG (1.2 MTPA) in Indonesia, and Marsa LNG (1 MTPA) in Oman.

Several liquefaction facilities are currently under construction and progressing towards completion. Plaquemines LNG's first four blocks (4.5 MTPA) started up in 2024, with all trains expected to ramp up in 2025. Corpus Christi LNG Phase III (5.96 MTPA) in the United States and LNG Canada (T1-T2, 14 MTPA) are currently under construction and are expected to begin commercial operations in 2025. In Russia, Arctic LNG 2 T2-T3 (13.2 MTPA) has been significantly delayed by sanctions and the trains are expected to start up only after 2026. In Mauritania and Senegal, Greater Tortue Ahmeyim (GTA) FLNG (2.5 MTPA) started producing LNG in February 2025 after experiencing several delays. Moreover, in the US, Woodside Louisiana LNG (16.5 MTPA) reached FID in April 2025.

Figure 5.6: Global approved liquefaction capacity by market, end-2024



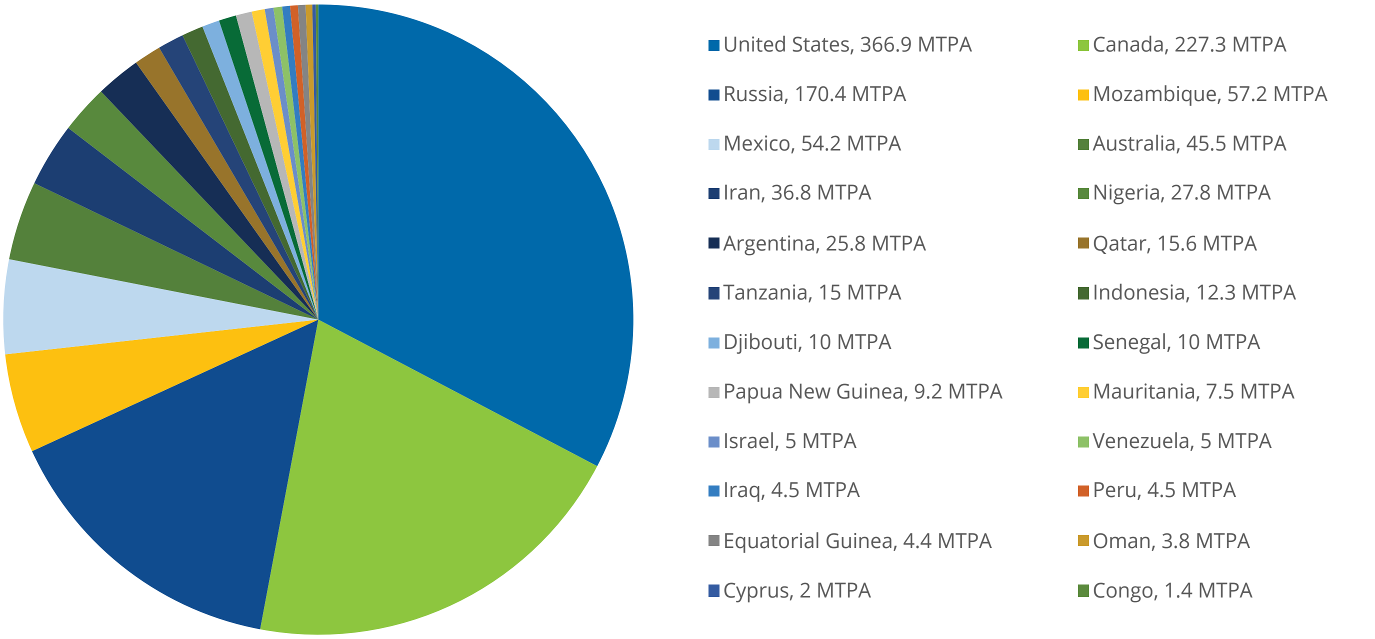
Source: Rystad Energy

Courtesy Osaka Gas

Proposed

As of the end of 2024, there is 1,121.9 MTPA of potential liquefaction capacity in the pre-FID stage, an increase of 75.3 MTPA compared to 2023. With the Russia-Ukraine conflict still ongoing and a huge decline in Russian piped gas volumes in the market, a wave of proposed liquefaction projects has emerged to offset the loss of Russian supply. Some projects have also been fast-tracked to help meet demand. However, only a portion of pre-FID projects are going to proceed.

Figure 5.7: Global proposed liquefaction capacity by market, end-2024



Source: Rystad Energy

A large portion of US planned liquefaction plants is supported by gas production growth in the Permian and Haynesville basins in recent years, which are close to the Gulf of Mexico LNG exporting region. While most operational US LNG projects are brownfield conversion schemes, currently proposed US LNG projects are mainly greenfield schemes that consist of multiple small to mid-scale LNG trains delivered in a phased manner. This provides flexibility in securing long-term offtakers and increases competitiveness in project economics through modular construction. In January 2024, the US Department of Energy (DOE) temporarily paused reviews of new LNG export applications. This pause was intended to allow for the update of environmental analysis that serve as the basis for non-Free Trade Agreement (FTA) licence authorisations issued by the DOE. With the new administration taking office, the regulatory environment for new LNG exports has been significantly eased. One of President Trump's first actions was to lift the freeze on LNG export approvals. As a result, Commonwealth LNG, shortly after, became the first project to receive conditional export authorisation for non-FTA markets since the freeze was lifted.

Out of the proposed 227.3 MTPA of liquefaction capacity in Canada, only a few projects are viable. The facilities on the West Coast have a competitive advantage due to lower shipping costs to Asian markets compared to other planned projects on the US Gulf Coast. Nevertheless, the transportation of feedstock gas via pipeline and environmental regulatory oversight remain significant challenges to be addressed. For instance, the proposed Ksi Lisims project (12 MTPA) in Canada hinges on the construction of a new pipeline. Even though construction of the pipeline has started on paper, the project is currently facing significant hurdles in securing the necessary permits to traverse First Nations land. Many projects have been cancelled or postponed. Those ongoing LNG export projects in western Canada are implementing various strategies to reduce carbon emissions, comply with environmental regulations, and gain support from local governments and residents. For example, LNG Canada T3-T4 (14 MTPA) has chosen high-efficiency aero-derivative gas turbines to minimise fuel consumption and plans to power part of the liquefaction plant with renewable energy.

With the significant reduction in gas flows to Europe, Russia is looking to increase LNG production and exports via a series of liquefaction projects. Russia currently has 170.4 MTPA of proposed liquefaction capacity. Far East LNG, often referred to as Sakhalin 1 LNG (6.2 MTPA), is a major project in the pre-FID stage that is aiming to commercialise produced gas from the Sakhalin 1 gas fields. Sakhalin 2 LNG T3 (5.4 MTPA), another project in the pre-FID stage, may face difficulties with sourcing feed gas since it plans to purchase this from the depleting Sakhalin 1 gas fields, while the gas reserves within the Sakhalin 2 region remain undeveloped. Yakutsk LNG (18 MTPA), located in Russia's Far East, is proposed to transfer gas from interior gas fields via a 1,300 km, 20-city pipeline to Russia's Pacific coast. Russia has set an ambitious goal of reaching 110 MTPA of LNG production by 2030. As the political rift between Russia and the West over Ukraine deepens, and a series of economic sanctions severely restrict Russian companies' ability to acquire technology and market access, the prospect of new LNG projects in Russia is becoming increasingly uncertain. However, LNG holds significant strategic importance for Russia as an important pathway to global markets, especially after losing the majority of its piped exports to European markets. In the long run, Russia still has major export potential for its vast resource base.

Africa's proposed liquefaction capacity has increased to 133.3 MTPA. Mozambique has the largest pipeline of proposed projects, with a combined capacity of 57.2 MTPA. TotalEnergies' 12.9 MTPA Mozambique LNG project has been under force majeure since 2021. As of early 2025, the expected start date has been pushed back even further, with operations now anticipated to begin beyond 2029. However, the project has recently gained momentum with the securing of US financing. Rovuma LNG in its new design may use a modular approach instead of a stick-built approach, with capacity expanded to 18 MTPA from 15.2 MTPA. However, FID for this project is anticipated to face significant delays due to security risks and a decreased interest in large-scale, high-cost liquefaction investments, given the saturation of the LNG market in the medium to long term. Tanzania is also planning its first long-delayed LNG plant, Tanzania LNG T1-T3 (15 MTPA), with the latest FID target set for 2025.

However, there is still a risk of delay due to the substantial amount of work required in areas such as project structure, contract strategy, and financing. Nigeria National Petroleum Corporation (NNPC) plans to revive two major LNG export projects that were put on hold about 12 years ago: Brass LNG in Bayelsa State and Olokola LNG in Ondo State. Among them, Brass LNG (10 MTPA) was proposed in 2003 and has been subject to numerous attempts to reach FID amid ownership changes and project alterations. In Mauritania and Senegal, further evaluation for Phase 2 of the GTA project, operated by BP and partners, has been confirmed, with the Phase 2 expansion project expected to add another 2.5 MTPA for a total of 5 MTPA. Considering that Front-End Engineering and Design (FEED) requires at least one year of time, the project is estimated to be approved at best in 2026. While good progress has been made, Africa must still overcome a series of challenges to drive timely execution of these proposed projects and to increase its attractiveness for capital by providing a stable investment climate to realise its vast resource potential.

In Asia Pacific, Australia remained the market with the largest proposed capacity of 45.5 MTPA in the region in 2024. Proposed projects such as Abbot Point LNG T1-T4 (2 MTPA), Gorgon LNG T4 (5.2 MTPA) and Wheatstone LNG T3-T5 (15.9 MTPA) have yet to progress, with most still in the feasibility stage. In Papua New Guinea (PNG), after Oil Search announced in March 2021 that PNG LNG T3 was no longer part of its future development plans, Kumul Petroleum announced in 2023 that it would build a separate 1 MTPA third train at the facility to utilise its own fields, but plans are still in the preliminary stages. In addition, ExxonMobil, together with TotalEnergies, is working towards a decision on the Papua LNG project (4 MTPA), even though FID was pushed out to 2026 due to a reopening of bidding to a broader group of contractors. Indonesia has proposed 12.33 MTPA of liquefaction capacity, mainly from Abadi LNG (9.5 MTPA), which will be supplied by the Abadi gas and condensate field in the Masela production sharing contract (PSC). A revised plan of development (PoD) with a carbon capture and storage (CCS) component was approved in December 2023. The project was planned to reach FID in the latter half of the 2020s and start producing first gas in early 2030s.

Decommissioned and idle

There were no announcements of LNG plants that had been decommissioned or were scheduled to be decommissioned in 2024. Bontang LNG, Indonesia’s first LNG project, possesses eight trains with a total capacity of 22.3 MTPA. Since 2006, the plant’s production has gradually decreased due to the depletion of feedstock supply. Two trains have been operational, two trains are already decommissioned and the remaining four are on standby. The Marsa El Brega LNG plant in Libya halted production in 2011 and there are currently no plans to bring it back online. Yemen LNG has been offline since April 2015 under force majeure due to the civil war in Yemen.

There is currently 49 MTPA[2] (including Bontang LNG) of capacity at operational LNG liquefaction trains that are more than 35 years old, mainly including trains at Brunei LNG, ADGAS LNG in the UAE, Arzew LNG in Algeria, MLNG in Malaysia, and North West Shelf LNG in Australia. No major upgrading plans were announced for these plants in 2024.

5.4
LIQUEFACTION TECHNIQUES

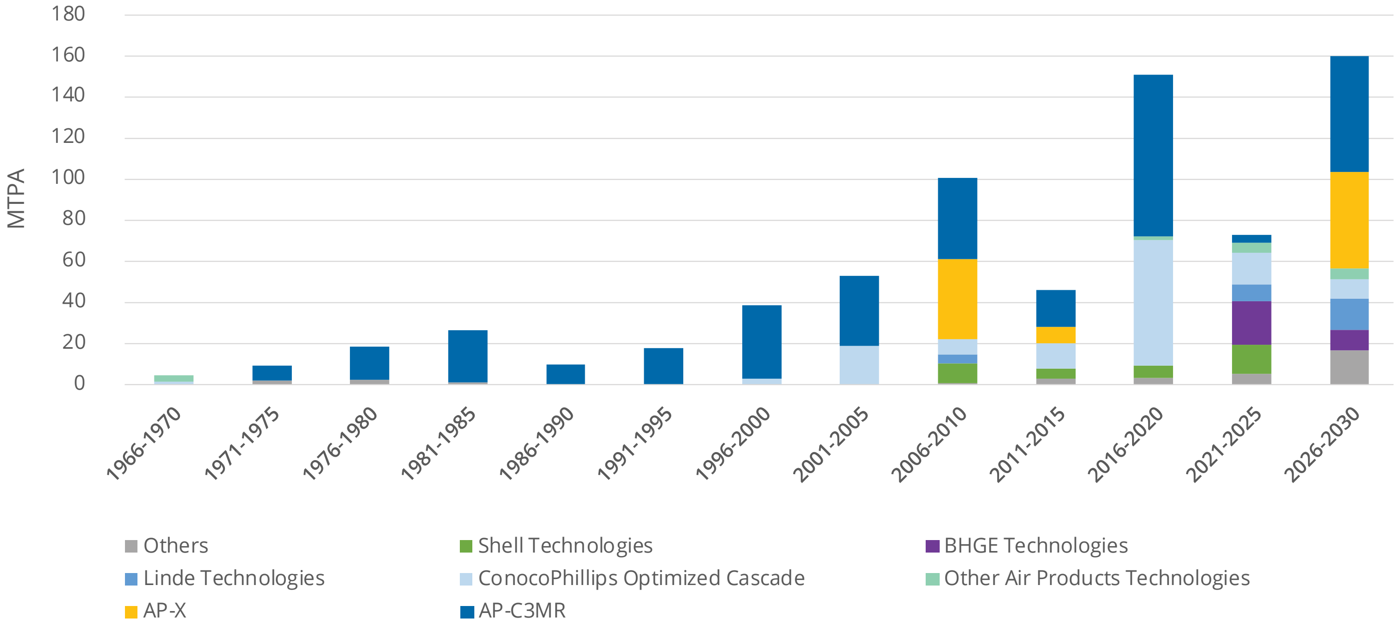
Air Products Technologies Account for

66% of Global Operational Capacity

Among the liquefaction trains that became operational in 2024, Plaquemines LNG T1-T8 in the United States adopted Baker Hughes' single-cycle mixed refrigerant (SCMR) technology, Altamira LNG T1 in Mexico adopted New Fortress Energy's Fast LNG technology and Congo Marine XII FLNG in Congo adopted Black & Veatch's poly refrigerant integrated cycle operations (PRICO) technology. Corpus Christi Stage 3 T1 in the United States has adopted ConocoPhillips' Optimized Cascade technology. Meanwhile, Arctic LNG 2 T1 in Russia has chosen Linde's mixed fluid cascade (MFC) technology. However, the situation for Arctic LNG remains uncertain due to difficulties in securing suppliers. Currently, Air Products' (AP) liquefaction technologies still dominate the market in liquefaction methodology, representing about 66% of the total operational capacity in 2024, while AP-C3MR hold about a 55% share. Air Products Technologies is estimated to grow its use to 440 MTPA once QatarEnergy LNG, NLNG, Golden Pass LNG, Energía Costa Azul LNG, Mozambique LNG (Area 1), Rio Grande LNG, and Petronas FLNG 3 Tiga have been deployed. Baker Hughes (BHGE) Technologies is estimated to grow its use to 32 MTPA once the Plaquemines LNG projects have been completed. Linde Technologies was estimated to grow its use to 28 MTPA once Arctic LNG 2 and Woodfibre LNG's expansion have been deployed. However, the technology used for Arctic LNG is still unsure due to sanctions. ConocoPhillips' Optimized Cascade technology is estimated to grow its use to 128 MTPA once Corpus Christi Stage 3 in the US and Pluto LNG's expansion in Australia have been deployed. Once the QatarEnergy LNG projects are deployed, AP-X technology is expected to increase to 94 MTPA. When the Golden Pass LNG, NLNG, Rio Grande LNG, and Mozambique LNG (Area 1) projects are put into use, AP-C3MR technology will increase to 129 MTPA.

[2] This does not include Kenai LNG as plans to convert it to an import facility were approved in December 2020.

Figure 5.8: Installed and approved liquefaction capacity by technology and start-up year, 1966-2030



Source: Rystad Energy

The roots of gas liquefaction technology date back to the start of the 1960s. In the initial batch of LNG export facilities, Arzew GL4Z T1-T3 adopted the Classic Cascade process developed by ConocoPhillips, while Kenai LNG adopted an early version of ConocoPhillips' Optimized Cascade process. Air Products introduced its Single Mixed Refrigerant technology (AP-SMR) to the liquefaction technology market in the 1970s, which was first applied at the Marsa El Brega LNG facility. During this period, the design capacity of liquefaction units was typically limited to 1.5 MTPA per train. These early installations served as experimental platforms for refining liquefaction technologies, aimed at efficiently cooling methane to approximately -162 degrees Celsius.

The AP-C3MR technology, which was first introduced at the Brunei LNG facility in 1972, gradually occupied a dominant position in liquefaction technology, accounting for approximately 55% of the global operating capacity by 2024 (including the SplitMR variation). The rising market share of the AP-C3MR technology can be attributed predominantly to QatarEnergy, with an expansion of capacity by roughly 30 MTPA since the launch of QatarGas 1 T1 in 1996. The Damietta LNG facility in Egypt was the first to incorporate the C3MR/ SplitMR technology, which has enhanced the AP-C3MR process by refining its mechanical layout to boost turbine efficiency.

The AP-X technology of Air Products was initially implemented in the QatarGas 2 project in 2009, facilitating a liquefaction capacity of 7.8 MTPA per train, marking it as the greatest per-train capacity in the LNG development history. The AP-X technology will also be employed in the QatarEnergy LNG project in Qatar, approved in 2021 and 2023, which involves six giant trains, each with a liquefaction capacity of 7.8 MTPA. The elevated liquefaction capacity is primarily achieved through the integration of an extra nitrogen refrigeration cycle with the C3MR technology, which serves a sub-cooling role and effectively adds to the refrigeration capacity. This innovative approach has also been applied in both operating and planned floating liquefaction facilities.

AP-N, a compact version derived from the AP-X supercooling technology, is installed on Petronas' PFLNG 1 and PFLNG 2 in Malaysia, while Coral South FLNG in Mozambique and Energía Costa Azul LNG in Mexico are installing the AP-DMR process. AP-N is the only expander-based (EXP) technology employed in offshore development. Compared to the mixed refrigerant (MR) process, the EXP technology boasts simplicity and requires less equipment. Cameroon FLNG in Cameroon, Congo Marine XII FLNG in Congo, and GTA in Mauritania and Senegal adopted the Black & Veatch PRICO technology.

Facing tougher competition in the 2000s, the market share of Air Products' liquefaction technology experienced a downturn, slipping from over 90% in the 1980s and 1990s to 66% in 2024. This decline is largely attributed to the rising adoption of ConocoPhillips' Optimized Cascade technology, as seen in projects such as Queensland Curtis LNG, Australia Pacific LNG, Sabine Pass LNG, Wheatstone LNG, and Corpus Christi LNG. The extensive implementation of ConocoPhillips' Optimized Cascade Process has resulted in its being utilised in 113.9 MTPA of operational capacity, representing 22.8% of the market, and securing its position as the second-leading liquefaction technology in the market. The Optimized Cascade Process by ConocoPhillips was initially used at Kenai LNG in the late 1960s and reemerged with the startup of Atlantic LNG T1 in 1999.

New liquefaction projects are expected to increasingly enter the market from 2025 to 2030, mainly due to the rising demand for small and medium-sized LNG production trains. As the focus on exploiting small amounts of stranded natural gas grows, coupled with intensifying competition among financiers and LNG project offtakers, small and medium-sized LNG trains are emerging as a lower-risk alternative. These trains are characterised by their compact size, straightforward design, ease of standardisation, and modularisation, which translates into cost and time savings during construction and execution. In 2024, Plaquemines LNG, utilising BHGE SCMR technology, commenced operations with a capacity of 4.5 MTPA. While the large-scale LNG liquefaction technology market is dominated by a few companies, new technologies are emerging. One such technology is New Fortress Energy's Fast LNG, which will be employed in the Altamira LNG T1 and T2 projects, with each train having a capacity of 1.4 MTPA.

Operator-driven liquefaction technologies continue to attract attention. The dual mixed refrigerant (DMR) process, developed by Shell and APCI, has been successfully implemented in the Sakhalin 2 LNG and Prelude FLNG projects and is set to be used at LNG Canada in 2025. This technology's configuration process is similar to the AP-C3MR method, but instead of using pure propane in the exchanger, the DMR process is pre-cooled with a refrigerant blend that consists primarily of ethane and propane. The benefits of using the DMR process become more apparent in colder environments, as pre-cooling the mixed refrigerant can avoid the pressure limitations of propane at low temperatures. The Novatek Arctic Cascade process, specifically designed for the Arctic climate by Novatek, has been applied in Yamal LNG T4, with a capacity of 0.9 MTPA.

Due to safety considerations (reducing the use of highly flammable refrigerants) and limited space available on compact decks, small-scale FLNGs typically employ relatively simple liquefaction technologies. The first operational FLNG, PFLNG Satu, used the AP-N technology of Air Products, which is based on a simple nitrogen cooling cycle. Black & Veatch's PRICO process has been successfully applied to the Cameroon FLNG. Compared to larger trains, these smaller modules, with a capacity of around 0.6 MTPA, allow for more optimised configurations and more efficient use of the limited deck area. As FLNGs with greater capacities are developed, increasingly complex technologies are being implemented; for instance, Prelude FLNG adopted Shell's DMR technology in 2019, with a capacity of 3.6 MTPA, and Coral South FLNG adopted the AP-DMR technology in 2022, with a capacity of 3.4 MTPA.

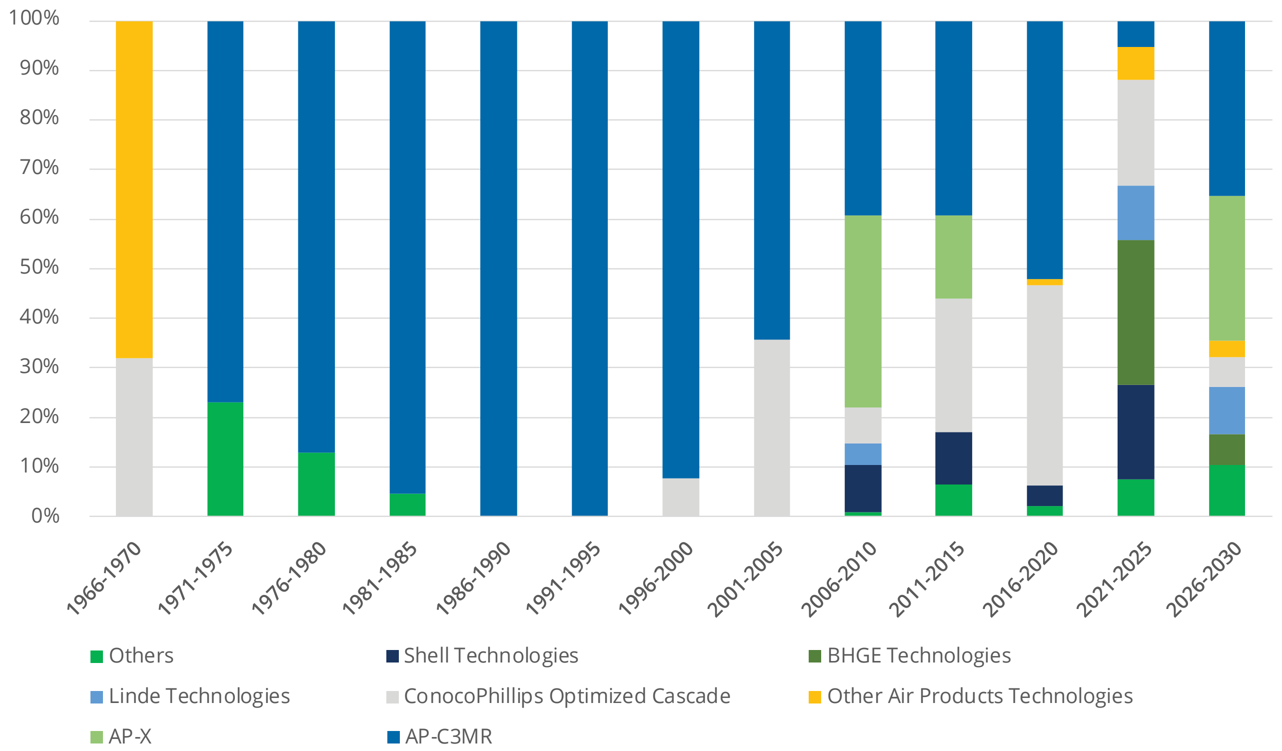
Emission reduction measures

Numerous measures have been implemented to reduce carbon dioxide emissions throughout the liquefaction of natural gas. The carbon footprint of LNG plants is primarily attributed to three sources: first, the CO_2 produced during the preliminary treatment of sour gas in the upstream phase; second, the CO_2 emitted by gas turbines that generate power for the liquefaction process; and third, the CO_2 released during the generation of electricity for the operation of the remaining facilities.

An additional method to reduce carbon emissions involves capturing and storing CO_2 during the natural gas liquefaction process. For instance, Hammerfest LNG in Norway introduced an all-electric approach, a concept also utilised by Freeport LNG. This approach involves using electric motors to power the liquefaction compressors. These facilities can also be connected to the local power grid, which includes a proportion of renewable energy in its supply mix. This integration can lead to a significant reduction in emissions, depending on the energy mix that powers the motors. Other methods include installing an acid gas removal unit (AGRU), which captures CO_2 along with various sulphur-containing gases from the feed.

CCS is frequently mentioned as a solution within the LNG industry. CCS deployment primarily focuses on two distinct areas: extracting CO_2 from reservoirs (as demonstrated by the Hammerfest LNG project) and capturing CO_2 after combustion. The cost of capturing CO_2 after combustion is higher, but it can be economically beneficial for newly constructed liquefaction plants due to the synergy between design and location. Venture Global is advancing CCS solutions at its LNG plants, including Plaquemines LNG and Calcasieu Pass LNG, both in the US, with the objective of capturing and sequestering approximately 500,000 tonnes of carbon annually. As global investments in liquefaction capacity grow and expand, the importance of optimising the choice of liquefaction process intensifies. With governments and businesses committed to reducing carbon emissions, selecting a versatile and cost-efficient liquefaction technology that complies with stricter emission regulations will be a critical consideration for new projects.

Figure 5.9: Share of installed and future approved liquefaction capacity by technology and start-up year



Source: Rystad Energy

Courtesy Hanwha Ocean

5.5 FLOATING LIQUEFACTION (LNG-FPSOS)

14.4 MTPA

Operational Floating Liquefaction Capacity Worldwide as of end of December 2024

There are currently eight operational FLNG units globally as of the end of January 2025. GTA project in Mauritania and Senegal is the latest FLNG to begin operations, starting up in January 2025 with a capacity of 2.5 MTPA.

The Petronas FLNG Satu, constructed by the South Korean entity Daewoo Shipbuilding & Marine Engineering (now called Hanwha Ocean), was the world's first FLNG facility, with a design capacity of 1.2 MTPA. This facility, having transited from the Kanowit gas field off Sarawak, East Malaysia in 2019, is now located at the Kebabangan field off Sabah, East Malaysia. The Petronas FLNG Rotan, the subsequent FLNG project for Petronas, was built by Samsung Heavy Industries of South Korea and features an enhanced design capacity of 1.5 MTPA.

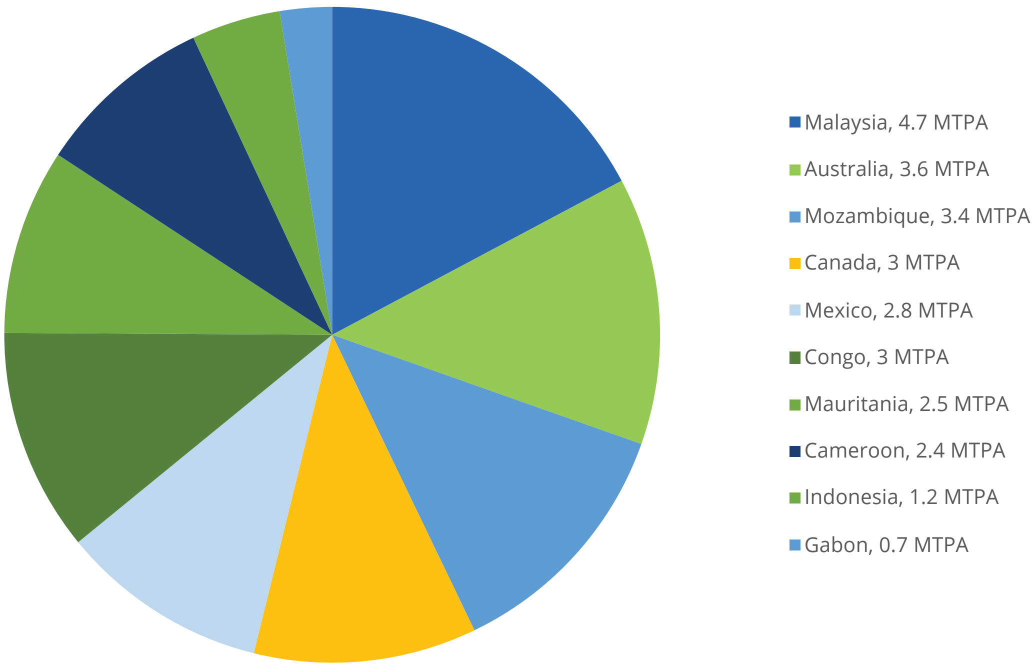
The Cameroon FLNG Terminal is located off the coast of Kribi, in the Océan Department of Cameroon, with a capacity of 2.4 MTPA. In February 2023, New Fortress Energy agreed to sell its entire interest in the project to Golar LNG.

Prelude FLNG off Western Australia, constructed by Samsung Heavy Industries, has a design capacity of 3.6 MTPA. In 2022, the facility's output significantly underperformed relative to its capacity, initially attributed to a four-month maintenance shutdown from December 2021 to early April 2022, which was prompted by a fire incident. This underperformance persisted throughout 2023. In May 2023, the Shell-managed facility temporarily halted production due to technical issues. However, in 2024, the facility started operating at close-to-capacity levels.

The Coral South FLNG terminal, also known as Coral Sul FLNG, is located in the Rovuma Basin off the coast of Cabo Delgado province, Mozambique, with a design capacity of 3.4 MTPA. In October 2022, the floating terminal commenced operations. This project is associated with the primary coral reservoir in the offshore Rovuma Basin and represents the first floating LNG facility to become operational in the deepwater offshore region of Africa.

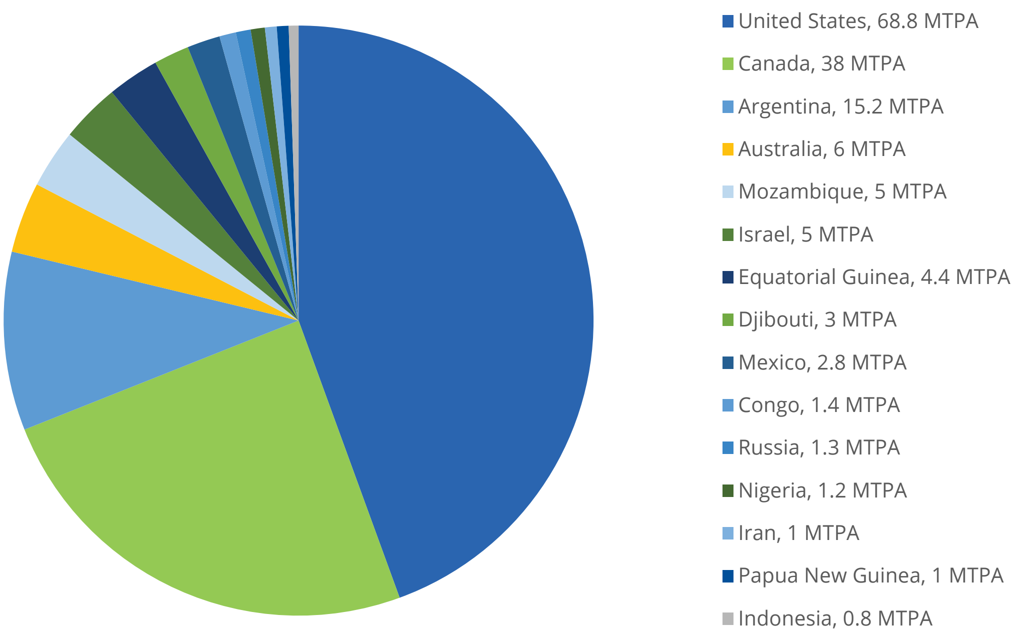
The Congo FLNG terminal, operated by Eni Congo, is located in the Marine XII Block, 20 kilometres offshore of Congo. In August 2022, Eni announced the purchase of the Tango FLNG vessel previously owned by Exmar, which has a liquefaction capacity of over 0.6 MTPA. In 2023, Eni signed a contract with China's Wison Heavy Industries to construct and install a FLNG plant with a capacity of 2.4 MTPA, marking the second FLNG project deployed in Congo. The overall LNG production capacity of Marine XII is anticipated to reach 3 MTPA by 2025. In December 2023, Eni initiated gas introduction into the Congo FLNG Terminal (Ex-Tango FLNG), achieving a record time for gas introduction following the FID.

Figure 5.10: Global operational and approved FLNG liquefaction capacity, end-2024



Source: Rystad Energy

Figure 5.11: Global proposed FLNG liquefaction capacity, end-2024



Source: Rystad Energy

The New Fortress Altamira FLNG terminal, known as Altamira Fast LNG, is an FLNG export facility in Mexico. In July 2022, New Fortress Energy (NFE) formed a partnership with Mexico's Comision Federal de Electricidad (CFE) to undertake various gas projects, which include the development of an FLNG hub off the coast of Altamira. This hub is to be co-located with the existing Altamira LNG import terminal. The feedgas for the facility will be supplied from CFE's current pipeline network. NFE plans to deploy several FLNG units within this hub, each with a capacity of 1.4 MTPA. These units will utilise NFE's 'Fast LNG' design, which incorporates modular, midsize liquefaction technology and offshore infrastructure similar to jackup rigs. Commercial operations started in August 2024.

The GTA FLNG terminal, also known as GTA LNG, is an FLNG terminal situated at the maritime boundary between Senegal and Mauritania, with a design capacity of 2.5 MTPA. FID for Phase 1 was taken in December 2018. Initially, first gas was expected in 2022, but due to the Covid-19 pandemic, bp announced a one-year delay, pushing the delivery to 2023. In 2023, the floating production storage and offloading (FPSO) vessel departed from the Qidong shipyard in China, while the Gimi FLNG vessel was under construction at Singapore's Keppel Shipyard. By January 2024, the FLNG Gimi arrived at the project site. However, delays occurred due to technical issues with the FPSO vessel. Finally, in January 2025, bp achieved first gas flow at GTA.

There is currently 154.84 MTPA of aspirational liquefaction capacity proposed as FLNG developments as of the end of 2024, of which 109.6 MTPA is in North America.

In the US, the proposed Delfin FLNG project is set to consist of four floating liquefaction vessels. FID on the first vessel was expected to be made in 2024, as the project was the first US FLNG project to receive regulatory approval. However, it requested several extensions to its construction completion deadline. In July 2022, FERC in the US granted Delfin another year-long extension to put its project into service by September 2023. Despite signing multiple offtake agreements that surpassed the contractual threshold for an FID on the first vessel, the project's progress stalled after the US Maritime Administration rejected Delfin FLNG's p ermit a pplication i n 2 024, requesting resubmission. Nevertheless, the new Trump administration has directed the federal agency responsible for reviewing offshore LNG export projects to accelerate permitting as of recently. This could have ripple effect for the remaining FLNG projects in the US – such as Point Comfort FLNG, Main Pass Energy Hub FLNG and Cambridge Energy FLNG – which all have been progressing at a slow pace for years. Among the few projects that reached FID in 2024, the Cedar FLNG project in Canada (3 MTPA), stands out as a floating facility. In regions where environmental interventions are typically met with scepticism, FLNG has emerged as a valuable solution, offering a viable alternative to traditional onshore developments while minimising ecological impact.

Two out of the four approved projects in 2024 were FLNG projects. In Asia, Genting handed out a $1 billion contact to Wison New Energies to build the first FLNG project in Indonesia, with feed gas to be supplied from the Kasuri Block in West Papua. The anticipated sailaway date from the shipyard in China is during the second quarter of 2026.

In Africa, the proposed capacity currently for FLNG projects in the region is 13.5 MTPA. This includes Coral North FLNG (3.5 MTPA) in Mozambique, Djibouti FLNG (3 MTPA), Fortuna FLNG (4.4 MTPA) in Equatorial Guinea, and UTM Offshore FLNG (1.2 MTPA) in Nigeria. Among them, the Coral North FLNG project was expected to be approved in 2024. Now, FID is most likely to take place in 2025. In Asia Pacific, the Middle East, South America, and Russia, some 30.3 MTPA of FLNG liquefaction capacity has been proposed.

There have been significant developments in floating liquefaction technology in recent years, primarily in the design of FLNG units. Rapid innovation has meant the cost of expensive, first-generation, highly bespoke FLNG units built by Shell, Petronas and Eni has been greatly reduced in second-generation FLNGs, commonly referred to as standardised FLNG units. Keppel Shipyard and Black & Veatch (B&V) first introduced the concept by converting the Moss-design LNG carrier Hilli into an FLNG retrofitted with B&V's PRICO liquefaction technology. Over the years, SBM Offshore has also patented its FLNG conversion solution, the TwinHull FLNG concept, which maximises efficiency and cost savings to optimise offshore gas fields. This design comprises two LNG tankers converted into a single integrated hull, allowing for greater storage capacity and optimisation of deck space. While these newer vessels are typically not as 'customised' with regards to the targeted field, they have greater flexibility in deployment and reduced lead times combined with significant cost savings. Given their suitability for smaller, remote offshore gas fields, FLNG units can offer advantages over onshore projects, which can face land constraints and environmental challenges. They can even serve as a stopgap solution for larger fields until onshore liquefaction trains come online.

5.6 RISKS TO PROJECT DEVELOPMENT

Market balances

Market balances are the foundations of any market. For LNG buildouts to be viable, they require a favourable demand outlook, with future prices providing the necessary support to push projects into favourable net present values (NPV). New projects typically have a lead time of around three to six years between FID and commercial operations. Overall, this results in a relatively stable and predictable supply side. Forecasting the demand side is harder. Geopolitics has entered an era of unprecedented volatility. The emergence of sanctions, trade wars and conflicts can have a profound impact on the market, often manifesting as 'black swan' events that inject sudden and unforeseen chaos into the global economy. Due to LNG demand in Europe, Asia and Asia Pacific, markets are expected to stay tight in the near term. The mild winter of 2023 serves as an example of the potential for subdued demand in the market. In Europe, the interplay between Russian piped gas supplies, storage refill targets and weather conditions plays a crucial role in determining prices, highlighting the complex dynamics at play. In Asia and Asia Pacific, the key drivers of demand are a complex interplay of trading politics, weather patterns, and industrial growth – all risks that are hard to quantify when deciding demand before an FID.

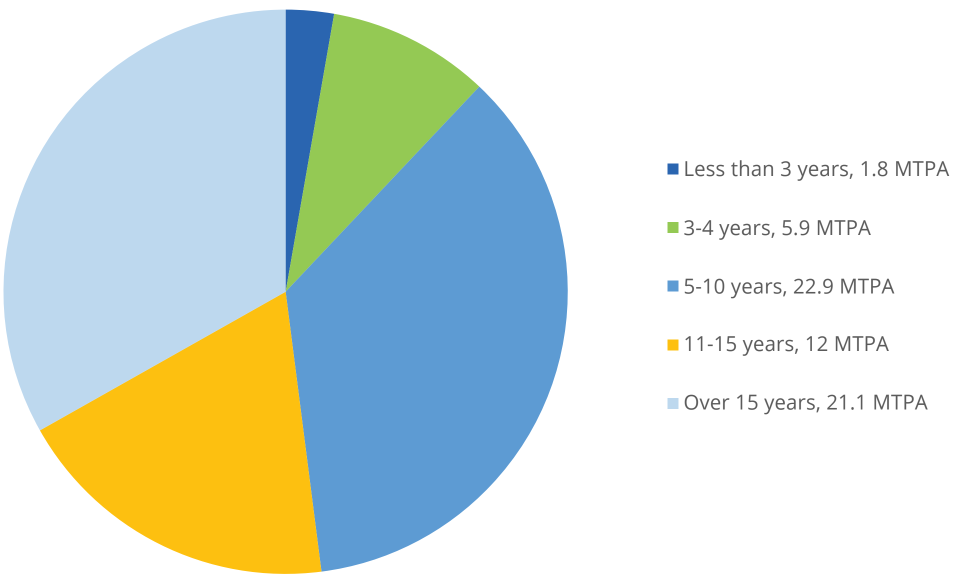
Supply and demand risks

More than three years have passed since war broke out in Ukraine, with Europe continuing to depend significantly on LNG imports to replace reduced Russian pipeline gas flow. Ukraine did not extend the Russian gas transit agreement, causing volumes through Ukraine to stop January 1, 2025. The colder winter of 2024/2025 and less piped gas have depleted storage levels to slightly above 40% as of mid-February 2025. The Title Transfer Facility (TTF) forward curve is experiencing an unusual backwardation in the first quarter of 2025 – where the spot price is higher than the forward price – due to current storage targets, which are supporting higher prices for the summer months while pressuring prices lower for the winter months. Revisions to storage targets or incentives to increase storage fill rates will impact the curve. Nevertheless, the need for new LNG supplies persists, as the war has disrupted not only future Russian LNG developments but also existing supplies, with Western companies exiting Russian ventures due to sanctions. As European winter demand eased in 2022/2023 and 2023/2024, LNG prices became more attractive to Asian buyers, particularly price-sensitive Chinese and Indian companies, which seized the opportunity to purchase excess volumes, while Japan and South Korea kept facing high inventory levels. Sustained low prices could spark a surge in LNG demand, but the outlook is clouded by the risk of delays in new supply and expansion projects. In Asia, most of the demand risk lies in India's and China's energy mix and economic outlooks.

Contracting trend

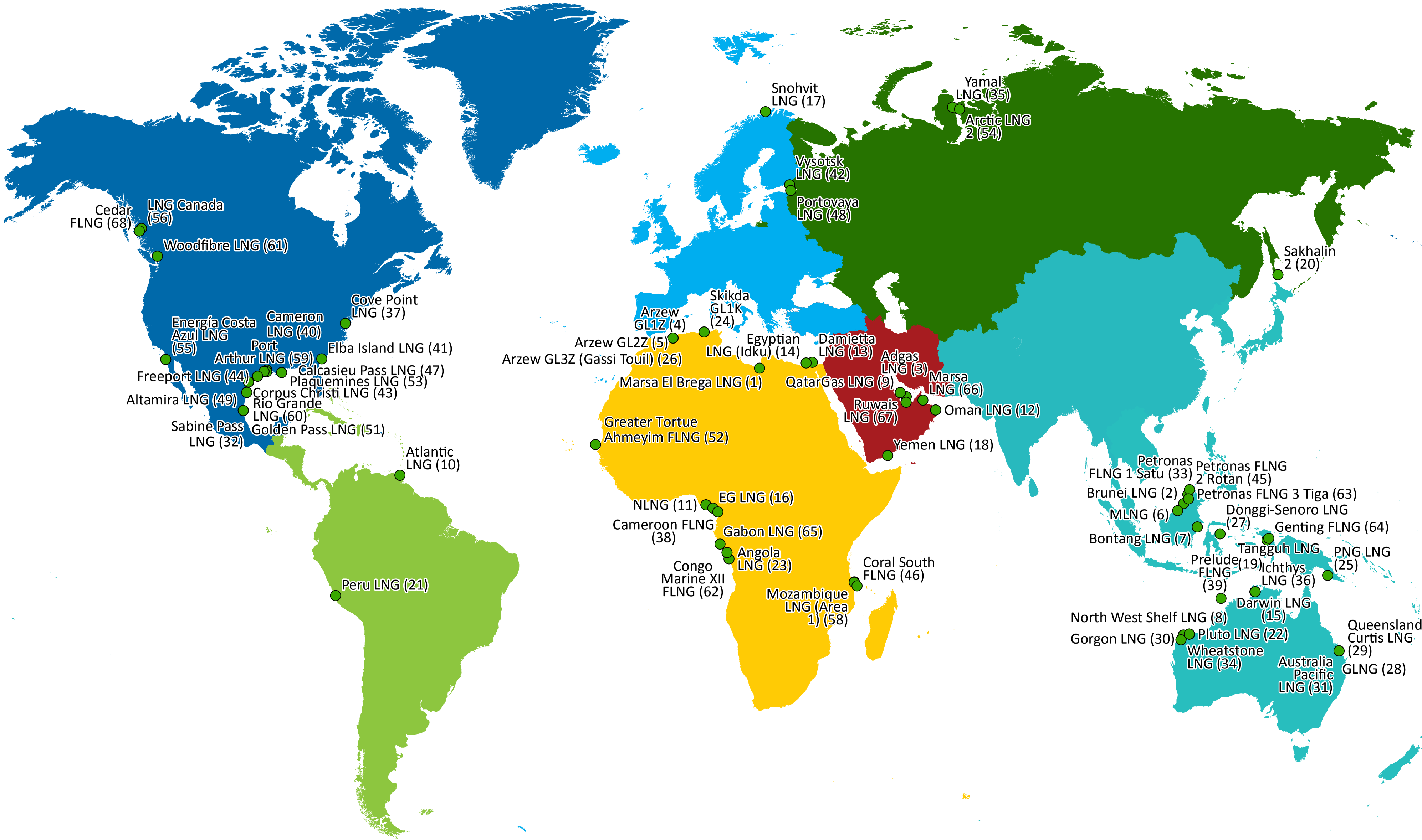
Monitoring LNG contracting activity is key to assessing upcoming LNG project approvals. Project financing is highly dependent on firm offtake deals for future supplies due to the multi-billion-dollar investments needed to move projects forward. The energy crisis has put security of supply back on the agenda, driving increased appetite for long-term LNG contracts in contrast to relying on spot market supply. In 2024, over 63 MTPA of LNG contracts were concluded. That is very similar to 2023 (62.5 MTPA), but remarkably lower than 2022 and 2021. Of the contracts concluded in 2024, 33% of the volume has a duration of over 15 years and around 52% is at or above 15 years, signaling a long-term commitment to LNG from buyers. Among the deals signed in 2024, markets in Asia and Asia Pacific - driven by China and South Korea - along with some Western European markets and LNG aggregators, dominate as offtakers. Notably, Qatar accounts for the largest contracted volume in 2024, followed by the US. Aggregators also make up a significant amount of the volumes. They play an important role as they support LNG project development by building up global LNG portfolios, which in turn generate future LNG demand through increased availability of supplies. This is particularly important when building new markets for LNG imports, which may not yet be ready to commit to gas and LNG through long-term contracts.

Figure 5.12: Global Sales and Purchase Agreement (SPA) duration signed between 1 January 2024 and 31 December 2024



Source: Rystad Energy

Figure 5.13: Global operational liquefaction plants and FID liquefaction plants expected to commission by 2029, end-2024



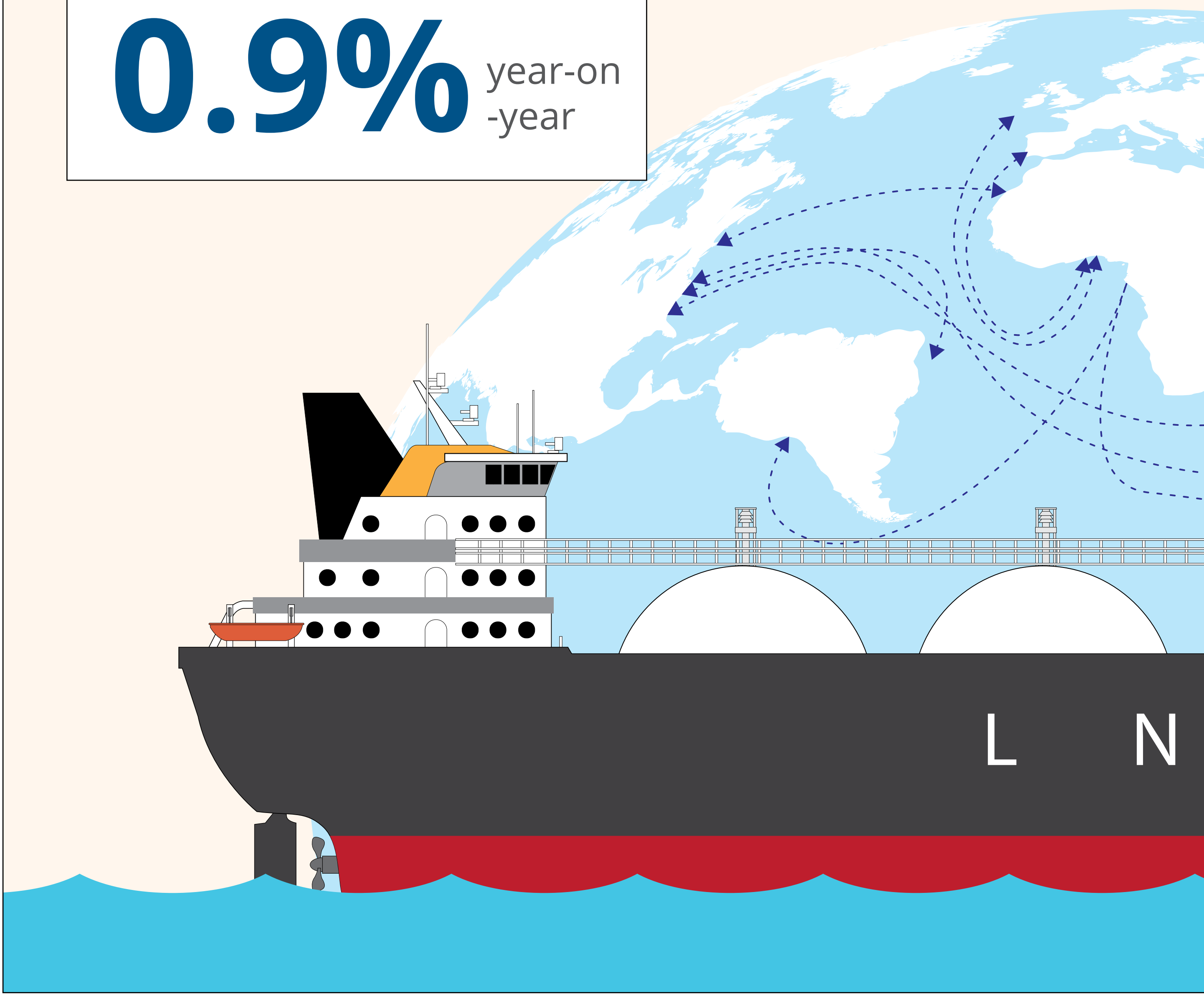
Note:
1. Numbers in parentheses behind project names refer to Appendix 1: Table of Global Liquefaction Plants and Appendix 2: Table of Global Liquefaction Plants Approved or Under Construction

Source: Rystad Energy

6 LNG Shipping

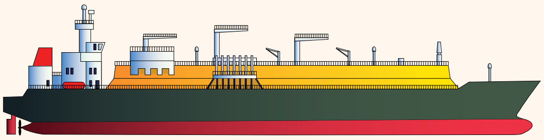
The global LNG fleet grew by **7.5% year-on-year** in 2024.

7,065
trade voyages, an increase of
0.9% year-on-year

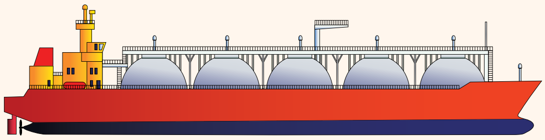


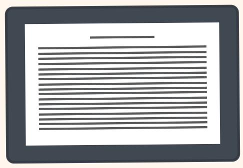
[1] During 2024
[2] Under construction vessels

742 active vessels / **64** new vessels[1]



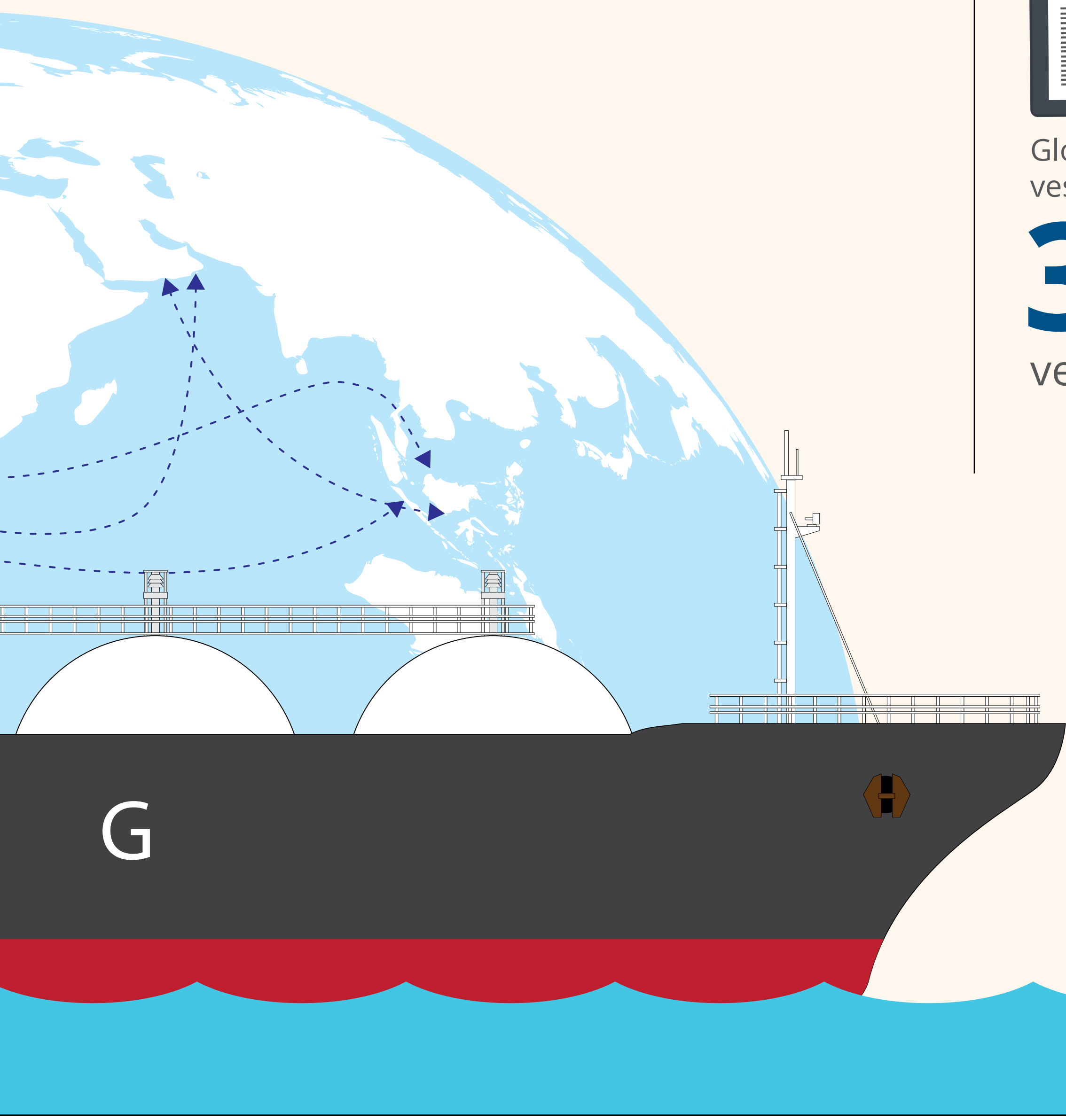
Including **48** FSRUs / **10** FSUs





Global LNG vessel orderbook[2]:

337 vessels



6. LNG Shipping

In 2024, the global LNG vessel fleet grew to 742 active vessels[3], including 48 operational FSRUs and 10 FSUs, following the delivery of 64 vessels throughout the year. This represents a 7.5% increase in the fleet size from 2023 to 2024, however, the number of LNG voyages only grew 0.9%. This rapid expansion of active LNG carriers relative to LNG trade growth pushed the shipping market into oversupply. Newer vessels represent a step-increase in efficiency, emissions performance, and project economics over the older fleet that will be retired in coming years due to commercial and regulatory pressures.

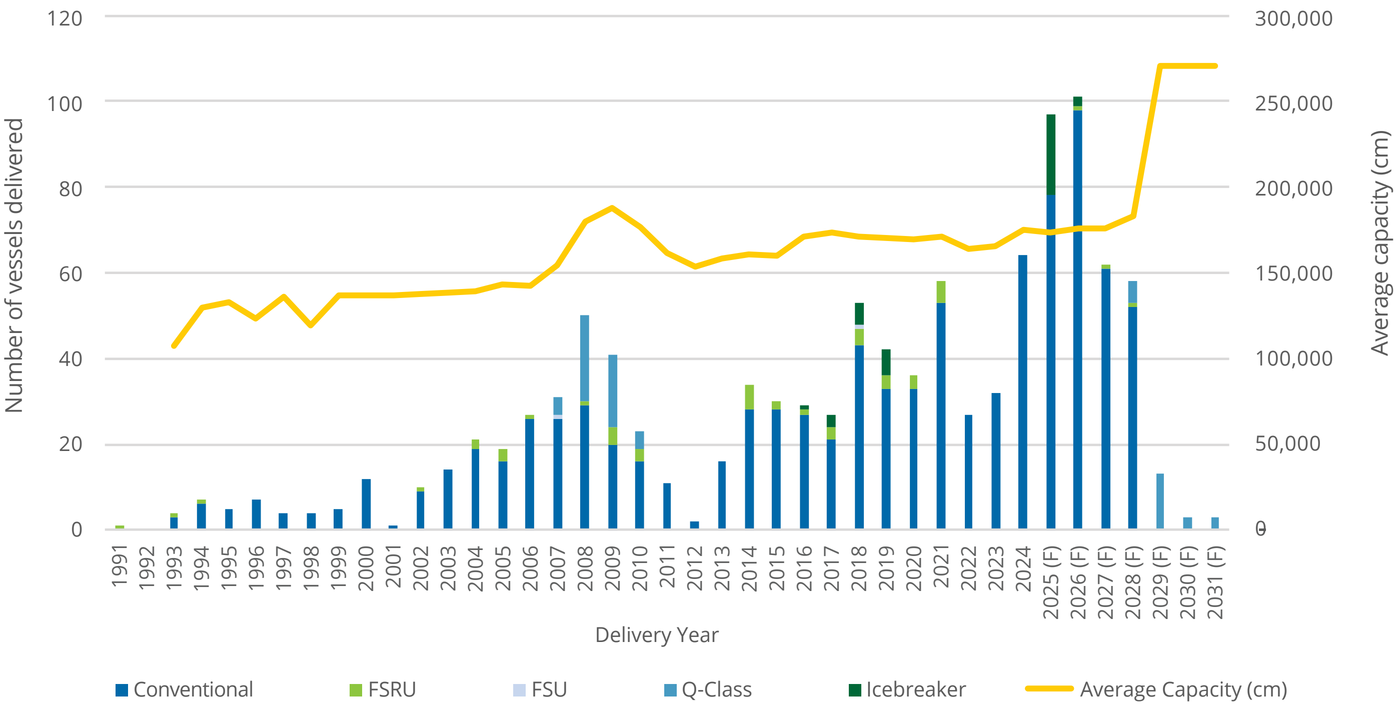
Courtesy Hanwha Ocean

[3] This section of the report only considers vessels with capacity of 30,000 cubic metres or more.


ام سويية
UMM SWAYYAH

6.1 OVERVIEW

Figure 6.1: Global active LNG fleet and orderbook by delivery year and average capacity, 1991-2031



Source: Rystad Energy

337 LNG Vessels

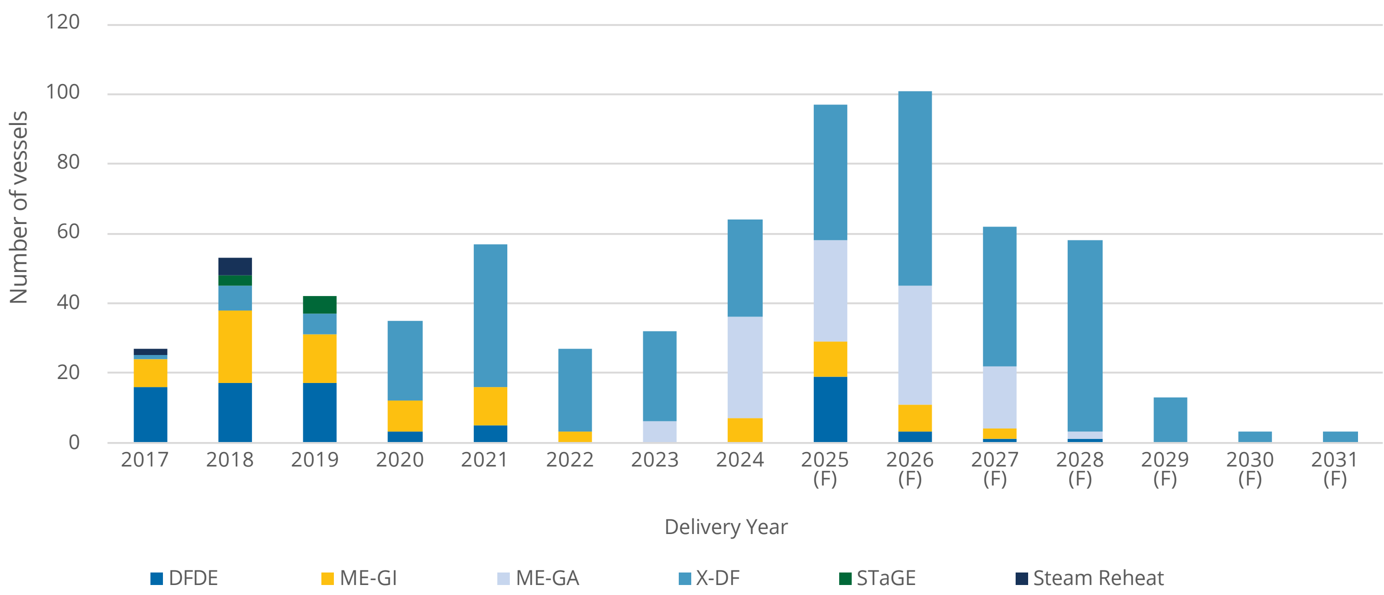
Under construction as of end-2024

Of the 64 newbuilds delivered in 2024, all have a capacity of between 174,000 and 200,000 cm. Vessels of this size remain within the upper limit of the Panama Canal's capacity following its expansion in 2016. They also benefit from economies of scale, particularly as additional LNG capacity is developed in the US Gulf Coast (USGC) for long-haul delivery to Asia. QatarEnergy LNG remains at the forefront of rising vessel capacities, ordering 24 new 271,000 cm (QC-max) vessels from Hudong-Zhonghua Shipbuilding for delivery between 2028 and 2031. These vessels are slightly larger than the 45 Qatari Q-Class newbuilds of over 200,000 cm delivered between 2007 and 2010. However, moving forward, 200,000 cm vessels, or larger, could find favour due to their economies of scale for long-haul voyages, especially for long-term charters, if some flexibility is maintained (Panama Canal, terminal compatibility, etc). The current orderbook for such ships comprises 37 vessels, each with a capacity of either 200,000 cm or 271,000 cm, scheduled for delivery between 2025 and 2031.

The global LNG orderbook had 337 newbuild vessels under construction at the end of 2024, equivalent to 45.4% of the current active fleet, with deliveries stretching into 2031. This illustrates shipowners' expectations that LNG trade will continue to grow in line with scheduled increases in liquefaction capacity, particularly from the US and Qatar, and fleet renewal demand from oncoming retirements of older, more inefficient vessels. An expected 97 carriers are scheduled to be delivered in 2025. The orderbook includes 21 icebreaker-class vessels for the Arctic LNG 2 project in Russia. These vessels are highly innovative and require high capital expenditure (CAPEX) which grants them the capability to traverse the Arctic region. Due to the Russia-Ukraine conflict, these vessels have faced a risk of delayed deliveries or cancellations due to international sanctions on Russia that have complicated equipment delivery and payments.

The first icebreaker-class LNG carrier, Aleksey Kosygin, built by Zvezda Shipyard for the Arctic LNG 2 project, left the shipyard for sea trials on 25 December, 2024. It is the first large LNG carrier to be completed and built by a Russian shipyard. After the sea trials, it is expected to enter operation in 2025. The more challenging part of the construction of the Aleksey Kosygin was mainly undertaken by Samsung Heavy Industries of South Korea. The second ship in the series, Pyotr Stolypin, is also nearly complete and is expected to conduct sea trials in the coming months. However, due to evolving sanctions risks, their timeline to enter commercial service remains unclear.

Figure 6.2: Historical and future vessel deliveries by propulsion type, 2017-2031



Source: Rystad Energy

In 2020, more low-pressure, slow-speed, dual-fuel WinGD (X-DF) systems were delivered than any other type, while 2023 was the first year in which a vessel with the Man B&W M-type, Electronically Controlled, Gas Admission (ME-GA) engine was delivered. Capitalising on improved fuel efficiencies and lower emissions, X-DF systems will still be one of the main choices, with 209 systems on order as of the end of 2024. The efficient new generation M-type, electronically controlled gas admission (ME-GA) system was expected to compete with the X-DF technology for newbuilds. However, in October 2024, Man B&W announced that it would no longer manufacture the ME-GA engine due to tightening IMO regulations regarding nitrogen oxide (NOx) emissions expected to come into force in 2027. As a result, the orderbook has become heavily weighted towards the WinGD's X-DF system, and future orders will rely mainly on X-DF. In addition, there are 21 M-type, Electronically Controlled, Gas Injection (ME-GI) system vessels under construction. The ME-GI, ME-GA, and X-DF systems represent a significant shift in favour of efficiency, economies of scale, and environmental performance, compared to the popular propulsion systems of the previous generation – steam turbine, dual-fuel diesel-electric (DFDE), and tri-fuel diesel electric (TFDE). Nevertheless, new proposals are being launched based on other internal combustion engines or power technologies.

As more oil-based fuels, including biofuels, become an option for these systems, the industry increasingly brackets them into a single category – DFDE – now representing the 'dual' fuels of LNG and oil-based fuels. From this section onward, this report will refer to them as DFDE.

South Korean shipbuilders HD Hyundai Heavy Industries Shipbuilding Group, Samsung Heavy Industries, and Hanwha Ocean remain the top three LNG carrier builders, although China's Hudong-Zhonghua has gained prominence in recent years. Chinese yards Jiangnan, Dalian Shipbuilding, Yangzijiang, and China Merchants Heavy Industry have also forayed into the lucrative market for conventional LNG carrier construction. Their business case has been bolstered by high newbuild prices and capacity constraints at South Korean yards. The latter four have a combined orderbook of 32 vessels to be delivered before the end of 2028.

In 2024, the large number of LNG vessel deliveries, combined with minimal LNG production growth, led to an oversupplied shipping market, causing spot charter rates to sink to historic lows. Peak charter rates were achieved at the start of 2024 as the market rolled over from winter, followed by another localised peak across July-August, when two-stroke vessels (west of Suez) fetched up to $94,000 per day. By December, however, this declined to just over $20,000 per day, barely covering the vessel's operating costs.

In total, 7,065 LNG trade voyages were undertaken in 2024, a 0.9% increase from the 7,004 seen in 2023. This is in line with minimal growth in LNG production. While Asia remains the dominant demand centre with 4,609 trade voyages, European trade voyages declined by 13% to 1,929 in 2024 due to weak market fundamentals through most of 2024, with Europe importing just over 100 MT.

Courtesy Osaka Gas

6.2
LNG CARRIERS

Vessel Age and Capacity

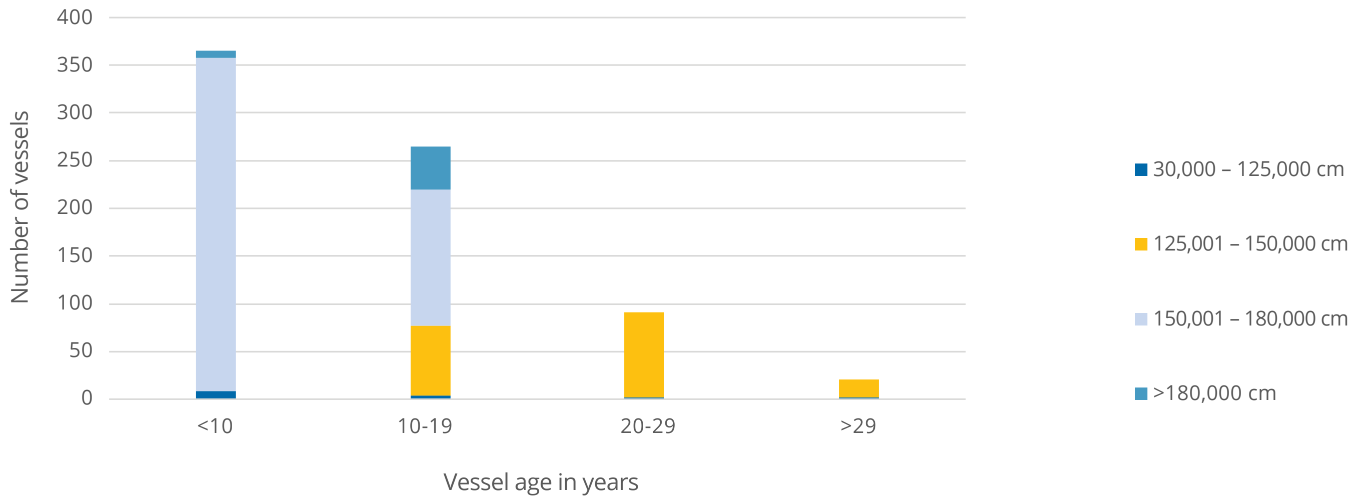
The current global LNG fleet is relatively young, considering the oldest operational LNG carrier was constructed in 1977. As of the end of 2024, some 84.9% of the fleet is under 20 years of age, consistent with the rapid growth of liquefaction capacity since the turn of the century. Additionally, newer vessels are larger and more efficient, with superior project economics and emissions performance over their operational lifetime.

Historically, shipowners operated vessels for 35 to 40 years before laying them up. However, upcoming emissions reduction regulations – most notably the IMO's Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII), as well as the more recent EU Emissions Trading System (ETS) and FuelEU – could shorten the lifespan of some older vessels or incentivise retrofits and conversions. Due to the rapid advancement of technology and emissions regulations, vessel lifespans have become shorter. As of the end of 2024, vessels were being scrapped after less than 25 years in service.

At the end of its operating life, a decision can be made on whether to scrap a carrier, convert it to an Floating Storage Unit (FSU) or Floating Storage and Regasification Unit (FSRU), or return it to operation should market conditions improve materially.

When commissioning a newbuild, a shipowner determines vessel capacity based on individual needs, ongoing market trends, technologies available at the time, and increasingly, with a view to future environmental regulations and demand for LNG. The flexibility of LNG carrier designs to implement new technologies or solutions is also key, with shipowners demanding future-proof concepts that can be easily retrofitted or upgraded when required. Liquefaction and regasification plants also have berthing capacity limits, while certain trade-lanes may impose restrictions on vessel dimensions. These factors are important when considering ship dimensions and compatibility. The needs of individual shipowners are also affected by market demand, meaning newbuild vessel capacities have stayed primarily within a small range in different periods, as illustrated in Figure 6.3.

Figure 6.3: Fleet capacity by vessel age, end-2024



Source: Rystad Energy

Due to the early dominance of steam turbine propulsion, vessels delivered before the mid-2000s were exclusively smaller than 150,000 cm as this was the range best suited for steam turbine propulsion systems, many of them equipped with Moss-type cargo tanks. The LNG carrier landscape changed dramatically when Qatari shipping line Nakilat introduced the Q-Flex (210,000 to 217,000 cm) and Q-Max (263,000 to 266,000 cm) vessels, specifically targeting large shipments of LNG to Asia and Europe. These vessels achieved greater economies of scale with their slow speed diesel with re-liquefaction plant (SSDR) propulsion systems, representing the 45 largest LNG carriers ever built. However, they will be surpassed by QatarEnergy LNG's next-generation 271,000 cm orders for its North Field Expansion projects, which will be equipped with modern propulsion technologies.

Most newbuilds have settled at a size between 174,000 and 180,000 cm. This capacity range now makes up 33.6% of the current fleet. The adoption of this size has been driven by technological advancements, particularly two-stroke dual-fuel propulsion systems that maximise fuel efficiency within this range.

Another crucial factor is the Panama Canal size limit. New locks, introduced as part of the 2016 expansion, allowed for larger vessels, a key development for ships engaged in trade involving US LNG supply. In May 2019, the Q-Flex LNG carrier Al Safliya, which is larger than 200,000 cm, became the first Q-Flex type LNG vessel and the largest LNG carrier by cargo capacity to transit the Panama Canal.

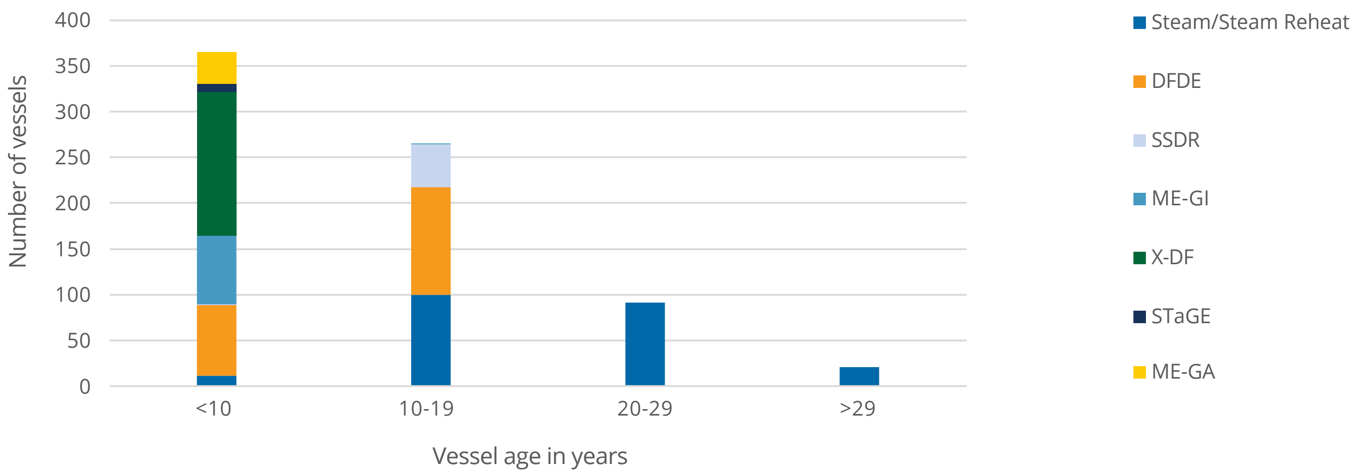
While 174,000 cm remains the most common newbuild size, larger ships have once again gathered interest from shipowners. Currently, 13 vessels with a 200,000 cm capacity are on order, all of which are capable of passing through the new Panama Canal locks. With further improved two-stroke propulsion solutions, such as the second-generation X-DF and ME-GA systems, 200,000 cm carriers could become a popular choice from an efficiency standpoint. However, other aspects, such as flexibility and terminal compatibility, must also be considered. As of the end of 2024, 24 carriers with a 271,000 cm capacity were also on order at Hudong-Zhonghua.

The technical annex, on page number 108, provides more details about containment systems and propulsion systems.

Fleet propulsion system breakdown by vessel age

Steam turbine systems make up the majority of older vessels, with DFDE and SSDR representing 43.5% of vessels aged over 10 years. As almost all the SSDR vessels comprise Qatari Q-Class ships, the age range is in line with when they were delivered. With one exception, the entirety of ME-GI, ME-GA, X-DF, and STaGE vessels are new due to the recent nature of these innovations. The orderbook shows that both generations of X-DF systems will make up a significant portion of delivered vessels until 2026, after which ME-GI and X-DF systems are expected to compete.

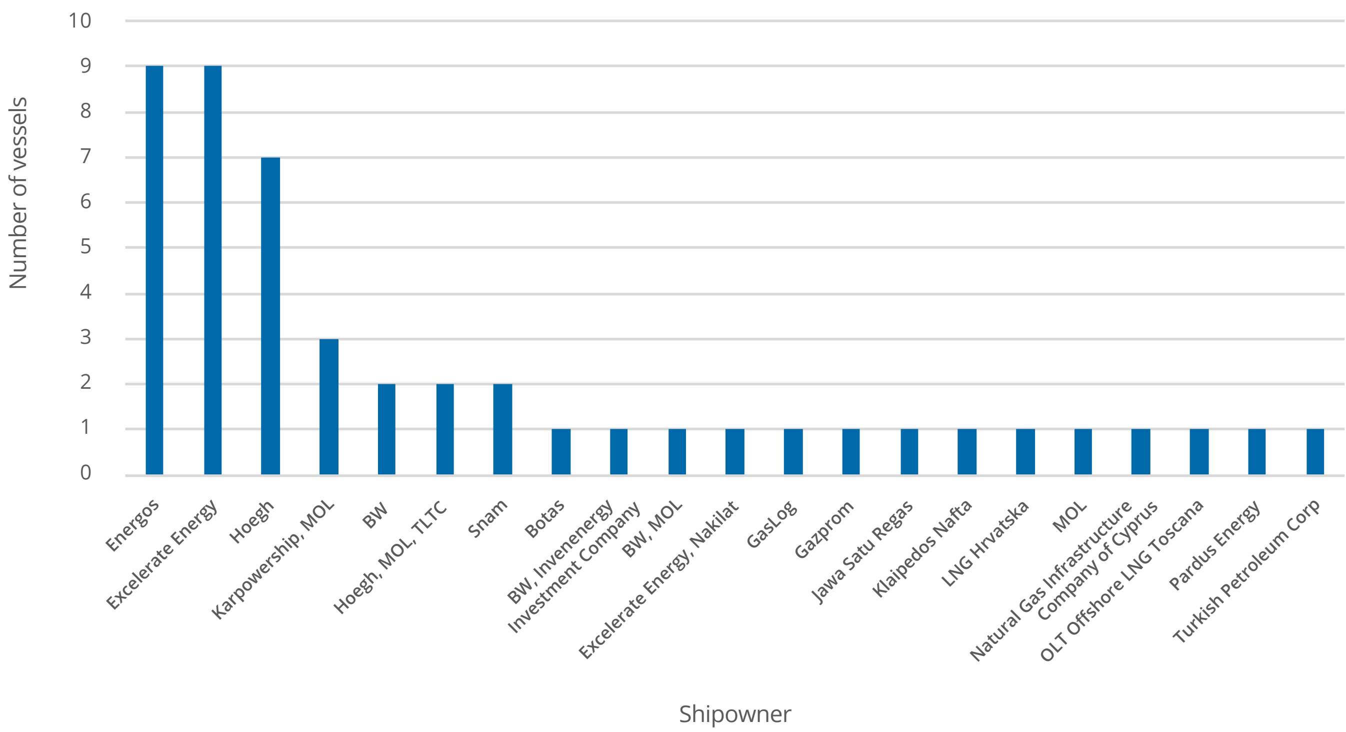
Figure 6.4: Fleet propulsion type by vessel age, end-2024



Source: Rystad Energy

6.3
FLOATING STORAGE AND REGASIFICATION UNIT (FSRU) OWNERSHIP

Figure 6.5: FSRU fleet by shipowner, end-2024



Source: Rystad Energy

FSRUs are used for LNG storage and regasification in addition to being regular LNG carriers, except for a few examples of non-propelled units. Compared to traditional onshore regasification plants, FSRUs offer better flexibility, lower capital outlay, and speed to market. A total of 48 FSRUs make up 6.5% of the active global LNG fleet. Shipowners Excelerate Energy, Hoegh, Energos (a joint venture of Apollo Funds and New Fortress Energy), Karpowership and BW continue to operate the largest fleets of active FSRUs, with Energos having taken over New Fortress Energy's fleet. Currently, one newbuild FSRU is under construction for Excelerate, two more are on order for MOL, while multiple older LNG carriers are being considered for conversion to FSRUs.

With the ability to import LNG via a 'plug-and-play' solution, FSRUs offer the flexibility of meeting demand as and where it is needed before being redeployed elsewhere. FSRUs are also deployed offshore, offering an advantage in land-scarce regions or remote areas.

Capital expenditure of an FSRU can be as little as half that of an onshore terminal, while installation in regions with existing infrastructure can happen in months, though this is offset by higher operating expenditure. FSRUs can be newbuilds or conversions from existing LNG carriers. Newbuild FSRUs offer design flexibility and a wider range of outfitting options but are higher in cost and take longer to build.

However, delivery delays, power cuts, and rising costs have affected certain projects in the past, slightly dampening demand for the vessel type. In addition, spikes in LNG transportation charter rates can motivate shipowners to use the ships as LNG carriers, reducing the number of FSRUs operating as regasification or storage units. As of the end of 2024, the orderbook included three FSRU newbuilds, one of which is set to be delivered in 2026 for Excelerate Energy, another is scheduled to be completed in 2027 and will be managed by MOL for Poland's Gdansk project, and a third one is expected by 2028 for MOL for Singapore. Two FSRUS are being built by HD Hyundai Heavy Industries Group and one by Hanwha Ocean. There is limited capacity to order FSRU newbuilds as most shipyards are focused on constructing the fleet of standard LNG carriers required for a wave of project capacity additions from 2026 to 2028.

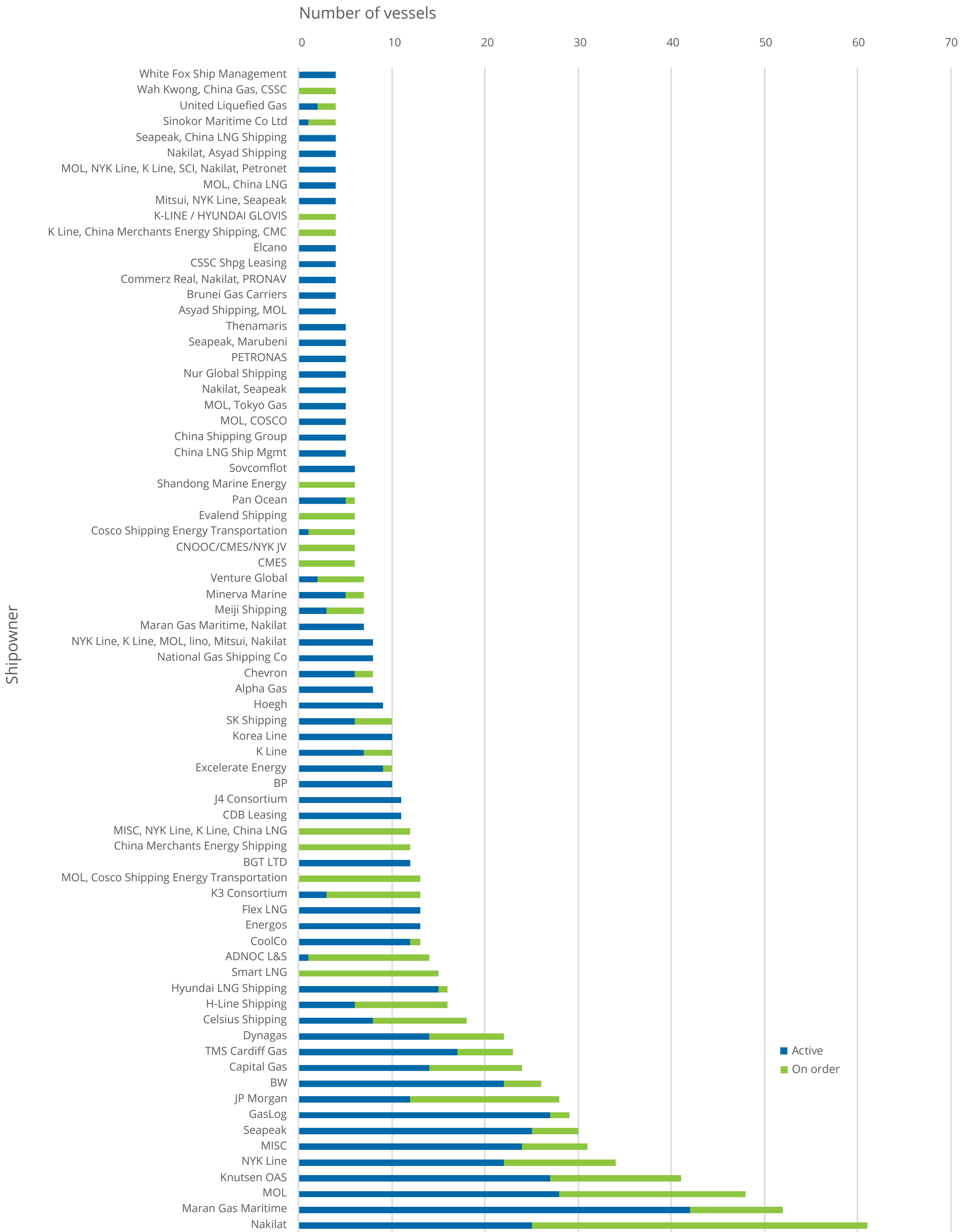
The flexibility of FSRUs has proven useful for markets with changing natural gas needs. FSRUs are expected to remain a popular storage and regasification solution for years to come. The Russia-Ukraine conflict has piqued FSRU interest across Europe, with their speed-to-market advantage helping alleviate the supply crunch and reduce dependence on Russian piped gas. FSRU charter rates, which were languishing at sub-$100,000-per-day levels in 2021, quickly surged to around $200,000 per day for vessels deployed to Germany in 2022.

Courtesy HD Hyundai Heavy Industries

6.4
LNG ORDERBOOK

Figure 6.6: Global fleet and orderbook by shipowner, end-2024[4]

Source: Rystad Energy

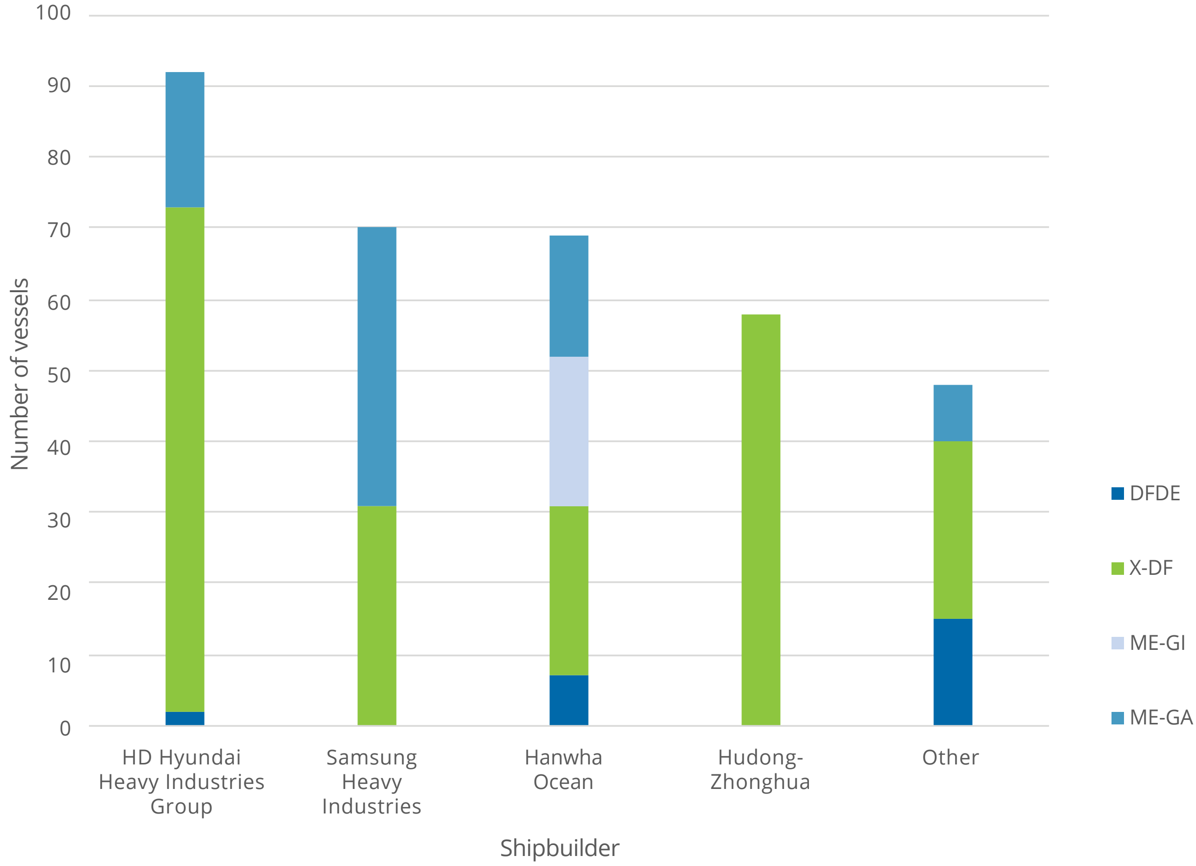


[4] Shipowners or consortiums with four or more total vessels included.

97 LNG vessels
scheduled for delivery in 2025

Of the 337 vessels under construction at the end of 2024, 97 are scheduled for delivery in 2025, followed by 101 in 2026, 62 in 2027, 58 in 2028, 13 in 2029, and three each in 2030 and 2031. Newbuild demand is being driven by large projects under discussion, such as those with QatarEnergy LNG, and the ongoing wave of US LNG development, where shipping is critical to maximise flexibility. Additionally, fleet renewal is becoming necessary as the IMO's EEXI and CII rules have been in effect since 2023. As of 2024, shipping is also included in the EU ETS, and from 2025, the FuelEU regulation will also impact ships calling at EU ports.

Figure 6.7: Newbuild orderbook by propulsion type and shipbuilder, end-2024



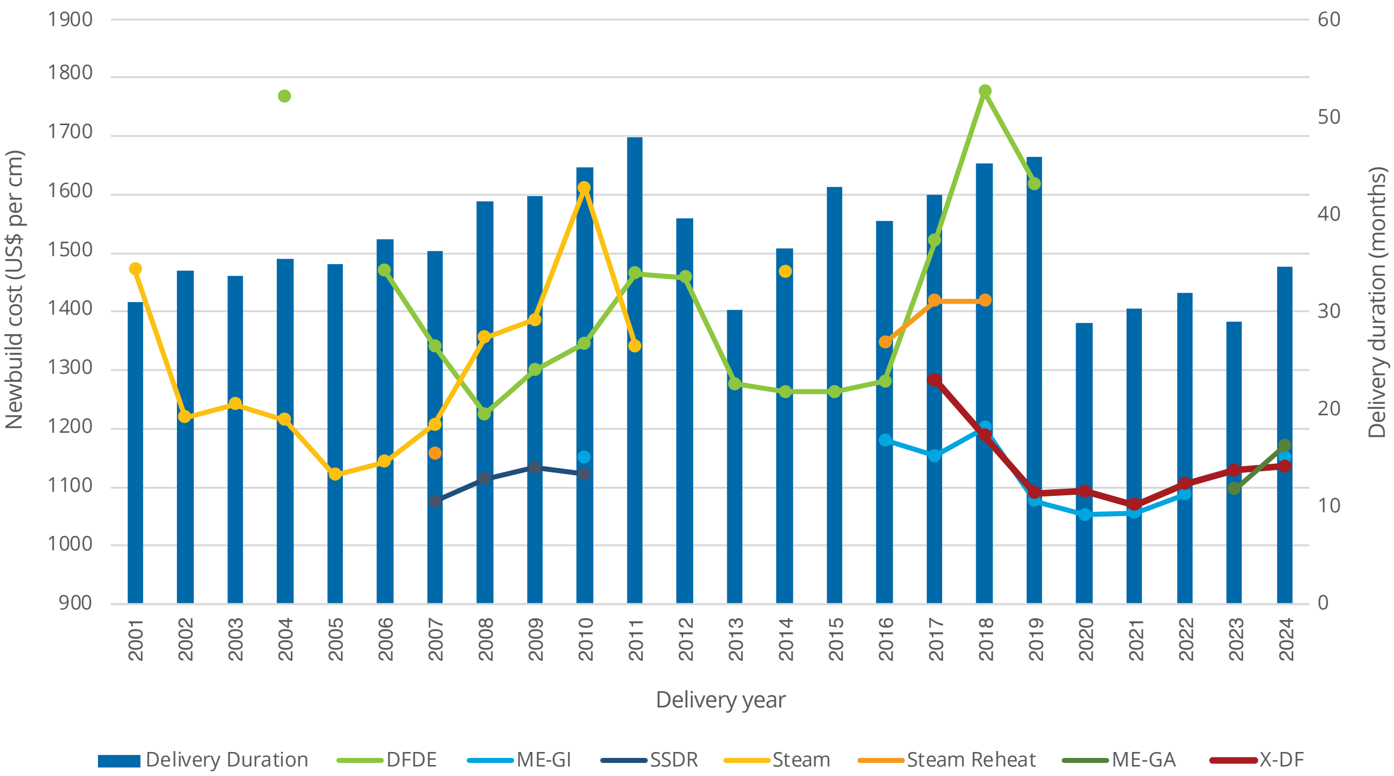
Source: Rystad Energy

Capitalising on better fuel efficiencies and lower emissions, both generations of X-DF are currently the main propulsion systems of choice, with 209 currently on order. The competing ME-GI system has 21 orders, while the new generation ME-GA system accounts for around 83, and DFDE systems account for 24 vessels. Apart from a mid-scale vessel owned by Huaxiang Shipping, all vessels on order are at or above 170,000 cm in size, showing a clear trend toward larger vessels, which new locks on the Panama Canal can now accommodate. With the new generation of two-stroke propulsion systems, vessel size might progressively trend towards 200,000 cm moving forward due to economies of scale for long-haul voyages. There are 13 such vessels currently on order, eight of which are for Dynagas and five for Venture Global. In 2022, two Dynagas-owned ships of 200,000 cm were delivered to charterer Cheniere Energy, named Clean Cajun and Clean Copano, both equipped with X-DF propulsion. In 2023 and 2024, an additional four Dynagas-owned ships of 200,000 cm were delivered to Cheniere Energy, named Clean Destiny, Clean Resolution, Clean Future, and Clean Vitality, all of which were equipped with ME-GA propulsion. There are also 24 QC-max vessels on order with a 271,000 cm capacity, all for QatarEnergy LNG. These will be the largest LNG carriers ever built and, in principle, be equipped with X-DF engines.

South Korean shipbuilders HD Hyundai Heavy Industries Group, Samsung Heavy Industries, and Hanwha Ocean are the top three builders of LNG vessels, with 92, 70, and 69 units on order, respectively. Additionally, Samsung previously assisted Zvezda shipyard in Russia in building 15 icebreakers for Arctic LNG 2, though this program has been stalled due to US sanctions. Hyundai and Samsung are working on a large proportion of newbuilds with both generations of X-DF systems and ME-GA, while Hanwha Ocean's orders cover X-DF, ME-GI, ME-GA, and a small number of DFDE vessels. Chinese builder Hudong-Zhonghua is currently working on 58 vessels with an orderbook stretching into 2031, all equipped with X-DF propulsion systems.

6.5
VESSEL COSTS AND DELIVERY SCHEDULE

Figure 6.8: Vessel delivery schedule and newbuild cost, 2001-2024



Source: Barry Rogliano Salles

51 Months

average delivery time for new LNG vessels contracted in 2024

The cost of constructing an LNG carrier depends on characteristics such as propulsion systems, capacity, and other specifications involving ship design. Historically, DFDE vessels started out pricier than steam turbine vessels, with the higher newbuild costs offset by efficiency gains from operating more modern ships. DFDE newbuild costs have varied heavily over the years due to different specification standards – a prominent example being the 2018 peak of over $1,700 per cm for 15 ice-breaker class vessels ordered to service Yamal LNG. These vessels, contracted from 2017, were priced at about $320 million apiece, which drove up average prices.

While vessels equipped with X-DF systems were initially marginally more expensive per cubic metre than vessels with ME-GI propulsion systems, they are now cost-competitive. Figure 6.8 above shows how the cost for X-DF, ME-GI, and ME-GA vessels have trended, falling from an initial $1,200 to $1,300 per cm to around $1,000 to $1,100 per cm for vessels delivered in 2020, but rising to $1,170 per cm by 2024 for ME-GA vessels.

Despite changes in average vessel sizes over time, shipyards have been able to maintain a consistent delivery schedule, with variance within this band occurring during the introduction of new propulsion systems. This can be attributed to shipyards having to adjust to novel designs with new engines, an example reaching almost 50 months in the years following the introduction of DFDE systems. However, the delivery time for vessels ordered in 2024 has now stretched to 51 months (more than four years) due to surging vessel demand and capacity limitations at South Korean shipyards.

Prices for newbuild LNG carriers inched down in 2024 as owners began to hold back orders given the high prices and current excess vessel availability. Prices for a standard 174,000 cm two-stroke vessel at South Korean yards declined from $260 million to $250 million across 2024.

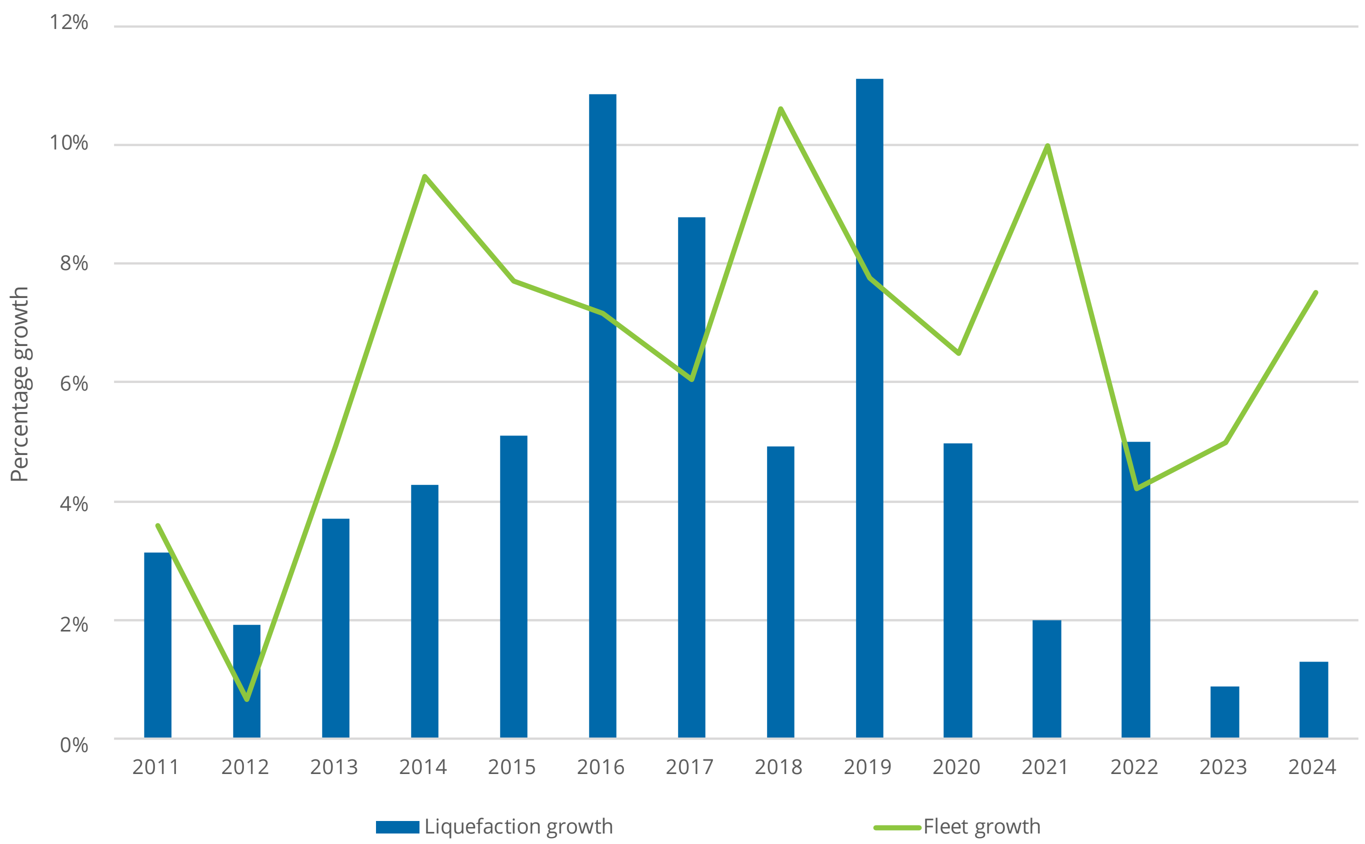
6.6 CHARTER MARKET

Charter day rates peak in 2024 at **$50,000** for steam turbine, **$90,000** for TFDE, and **$110,000** for two-stroke vessels

Shipping costs constitute an important proportion of netback calculations when delivering LNG. Therefore, charter rates are seriously considered when formulating market strategies. Historically, LNG was largely marketed through long-term contracts, encouraging shipowners to enter term charters with large players. As portfolio players have emerged, an increasing number of vessels have become available on the spot market, contributing to the market depth of charter fixtures and pricing. However, lack of liquidity can still contribute to charter rate volatility due to a mismatch between supply and demand. Since the Russia-Ukraine conflict, charterers have increasingly preferred longer duration charters to ensure supply security.

The price differentials between vessels with X-DF/ME-GI, DFDE, and steam turbine propulsion can be explained by efficiency gains from using newer propulsion systems. Steam turbine systems are significantly less efficient than DFDE systems, which in turn are less efficient than X-DF, ME-GA, and ME-GI engines. Additionally, vessels using steam turbines tend to be smaller in size, limiting usability as spot cargoes tend to be at least 150,000 cm. Finally, charterers, conscious about carrier emissions, are demanding newer technologies, further widening the price differential. As IMO regulations (EEXI and CII) enter into force, steam turbine and other less efficient propulsion types may be limited to certain trade lanes. Market participants must balance fuel efficiencies, boil-off gas savings, and higher costs when choosing their carriers and associated propulsion systems.

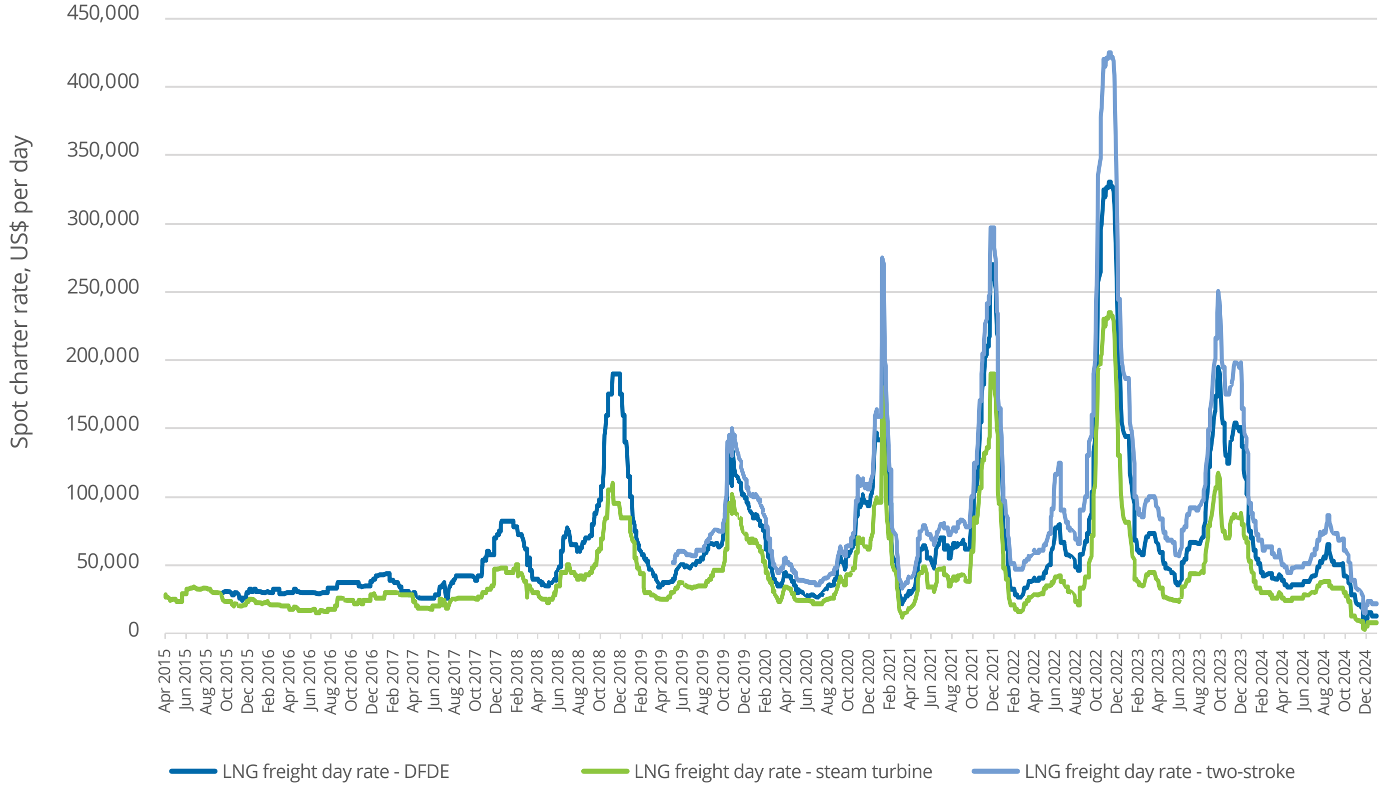
Figure 6.9: Liquefaction capacity growth vs LNG global fleet count growth, 2011-2024



Source: Rystad Energy

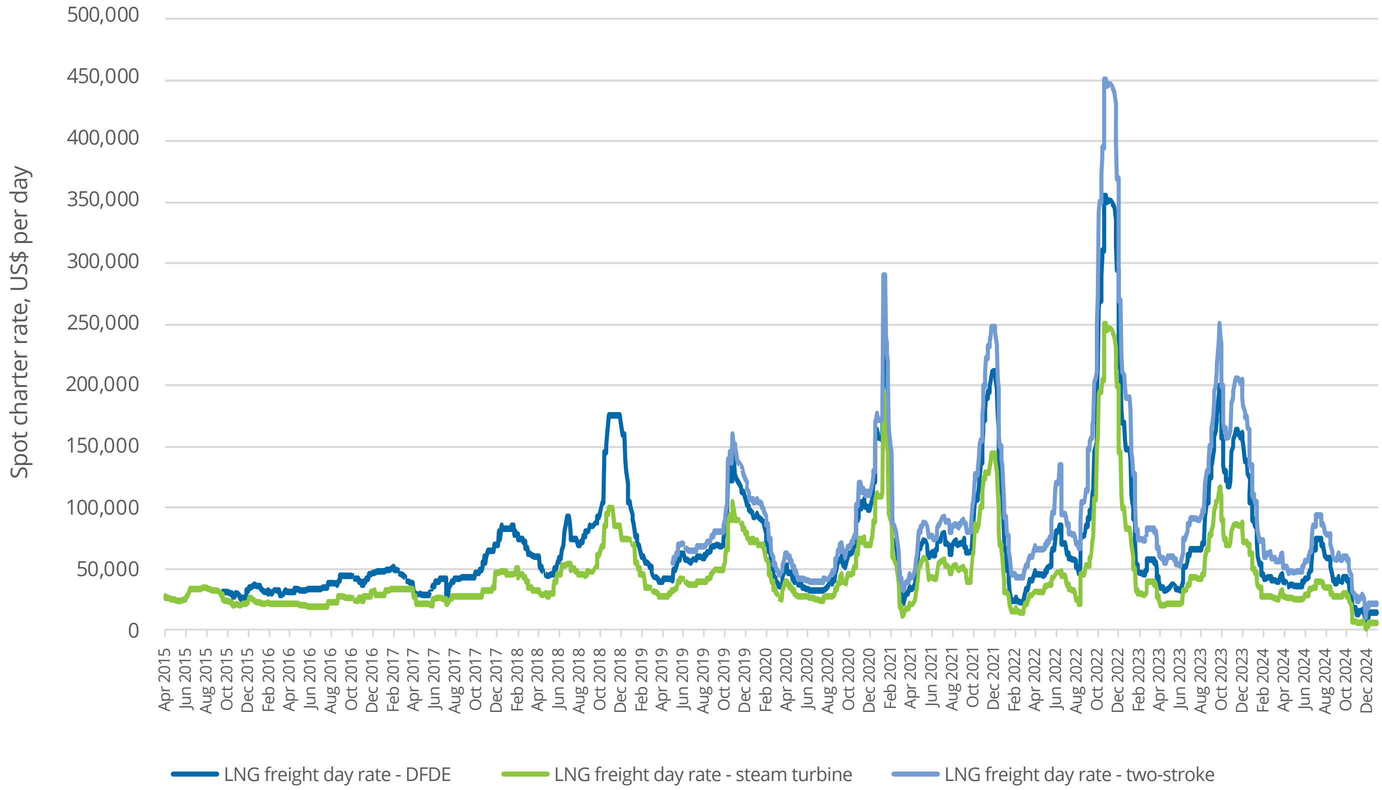
From 2013 onwards, the rate of vessel deliveries far outweighed that of liquefaction capacity growth, resulting in a glut of LNG shipping capacity and a steady decline in charter rates. This continued until 2015, after which they remained between $15,000 and $50,000 per day (for steam turbine) until the fourth quarter of 2017, when a rapid increase in Asian LNG demand sparked an increase in charter rates, which remained volatile through 2018.

Figure 6.10: Spot charter rates East of Suez, April 2015 to end 2024



Source: Argus

Figure 6.11: Spot charter rates West of Suez, April 2015 to end 2024



Source: Argus

The year 2021 proved to be a turbulent year for LNG shipping markets, as charter rates declined as winter demand eased after February, falling to historical lows in early March. A climb then commenced as the Ever Given container ship blocked the Suez Canal, while it became clear that Europe and Asia would compete for LNG cargoes. By October 2021, gas prices hit new highs as demand growth from the industrial sector coincided with a coal shortage in China, which further strengthened its position as an LNG buyer. Once again, this caused a large spike in charter rates, reaching $140,000 per day for steam turbine vessels, $210,000 per day for DFDE vessels, and $250,000 per day for X-DF/ME-GI vessels in mid-December.

The year 2022 saw a surge in LNG freight driven by soaring LNG prices. At the beginning of the year, freight rates eased briefly before ticking upwards as the Ukraine crisis started in February, structurally increasing LNG demand in Europe. Markets previously relying on Russian pipeline gas imports began to increase their LNG imports, while aiming to build out regasification capacity, placing material upward pressure on freight rates. Rates reached $45,000 per day for steam turbine vessels, $80,000 per day for DFDE vessels, and $120,000 per day for X-DF/ME-GI vessels at the end of May 2022. In August, Europe prepared in advance for winter and pushed the LNG shipping market into the peak season ahead of schedule. West of Suez rates reached $250,000 per day for steam turbine vessels, $355,000 per day for DFDE vessels, and $450,000 per day for X-DF/ME-GI vessels by the end of October 2022. Then, as winter turned out to be milder than expected, with high inventory in European and Asian storage, prices softened considerably into early 2023, after which charter rates also declined.

While 2023 was a year of stabilisation, the conflict in Ukraine still forced Europe to diversify from the Russian pipeline gas. The US played the role of filling that gap and became the world's largest LNG exporter. Thanks to the mild winter of 2022/23, market fundamentals in 2023 were well balanced, which eased freight rates. In September 2023, Europe prepared in advance for winter, pushing the LNG shipping market into the peak season. By the end of the month, West of Suez rates reached $117,000 per day for steam turbine vessels, $200,000 per day for DFDE vessels, and $250,000 per day for X-DF/ME-GI vessels. As in 2022, the end of September saw a buildup of floating storage. Then, with high gas inventories in Europe and Asia, prices dropped again, much lower than at the end of 2022.

The year 2023 was marked by a major disruption to the Panama Canal due to drought conditions reducing water levels in the Gatun Lake, which forced US-Asia voyages through the Cape of Good Hope and the Suez Canal. By early 2024, the Suez Canal itself was disrupted by geopolitical tensions in the Red Sea following the onset of the latest Middle East conflict. Houthi rebels began drone and missile attacks on vessels crossing the Bab El-Mandab strait, with LNG vessels suspending voyages through the Red Sea and Middle Eastern LNG cargoes taking the Cape of Good Hope route to Europe.

In 2024, following three volatile years, the large number of LNG vessel deliveries to the market, coupled with minimal LNG production growth, led to an oversupplied shipping market. Peak charter rates were achieved at the start of the year, followed by another localised peak across July and August, when X-DF/ME-GI vessels (West of Suez) fetched up to $94,000 per day.

By December, spot charter rates fell below Covid-era lows when US LNG shut-ins depressed shipping demand. Two-stroke vessels saw rates just over $20,000 per day, barely covering operating costs. Charter rates for steam turbine carriers declined to between $6,000 and $7,000 per day. The oversupply of vessels was exacerbated by tightness in the European market, which kept Atlantic Basin vessels within the Atlantic, weighing on tonne-mile demand.

Courtesy NYK Line

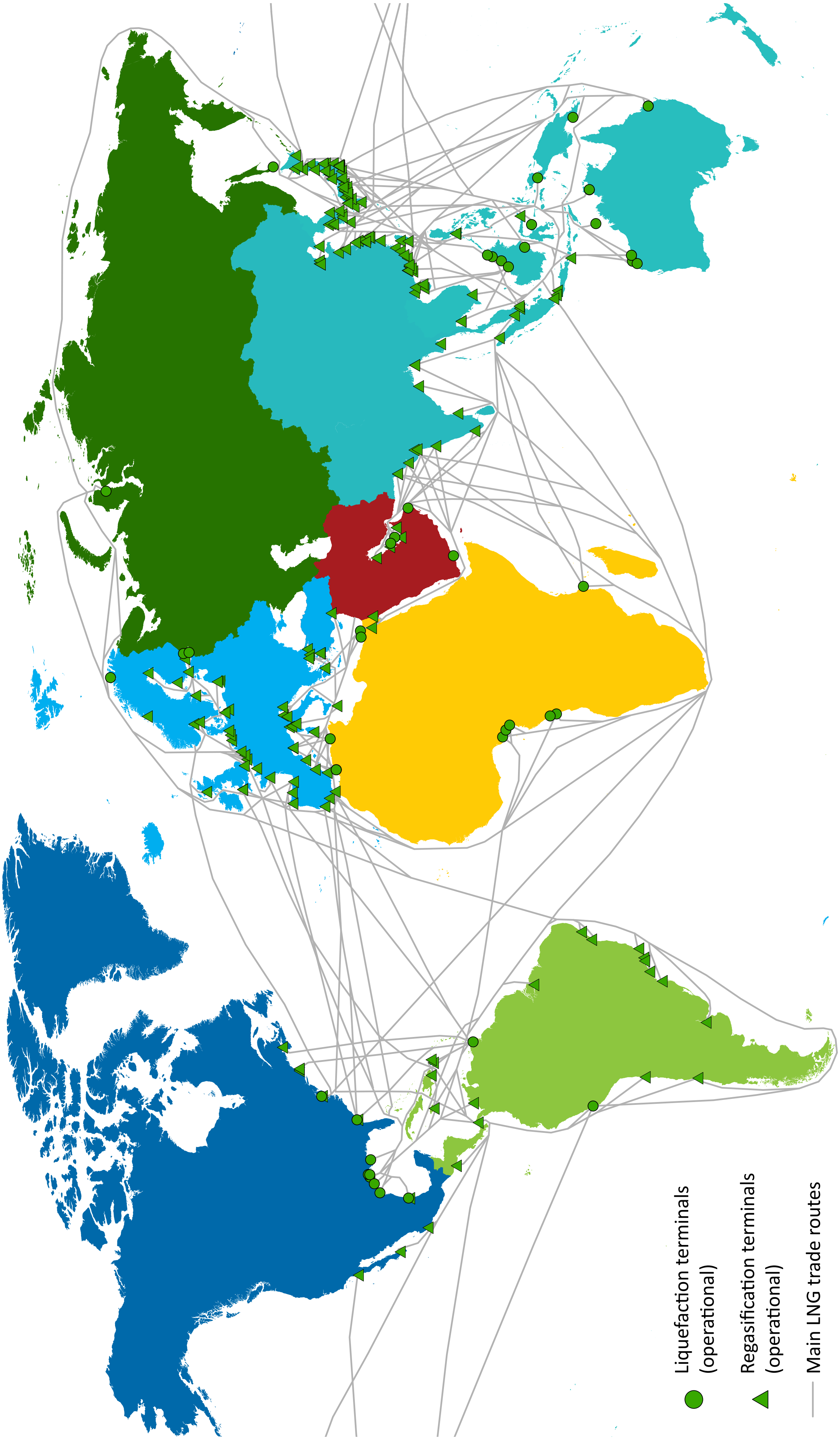


Figure 6.12: Major LNG shipping routes, 2024

Source: Rystad Energy

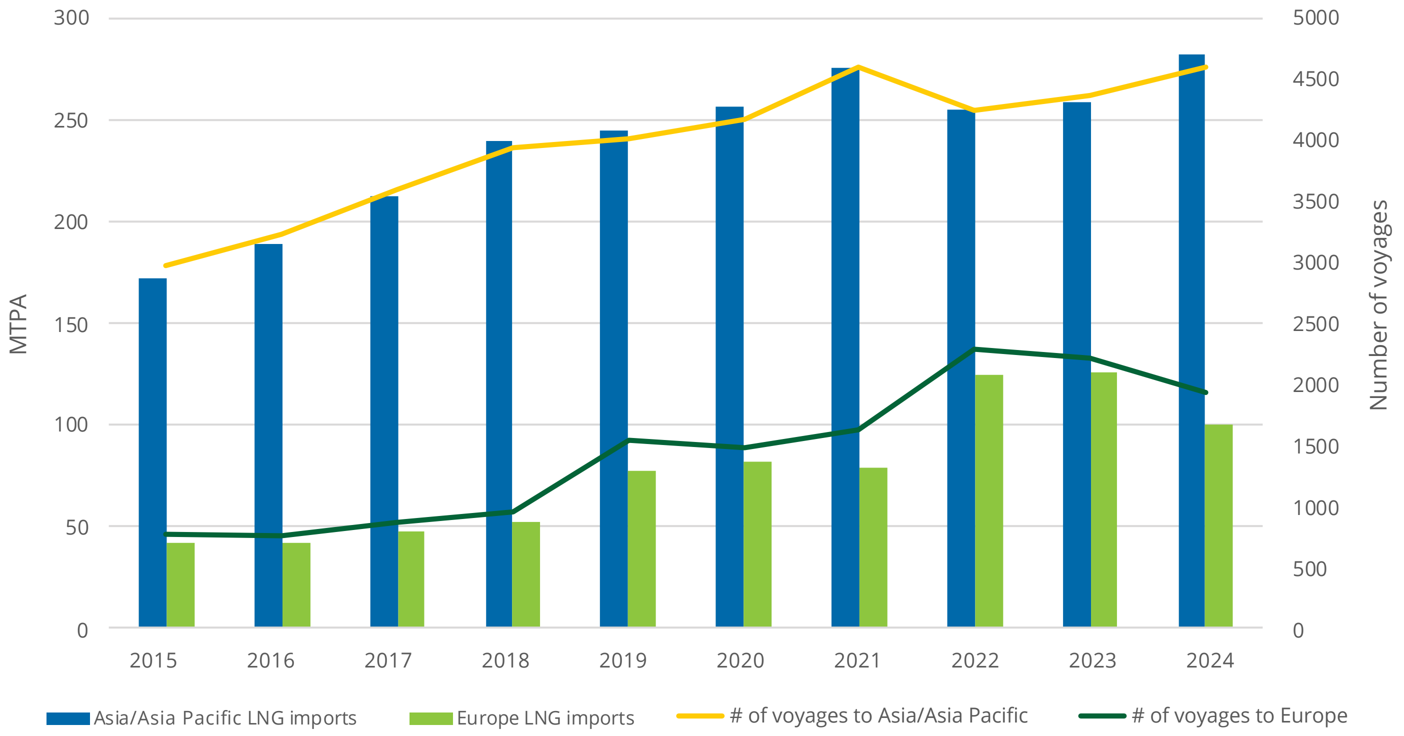
6.7
FLEET VOYAGES AND VESSEL UTILISATION

7,065 LNG trade voyages
in 2024

2024 was characterised by minimal LNG supply growth, with just 7,065 voyages, or 0.9% growth from 2023. With a 7.5% growth in the LNG fleet, the LNG shipping market became oversupplied by year end.

The widening and deepening of the Panama Canal in 2016 reduced the voyage distance and time from the Sabine Pass terminal in the US to Japan's Kawasaki LNG facility to 9,400 nautical miles (nm) and 29 days through the Panama Canal. This is compared to 14,500 nm and 45 days through the Suez Canal and nearly 16,000 nm and 49 days around the Cape of Good Hope. However, due to the route's popularity, the Panama Canal has become a bottleneck for this voyage, with the situation exacerbated by drought conditions in Panama that reduced water levels in the Gatun Lake in 2023, forcing re-routes through the Cape of Good Hope.

Figure 6.13: LNG imports and number of voyages to Asia and Europe, 2015-2024



Source: Rystad Energy, LSEG data and analytics

The number of LNG trade voyages from the US to Europe dropped to 693 in 2024, down from over 800 in 2023, as European LNG demand dampened due to weak fundamentals at the start of the year.

The most common voyage globally in 2024 was from Australia to Japan, with 389 voyages. The most common voyage to Europe in 2024 was from the US to the Netherlands, with 137 shipments. Japan, China, and South Korea took the highest number of cargoes globally, receiving 3,184 cargoes in total or 1,259, 1,204, and 721 cargoes, respectively. The average number of voyages completed per vessel was 9.5 in 2024, lower than in 2023, as the large number of newbuild deliveries far exceeded production growth, leading to lower fleet utilisation.

6.8 RECENT DEVELOPMENTS IN LNG SHIPPING

Recent developments in LNG shipping related to decarbonisation and new technologies for LNG carriers include numerous initiatives aimed at reducing carbon emissions.

LNG as a transition fuel: LNG is increasingly being used as a transition fuel in the shipping industry due to its ability to reduce greenhouse gas emissions by between 20% and 30% compared to conventional fuel oil. This makes it a pragmatic choice for shipping companies aiming to comply with tightening emissions regulations.

Biofuels and LNG: Due to their availability and developed infrastructure, biofuels and LNG will emerge as preferred alternative fuels for shipping companies by 2030. These fuels are expected to help meet initial compliance needs with new emissions rules.

Application of energy-saving devices: Many LNG carriers are equipped with energy-saving devices, such as propeller boss cap fins, rudder bulbs, air lubrication systems, and shaft generators, which can effectively reduce fuel consumption and carbon emissions. However, these systems are not sufficient to respond to the new regulations over the mid to long-term.

Optimisation of ship design: Some newly built LNG carriers adopt advanced design concepts and hydrodynamic shapes to reduce resistance and improve energy efficiency. For example, the streamlined hull design can reduce the ship's resistance in the water, thereby reducing energy consumption.

Improvement of operational management: This is a transversal topic for the whole shipping industry that will also include efficient data analysis and excellence in operation plans to reduce waiting time and just-in-time terminal arrivals, among other important matters.

Use of shore power: When an LNG carrier is docked at the terminal, shore power can supply electricity. This can reduce the ship's fuel consumption and exhaust emissions, reducing carbon emissions by about 8% to 9%. However, for cargo operations, the energy required to offload the cargo may limit the feasibility of this solution.

Optimisation of route planning: By using weather routing technology and optimising route planning, ships can sail in the most favourable wind and current conditions, reducing fuel consumption and carbon emissions. This obviously has more impact when a wind-assisted propulsion system is installed onboard.

New designs and technologies for LNG carriers

Advances in cargo handling technology: New LNG loading and unloading equipment has been developed to improve the efficiency and safety of LNG loading and unloading operations. For example, some new loading and unloading arms have a higher flow rate and better sealing performance, which can reduce LNG leaks during loading and unloading.

Enhanced cargo storage and management systems: The insulation technology and storage tank design of LNG carriers have been continuously improved to reduce the evaporation loss of LNG (reduced boil-off rate). At the same time, intelligent cargo management systems have been introduced to monitor the status of LNG in real time and ensure the safety and stability of cargo storage.

Dual-fuel propulsion systems: Many LNG carriers are equipped with dual-fuel propulsion systems that can switch between LNG and traditional fuels as needed. This not only reduces carbon emissions but also ensures the reliability and flexibility of ship power. The majority of new designs are equipped with shaft generators (power take off, PTO) in the main engines and air lubrication systems. This enhances the efficiency of the ship for a certain range of speeds.

Wind-assisted propulsion: This technology is gaining momentum, for instance, in the tanker segment. Although only one LNG carrier is expected to be equipped with such a solution in the near future, some LNG carrier designs have proposed this.

Fuel cell technology: Fuel cell technology is gradually being applied to LNG carriers. Fuel cells convert the chemical energy of fuels into electrical energy through electrochemical reactions, which have high energy conversion efficiency and low emissions. For example, some LNG carriers use solid oxide fuel cells (SOFC) running on LNG combined with waste heat recovery systems to provide auxiliary power, with fuel savings of 6% to 7%.

Onboard carbon capture: Post-combustion or pre-combustion technologies have been proposed for some LNG-fuelled ships. LNG carriers are candidates for such installations. The handicap here is mainly the storage on board and the logistics of offloading for sequestration. These technologies could be considered for units like FSRUs that are permanently moored.

Application of digital technologies

Intelligent monitoring and control systems: LNG carriers are equipped with intelligent monitoring and control systems that use sensors and data analysis technologies to monitor the operation status of the ship in real time. This can include the engine's performance, the status of the cargo, and the crew's safety. This enables the timely detection of problems and the implementation of corresponding measures to improve ship safety and operational efficiency.

Remote operation and maintenance technologies: With advancements in communication technology, remote operation and maintenance solutions are increasingly being applied to LNG carriers. Shipowners can remotely monitor and control the operation of the ship through the Internet of Things and cloud computing technologies and carry out remote diagnosis and maintenance. This helps reduce maintenance costs and improves maintenance efficiency.

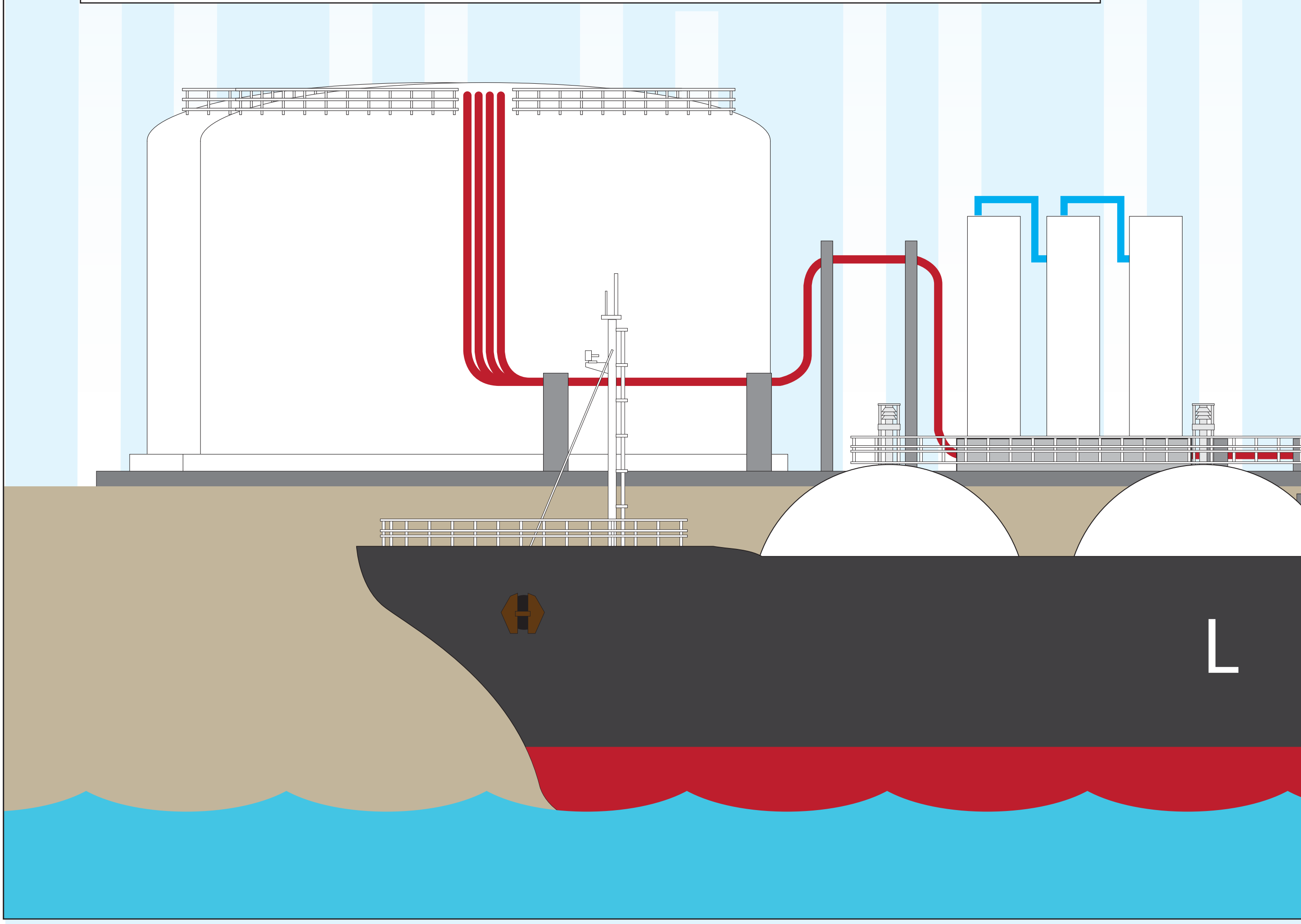
LNG carrier design: In addition to technology, we have seen that increasing capacity can improve efficiency and reduce transportation costs in certain cases. However, this sometimes impacts flexibility. To address this, some designs include a compact machinery space, which allows for a larger cargo area without compromising ship dimensions and ensuring full compatibility with terminals and canals.

7 LNG Receiving Terminals[1]

66.6 MTPA of receiving capacity was added in 2024.

+10 new terminals in 2024	**+6** expansion projects at existing terminals	**+1** restart of idled terminal

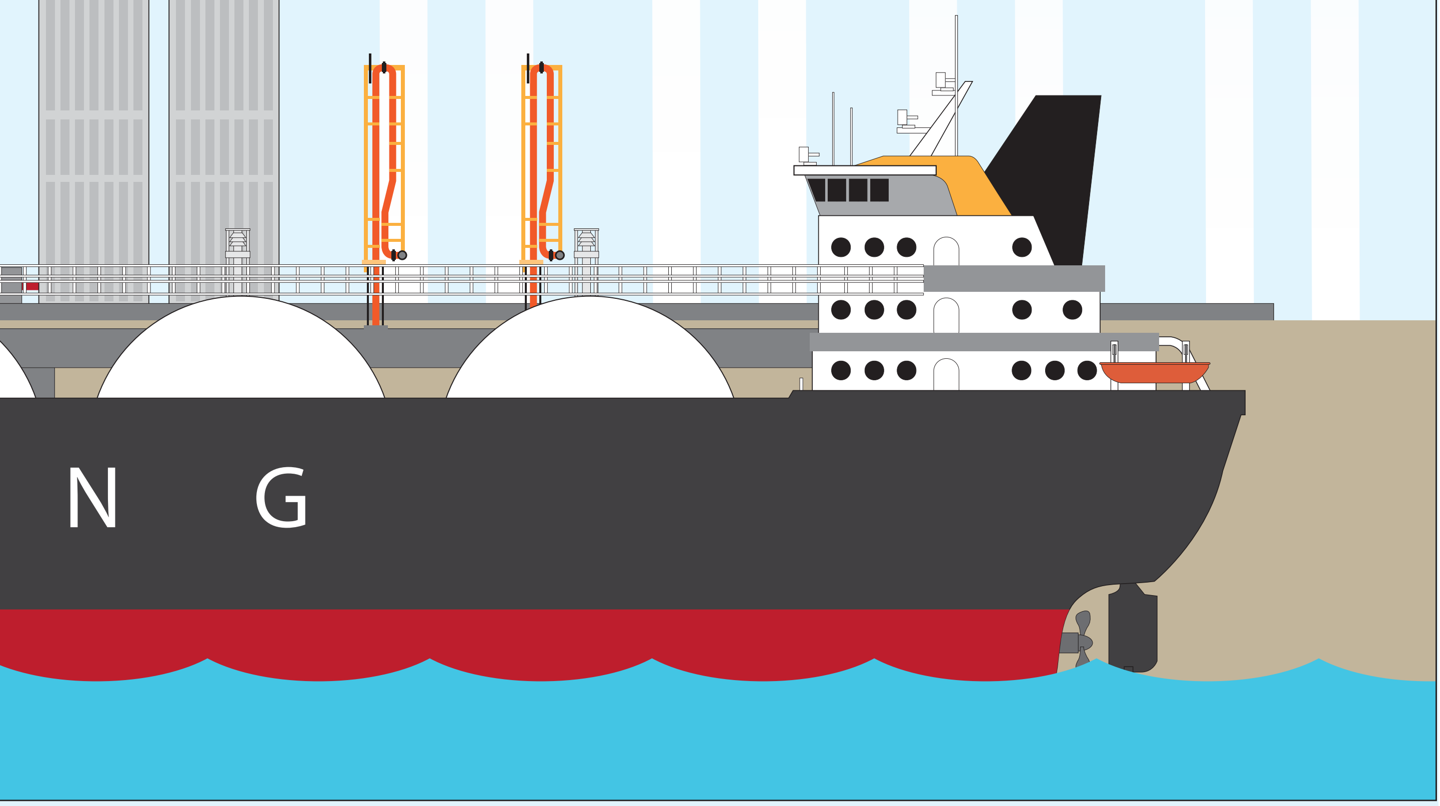
China commissioned 3 new terminals and expanded 3 existing LNG regasification plants



[1] This report includes terminals with small-scale (<0.5 MTPA) regasification capacity adding large impact on import for the market.

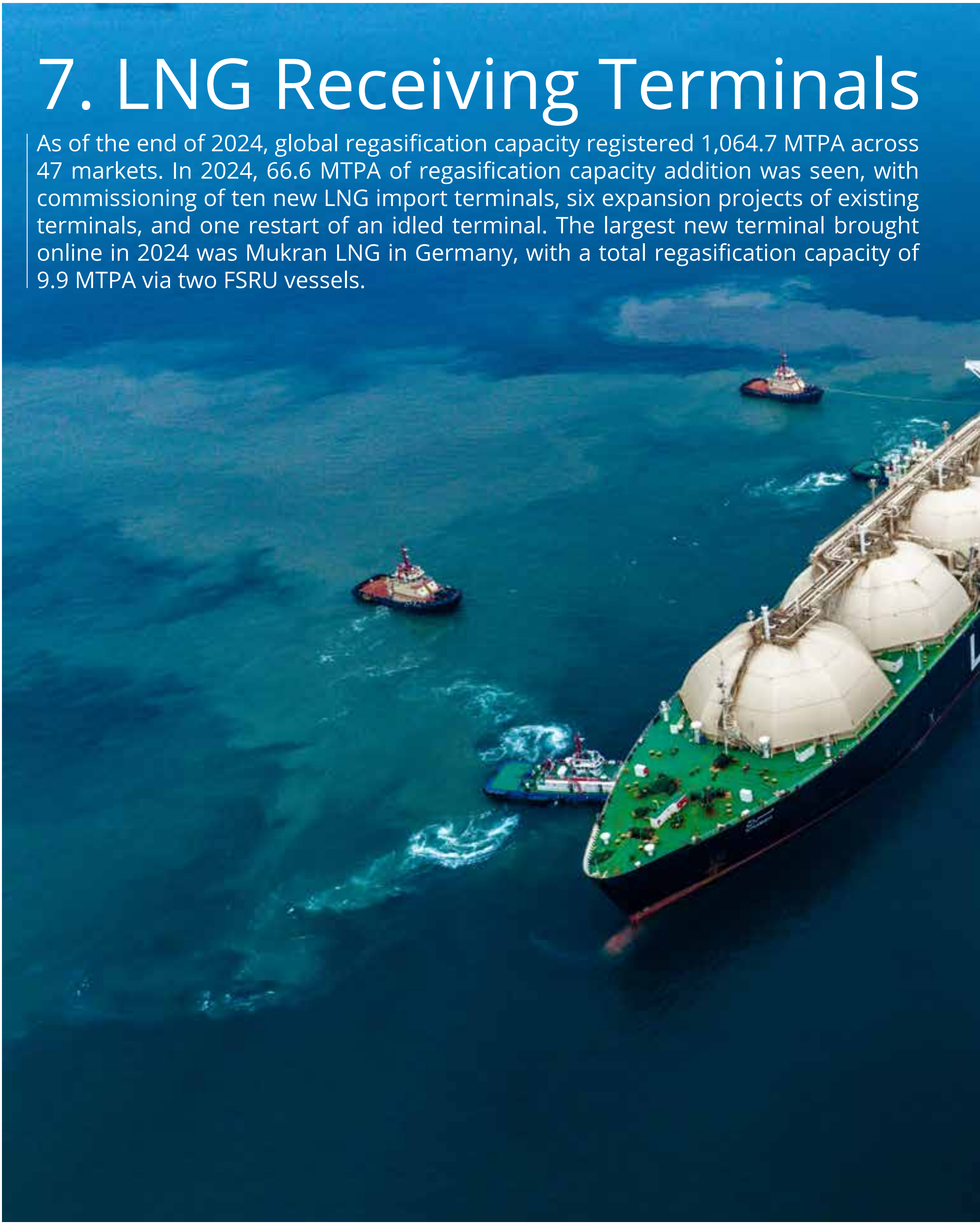
+6 new floating terminals:
Brazil (3), Germany (2), Greece (1)

265.8 MTPA
of new regasification capacity under construction



7. LNG Receiving Terminals

As of the end of 2024, global regasification capacity registered 1,064.7 MTPA across 47 markets. In 2024, 66.6 MTPA of regasification capacity addition was seen, with commissioning of ten new LNG import terminals, six expansion projects of existing terminals, and one restart of an idled terminal. The largest new terminal brought online in 2024 was Mukran LNG in Germany, with a total regasification capacity of 9.9 MTPA via two FSRU vessels.



Courtesy CNOOC

7.1 OVERVIEW

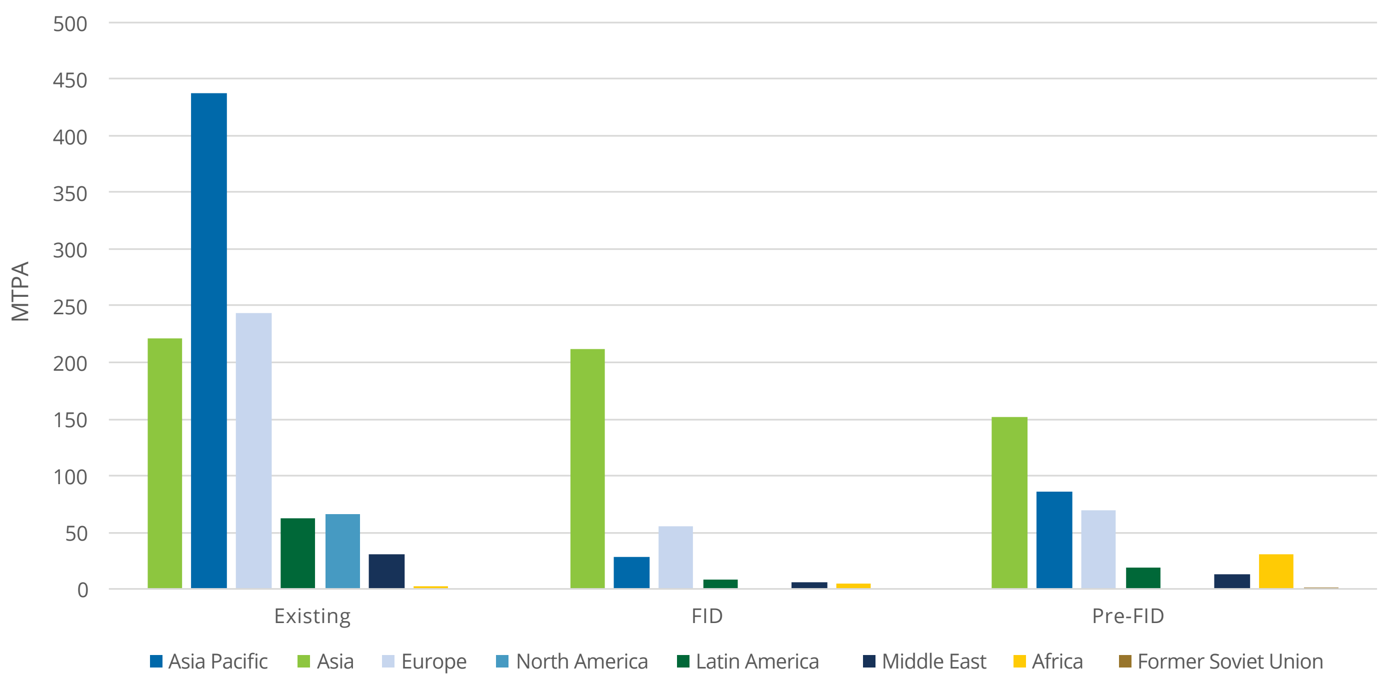
1,064.7 MTPA

Global LNG regasification capacity as of end-2024

The expansion of global LNG regasification capacity continued in 2024, with 17 projects coming online across seven markets, while the previous year also had 17 projects online across ten markets. Asia led the capacity additions in 2024 with 25.1 MTPA, followed by Europe at 22.3 MTPA, Latin America at 13.8 MTPA, Africa at 2.9 MTPA, and Asia Pacific at 2.4 MTPA. Of the total 66.6 MTPA added globally in 2024, 44.5 MTPA came from ten new terminals, while 19.1 MTPA resulted from six expansion projects at existing facilities, with another 2.9 MTPA from the restart of one idled terminal. The 9.9 MTPA floating-based terminal Mukran LNG in Germany contributed the largest capacity addition via two FSRU vessels Energos Power and Neptune, followed by the 6.1 MTPA Huizhou LNG 1 in China and three 6 MTPA projects – Chaozhou Huaying LNG 1 and Tianjin PipeChina LNG 2 expansion in China, and Para LNG (Barcarena) FSRU in Brazil. Egypt, with the restart of Ain Sokhna FSRU, reclaimed its position as an LNG importer. In June 2024, the FSRU vessel Hoegh Galleon, mooring at Ain Sokhna terminal, received its commissioning cargo, which was loaded from the Sagunto LNG import terminal in Spain. The terminal has helped to meet Egypt's growing supply-demand gap and has maintained high utilisation since its commissioning.

Asia, driven exclusively by China, accounted for the highest capacity additions in 2024, with 25.1 MTPA of regasification capacity brought online. Huizhou LNG 1, being the largest contributor in capacity addition, started commercial operation in late August 2024, bringing 6.1 MTPA to the market. Two 6 MTPA projects – Chaozhou Huaying LNG 1 and Tianjin PipeChina LNG 2 expansion – also became operational in China, with the startups of the 4 MTPA Shandong (Qingdao) LNG 3 and the 3 MTPA Zhangzhou LNG 1 projects as well.

Figure 7.1: LNG regasification capacity by status and region, as of end-2024



Source: Rystad Energy

7.2 RECEIVING TERMINAL CAPACITY AND GLOBAL UTILISATION

Global regasification capacity witnessed significant growth in 2024, with 66.6 MTPA of additions across Asia, Europe, Latin America, Africa, and Asia Pacific. Floating-based terminals played a critical role, accounting for 34.4 MTPA (51.6% of the total additions), due to their flexibility and reduced capital investment. Among the new terminals, six were FSRU-based, including three in Brazil, two in Germany and one in Greece. These floating terminals added 0.98 million cubic metres (mmcm) of LNG storage capacity.

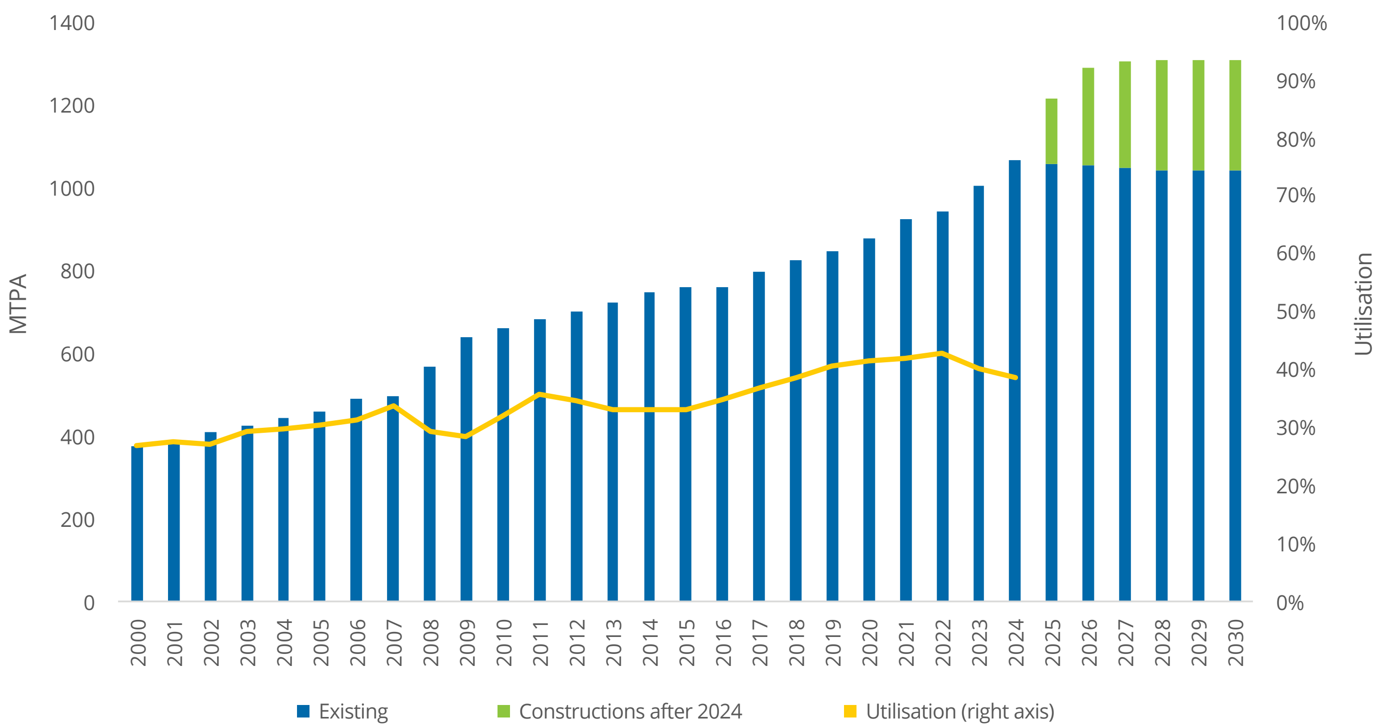
China was the top driver of capacity additions, adding 25.1 MTPA through three new projects and four expansion projects at existing terminals. This is followed by Europe adding a total capacity of 22.3 MTPA, with the startups of FSRU-based terminals in Germany and Greece, and with the expansion of Zeebrugge 2 in Belgium. Strong growth was also seen in Latin America with 13.8 MTPA of addition, from three new FSRU-based terminals in Brazil. Egypt became an LNG import market again by restarting the Ain Sokhna terminal in June 2024, with the arrival of the Hoegh Galleon FSRU.

In 2024, ten new regasification terminals started operations globally, with a total capacity addition of 44.5 MTPA. Four were onshore terminals, with three in China (Chaozhou Huaying LNG, Huizhou LNG and Zhangzhou LNG) and one in South Korea. Offshore-wise, six new FSRU-based terminals were brought online in 2024, with three in Brazil, two in Germany and one in Greece. These floating-based terminals collectively added 27 MTPA of regasification capacity and 0.98 mmcm of storage capacity. Rapid growth has continued in Germany and Brazil, with an increase of over 13 MTPA of regasification capacity in each of these two markets.

Six expansion projects at existing terminals came online in 2024, with a regasification capacity of 19.1 MTPA. This includes the 6 MTPA Tianjin PipeChina LNG 2 expansion project in China, the 4.7 MTPA Zeebrugge 2 expansion project in Belgium, the 4.4 MTPA added to Mukran LNG with the arrival of FSRU vessel Neptune, the 4 MTPA Shandong (Qingdao) LNG 3 in China. Another two onshore expansion projects for Tianjin Nangang LNG in China added 1.3 mmcm of storage capacity, but without regasification capacity expansion.

As of the end of 2024, 265.8 MTPA of new regasification capacity was under construction globally, including 29 new onshore terminals, 12 new floating-based terminals, and 33 expansion projects at existing regasification facilities. Asia leads this development with 69.6% of global under-construction regasification capacity, followed by Europe (13.5%) and Asia Pacific (10.5%). Capacity wise, China will continue to lead newbuilds, followed by India, Germany and Pakistan. China has 143.8 MTPA of capacity under construction – all onshore projects including 20 new terminals and 18 expansion projects at existing terminals. India has three new terminals and four expansion projects under construction, totaling 27 MTPA. Germany has three expansion projects – two onshore and one FSRU-based – aimed to come online between 2025 and 2027, totaling 19.3 MTPA. Pakistan's 5.6 MTPA Energas Terminal and 8.5 MTPA Pakistan Onshore LNG are expected to commission in 2025. South Korea has a total capacity of 8.1 MTPA under construction through one new terminal (the 6 MTPA Dangjin 1) and one expansion project (the 2.1 MTPA Gwangyang LNG 2).

Figure 7.2: Global receiving terminal capacity, 2000-2030



Source: Rystad Energy

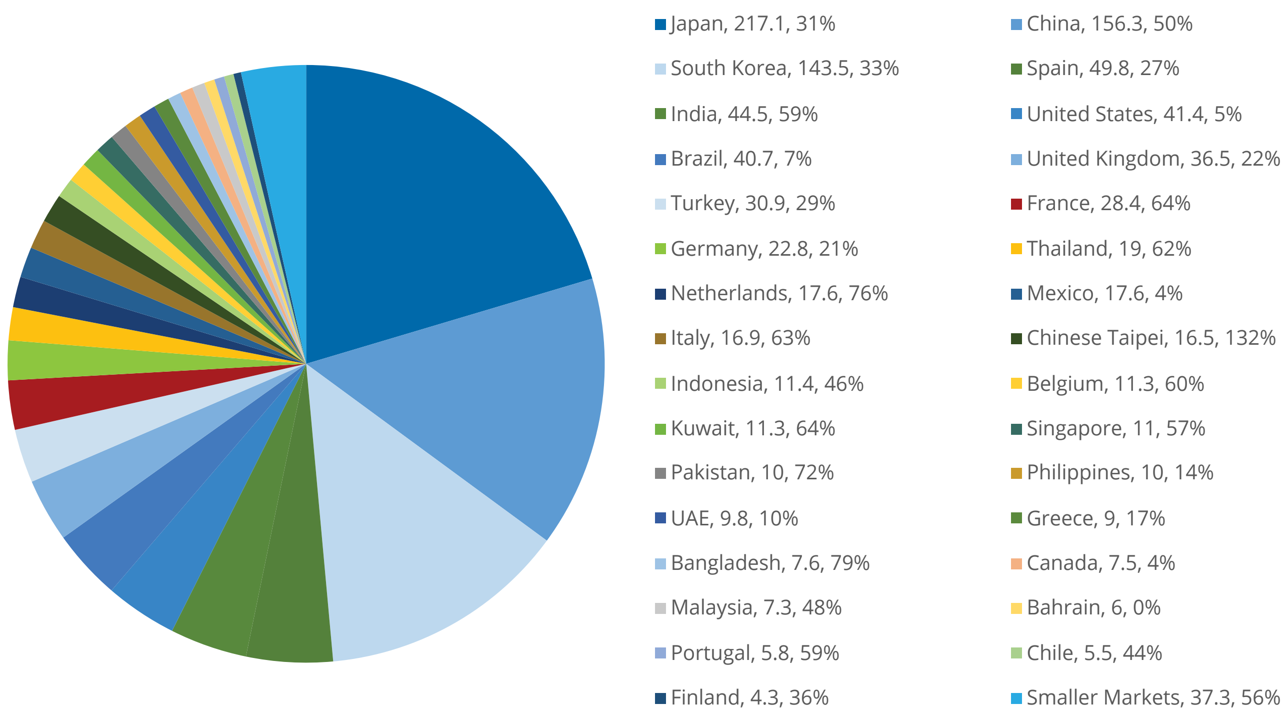
Seven new markets, including Nicaragua, Senegal, Australia, Estonia, Ghana, Cyprus, and Antigua & Barbuda, are currently building their first LNG import terminals and planning to start LNG imports in 2025 or 2026. The seven new markets are expected to add 13.6 MTPA of regasification capacity through the construction of one onshore terminal and six floating-based terminals. This also shows that floating-based solutions are generally more popular in emerging markets, as the option exhibits noticeable flexibility in deployment and lower fixed costs.

Construction is also under way in 15 existing markets, including China, India, Germany, Pakistan, South Korea, Chinese Taipei, the Philippines, Jordan, Poland, Italy, Vietnam, the Netherlands, France, Belgium, and Panama. Out of the 38 projects under construction in China, 12 were approved in 2022, one was approved in 2023, and five were approved in 2024. Although terminal approval has slowed in China comparing with the level in 2022, its LNG import capacity will continue to trend higher, with the expected massive completions of construction in the coming years. China is expected to have 13 new startups and 12 expansion projects coming online in 2025, with all of them equipped with storage capacities. The 10 MTPA expansion of Jiangsu Yancheng Binhai LNG 2 in Jiangsu province, operated by CNOOC, will be the largest startup by regasification capacity in 2025. The project will add ten LNG storage tanks of 270,000 cm each. The 13 new startups, including PipeChina Longkou Nanshan LNG 1, Sinopec Longkou LNG, Sinopec Zhoushan Liuheng LNG 1, Shanghai LNG 1, Yangjiang LNG, Yantai West Port (Xigang) LNG, CNPC Fuqing LNG, Huafeng Zhongtian LNG, GCL Jiangsu Rudong LNG 1, Wenzhou Huagang LNG 1, Jiangsu Guoxin Rudong LNG 1, Wuhu LNG, and PipeChina Shenzhen LNG, will add a combined capacity of 45.9 MTPA to the market.

Global regasification utilisation edged lower in 2024, averaging 38.6%, compared to 40.1% in 2023 and 42.8% in 2022. The decrease was driven by tepid demand in major markets like Europe and Asia Pacific, alongside the commissioning of significant new regasification capacity in 2024. Europe's utilisation rate dropped to 41% in 2024, a sharp fall from its 2022 peak of 73.8%, as mild weather and robust inventories reduced gas demand across the markets in the region. In Asia and Asia Pacific, utilisation remained relatively stable at around 43% to 44% from 2022 to 2024.

7.3 RECEIVING TERMINAL CAPACITY AND UTILISATION BY MARKET

Figure 7.3: LNG regasification capacity by market (MTPA) and annual regasification utilisation, 2024



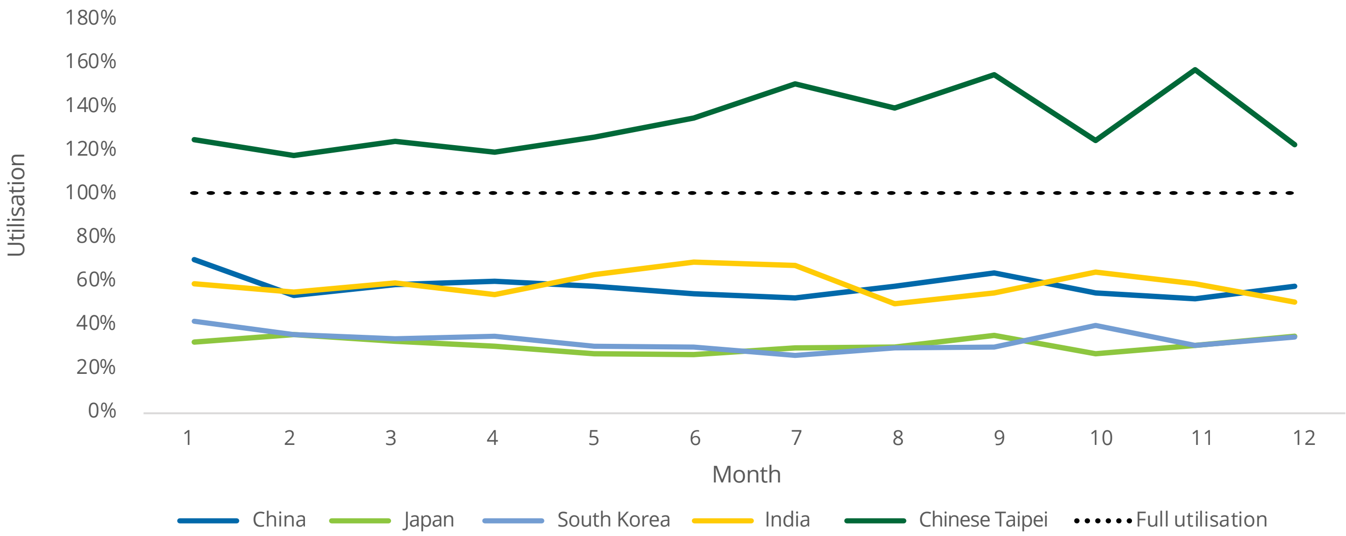
Source: Rystad Energy

As one of the first markets to build LNG import terminals, Japan has remained the largest owner of regasification capacity, with 217.1 MTPA as of the end of 2024, making up nearly 20.5% of global capacity. Japan owns two of the world's five largest LNG import terminals, including Sodegaura (29.4 MTPA) starting operation in 1973 and Futtsu (16 MTPA) commissioned in 1985. No capacity was added in Japan in 2023 and 2024, following the startups of the 3.2 MTPA Hitachi LNG expansion project in 2021 and the 1 MTPA Niihama LNG in 2022. Japan's regasification utilisation was largely unchanged in 2024 at 31%, with strong output of nuclear power in the market. Mild weather conditions throughout most time of the year resulted in healthy LNG inventory level in Japan, which weighed on buying incentive of Japanese companies.

China surpassed South Korea and became the second largest market for regasification capacity in 2024, with 156.3 MTPA at 32 terminals in total. China's gas demand continued its post-pandemic recovery in 2024, providing momentum in constructions of LNG infrastructures such as receiving terminals and storage tanks. Significant regasification construction plans have been carried out in China to bring in more LNG flows. As of the end of 2024, China's regasification capacity has reached 156.3 MTPA, since its first LNG import terminal Guangdong Dapeng LNG started in 2006. China had seven regasification projects commissioning in 2024, bring a total capacity of 25.1 MTPA. This includes the 6.1 MTPA Huizhou LNG Phase 1, the 6 MTPA Chaozhou Huaying LNG Phase 1, the 6 MTPA Tianjin PipeChina LNG Phase 2 expansion, the 4 MTPA Shandong (Qingdao) LNG Phase 3, and the 3 MTPA Zhangzhou LNG Phase 1, as well as two expansion projects at Tianjin Nangang LNG only with storage capacity additions. With the construction of 20 new terminals and 18 expansion projects at existing terminals under way, another 143.8 MTPA of regasification capacity is expected to be added in China by 2030. China's gas consumption growth moved higher from about 6% YOY in 2023 to 8% YOY in 2024, mainly driven by the city gas sector. This is on the back of rising urban gasified population, and the boom in LNG truck sales as noticeable price competitiveness of LNG compared to diesel emerged. China's regasification utilisation was 50% in 2024, falling from 2023's average of 55%, much lower than over 80% in 2020 and 2021. This is due to rapid expansions in regasification capacity and increased output from competing renewables. Going forward, with the rapid growth of China's regasification capacity and moderate growth in LNG demand compared with the pre-pandemic period, the market's regasification utilisation is expected to move rangebound at 40% to 50%.

South Korea ranked the world's third-largest market by regasification capacity, with a total of 143.5 MTPA across eight terminals. Three of the world's five largest LNG import terminals are in South Korea, including Incheon LNG (54.9 MTPA), Pyeongtaek LNG (41 MTPA) and Tongyeong LNG (26.5 MTPA). South Korea's high regasification capacity has helped the market boost LNG import and become one of the world's largest LNG importers, behind China and Japan. South Korea had a new startup in 2024, namely the 2.4 MTPA Ulsan LNG. A new terminal is under construction, namely 6 MTPA Dangjin 1, which plans to come online in 2025. Another expansion project – the 2.1 MTPA Gwangyang LNG 2 – has reached FID and is expected to start operation in 2026. South Korea increased its nuclear power generation and approved the construction of new reactors in 2024, to align with its strategic plan to enhance energy security and reduce emissions. South Korea's regasification utilisation was largely unchanged at 33% in 2024.

Figure 7.4: Monthly regasification utilisation by top five LNG importers, 2024



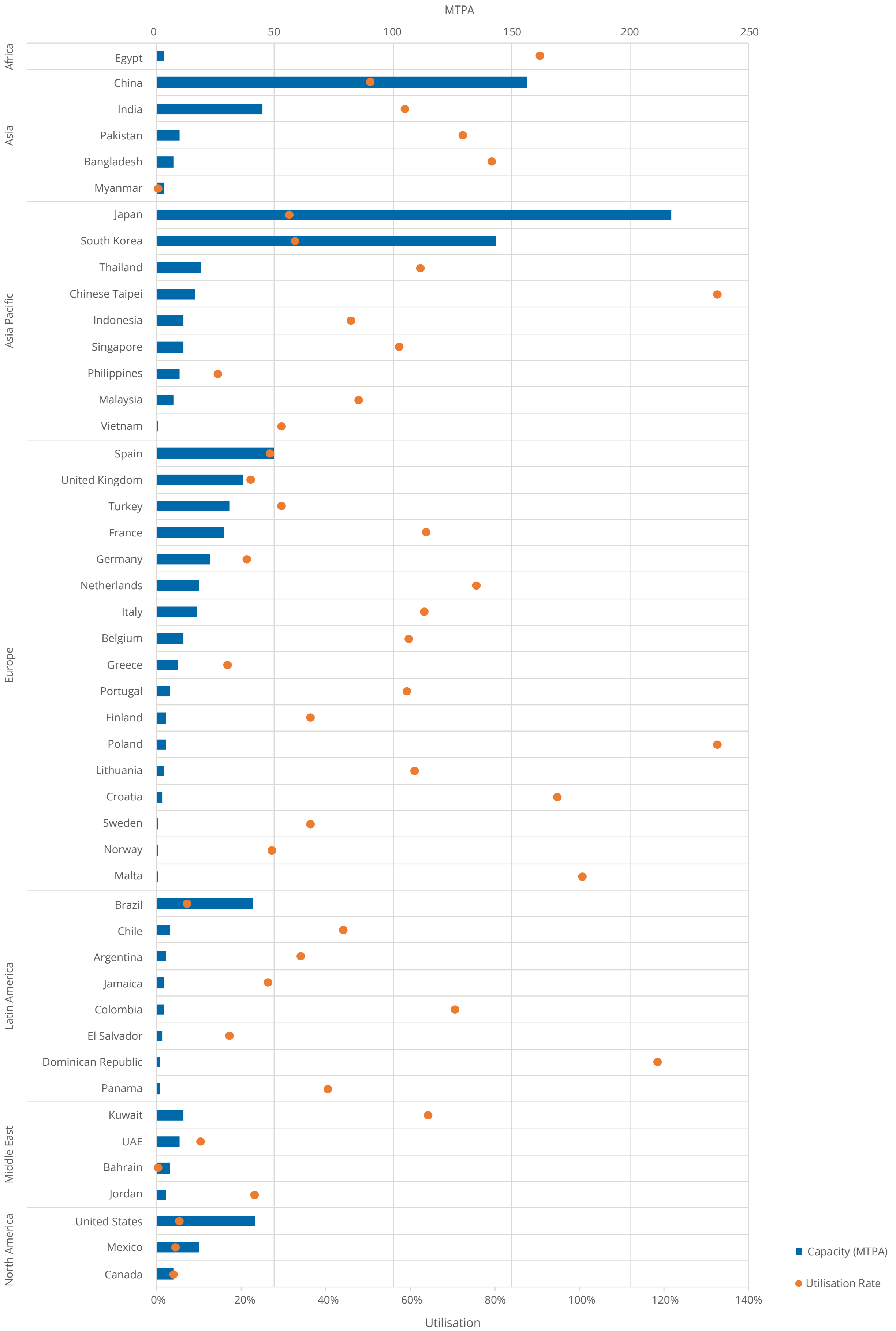
Source: Rystad Energy

Spain owns the world's fourth-largest and Europe's largest operational regasification capacity, with 49.8 MTPA across seven terminals by the end of 2024. The market's regasification utilisation dropped from 34% in 2023 to 27% in 2024. The latest startup was seen in 2023, with the market reactivating the idled 5.9 MTPA El Musel onshore terminal to strengthen its LNG import capacity, following the outbreak of Russia-Ukraine conflict, which spurred concerns about the region's gas supply. The terminal also offers storage and reloading services, with LNG storage capacity of 300,000 cm.

India is the fifth-largest regasification market globally, with 44.5 MTPA across seven terminals as of the end of 2024. India had its latest startup in April 2023, namely the 5 MTPA Dhamra LNG project. The 17.5 MTPA Dahej LNG ranks as the world's fifth-largest terminal by import capacity. Three new terminals and four expansion projects are under construction, of which five are onshore and two are floating-based. By 2026, these undertakings are projected to bring 27 MTPA of regasification capacity and 1.12 mmcm of storage capacity online. Average regasification utilisation in India grew noticeably in 2024 from 49% in the prior year to 59%, as the market raised LNG buying to meet gas for power demand due to heatwaves. Soft demand from Europe and North Asia had made spot LNG prices trend lower in 2024 – improved import economics also prompted the market to buy more LNG.

Europe gradually eased its energy crisis by addressing the plunge in Russian piped gas with LNG imports and piped gas imports from other origins. In 2024, Europe continued to enhance its LNG import capacity by expediting regasification startups, with a total capacity of 22.3 MTPA, although at a slower pace compared to 30 MTPA added in 2023. Three of the startups in 2024 were new terminals and two were an expansion project. Collectively, these projects accounted for 33.6% of global capacity additions in 2024.

Figure 7.5: Receiving terminal import capacity and regasification utilisation by market, 2024



Source: Rystad Energy

Note:
Utilisation rates are calculated by dividing the annual import volume by the annual Nameplate Capacity. Optimisation and debottlenecking may allow certain sites to import a higher volume than their Nameplate Capacity, provided that the Design Capacity is not exceeded. This results in a utilisation rate of more than 100%.

Germany led the growth in Europe, with three FSRU-based startups, including the 5.5 MTPA Mukran LNG (Energos Power), the 4.4 MTPA Mukran LNG (Neptune), and the 3.7 MTPA Stade LNG 1 (Transgas Force), together contributing 13.6 MTPA of capacity addition. This is followed by Belgium, with the 4.7 MTPA expansion project at Zeebrugge terminal. Greece also commissioned the 4 MTPA Alexandroupolis FSRU. Europe continued its preference for floating-based projects over onshore terminals, giving that floating terminals offer greater flexibility on deployment and lower fixed investment. Out of the five projects commissioned in 2024, four were FSRU-based, totaling 17.6 MTPA.

Europe is expected to add 55.9 MTPA of regasification capacity between 2025 and 2027, including projects which are under construction or have reached FID, mostly in Germany, Italy and Greece. Germany was the largest contributor to Europe's regasification expansion in 2024, with a capacity addition of 13.6 MTPA. Germany will keep the position between 2025 and 2027 by adding another 19.3 MTPA. This involves three expansion projects at existing terminals, including two onshore projects, Elbehafen LNG 2 and Stade LNG 2, and one FSRU-based project, Wilhelmshaven FSRU 2. The first phases of Elbehafen and Stade are both floating based, while the two may switch to onshore mode with the expansions, as the market sees the necessity to maintain LNG imports in the medium to long term. Meanwhile, high gas storages have reduced Germany's regasification utilisation from 39% in 2023 to 21% in 2024.

Europe's regasification utilisation dropped to 41% on average in 2024 from 54% in the prior year, with muted LNG imports in 2024 due to strong renewable output, mild weather and high storage levels. Although piped gas from Russia remained at low levels, piped flows to Europe rebounded in 2024 with increments from Norway and Azerbaijan. This in couple with high inventory levels, curbed Europe's LNG demand. France operated its LNG import terminals at an average utilisation of 64% in 2024, dropping from 77% in 2023. Belgium's regasification utilisation fell from over 120% in the previous year to 60% in 2024, although the level remained much higher than most other markets. With the improving balance of the European market, its gas price benchmark, the TTF, has maintained a downward trend and averaged $10.96 per mmBtu, with an 16.3% year-on-year decrease. Russia sent 49.5 bcm of pipeline gas to Europe in 2024, up 3.7% YOY but down over 70% from the pre-conflict levels. At the same time, affected by weak demand, LNG flows from the US to Europe decreased from 56.63 MT in the prior year to 46.32 MT, making up 46% of Europe's total LNG imports.

The US remained the sixth-largest market for regasification capacity as of the end of 2024, at 41.4 MTPA in total. Despite the relatively high regasification capacity, US demand for LNG imports has remained low, due to strong growth momentum in domestic gas production since the shale revolution a decade ago. Average utilisation of LNG import terminals was flat at 5% in 2024 compared to 2023. while 85% of US LNG imports were received by terminals in Puerto Rico. Since the San Juan FSRU, with an annual import capacity of 1.1 MTPA, was put into operation in 2020, it has effectively relieved the pressure on the existing terminals. Average regasification utilisation in North America, including the US, Mexico and Canada, edged higher from 4% in 2023 to 5% in 2024. The region has become more export-oriented for LNG, weighing on the outlook for the regional regasification sector, and may prompt more import terminals to turn idled or transform to export facilities in the future.

Latin America witnessed significant regasification startups in 2024, with a total capacity addition of 13.8 MTPA. This brought the region's total capacity to 62.2 MTPA as of the end of 2024. Three FSRU projects came online in 2024, including the 6 MTPA Para LNG (Golar Celsius), the 3.8 MTPA Sao Paulo LNG, and the 4 MTPA Terminal Gas Sul LNG (Energos Winter), all in Brazil. The startups collectively added 0.48 mmcm of LNG storage capacity. Brazil in 2024 experienced its most severe drought in decades, causing a plunge in hydropower output while lifting gas for power demand. As a result, Brazil's LNG imports rebounded significantly, rising from only 0.66 MT in the prior year to 2.94 MT in 2024. The market's regasification utilisation was lifted from 2% in 2023 to 7% in 2024. The volatility of domestic renewable output in Brazil has caused uncertainty about the market's LNG import demand. As a result, FSRU-based terminals are likely to remain the dominance at Brazil's regasification sector.

Courtesy CNOOC

Table 7.1: LNG regasification terminals, January-December 2024

Receiving capacity	New LNG onshore import terminals	Number of regasification markets
+66.6 MTPA Net growth of global receiving capacity.	**+4** Number of new onshore regasification terminals.	No new markets with regasification capacity emerged in 2024.
Net nameplate regasification capacity grew by 66.6 MTPA from end 2023 and reached 1,064.7 MTPA by end 2024.	New onshore regasification terminals were added in China (Chaozhou Huaying, Huizhou, Zhangzhou), and South Korea (Ulsan).	The number of markets with regasification capacity was flat at 47, as of end-2024.
Capacity addition by new terminals was 44.5 MTPA, with another 19.1 MTPA from expansion projects and 2.9 MTPA from restart of one idled terminal.	Five expansion projects at existing onshore terminal were completed in China (Shandong Qingdao LNG 3, Tianjin Nangang LNG 2 & 3, Tianjin PipeChina LNG 2 expansion), and Belgium (Zeebrugge 2 Expansion Step 1).	Egypt reopened Ain Sokhna FSRU in 2024, enabling it to resume LNG imports after Sumed FSRU was closed in late 2023.

Source: Rystad Energy

7.4 RECEIVING TERMINAL LNG STORAGE CAPACITY

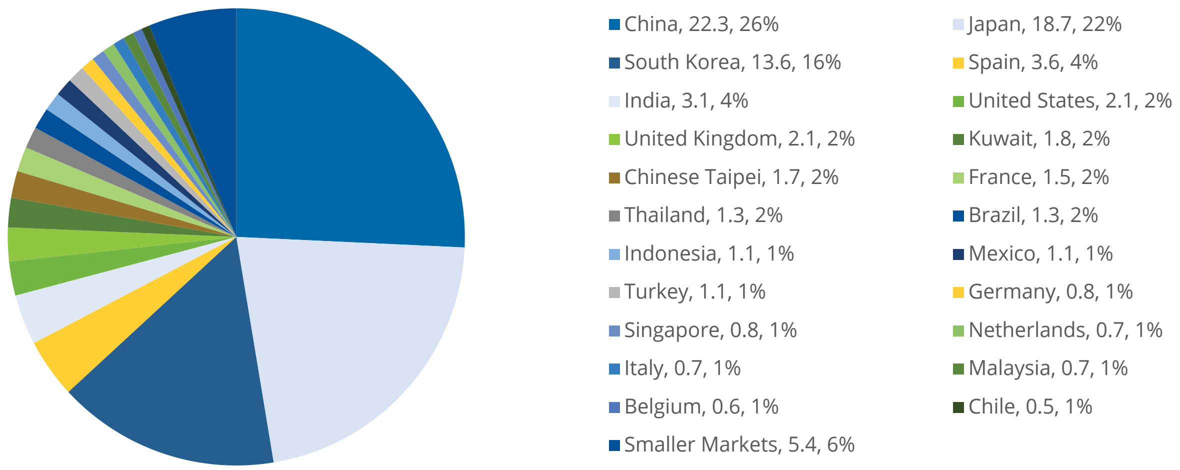
86.5 mmcm
of global storage capacity, as of end-2024

Global LNG storage capacity experienced sustained expansion in 2024, reaching a total of 86.5 mmcm. The commissioning of ten new terminals and six expansion projects, together with the restart of one idled terminal, added 5.9 mmcm to the global LNG storage capacity in 2024, slowing from 6.9 mmcm added in 2023. Asia, driven entirely by China, dominated the growth by adding 3.9 mmcm through seven projects, accounting for 67% of the global increase. This is followed by Europe, with a capacity addition of 0.65 mmcm in Germany and Greece, while Asia Pacific, Latin America and Africa contributed 0.65 mmcm, 0.48 mmcm and 0.17 mmcm, respectively. South Korea, Germany and Brazil added 0.65 mmcm, 0.49 mmcm and 0.48 mmcm, respectively, of LNG storage capacity in 2024.

China, Japan and South Korea dominated the share in the global operational LNG storage capacity, at 63% in 2024, with 25.7% by China, 21.7% by Japan and 15.7% by South Korea. Region wise, Asia and Asia Pacific combined accounted for 74.7% of global LNG storage capacity. Terminal wise, Pyeongtaek LNG, Incheon LNG and Tongyeong LNG, all in South Korea and fully owned by KOGAS, ranked as the world's three-largest LNG storage facilities, with capacities of 3.4 mmcm, 2.9 mmcm and 2.6 mmcm, respectively.

China overtook Japan as the world's largest market by LNG storage capacity in 2024. China has tended to install mega storage tanks, with capacity as large as 200,000 to 270,000 cm per tank, while tanks of similar sizes are rarely built in other markets or at terminals built years ago. Mega storage tanks can help China to diversify the business portfolio of regasification terminals from only regasification to storage service and re-export. Tianjin Nangang LNG Phase 2 and Phase 3 added 1.3 mmcm of storage capacity in 2024, followed by 0.66 mmcm from Tianjin PipeChina LNG 2 expansion, 0.6 mmcm from Huizhou LNG 1, 0.6 mmcm from Chaozhou Huaying LNG 1, 0.48 mmcm from Zhangzhou LNG 1, and 0.27 mmcm from Shangdong Qingdao LNG 3. Due to the importance of energy security, China has accelerated the development of its LNG infrastructure, by expanding regasification capacity and storage capacity. As of the end of 2024, 38 regasification projects were under construction in China, with a planned storage capacity addition of 30.5 mmcm. Among these, the Jiangsu Yancheng Binhai LNG and Tangshan LNG projects will be the top contributor of storage capacity addition, with 4.3 mmcm and 3.2 mmcm, respectively. CNOOC's Jiangsu Yancheng Binhai LNG project in January 2025 successfully commissioned its 270,000 cm LNG storage tank, which is the largest of its kind globally and developed independently by CNOOC. The tank can store 119,000 tonnes of LNG, meeting the energy needs of 22 million residents for two months, while reducing carbon emissions significantly.

Figure 7.6: LNG storage tank capacity by market (mmcm) and percentage of total, 2024



Source: Rystad Energy

7.5 RECEIVING TERMINAL BERTHING CAPACITY

The berthing capacity of LNG receiving terminals plays a critical role in determining the size and type of LNG carriers that can be accommodated, directly impacting shipping efficiency and flexibility. LNG carriers are typically categorised by size: conventional vessels (125,000 to 175,000 cm), Q-Flex carriers (about 210,000 cm), and Q-Max carriers (about 260,000 cm), with the last being the world's largest LNG carriers in operation.

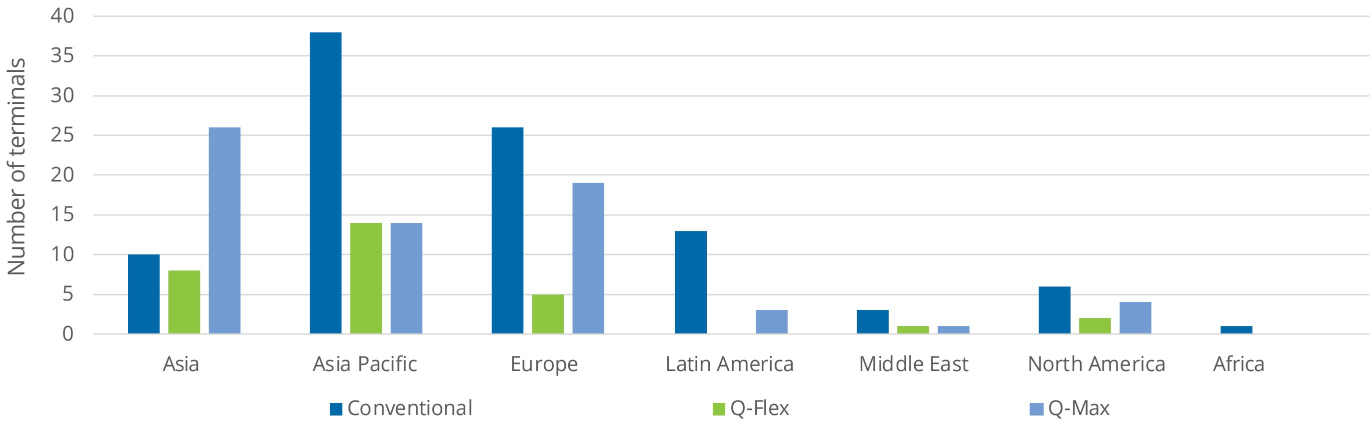
As of the end of 2024, 194 operational LNG regasification terminals are in service globally. Of these, 97 are designed to accommodate only conventionally-sized vessels, reflecting their widespread use. Among the ten new regasification projects commissioned in 2024, five can berth conventional carriers, underscoring their continued relevance despite a growing preference for larger Q-Class vessels. The increasing deployment of Q-Flex and Q-Max vessels, combined with rising storage capacity at LNG terminals, has driven infrastructure upgrades to enhance berthing capabilities worldwide. This shift has enabled terminals to adapt to evolving shipping dynamics and improve operational flexibility.

Berthing capacity across the world is also expanding. As of the end of 2024, Q-Max carriers can berth at 67 terminals worldwide, with 26 in Asia, 19 in Europe, 14 in Asia Pacific, three in Latin America, one in Middle East, and four in North America. 30 terminals could accommodate Q-Flex vessels in 2024. Of these, 22 are located in Asia and Asia Pacific, representing 73% of the global share, highlighting the region's dominance in large-scale LNG infrastructure. Among the ten new projects brought online in 2024, four terminals can berth Q-Max carriers, and one has the capability to accommodate Q-Flex vessels.

Onshore regasification terminals lead in terms of large vessel accommodation. Of the 145 operational onshore terminals, 84 are capable of berthing Q-Max or Q-Flex carriers. In contrast, floating and offshore terminals are predominantly designed for conventional vessels, with only 27% equipped to handle Q-Class carriers. In 2024, three new onshore terminals became operational in China – two (Huizhou LNG 1 and Zhangzhou LNG 1) can berth Q-Max carriers and one (Chaozhou Huaying LNG 1) can accommodate Q-Flex vessels. Additionally, two new FSRU-based terminals in Germany – Mukran LNG and Stade LNG 1 – also support Q-Max berthing.

The expansion of berthing capacity reflects a clear trend towards accommodating larger LNG carriers, driven by the need for greater efficiency in LNG shipping and supply chain operations, in the context of rising LNG demand across regions. As the global LNG market continues to evolve, the strategic adaptation of terminal infrastructure will remain a key enabler of supply flexibility and market responsiveness.

Figure 7.7: Number of maximum berthing capacity of LNG receiving terminals by region, as of end-2024



Source: Rystad Energy

7.6
FLOATING AND OFFSHORE REGASIFICATION

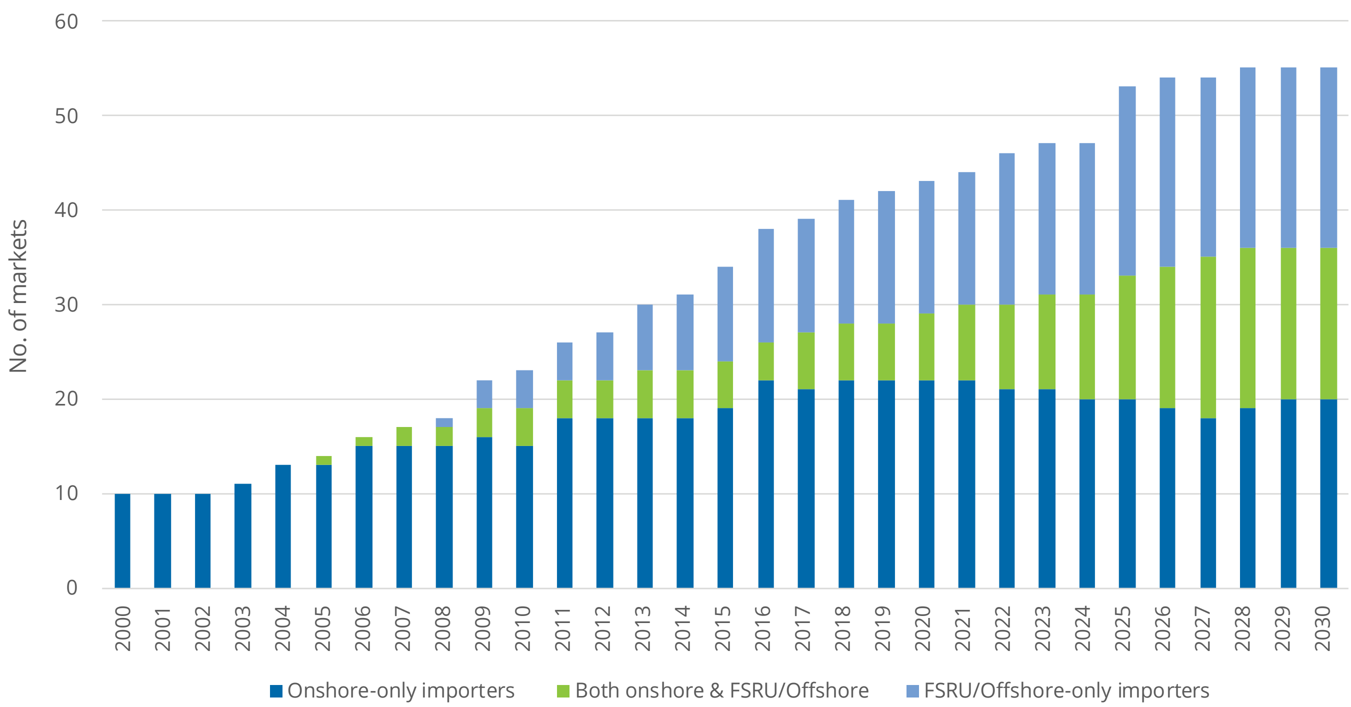
41.1 MTPA

of floating and offshore terminals under construction, as of end-2024

Floating and offshore regasification projects continue to gain traction, offering flexibility and cost efficiency for LNG imports, particularly in emerging markets. As of the end of 2024, there were 52 operational floating and offshore regasification projects worldwide, with a combined regasification capacity of 207.3 MTPA. These facilities account for approximately 20% of global regasification capacity, underscoring their growing role in the LNG value chain. While onshore terminals still dominate the market, FSRUs have become the preferred choice for new markets due to their scalability and shorter construction timelines.

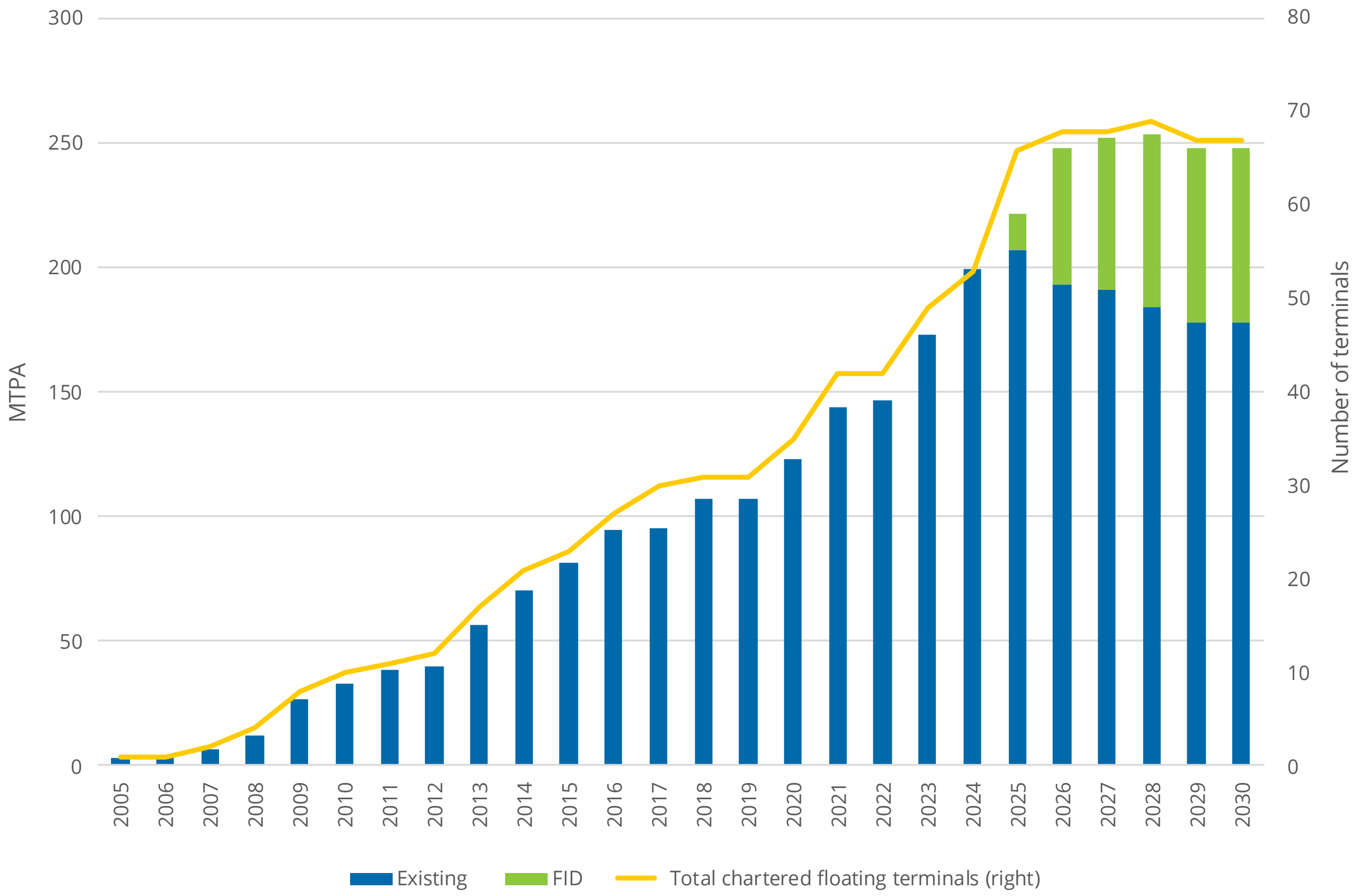
Eight floating-based projects commissioned in 2024, adding 34.4 MTPA of regasification capacity. Europe accounted for over 50% of the growth, driven by strategic initiatives to enhance LNG import infrastructure in response to energy security concerns and to offset missing volumes from Russian piped gas. The region commissioned four floating projects with a combined capacity of 17.6 MTPA. Strong growth of floating-based terminals was also observed in Latin America as well, with three new floating terminals, collectively adding 13.8 MTPA of regasification capacity.

Figure 7.8: Number of regasification markets by type, 2000-2030



Source: Rystad Energy

Figure 7.9: Floating and offshore regasification capacity by status and number of projects, 2005-2030



Source: Rystad Energy

As of the end of 2024, 13 floating and offshore regasification projects are under construction globally, representing a total capacity of 41.1 MTPA. This includes 21 MTPA from Asia and Asia Pacific, 9.8 MTPA from Europe, 6.1 MTPA from Latin America, and 4.2 MTPA from Africa. Some 62% of this capacity is expected to start operation in 2025. Europe is expected to have four projects commissioned in 2025 and add a combined capacity of 9.8 MTPA across four markets – Germany, Italy, Estonia, and Cyprus.

Over the past decade, FSRUs have been instrumental in introducing LNG imports to new markets. As of the end of 2024, 16 out of the 47 LNG-importing markets rely exclusively on floating and offshore facilities, while 11 use a mix of floating and onshore terminals. By contrast, only eight markets exclusively relied on floating terminals in 2014. FSRUs have gained popularity due to their lower upfront investment, faster construction timelines, and ability to address short-term demand fluctuations. The 2022 energy crisis further accelerated the adoption of FSRUs in Europe, where urgency to reduce dependency on Russian pipeline gas led to a wave of floating-based regasification constructions and plans.

In contrast to emerging markets, established gas markets continue to prioritise onshore terminals due to their larger capacity and storage capabilities. These facilities also provide greater resilience against weather-related risks, vessel performance issues, and chartering uncertainties. China, the second-largest LNG regasification market, operates 32 terminals (51 projects) with a total capacity of 156.3 MTPA. A total of 31 terminals in China are onshore, with only one FSRU – the 6.1 MTPA Hong Kong FSRU (Bauhinia Spirit) – commissioned in 2023. This underscores China's preference for onshore terminals, which offer flexibility for future capacity expansions and greater operational stability. This is supported by the positive outlook for the market's LNG import in the medium to long term to meet the still-rising demand by the late 2030s. China is expected to maintain its position as the main engine for global LNG demand.

7.7 RECEIVING TERMINALS WITH RELOADING AND TRANS-SHIPMENT CAPABILITIES

Highest re-exports in 2024: Belgium,

0.85 MTPA

The global re-export LNG market has grown rapidly as import terminals expand their service offerings beyond traditional regasification services. Many terminals now provide reloading, trans-shipment, small-scale LNG bunkering, and truck-loading services, transforming into integrated LNG hubs. These hubs enable importers to capitalise on cross-market arbitrage opportunities and optimise their LNG portfolios through flexible term contracts. Enhanced reloading and trans-shipment capabilities at terminals are increasingly critical for meeting the demands of a dynamic market, allowing more efficient redistribution of LNG to regions with higher demand or better pricing. This trend highlights the evolving role of import terminals in global LNG trade.

Global LNG re-exports decreased 38% in 2024 to 4.96 MT from the year-earlier level of 7.97 MT, with 13 markets re-exporting cargoes, down from 21 in 2023. The decrease was mainly driven by Europe and Asia, where LNG re-exports decreased from 3.12 MTPA and 1.39 MTPA, respectively, in 2023 to 2.29 MTPA and 0.65 MTPA in 2024, although their combined share in global LNG re-exports edged higher from 57% to 59%. Disruption to shipping in the Red Sea has largely curbed cross-region re-exports via the two routes from Europe to Asia and from Asia to Europe.

Belgium rose to be the world's largest re-export market in 2024, with a total volume of 0.85 MT and making up 17% of the global re-export. The market only re-exported 0.12 MT of LNG in 2023. Zeebrugge terminal in Belgium has been one of the main re-export hubs in Europe. It has both bunkering and trans-shipment facilities. Indonesia's re-exports remained strong in 2024, with a total volume of 0.85 MT, slightly lower than 0.88 MT in 2023. This was supported by the deal between TotalEnergies and Pertamina to use the Arun LNG terminal as a trading hub. The two companies reached the agreement in 2021 to use two tanks at the terminal to store LNG from international sources as part of the terminal's global marketing strategy. Arun LNG was previously an export terminal but converted to an import terminal in 2015.

Spain was the third-largest LNG re-export market in 2024, despite a plunge in the volume from 1.54 MT in 2023 to 0.78 MT in 2024. Spain, boasting the highest regasification capacity in Europe, has emerged as a pivotal regional LNG hub. This advantage enables it to redistribute LNG cargoes to other European markets, including Italy, the Netherlands and France. The 5.9 MTPA El Musel terminal in Spain, which had been idle for nearly a decade as a consequence of insufficient demand, was reactivated in 2023. Equipped with two 150,000 cm LNG storage tanks, the terminal is expected to be primarily utilised for storage and re-export purposes. The El Musel terminal mainly re-exports LNG to Europe, to ensure the region's security of supply, and will be used for tank reloading to supply cities nearby.

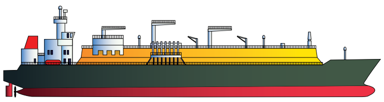
Re-exports from China also fell in 2024 to 0.46 MT from 1.39 MT in the prior year, with a 9.3% share in global re-exports. The decrease in trading scale is mainly caused by reduced arbitrage opportunities. The primary destinations included neighbouring markets South Korea and Japan. China's LNG re-exports were mainly sourced from PipeChina's Hainan Yangpu LNG terminal. This terminal represents one of the few facilities within China that possess both reloading and trans-shipment capabilities, playing a pivotal role in facilitating China's LNG re-export activity.

The first LNG-bonded warehouse in the Beijing-Tianjin-Hebei region, with three LNG terminals in Tianjin, was officially put into use in early 2024. Following this, the first LNG cargo, with a volume of 66,900 tonnes, was successfully unloaded into the LNG bonded warehouse. The warehouse has completed several LNG bonded operations for companies such as CNOOC, Sinopec and ENN. The establishment of the Tianjin LNG bonded warehouse is of great significance for the city to become an LNG trading centre and LNG bunkering centre in northern China.

Courtesy CNOOC

8 LNG Bunkering Vessels and To

erminals



56

active vessels

17 in Asia/Asia Pacific

25 in Europe

1 in Middle East

10 in North America

2 in Latin America

1 in Russian Baltic

Active fleet average capacity

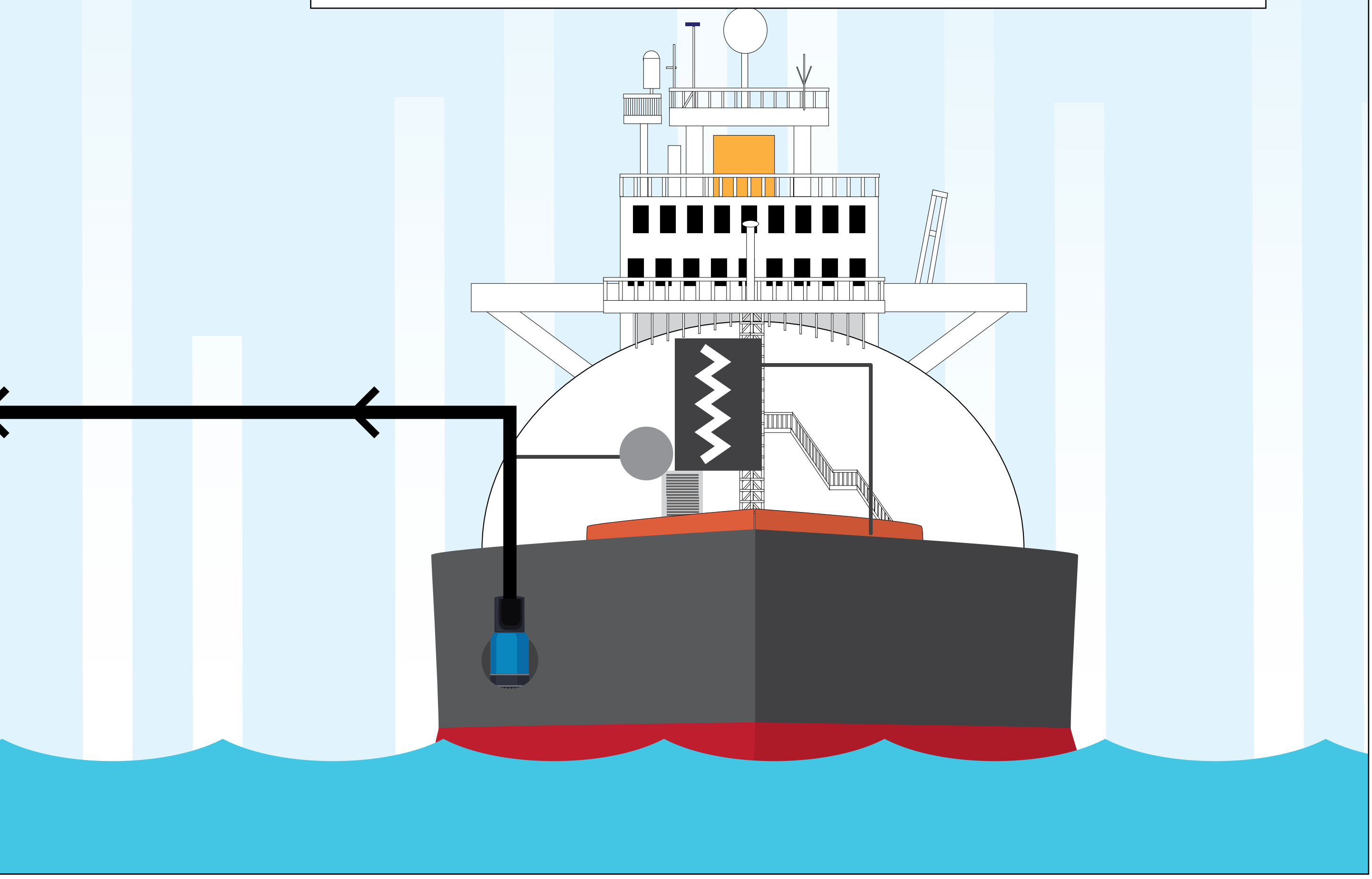
8,806 cm

23

on orderbook

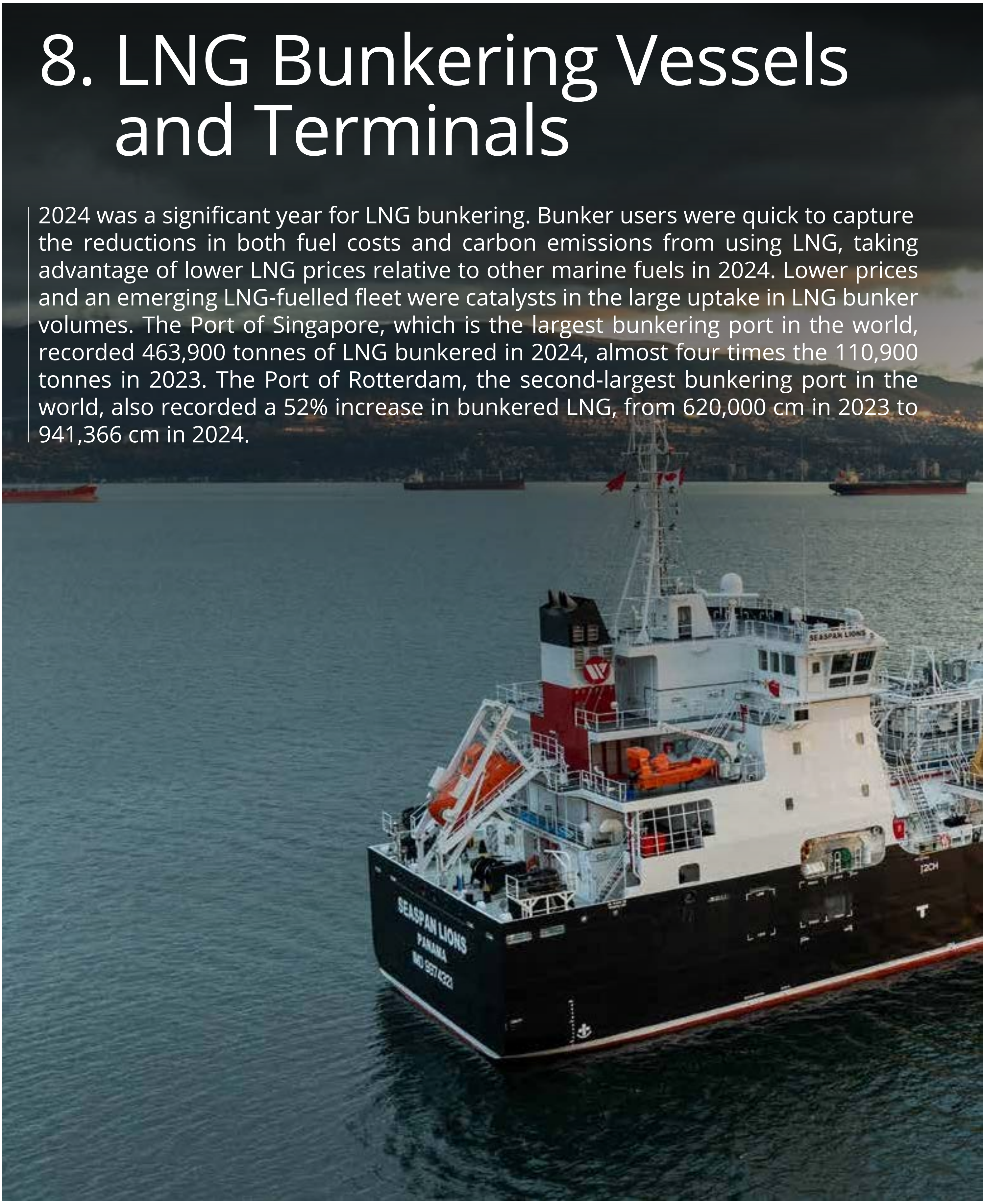
Orderbook fleet average capacity

15,460 cm



8. LNG Bunkering Vessels and Terminals

2024 was a significant year for LNG bunkering. Bunker users were quick to capture the reductions in both fuel costs and carbon emissions from using LNG, taking advantage of lower LNG prices relative to other marine fuels in 2024. Lower prices and an emerging LNG-fuelled fleet were catalysts in the large uptake in LNG bunker volumes. The Port of Singapore, which is the largest bunkering port in the world, recorded 463,900 tonnes of LNG bunkered in 2024, almost four times the 110,900 tonnes in 2023. The Port of Rotterdam, the second-largest bunkering port in the world, also recorded a 52% increase in bunkered LNG, from 620,000 cm in 2023 to 941,366 cm in 2024.



Courtesy Seaspan Energy


NO SMOKING
seaspan

56 units

global operational LNG bunkering vessel fleet, end-2024

While concerns about methane slip challenge LNG's environmental credentials as a marine fuel, its price competitiveness, widespread availability, and mature infrastructure continue to offer advantages over alternative options. During the first half of 2024, declining global LNG prices enhanced its position as a cost-effective and lower-emissions fuel compared to conventional bunker fuels. Even after accounting for the increase in LNG prices in the second half of 2024, deliveries and new orders of LNG-fuelled vessels did not slow, as LNG continued to remain competitive in terms of price against conventional fuels. Although it is expected that volatility in the short-term market will continue due to ripple effects from the partial loss of Russian pipeline gas to Europe, prices are expected to trend downwards when new LNG supply is introduced in the medium to long term, particularly later this decade. The increased supply is projected to lower LNG prices, allaying LNG fuel costs.

LNG bunkering demand has been on the rise due to stricter environmental regulations, price competitiveness against existing fossil fuels, and an expanding LNG bunkering supply chain. The IMO 2020 Global Sulphur Limit, which capped sulphur content in marine fuels at 0.5% globally and at 0.1% in emission control areas, catalysed LNG adoption due to the fuel's near- zero-sulphur emissions. In 2023, the IMO's revised Greenhouse Gas (GHG) Strategy set ambitious decarbonisation targets, including a 20% to 30% GHG reduction by 2030 and a 70-80% cut by 2040, relative to 2008 levels. These measures have solidified LNG's role as a transitional fuel for maritime decarbonisation.

In 2024 and 2025, policy and regulatory advancements continued to influence the LNG bunkering landscape. The IMO's amendments to Annex VI of the MARPOL Convention (MEPC.385(81)), effective from August 1, 2025, introduced key provisions on low-flashpoint fuels, gaseous fuel definitions, the replacement of marine diesel engines and steam systems, and enhanced granularity of the IMO Ship Fuel Consumption Database (IMO DCS). These changes are set to increase transparency in fuel consumption data and encourage the adoption of cleaner fuels like LNG. Meanwhile, the IMO also enforced a ban on heavy fuel oil (HFO) in Arctic shipping, effective July 1, 2024, further promoting LNG as a cleaner alternative due to its minimal black carbon emissions. Regional initiatives like the European Union's ETS and FuelEU Maritime also played a pivotal role, offering financial incentives and stricter compliance measures to accelerate the use of LNG and hybrid fuel technologies. These regulatory advancements, alongside technological innovations addressing methane emissions and improvements in bunkering infrastructure, have strengthened LNG's position in the maritime sector. The global expansion of LNG bunkering infrastructure, along with increased port capabilities to support LNG-fuelled vessels, is further boosting accessibility. As these policy frameworks evolve, they create a more favourable environment for LNG adoption, supporting the industry's decarbonisation goals and ensuring LNG's continued growth as an environmentally viable fuel option.

LNG bunkering has become an essential component of the maritime sector's shift towards cleaner energy sources. The primary methods for supplying LNG to vessels are terminal tank-to-ship, truck-to-ship, and ship-to-ship (STS) transfers. Among these, STS bunkering is particularly prevalent, offering faster refuelling for LNG-powered ships compared to truck-to-ship operations, which are constrained by lower flow rates and smaller bunker capacities.

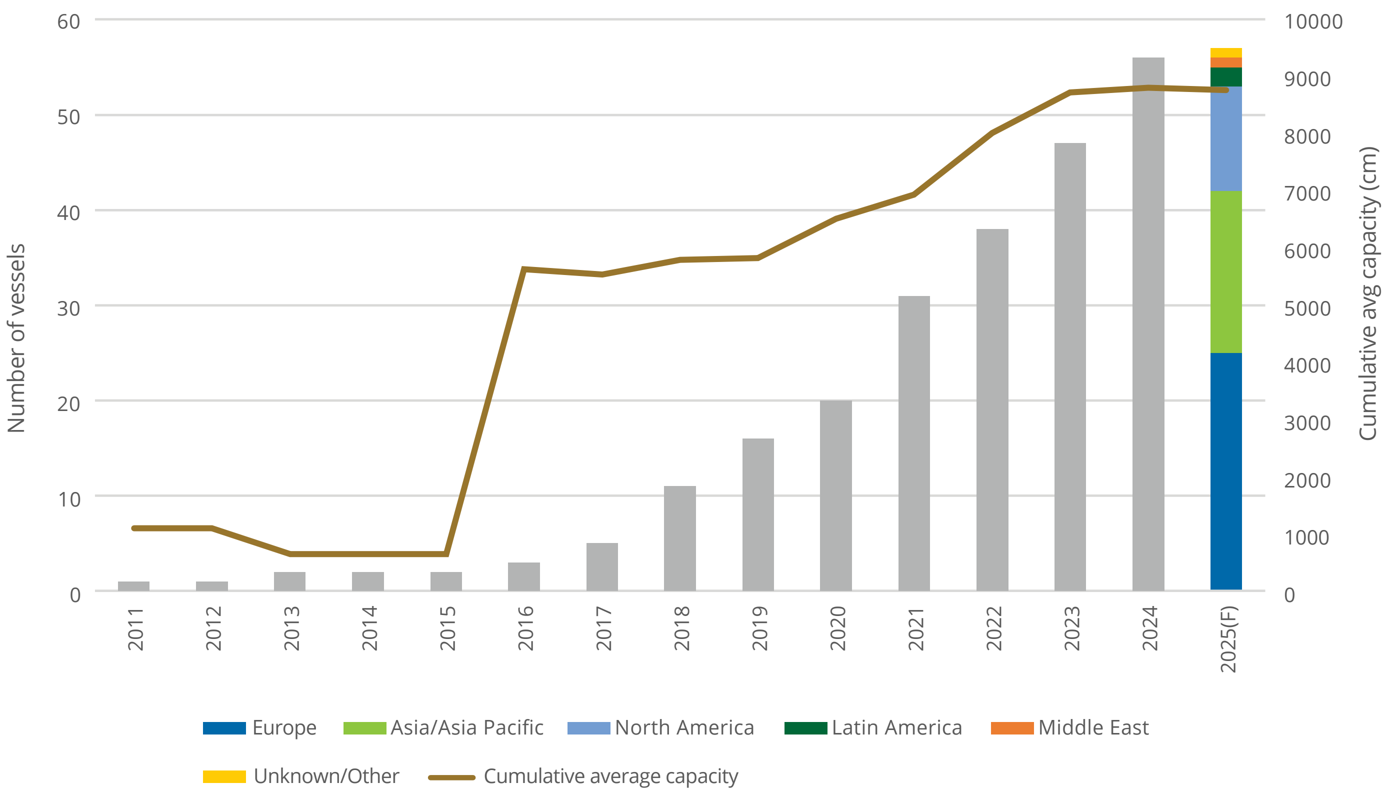
Early LNG bunkering relied on small-scale LNG carriers that primarily performed cargo deliveries rather than dedicated STS operations. These carriers, with capacities ranging from 1,000 to 20,000 cm, were introduced in the 1990s but were not specifically designed for STS bunkering. A notable example is the Pioneer Knutsen, a 1,100 cm LNG carrier launched in 2004, which has a long history of small-scale deliveries and STS transfers along Norway's coast well before its first LNG bunkering operation in 2011.

The concept of dedicated STS LNG bunkering began with the Seagas, a 187 cm vessel that started operations in 2013 at the Port of Stockholm. Converted from a Norwegian ferry, the Seagas refuels the Viking Grace ferry with approximately 70 tonnes of LNG per trip, loaded via trucks from the Nynashamn terminal, 60 kilometres from Stockholm.

In 2017, purpose-built LNG bunkering vessels entered service, marking a turning point for STS bunkering. The Green Zeebrugge (5,000 cm), the Coralius (5,800 cm), and the New Frontier 1 (6,500 cm, ex-Cardissa) began operations in Europe, leveraging their proximity to LNG terminals. These vessels enabled efficient bunkering operations across the North Sea and Baltic Sea regions. In 2018, the Kairos (7,500 cm), commenced operations at Lithuania's Klaipeda LNG terminal, further expanding regional STS capabilities.

Conversions of existing vessels have also bolstered LNG bunkering infrastructure. The Oizmendi, a former oil tanker, was converted into a multifuel bunkering vessel in 2018, offering 660 cm of capacity at Spain's Port of Bilbao. Similarly, the 7,500 cm Coral Methane, originally an LNG transport vessel, was upgraded for STS bunkering and now operates across multiple European ports, including Barcelona and Rotterdam.

Figure 8.1: Cumulative number of operational LNG bunkering vessels by region and average vessel capacity, based on LNG bunkering start-year 2011-2025



Source: Rystad Energy

Ports and terminals have significantly expanded their LNG bunkering capabilities, often modifying existing infrastructure to meet growing demand. Truck-to-ship bunkering, while frequently used due to its low capital requirements, is constrained by its limited capacity and flow rates. In contrast, terminal tank-to-ship and STS bunkering support higher volumes but require greater investment in storage, vessels, and loading arms.

The integration of small-scale LNG terminals into the North Sea and Baltic Sea regions during the 2010s was critical in establishing a robust bunkering network. Facilities such as Norway's Risavika plant and Finland's Pori terminal incorporated direct terminal-to-ship bunkering capabilities, supported by expanded storage and specialised loading systems. Finland also commissioned its new small-scale receiving terminal in Tornio Manga in 2019, with both tank-to-ship and truck-to-ship bunkering services.

In Southern Europe, the CORE LNGas hive initiative accelerated LNG bunkering development across the Iberian Peninsula. Spanish ports, including Cartagena and Bilbao, have implemented truck-to-ship and jetty-to-ship bunkering services. In 2023, Repsol inaugurated another LNG bunkering terminal in Santander, reinforcing its commitment to sustainability and providing fuel for Brittany Ferries' LNG-powered vessels.

In Asia, Singapore's port has been modified and equipped with truck-to-ship bunkering capabilities since 2017. Likewise in Japan, the Port of Yokohama introduced truck-to-ship bunkering services in 2018.

The global LNG bunkering fleet has expanded significantly since 2020, with many regions introducing their first dedicated LNG bunkering vessels.

In Europe, the Gas Agility (18,600 cm) with its membrane tanks performed the first STS bunkering at the Port of Rotterdam in November 2020, which set a benchmark for the sector. Other notable vessels included Russia's Dmitry Mendeleev (5,800 cm, ice class), Estonia's Optimus (6,000 cm), Italy's Avenir Aspiration (7,500 cm), and France's Gas Vitality (18,600 cm, sister ship to Gas Agility). The Gas Vitality commenced operations in France in 2021, while Korea Line's K. Lotus (18,000 cm) joined Shell's fleet in Rotterdam in 2022. By March 2023, the Haugesund Knutsen (5,000 cm) also performed its maiden LNG bunkering at the Port of Barcelona.

Titan Energy expanded its fleet of inland barges in 2023 with the acquisition of two 12,000 cm vessels, Titan Unikum and Titan Vision, which were converted to handle LNG, biomethane, and hydrogen-derived e-methane. Meanwhile, the Levante LNG (12,500 cm) owned by Scale Gas and Peninsula, began operations in November 2023, serving the ports of Algeciras and Gibraltar. Ports in France, including Le Havre and La Rochelle, also conducted their first STS LNG bunkering operations in 2021 and 2022, respectively.

The Asia Pacific region has also expanded its LNG bunkering capacity. South Korea introduced the SM Jeju LNG2 in 2020. Japan's Kaguya (3,500 cm) conducted its first STS bunkering operation in the same year, serving vessels in the Chubu region. Malaysia followed suit with the Avenir Advantage (7,500 cm), which supports STS operations and small-scale LNG transportation. Singapore entered the market with the 7,500 cm FueLNG Bellina in 2021, its first LNG bunker vessel, operated by FueLNG, a joint venture between Keppel Offshore & Marine and Shell Eastern Petroleum. These advancements underline the region's strategic shift toward LNG as a sustainable marine fuel. The first China-operated LNG STS bunkering service took place in 2022 by CNPC in Shenzhen Yantian, with the 8,500 cm LNG bunkering vessel named Xin Ao Pu Tuo Hao built by Dalian Shipbuilding Industry Group.

In the United States, the development of LNG bunkering infrastructure gained momentum. The Clean Jacksonville (2,200 cm), the market's first bunker barge featuring a membrane cargo tank, served the Port of Jacksonville until 2024 before being reassigned to Galveston, Texas. The Q-LNG ATB 4000, which has capacity of 4,000 cm, was delivered in 2021 and became the first articulated tug barge (ATB) for LNG bunkering. Additional vessels, including Clean Canaveral (5,500 cm) in 2021 and Clean Everglades (5,500 cm) in 2023, bolstered operations along the southeastern US coast. The Clean Everglades was assigned to Jacksonville in Florida, to take the place of the Clean Jacksonville, which was moved to Galveston. Meanwhile, the Coral Favia (10,000 cm), which is capable of operating as both a small-scale LNG shuttle or bunkering vessel, shifted from shuttle operations at a regasification terminal in Germany to support Eagle LNG's bunkering operations in North America in 2024. Latin America's inaugural LNG bunkering vessel, the Avenir Accolade (7,500 cm), began operating in Brazil in 2021, and is currently chartered to New Fortress Energy with operations in the Caribbean.

At the end of December 2024, the global operational LNG bunkering and bunkering-capable small-scale vessel fleet reached 56 units, nine more than that in 2023, with a total added capacity of 82,900 cm.

2024 saw four new LNG bunkering vessels in Asia, one in Europe and four in the Americas. The KEYS Azalea (3,500 cm) was launched in Japan, while the Hai Yang Shi You 302 (12,000 cm) and Huaihe Nengyuan Qihang (14,000 cm) both serve the market in China. The Paolina Cosulich (8,200 cm) has been deployed close to Singapore since March 2024. In Europe, the Energy Stockholm (8,000 cm) will support the Amsterdam-Rotterdam-Antwerp region. In North America, the Seaspan Garibaldi (7,600 cm) and Seaspan Lions (7,600 cm) will provide LNG fuelling service for vessels on the west coast, while the Progress (12,000 cm) will be based in the US east coast, at the port of Savannah in Georgia. The Coral Favia (10,000 cm) was also introduced as an LNG bunkering vessel, receiving LNG bunkering volumes from Eagle LNG's Maxville facility in Florida.

In 2025 alone, there will be two LNG bunkering vessels expected for delivery. The first is the 7,600 cm Seaspan Baker, built by CIMC Sinopacific Offshore & Engineering, which will be third from a set of three same-capacity LNG bunkering vessels ordered by Seaspan Energy. It is expected to service North America after delivery in January 2025. The second will be the 7,500 cm Green Pearl, which is chartered by Axpo and built by the San Giorgio del Porto shipyard in Italy.

The LNG bunkering fleet is concentrated in Europe with the highest capacity of operational bunkering vessels. This is followed by Asia/Asia Pacific and then North America, both of which have seen rapid expansions in the past five years. The fleet is quite young, with most of the active bunkering vessels delivered in the past five years, while the typical size of LNG bunkering vessels has increased over time. Twenty-three vessels are currently under construction with a total bunkering capacity of 355,600 cm, seven of which are expected to come online in 2026 and another 10 in 2027.

As of the end of 2024, Europe has the highest bunkering capacity, with a total of 190,757 cm across 25 vessels currently in operation within the region. Europe's LNG bunkering sector has experienced significant growth, marked by increased infrastructure development and a surge in LNG-fuelled vessel orders. A notable milestone was the christening of the Energy Stockholm, Europe's largest inland LNG bunkering vessel with 8,000 cm capacity, enhancing LNG refuelling capabilities across the continent. This expansion aligns with the European Union's 'Fit for 55' regulatory package, which mandates the development of LNG bunkering infrastructure across a broad network of ports, aiming to reduce maritime emissions. Additionally, Spain reported a significant increase in LNG bunker sales, with loadings from regasification terminals more than doubling to 3.8 terawatt-hours (TWh) in 2024, up from 1.5 TWh the previous year. These developments underscore Europe's commitment to advancing LNG as a transitional marine fuel, supporting the maritime industry's shift towards more sustainable operations.

As of the end of 2024, Asia/Asia Pacific has the second-highest bunkering capacity, with a total of 179,700 cm across 17 vessels in operation.

Moving to Asia Pacific, the KEYS Azalea (3,500 cm), which was built by Mitsubishi Heavy Industries under contract for KEYS Bunkering West Japan, was delivered and put into operation in 2024. The vessel not only provides LNG bunkering services to oceangoing vessels docked at ports in the Kyushu-Seto Inland Sea region but is also engaged in LNG coastal transportation operations. The Ecobunker Tokyo Bay (2,500 cm), owned by Ecobunker Shipping, will provide LNG bunkering services in Tokyo Bay starting 2026. It is a multi-bunkering vessel capable of both STS LNG and very-low-sulphur fuel oil (VLSFO) bunkering. Osaka Gas is planning to launch an STS LNG bunkering service with a 3,500 cm bunkering vessel in the Osaka Bay and Setouchi regions. This service is expected to begin in 2026.

China currently has five operational LNG bunkering vessels after the first LNG STS bunkering conducted by CNPC with the 8,500 cm Xin Ao Pu Tuo Hao in 2022. CNOOC's first STS transfer was carried out in January 2023 by the Hai Yang Shi You 301 (30,000 cm), built by Chinese shipyard Jiangnan Shipbuilding (Group). The year 2022 also saw another China-built LNG bunkering vessel, with the Hai Gang Wei Lai (20,000 cm, ex-Avenir Allegiance) performing its first STS bunkering. This is operated by Shanghai Shanggang Energy Service and was built by Nantong CIMC SinoPacific Offshore & Engineering. The vessel has conducted LNG STS bunkering operations for vessels mainly in Shanghai Yangshan Port. CNOOC's second LNG bunkering vessel, the Hai Yang Shi You 302 with a capacity of approximately 12,000 cm, was put into operation in Jiangsu Province in 2024. Hai Yang Shi You 302 is China’s first LNG bunkering vessel classified by the China Classification Society (CCS). With the advantages of ‘river-to-sea direct transportation’ and ‘ice-class navigation’, this vessel can provide flexible refuelling services for LNG vessels in China’s rivers and seas. 2024 saw the handover of another Chinese-developed LNG bunkering vessel, Huaihe Nengyuan Qihang (14,000 cm). It is owned by Huaihe Energy Holding Group and was built by Hudong-Zhonghua Shipbuilding Group. The CCS-classed bunkering vessel is capable of navigating oceans and the Yangtze River and has commenced operations mainly at Shanghai's Yangshan Port along the Yangtze River as well as China’s coastal areas.

South Korea currently provides STS bunkering services with four bunkering vessels, namely the SM Jeju LNG1 (7,500 cm), which is undergoing repairs, the SM Jeju LNG2 (7,500 cm), the K LNG Dream (500 cm), and the Blue Whale (7,500 cm). The Blue Whale started operation in 2023 and was built by HD Hyundai Heavy Industries for delivery to Kogas, marking progress in the market’s STS bunkering capabilities. While no new LNG bunkering vessels are expected to enter service in South Korea in 2025, the market is planning to enhance its LNG bunkering capacity at the proposed 13.7 MTPA Dangjin LNG import facility.

Singapore currently has three bunkering vessels in operation. In addition to the FueLNG Bellina (7,500 cm) introduced in 2021, the FueLNG Venosa (18,000 cm) and LNG Brassavola (12,000 cm) were Singapore’s second and third bunkering vessels after both were introduced in 2023.

North America continued its progress toward becoming a significant region in the LNG bunkering market in 2024, reaching a total capacity of 86,400 cm across 10 operational vessels by year-end. 2024 marked the delivery of three newbuild LNG bunkering vessels: the Progress (12,000 cm), Seaspan Garibaldi (7,600 cm), and Seaspan Lions (7,600 cm). The Progress, built by Fincantieri Bay Shipbuilding and operated by Crowley Maritime under a long-term charter with Shell, commenced operations at the US Port of Savannah, Georgia, in August 2024. It has already provided LNG fuelling services to large containerships and is equipped to serve additional ports along the US East Coast. This vessel, the largest Jones Act- compliant LNG bunkering barge, reflects significant technological advancements, including improved cargo handling and faster transfer rates to support growing LNG demand. Additionally, Seaspan Garibaldi and Seaspan Lions, constructed by CIMC SOE for Seaspan Energy, introduced LNG bunkering services on the North American West Coast. While the Seaspan Garibaldi will eventually be positioned to support operations near the Panama Canal, the Seaspan Lions focuses on the Pacific Northwest region, marking a milestone as the first LNG bunkering vessel in the area. Both vessels are equipped with innovative features, such as dual-fuel generators and advanced propulsion systems, which contribute to emissions reduction and align with green shipping goals. These developments underscore the expanding role of US ports and LNG bunkering infrastructure in supporting the maritime industry’s transition to low-carbon fuels. Looking ahead, the Seaspan Baker (7,600 cm) is slated for delivery in 2025, further enhancing the region’s LNG bunkering capabilities.

The newcomer in STS LNG bunkering is the Middle East with the Green Zeebrugge (5,000 cm) LNG bunkering vessel. The ship moved at the end of 2024 to Dubai and has performed the first ever LNG bunkering in the Middle East. This area is identified as a potential new LNG bunkering hub with Oman, the UAE, and Qatar as the main bunkering locations.

Table 8.1: Table of global LNG bunkering vessels

Market	Regional Market	Vessel Name	Delivery	LNG bunkering start date	Capacity (cm)	Concept	Infrastructure Life Cycle
North Europe	Europe	Pioneer Knutsen	2004	2011	1100	Bunkering vessel	Operational
Sweden	Europe	Seagas	2013	2013	187	Bunkering vessel	Operational
Europe	Europe	Coral Energy	2013	2016	15600	Small-scale/ bunkerable	Operational
North Europe	Europe	Coralius	2017	2017	5800	Bunkering vessel	Operational
Dubai, UAE	Middle East	Green Zeebrugge	2017	2017	5000	Bunkering vessel	Operational
Europe	Europe	New Frontier 1 (ex-Cardissa)	2017	2018	6500	Bunkering vessel	Operational
Spain	Europe	Oizmendi	2017	2018	660	FO/DO/LNG Bunkering vessel	Operational
Europe	Europe	Coral Methane	2018	2018	7500	Small-scale/ bunkerable	Operational
North Europe	Europe	Coral Energice	2018	2018	18000	Small-scale/ bunkerable	Operational
East Coast, US	North America	Clean Jacksonville	2018	2018	2200	Non-propelled bunker barge (Jones Act)	Operational
Spain	Europe	Bunker Breeze	2018	2018	1200	FO/DO Bunkering vessel; LNG Bunker Designed	Operational
North Europe	Europe	Kairos	2018	2019	7500	Bunkering vessel	Operational
South Korea	Asia Pacific	SM Jeju LNG1	2019	2019	7500	Bunkering vessel	In Casualty Or Repairing
Netherlands	Europe	FlexFueler 001	2019	2019	1480	Non-propelled bunker barge (inland)	Operational
North Europe	Europe	Coral Fraseri	2019	2019	10000	Small-scale/ bunkerable	Operational
North Europe	Europe	LNG London	2019	2019	3000	Bunkering vessel (inland)	Operational
South Korea	Asia Pacific	SM Jeju LNG2	2020	2020	7500	Bunkering vessel	Operational
Japan	Asia Pacific	Kaguya	2020	2020	3500	Bunkering vessel	Operational
Netherlands	Europe	Gas Agility	2020	2020	18600	Bunkering vessel	Operational
Malaysia	Asia Pacific	Avenir Advantage	2020	2020	7500	Bunkering vessel	Operational
Belgium	Europe	FlexFueler 002	2020	2021	1480	Non-propelled bunker barge (inland)	Operational
Singapore	Asia Pacific	FueLNG Bellina	2021	2021	7500	Bunkering vessel	Operational
China	Asia	Hai Gang Wei Lai (ex-Avenir Allegiance)	2021	2021	20000	Bunkering vessel	Operational
US	North America	Q-LNG ATB 4000	2021	2021	4000	Non-propelled bunker barge (Jones Act)	Operational
Carribean	Latin America	Avenir Accolade	2021	2021	7500	Small-scale/ bunkerable	Operational
Russia	Unknown/ Other	Dmitry Mendeleev	2021	2021	5800	Bunkering vessel	Operational
Norway	Europe	Bergen LNG	2021	2021	850	Bunkering vessel	Operational
North Europe	Europe	LNG Optimus	2021	2021	6000	Bunkering vessel	Operational

Market	Regional Market	Vessel Name	Delivery	LNG bunkering start date	Capacity (cm)	Concept	Infrastructure Life Cycle
North Europe	Europe	Avenir Aspiration	2021	2021	7500	Bunkering vessel	Operational
France	Europe	Gas Vitality	2021	2021	18600	Bunkering vessel	Operational
East Coast, US	North America	Clean Canaveral	2021	2021	5500	Bunkering vessel	Operational
South Korea	Asia Pacific	K LNG Dream	2022	2022	500	Bunkering vessel	Operational
China	Asia	Xin Ao Pu Tuo Hao	2022	2022	8500	Bunkering vessel	Operational
China	Asia	Hai Yang Shi You 301	2022	2022	30000	Small-scale/ bunkerable	Operational
Netherlands	Europe	K. Lotus	2022	2022	18000	Bunkering vessel	Operational
North America	North America	Avenir Achievement	2022	2022	20000	Small-scale/ bunkerable	Operational
North Europe	Europe	Avenir Ascension	2022	2022	7500	Bunkering vessel	Operational
Spain	Europe	Haugesund Knutsen	2022	2022	5000	Bunkering vessel	Operational
North America	North America	Titan Unikum	2023	2023	12000	Small-scale/ bunkerable	Operational
Asia	Asia	Titan Vision	2023	2023	12000	Small-scale/ bunkerable	Operational
Spain	Europe	Levante LNG	2023	2023	12500	Bunkering vessel	Operational
Europe	Europe	Alice Cosulich	2023	2023	8200	Small-scale/ bunkerable	Operational
Singapore	Asia Pacific	FueLNG Venosa	2023	2023	18000	Bunkering vessel	Operational
South Korea	Asia Pacific	Blue Whale	2023	2023	7500	Bunkering vessel	Operational
US	North America	Clean Everglades	2023	2023	5500	Non-propelled bunker barge (Jones Act)	Operational
Singapore	Asia Pacific	LNG Brassavola	2023	2023	12000	Bunkering vessel	Operational
Latin America	Latin America	New Frontier 2	2023	2023	18000	Bunkering vessel	Operational
North America	North America	Coral Favia	2010	2024	10000	Small-scale/ bunkerable	Operational
Japan	Asia Pacific	KEYS Azalea	2024	2024	3500	Bunkering vessel	Operational
China	Asia	Hai Yang Shi You 302	2024	2024	12000	Bunkering vessel	Operational
China	Asia	Huaihe Nengyuan Qihang	2024	2024	14000	Bunkering vessel	Operational
West Coast, US	North America	Seaspan Garibaldi	2024	2024	7600	Bunkering vessel	Operational
Europe	Europe	Energy Stockholm	2024	2024	8000	Bunkering vessel (inland)	Operational
US	North America	Progress	2024	2024	12000	Non-propelled bunker barge (Jones Act)	Operational
West Coast, US	North America	Seaspan Lions	2024	2024	7600	Bunkering vessel	Operational
Asia Pacific	Asia Pacific	Paolina Cosulich	2024	2024	8200	Small-scale/ bunkerable	Operational
West Coast, US	North America	Seaspan Baker	2025	2025	7600	Bunkering vessel	Under construction
Europe	Europe	Green Pearl	2025	2025	7500	Non-propelled bunker barge	Under construction
Japan	Asia Pacific	Ecobunker Tokyo Bay	2026	2026	2500	Bunkering vessel	Under construction

Market	Regional Market	Vessel Name	Delivery	LNG bunkering start date	Capacity (cm)	Concept	Infrastructure Life Cycle
Japan	Asia Pacific	Osaka Gas BV	2026	2026	3500	Bunkering vessel	Under construction
Europe	Europe	Scale Gas BV Order No.2	2026	2026	12500	Bunkering vessel	Under construction
		Harbin Industrial Investment Order No.1	2026	2026	19600	Bunkering vessel	Under construction
		Harbin Industrial Investment Order No.2	2026	2026	19600	Bunkering vessel	Under construction
		Avenir BV Order No.1	2026	2026	20000	Bunkering vessel	Under construction
		Vitol BV Order No.1	2026	2026	12500	Bunkering vessel	Under construction
		Wuyang Tanker BV Order	2027	2027	12000	Bunkering vessel	Under construction
		Equatorial Marine BV Order	2027	2027	20000	Bunkering vessel	Under construction
		CIMC Hull S1075	2027	2027	19600	Bunkering vessel	Under construction
		CIMC Hull S1076	2027	2027	19600	Bunkering vessel	Under construction
		Avenir BV Order No.2	2027	2027	20000	Bunkering vessel	Under construction
		Posco International BV Order	2027	2027	12500	Bunkering vessel	Under construction

Courtesy Hanwha Ocean

Market	Regional Market	Vessel Name	Delivery	LNG bunkering start date	Capacity (cm)	Concept	Infrastructure Life Cycle
		Vitol BV Order No.2	2027	2027	20000	Bunkering vessel	Under construction
		Ibaizabal BV Order No.1	2027	2027	18600	Bunkering vessel	Under construction
		Peninsula BV Order No.1	2027	2027	18000	Bunkering vessel	Under construction
		Peninsula BV Order No.2	2027	2027	18000	Bunkering vessel	Under construction
		Eastern Pacific Shipping, Mediterranean Shipping Company - BV Order No. 1	2028	2028	18000	Bunkering vessel	Under construction
		Eastern Pacific Shipping, Mediterranean Shipping Company - BV Order No. 2	2028	2028	18000	Bunkering vessel	Under construction
		Eastern Pacific Shipping, Mediterranean Shipping Company - BV Order No. 3	2028	2028	18000	Bunkering vessel	Under construction
		Eastern Pacific Shipping, Mediterranean Shipping Company - BV Order No. 4	2028	2028	18000	Bunkering vessel	Under construction

Source: Rystad Energy

9. References Used in the 2025 Edition

9.1 Data Collection

Data in Chapters 1, 2, 5, 6, 7, 8 and 9 of the 2025 IGU World LNG Report is sourced from a range of public and private domains, including Rystad Energy, the bp Statistical Review of World Energy, the International Energy Agency (IEA), the Oxford Institute for Energy Studies (OIES), the US Energy Information Administration (EIA), the US Department of Energy (DOE), Argus, the International Group of Liquefied Natural Gas Importers (GIIGNL), Refinitiv Eikon, DNV GL, Barry Rogliano Salles (BRS), company reports and announcements.

Any private data obtained from third-party organisations is cited as a source at the point of reference (i.e. charts and tables). No representations or warranties, express or implied, are made by the sponsors concerning the accuracy or completeness of the data and forecasts supplied under the report.

9.2 Data Collection for Chapter 3

2024 trade data in Chapter 3 of the 2025 IGU World LNG Report is sourced from Rystad Energy and 2023 trade data was sourced from GIIGNL. No representations or warranties, express or implied, are made by the sponsors concerning the accuracy or completeness of the data and forecasts supplied under the report.

9.3 Data Collection for Chapter 4

Data in Chapter 4 of the 2025 IGU World LNG Report is sourced from S&P Global Commodities Insights. No representations or warranties, express or implied, are made by the sponsors concerning the accuracy or completeness of the data and forecasts supplied under the report.

9.4 Preparation and Publication of the 2025 IGU World LNG Report

The IGU wishes to thank the following organisations and Task Force members entrusted to oversee the preparation and publication of this report:

- Energy Institute Hrvoje Pozar, Croatia: Daniel Golja
- Osaka Gas Co., Ltd., Japan: Atsuo Kanno, Makoto Matusmoto
- Czech Gas Association, Czech Republic: Chrz Václav
- QatarEnergy, Qatar: Amine Yacef
- Bureau Veritas, France: Carlos Guerrero Pozuelo
- S&P Global, Singapore: Kenneth Foo, Shermaine Ang, Ally Blakeway
- International Gas Union, United Kingdom: Mark McCrory, Neill Tannock
- Korea Gas Corporation, Republic of Korea: Jeongwook Khang, Young-Kyun Kim
- CNOOC EEI, China: Kai Wang, Yun Shi, Wei Li, Meini Zou, Sixing Zhao, Dan Wang, Dong Liang, Chuyu Sun, Zeyu Zhou
- Rystad Energy, Norway: Xi Nan, Jan-Eric Fähnrich, Christoph Halser, Ole Dramdal, Kaushal Ramesh, Wei Xiong, Lu Ming Pang

9.5 Definitions

Brownfield Liquefaction Project: A land-based LNG project at a site with existing LNG infrastructure, such as: jetties, storage tanks, liquefaction facilities or regasification facilities.

Commercial Operations: For LNG liquefaction plants, commercial operations start when the plants deliver commercial cargos under the supply contracts with their customers.

East and West of Suez: The terms East and West of Suez refer to the location in which an LNG tanker fixture begins. For these purposes, marine locations to the west of the Suez Canal, Cape of Good Hope, or Novaya Zemlya, but to the east of Tierra del Fuego, the Panama Canal, or Lancaster Sound, are considered to lie west of Suez. Other points are considered to lie east of Suez.

Forecast Data: Forecast liquefaction and regasification capacity data only considers existing and approved capacity (criteria being FID taken) and is based on company announced start dates.

Greenfield Liquefaction Project: A land-based LNG project at a site where no previous LNG infrastructure has been developed.

Home Market: The market in which a company is based.

Laid-Up Vessel: A vessel is considered laid-up when it is inactive and temporarily out of commercial operation. This can be due to low freight demand or when running costs exceed ongoing freight rates. Laid-up LNG vessels can return to commercial operation, undergo FSU/FSRU conversion or proceed to be sold for scrap.

Liquefaction and Regasification Capacity: Unless otherwise noted, liquefaction and regasification capacity throughout the document refers to nominal capacity. It must be noted that re-loading and storage activity can significantly reduce the effective capacity available for regasification.

LNG Carriers: For the purposes of this report, only Q-Class and conventional LNG vessels with a capacity greater than 30,000 cm are considered part of the global fleet discussed in the 'LNG Carriers' chapter (Chapter 6). Vessels with a capacity of 30,000 cm or less are considered small-scale LNG carriers.

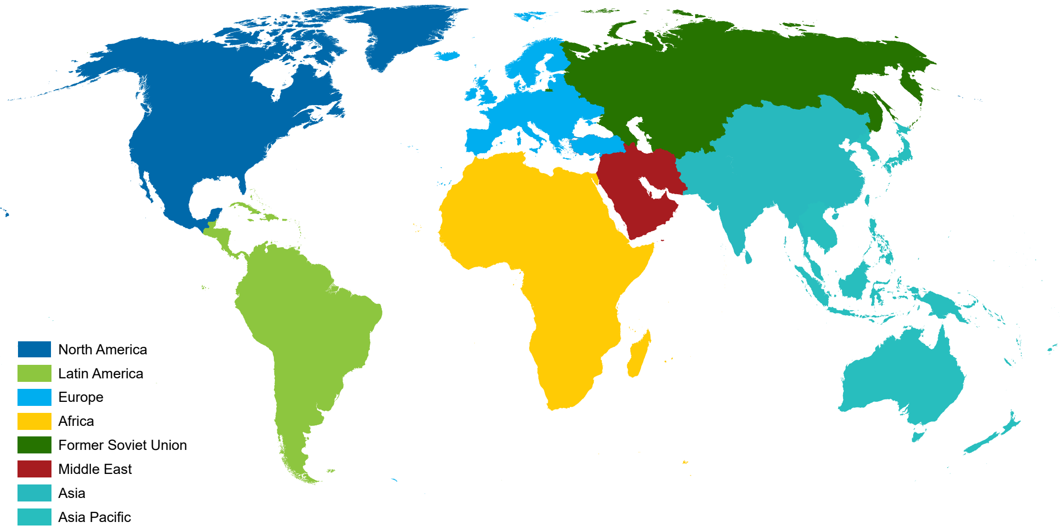
Scale of LNG Trains:
- **Small-scale:** 0-0.5 MTPA capacity per train
- **Mid-scale:** >0.5-1.5 MTPA capacity per train
- **Large-scale:** More than 1.5 MTPA capacity per train

Spot Charter Rates: Spot charter rates refer to fixtures beginning between five days after the date of assessment and the end of the following calendar month.

9.6 Regions and Basins

The IGU regions referred to throughout the report are defined as per the colour-coded areas in the map below. The report also refers to three basins: Atlantic, Pacific and Middle East. The Atlantic Basin encompasses all markets that border the Atlantic Ocean or Mediterranean Sea, while the Pacific Basin refers to all markets bordering the Pacific and Indian Oceans. However, these two categories do not include the following markets, which have been differentiated to compose the Middle East Basin: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Oman, Qatar, UAE and Yemen. IGU has also considered markets with liquefaction or regasification activities in multiple basins and has adjusted the data accordingly.

Figure 9.1: Grouping of markets into regions



9.7 Acronyms

AP = Air Products
BHGE = Baker Hughes
CAPEX = Capital Expenditure
CCS = Carbon Capture and Storage
CCS = China Classification Society
CCUS = Carbon Capture, Utilisation and Storage
CII = Carbon Intensity Indicator
CO2 = Carbon Dioxide
CSG = Coal Seam Gas
CNG = Compressed Natural Gas
DES = Delivered Ex-Ship
DFDE = Dual-Fuel Diesel Electric
DMR = Dual Mixed Refrigerant
EEXI = Energy Efficiency Existing Ship Index
EPC = Engineering, Procurement and Construction
ETS = Emissions Trading System
EU = European Union
EXP = Expender-Based
FEED = Front-End Engineering and Design
FERC = Federal Energy Regulatory Commission
FID = Final Investment Decision
FLNG = Floating Liquefied Natural Gas
FOB = Free On-Board
FPSO = Floating Production, Storage and Offloading
FSRU = Floating Storage and Regasification Unit
FSU = Floating Storage Unit
FSU = Former Soviet Union
FTA = Free Trade Agreement
GCU = Gas Combustion Unit
GHG = Greenhouse Gas
GTT = Gaztransport & Technigaz
HFO = Heavy Fuel Oil
IHI = Ishikawajima-Harima Heavy Industries
IMO = International Maritime Organisation
ISO = International Organisation for Standardization
JKM = Platts Japan-Korea Marker
LNG = Liquefied Natural Gas
LPG = Liquefied Petroleum Gas
MARPOL = International Convention for the Prevention of Pollution from Ships
ME-GA = M-type, Electronically Controlled, Gas Admission
ME-GI = M-type, Electronically Controlled, Gas Injection
MEPC = Marine Environment Protection Committee
MFC = Mixed Fluid Cascade
MMLS = Moveable Modular Liquefaction System
MR = Mixed Refrigerant
NGV = Natural Gas Vehicle
NOx = Nitrogen Oxide
NWE = Platts Northwest Europe Marker
OPEX = Operating Expenditure
PSC = Production Sharing Contract
PRICO = Poly Refrigerant Integrated Cycle Operations
SCMR = Single-Cycle Mixed Refrigerant
SOx = Sulphur Oxides
SPA = Sales and Purchase Agreement
SPB = Self-Supporting Prsimatic type B
STaGE = Steam Turbine and Gas Engine
SSDR = Slow Speed Diesel with Re-liquefaction Plant
STS = Ship-to-Ship
TFDE = Triple-Fuel Diesel Electric
TTF = Title Transfer Facility
UAE = United Arab Emirates
UK = United Kingdom
US = United States
VLSFO = Very Low Sulphur Fuel Oil
X-DF = eXpanded Diesel Fuel
YOY = Year-on-Year

9.8 Units

bbl = barrel
bcfd = billion cubic feet per day
bcm = billion cubic metres
cm = cubic metres
GT = gigatonnes
KTPA = thousand tonnes per annum
mcm = thousand cubic metres
mmcfd = million cubic feet per day
mmcm = million cubic metres
mmBtu = million British thermal units
MT = million tonnes
MTPA = million tonnes per annum
nm = nautical miles
tcf = trillion cubic feet

9.9 Conversion Factors

Table 9.1: Overview of Conversion Factors

	Tonnes LNG	cm LNG	mmcm gas	mmcf gas	mmBtu	boe
Tonnes LNG	-	2.222	0.0013	0.0459	53.38	9.203
cm LNG	0.45	-	5.85 x 10-4	0.0207	24.02	4.141
mmcm gas	769.2	1,700	-	35.31	41,100	7,100
mmcf gas	21.78	48	0.0283	-	1,200	200.5
mmBtu	0.0187	0.0416	2.44 x 10-5	8.601 x 10-4	-	0.1724
boe	0.1087	0.2415	1.41 x 10-4	0.00499	5.8	-

ANNEX 1 – LNG SHIPPING

Containment systems

NG containment systems store LNG at a cryogenic temperature of approximately -162°C (-260°F). They can be split into two main categories: membrane systems and self-supporting systems, also called independent tanks. Membrane systems are mostly designed by Gaztransport & Technigaz (GTT), while self-supporting systems mainly comprise spherical 'Moss' type vessels and Ishikawajima-Harima Heavy Industries (IHI) Corporation's Type B vessels. Due to the advantages highlighted below, modern newbuilds have entirely adopted the membrane type.

Table 6.1: Overview of containment systems

	Membrane	Self-supporting
Current fleet count	623	119
Current fleet proportion (%)	84.0%	16.0%
Systems	GTT-designed: Mark III, Mark III Flex, Mark III Flex+, NO96 series, NO96 Super+, CS1, NEXT1 (under commercialisation) KC LNG TECH Designed: KC-1, KC-2	Moss Maritime-designed: Moss Rosenberg IHI-designed: SPB LNT Marine-designed: LNT A-BOX
Advantages	• Space-efficient • Thin and lighter containment system • Higher fuel-efficiency • Lower wheelhouse height	• More robust in harsh conditions • Partial loading possible • Faster construction
Disadvantages	• Partial loading restricted • Less robust in harsh conditions	• Spherical design uses space inefficiently • Slower cool-down rate • Thicker, heavier containment system

Source: Rystad Energy

In both systems, a small amount of LNG is naturally vaporised (boil-off) during a voyage due to heat transferred from the atmospheric environment, liquid motion or sloshing, the tank-cooling process, and the tank-depressurisation process. Boil-off rates in new membrane carriers at laden conditions are usually below 0.10% of tank capacity per day, with partial or full re-liquefaction systems reducing this further. This contrasts with older self-supporting carriers, which average about 0.15% of tank capacity per day. Membrane and self-supporting systems can be further split into specific types, which are examined below.

The two dominant membrane-type LNG containment systems are the Mark III, designed by Technigaz, and the NO96 by Gaztransport. These two companies later merged to form GTT. Membrane-type systems have primary and secondary thin membranes made of metallic or composite materials that shrink minimally upon cooling. The Mark III has two foam insulation layers, while the NO96 uses insulated plywood boxes purged with nitrogen gas. These boxes were originally filled with perlite, later replaced by glass wool, and more recently, foam insulation. GTT has developed the Next1 containment system, which includes two metallic membranes made of invar and supported by a layer of insulating reinforced polyurethane foam.

GTT states a boil-off rate of 0.07% for its Mark III Flex+ and is aiming for a similar rate for its Next1 system, while the new NO96 Super+ has a boil-off rate of 0.085%. Within a range of tank filling levels, the ship's natural pitching and rolling movement at sea and the liquid free-surface effect can cause the liquid to move within the tank in membrane containment systems, which may place high-impact pressure on the tank surface. This effect is called 'sloshing' and can cause structural damage. The first precaution is to maintain the level of the tanks within the required limits given by the tank designer, GTT. This is typically lower than a level corresponding to 10% of the height of the tank or higher than a level corresponding to 70% of the height of the tank. The membrane-type system has become the popular choice due to the space efficiency of the prismatic shape and its lower boil-off rate, despite restrictions on part-filling due to the sloshing effect.

The new generation of 200,000 cm vessels have four-tank membrane vessels, contrasting with five-tank Q-flex and Q-Max ships. The new generation of 271,000 cm cargo capacity carriers will feature five tanks.

Celebrating 53 years in operation, the Moss Rosenberg type B system was first delivered in 1973. LNG carriers of this design typically feature four or five self-supporting aluminium spherical tanks, insulated by polyurethane foam flushed with nitrogen. The spherical shape allows for accurate stress and fatigue prediction of the tank, increasing durability and removing the need for a complete secondary barrier. A partial secondary barrier in the form of a tray covers the bottom of the tank to capture any LNG leakage. Unlike membrane tanks, independent self-supporting spherical tanks allow for partial loading during a voyage. However, due to its spherical shape, the Moss Rosenberg system uses space inefficiently compared to membrane storage, and its design necessitates a heavier containment unit.

The Sayaendo-type vessel, produced by Mitsubishi, is a recent improvement on the traditional Moss Rosenberg system. The spherical tanks are elongated into an apple shape, increasing volumetric efficiency. They are then covered with a lightweight prismatic hull to reduce wind resistance. Sayaendo vessels are powered by ultra-steam turbine plants, which are steam reheat engines that are more efficient than regular steam turbine engines.

The Sayaringo steam turbine and gas engine (STaGE) type vessel, also produced by Mitsubishi, further improved the Saeyendo-type vessel. The STaGE vessel adopts the shape of the Sayaendo alongside a hybrid propulsion system, combining a steam turbine and gas engine to maximise efficiency. Eight STaGE newbuilds were delivered between 2018 and 2019.

The IHI-designed self-supporting prismatic type B (SPB) system was first implemented in 1993 in two 89,900 cm LNG carriers, Polar Spirit and Arctic Spirit. Since then, it has been used in several liquefied petroleum gas (LPG) and small-scale LNG vessels before Tokyo Gas commissioned four 165,000 cm vessels with the design, primarily for transportation from Cove Point in the US. The design involves four tanks subdivided internally, allowing for partial loading during the voyage. The tanks have one longitudinal and one transversal subdivision internally to reduce sloshing. The result mitigates the sloshing issue and does not require a pressure differential, claiming a relatively low boil-off rate of 0.08%. It is worth noting that the SPB system has higher space efficiency and is lighter than the Moss Rosenberg design. A few shipyards are exploring new independent type B systems, similar to the SPB, including high manganese steel.

Moss Rosenberg and IHI SPB tank types represent under 20% of the fleet in service. Although membranes have become the tank of choice for LNG carriers, self-supporting technology is still available and fully approved in accordance with international regulations.

The LNT A-Box is a self-supporting design of type A aimed at providing a reasonably priced LNG containment system. It features a primary barrier made of either stainless steel or 9% nickel steel and a secondary barrier made of liquid-tight polyurethane panels installed in the ship bulkheads, deck and ceiling of the cargo holds. Similar in shape to the IHI-SPB design, the system mitigates sloshing by way of an independent tank, with the aim of minimising boil-off gas. The first 45,000 cm newbuild with this system in place, the Jia Xing (ex-Saga Dawn), was delivered in December 2019. LNT Marine has jointly developed a new LNG carrier design of 175,000 cm featuring the LNG A-BOX system.

Propulsion systems

Propulsion systems affect capital expenditure, operational expenses, emissions, vessel size range, vessel reliability, and compliance with regulations. Before the early 2000s, steam turbine systems running on boil-off gas and heavy fuel oil were the only available propulsion solution for LNG carriers. Increasing fuel oil costs and stricter emission regulations led to the development of more efficient alternatives such as the dual fuel diesel electric (DFDE), triple fuel diesel electric (TFDE), and the slow-speed diesel with re-liquefaction plant (SSDR).

In recent years, modern containment systems that generate lower boil-off gas and the rise of short-term and spot trading of LNG have spawned demand for more flexible and efficient propulsion systems to adapt to varied sailing speeds, distances and conditions. These factors have resulted in a new wave of dual-fuel propulsion systems that also burn boil-off gas with a small amount of pilot fuel or diesel. This includes the high-pressure MAN B&W M-type electronically controlled gas injection (ME-GI) system, the M-type electronically controlled gas admission system (ME-GA) of low-pressure injection (recently withdrawn), and two generations of low-pressure injection Winterthur Gas & Diesel (WinGD) X-DF.

Special mention should be made of ABB's Azipod units, which have been deployed in the 15 Arc7 icebreaker units in service for the Yamal LNG project in Russia. The electrical motors of this propulsion system are housed in a submerged pod outside the LNG carrier's hull, with 360-degree rotational capabilities. The resulting heightened manoeuvrability enables the highly powered units to navigate efficiently through the Arctic, including through ice up to 2.1 metres thick. This propulsion system will be deployed in the Arc7 icebreakers ordered for Novatek's Arctic LNG 2 project.

Additional systems to reduce fuel consumption on board include air lubrication systems and PTO-shaft generators in the propulsion lines. These technologies are currently being implemented in many vessels on order. Other systems are currently being assessed, such as wind-assisted propulsion, onboard carbon capture, or fuel cells, to mention a few. In 2024, Mitsui OSK Lines announced the installation of a wind-assisted propulsion system on one newbuild LNG carrier at Hanwha Ocean. It is also worth noting that an onboard carbon capture system was installed on the LNG carrier Seapeak Arwa in 2023 for several months as part of a demonstration project. Some builders are currently proposing designs incorporating such new technologies.

Steam turbine

Steam turbines for ship propulsion are now considered a superseded technology and hiring crew with steam experience has become increasingly difficult. In a steam turbine propulsion system, two boilers supply highly pressurised steam at over 500°C (932°F) to a high and then low-pressure turbine to power the main propulsion and auxiliary systems. The steam turbine's main fuel source is boil-off gas, with heavy fuel oil used as an alternative if the former proves insufficient. The fuels can be burned at any ratio and excess boil-off gas can be converted to steam, making the engine reliable and eliminating the need for a gas combustion unit (GCU). Maintenance costs are also relatively low.

The key disadvantage of steam turbines is their low efficiency, running at 35% efficiency when fully loaded (most efficient). The newer generations of propulsion systems, DFDE and ME-GI/ME-GA/X-DF engines, are approximately 25% and 50% more efficient, respectively, than steam. There are 211 active steam-turbine propulsion vessels that were delivered before 2015, making up 28.4% of the total active fleet.

An improvement of the steam turbine was introduced in 2015, involving reheating the steam in-cycle to improve efficiency by more than 30%. Aptly named the steam reheat system (or ultra-steam turbine), there are currently 12 active vessels with this propulsion system, but no further newbuilds are due.

Dual-fuel diesel electric/triple-fuel diesel electric (DFDE and TFDE)

DFDE propulsion was introduced in 2006 as the first alternative to steam turbine systems. They can run on both diesel and boil-off gas in separate modes, powering generators that produce electricity used to drive electric motors for propulsion. Auxiliary power is also delivered through these generators, and a gas combustion unit (GCU) is in place should there be excess boil-off gas. In 2008, the arrival of TFDE vessels improved the adaptability of this type of vessel with the option of burning heavy fuel oil as an additional fuel source. Being able to choose from different fuels during different sailing conditions and prevailing fuel prices increases overall efficiency by up to 30% over steam turbine propulsion. Additionally, the response of these vessels under a dynamic load, such as during adverse weather conditions, is considered excellent.

However, the DFDE and TFDE propulsion systems also have certain disadvantages. Capital outlays and maintenance costs are relatively high, partly due to the necessity for a GCU and the number of engines and cylinders. Knocking and misfiring can happen in gas mode if the boil-off gas composition is out of the engine-specified range. Knocking refers to ignition in the engine prior to the optimal point, which can be detrimental to engine operation. There were 194 active TFDE/DFDE vessels as of the end of 2024, representing 26.1% of the current fleet. There are currently 24 newbuild vessels with DFDE systems to be delivered, 21 icebreakers to service the Arctic LNG 2 project, and three newbuild FSRUs, likely equipped with DFDE systems. The delivery of the vessels for the Arctic LNG 2 project continues to be materially delayed due to US sanctions.

Slow-speed diesel with re-liquefaction plant (SSDR)

The SSDR was introduced with the DFDE propulsion system, running two low-speed diesel engines and four auxiliary generators with a full re-liquefaction plant to return boil-off gas to LNG tanks in a liquid state. The immediate advantages are the negligible boil-off, which optimised cargo value during the high gas price environment of 2022, and the option to efficiently use heavy fuel oil or diesel as a fuel source. However, the heavy electricity use of the re-liquefaction plant can negate efficiency gains and restrict the SSDR only to very large carriers (to achieve economies of scale). There are currently 48 SSDR vessels in the active LNG fleet, 44 of which are Nakilat's Q-Class vessels. The Q-Max vessel (Rasheeda) previously ran an SSDR engine before being converted to an ME-GI-type vessel in 2015. Due to more stringent environmental regulations and the introduction of third-generation engines, no SSDR engines are on order.

M-type, electronically controlled (MAN B&W ME-GI, ME-GA)

Introduced in 2015 by MAN B&W, the two-stroke M-type electronically controlled gas injection system, commonly known as ME-GI, pressurises boil-off gas up to around 350 bar and burns it with a small amount of injected diesel fuel (pilot fuel). Efficiency is maximised as the slow-speed engine can run off a high proportion of boil-off gas while minimising the risk of knocking. Similar efficiency and reliability levels are observed when switching fuel sources, as the engine always runs on a diesel thermodynamic cycle.

Fuel efficiency is maximised for large-sized LNG carriers, which make up the majority of newbuilds today. As such, the current modern LNG fleet in service reflects the apparent advantages of the ME-GI propulsion system. A total of 76 newbuild vessels fitted with ME-GI systems have been delivered since 2015, with 21 additional newbuilds with the system under construction.

MAN B&W developed a new engine based on the low-pressure Otto cycle, the two-stroke M-type electronically controlled gas admission system (ME-GA), which is specifically designed for the LNG carrier segment and runs on the Otto thermodynamic cycle. This system allows for a low gas supply pressure and is better suited for using boil-off gas as a fuel. The ME-GA is also touted to have lower capital expenditure, operational expenditure, and NOx emissions than current-generation engines. The popularity of the ME-GA engine has surged, with six delivered in 2023 and 29 in 2024. However, in October 2024, MAN B&W announced it would cease manufacturing the ME-GA engine, citing tightening IMO regulations around NOx emissions, shifting the orderbook largely towards X-DF.

Of the 83 ME-GA vessels currently on order, 29 will be delivered this year, 34 next year, 18 in 2027, and two in 2028.

Low-pressure slow-speed dual-fuel (Winterthur Gas & Diesel X-DF)

Introduced by Wartsila, the Winterthur Gas & Diesel (WinGD) X-DF was premiered in 2017 on the South Korean newbuild, SK Audace. The X-DF operates on the Otto thermodynamic cycle, burning a fuel-air mixture with a high air-to-fuel ratio and injecting it at low pressure. When burning gas, a small amount of fuel oil is used as pilot fuel. As the maintained pressure is low, the system is easier to implement and integrate with a range of vendors.

In terms of overall ship fuel consumption and efficiency, LNG carriers equipped with ME-GI and first-generation X-DF are comparable from a ship's holistic approach. The first-generation X-DF stands out in terms of safety and emissions, surpassing the ME-GI due to low levels of nitrogen emissions without needing an after-treatment system. The ME-GI compensates for this with slightly lower fuel/gas consumption and better dynamic response.

Building on its earlier success, WinGD introduced the second-generation X-DF systems in 2020. The second-generation X-DF (2.1 and 2.2 engine version) reduces methane slip by half and improves fuel consumption by between 3% and 5% through exhaust recycling systems. Overall efficiency has improved to over 50%, while operations and maintenance requirements remain excellent. The second-generation X-DF has competed with ME-GA systems, with 157 vessels currently in service. The orderbook for LNG carriers contains 209 X-DF vessels across both generations, accounting for 62% of total newbuilds to be delivered.

Steam turbine and gas engine (STaGE)

First introduced in 2018, the Sayaringo STaGE propulsion system runs both a steam turbine and a dual-fuel engine. Waste heat from running the dual-fuel engine is recovered to heat feedwater and generate steam for the steam turbine, significantly improving overall efficiency. The electric generators attached to the dual-fuel engine power both a propulsion system and the ship, eliminating the need for an additional turbine generator. In addition to efficiency, the combination of two propulsion systems improves the ship's adaptability while reducing overall emissions. As a Japanese innovation, STaGE systems have been produced exclusively by Mitsubishi, with eight newbuilds delivered in 2018 and 2019. However, there are currently no STaGE vessels on order.

Courtesy SK Shipping

Courtesy CNOOC

Appendix 1: Table of Global Liquefaction Plants, end-2024

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
1	Libya	Marsa El Brega LNG	Marsa El Brega LNG	AP-SMR	1970	3.20	NOC (Libya)* (100%)
2	Brunei	Brunei LNG	Brunei LNG T1-T2	AP-C3MR	1972	2.88	Shell* (25%); Brunei Government (50%); Mitsubishi Corp (25%)
2	Brunei	Brunei LNG	Brunei LNG T3-T4	AP-C3MR	1973	2.88	Shell* (25%); Brunei Government (50%); Mitsubishi Corp (25%)
2	Brunei	Brunei LNG	Brunei LNG T5	AP-C3MR	1974	1.44	Shell* (25%); Brunei Government (50%); Mitsubishi Corp (25%)
3	UAE	Adgas LNG	Adgas LNG T1	AP-C3MR	1977	1.15	ADNOC LNG* (0%); ADNOC (70%); Mitsui (15%); BP (10%); TotalEnergies (5%)
3	UAE	Adgas LNG	Adgas LNG T2	AP-C3MR	1977	1.15	ADNOC LNG* (0%); ADNOC (70%); Mitsui (15%); BP (10%); TotalEnergies (5%)
4	Algeria	Arzew GL1Z	Arzew GL1Z T1-T6	AP-C3MR	1978	7.90	Sonatrach* (100%)
5	Algeria	Arzew GL2Z	Arzew GL2Z T1-T6	AP-C3MR	1981	8.40	Sonatrach* (100%)
6	Malaysia	MLNG	MLNG Satu T1-T3	AP-C3MR	1982	8.40	Petronas* (90%); Mitsubishi Corp (5%); Sarawak State (5%)
7	Indonesia	Bontang LNG	Bontang LNG TC-TD	AP-C3MR	1983	5.60	Pertamina* (55%); Japan Indonesia LNG Co. (JILCO) (20%); PT VICO Indonesia (15%); TotalEnergies (10%)
7	Indonesia	Bontang LNG	Bontang LNG TE	AP-C3MR	1989	2.80	Pertamina* (55%); Japan Indonesia LNG Co. (JILCO) (20%); PT VICO Indonesia (15%); TotalEnergies (10%)
8	Australia	North West Shelf LNG	North West Shelf LNG T1	AP-C3MR	1989	2.50	Woodside* (33.33%); BP (16.67%); Chevron (16.67%); Shell (16.67%); Mitsubishi Corp (8.33%); Mitsui (8.33%)
8	Australia	North West Shelf LNG	North West Shelf LNG T2	AP-C3MR	1989	2.50	Woodside* (33.33%); BP (16.67%); Chevron (16.67%); Shell (16.67%); Mitsubishi Corp (8.33%); Mitsui (8.33%)
7	Indonesia	Bontang LNG	Bontang LNG TF	AP-C3MR	1993	2.80	Pertamina* (55%); Japan Indonesia LNG Co. (JILCO) (20%); PT VICO Indonesia (15%); TotalEnergies (10%)
8	Australia	North West Shelf LNG	North West Shelf LNG T3	AP-C3MR	1993	2.50	Woodside* (33.33%); BP (16.67%); Chevron (16.67%); Shell (16.67%); Mitsubishi Corp (8.33%); Mitsui (8.33%)
3	UAE	Adgas LNG	Adgas LNG T3	AP-C3MR	1994	3.00	ADNOC LNG* (0%); ADNOC (70%); Mitsui (15%); BP (10%); TotalEnergies (5%)
6	Malaysia	MLNG	MLNG Dua T4-T6	AP-C3MR	1995	9.60	Petronas* (80%); Mitsubishi Corp (10%); Sarawak State (10%)
9	Qatar	QatarGas LNG	Qatargas 1 T1	AP-C3MR	1996	3.20	QatarEnergy LNG* (0%); QatarEnergy (100%)
9	Qatar	QatarGas LNG	Qatargas 1 T2	AP-C3MR	1996	3.20	QatarEnergy LNG* (0%); QatarEnergy (100%)
9	Qatar	QatarGas LNG	Qatargas 1 T3	AP-C3MR	1996	3.20	QatarEnergy LNG* (0%); QatarEnergy (100%)
7	Indonesia	Bontang LNG	Bontang LNG TG	AP-C3MR	1998	2.80	Pertamina* (55%); Japan Indonesia LNG Co. (JILCO) (20%); PT VICO Indonesia (15%); TotalEnergies (10%)

Note:
1. Reference number is sorted by infrastructure start year and liquefaction plant project.

Appendix 1: Table of Global Liquefaction Plants (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
7	Indonesia	Bontang LNG	Bontang LNG TH	AP-C3MR	1999	2.95	Pertamina* (55%); Japan Indonesia LNG Co. (JILCO) (20%); PT VICO Indonesia (15%); TotalEnergies (10%)
9	Qatar	QatarGas LNG	Rasgas 1 T1	AP-C3MR	1999	3.30	QatarEnergy LNG* (0%); QatarEnergy (63%); ExxonMobil (25%); ITOCHU (4%); Korea Gas (3%); Sojitz (1.5%); Sumitomo (1.5%); Samsung (0.5%); Hyundai (0.4%); SK Earthon (0.4%); LG International (0.28%); Daesung (0.27%); Hanwha Energy (0.15%)
9	Qatar	QatarGas LNG	Rasgas 1 T2	AP-C3MR	1999	3.30	QatarEnergy LNG* (0%); QatarEnergy (63%); ExxonMobil (25%); ITOCHU (4%); Korea Gas (3%); Sojitz (1.5%); Sumitomo (1.5%); Samsung (0.5%); Hyundai (0.4%); SK Earthon (0.4%); LG International (0.28%); Daesung (0.27%); Hanwha Energy (0.15%)
10	Trinidad and Tobago	Atlantic LNG	Atlantic LNG T1	ConocoPhillips Optimized Cascade	1999	3.00	Atlantic LNG* (0%); Shell (46%); BP (34%); China Investment Corporation (10%); NGC (10%)
11	Nigeria	NLNG	NLNG T1	AP-C3MR	1999	3.30	Nigeria LNG (NLNG)* (0%); NNPC (Nigeria) (49%); Shell (25.6%); TotalEnergies (15%); Eni (10.4%)
11	Nigeria	NLNG	NLNG T2	AP-C3MR	1999	3.30	Nigeria LNG (NLNG)* (0%); NNPC (Nigeria) (49%); Shell (25.6%); TotalEnergies (15%); Eni (10.4%)
12	Oman	Oman LNG	Oman LNG T1	AP-C3MR	2000	3.55	Oman LNG* (0%); Omani Government (51%); Shell (30%); TotalEnergies (5.54%); Korea LNG (5%); Mitsubishi Corp (2.77%); Mitsui (2.77%); PTTEP (2%); ITOCHU (0.92%)
12	Oman	Oman LNG	Oman LNG T2	AP-C3MR	2000	3.55	Oman LNG* (0%); Omani Government (51%); Shell (30%); TotalEnergies (5.54%); Korea LNG (5%); Mitsubishi Corp (2.77%); Mitsui (2.77%); PTTEP (2%); ITOCHU (0.92%)
10	Trinidad and Tobago	Atlantic LNG	Atlantic LNG T2	ConocoPhillips Optimized Cascade	2002	3.30	Atlantic LNG* (0%); Shell (51.1%); BP (37.8%); NGC (11.1%)
11	Nigeria	NLNG	NLNG T3	AP-C3MR	2002	3.30	Nigeria LNG (NLNG)* (0%); NNPC (Nigeria) (49%); Shell (25.6%); TotalEnergies (15%); Eni (10.4%)
6	Malaysia	MLNG	MLNG Tiga T7-T8	AP-C3MR	2003	7.70	Petronas* (60%); Sarawak State (25%); JX Nippon Oil and Gas (10%); Mitsubishi Corp (5%)
10	Trinidad and Tobago	Atlantic LNG	Atlantic LNG T3	ConocoPhillips Optimized Cascade	2003	3.30	Atlantic LNG* (0%); Shell (51.1%); BP (37.8%); NGC (11.1%)
8	Australia	North West Shelf LNG	North West Shelf LNG T4	AP-C3MR	2004	4.60	Woodside* (33.33%); BP (16.67%); Chevron (16.67%); Shell (16.67%); Mitsubishi Corp (8.33%); Mitsui (8.33%)
9	Qatar	QatarGas LNG	Rasgas 2 T3	AP-C3MR/ SplitMR	2004	4.70	QatarEnergy LNG* (0%); QatarEnergy (70%); ExxonMobil (30%)
9	Qatar	QatarGas LNG	Rasgas 2 T4	AP-C3MR/ SplitMR	2005	4.70	QatarEnergy LNG* (0%); QatarEnergy (70%); ExxonMobil (30%)

Appendix 1: Table of Global Liquefaction Plants (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
10	Trinidad and Tobago	Atlantic LNG	Atlantic LNG T4	ConocoPhillips Optimized Cascade	2005	5.20	Atlantic LNG* (0%); Shell (51.1%); BP (37.8%); NGC (11.1%)
11	Nigeria	NLNG	NLNG T4	AP-C3MR	2005	4.10	Nigeria LNG (NLNG)* (0%); NNPC (Nigeria) (49%); Shell (25.6%); TotalEnergies (15%); Eni (10.4%)
13	Egypt	Damietta LNG	Damietta LNG T1	AP-C3MR/ SplitMR	2005	5.00	SEGAS* (0%); Eni (50%); EGAS (40%); EGPC (Egypt) (10%)
14	Egypt	Egyptian LNG (Idku)	Egyptian LNG (Idku) T1	ConocoPhillips Optimized Cascade	2005	3.60	Shell* (35.5%); Petronas (35.5%); EGPC (Egypt) (24%); TotalEnergies (5%)
14	Egypt	Egyptian LNG (Idku)	Egyptian LNG (Idku) T2	ConocoPhillips Optimized Cascade	2005	3.60	Shell* (38%); Petronas (38%); EGPC (Egypt) (24%)
11	Nigeria	NLNG	NLNG T5	AP-C3MR	2006	4.10	Nigeria LNG (NLNG)* (0%); NNPC (Nigeria) (49%); Shell (25.6%); TotalEnergies (15%); Eni (10.4%)
12	Oman	Oman LNG	Oman LNG T3 (Qalhat)	AP-C3MR	2006	3.30	Oman LNG* (0%); Omani Government (65.6%); Shell (11.04%); Mitsubishi Corp (4.02%); Eni (3.68%); Naturgy (3.68%); ITOCHU (3.34%); Osaka Gas (3%); TotalEnergies (2.04%); Korea LNG (1.84%); Mitsui (1.02%); PTTEP (0.74%)
15	Australia	Darwin LNG	Darwin LNG T1	ConocoPhillips Optimized Cascade	2006	3.70	Santos* (43.44%); SK Innovation (25%); Inpex (11.38%); Eni (10.98%); JERA (6.13%); Tokyo Gas (3.07%)
9	Qatar	QatarGas LNG	Rasgas 2 T5	AP-C3MR/ SplitMR	2007	4.70	QatarEnergy LNG* (0%); QatarEnergy (70%); ExxonMobil (30%)
11	Nigeria	NLNG	NLNG T6	AP-C3MR	2007	4.10	Nigeria LNG (NLNG)* (0%); NNPC (Nigeria) (49%); Shell (25.6%); TotalEnergies (15%); Eni (10.4%)
16	Equatorial Guinea	EG LNG	EG LNG T1	ConocoPhillips Optimized Cascade	2007	3.70	ConocoPhillips* (56%); Sonagas G.E. (25%); Mitsui (8.5%); Marubeni (6.5%); Equatorial Guinea Government (4%)
17	Norway	Snohvit LNG	Snohvit LNG T1	Linde MFC	2007	4.30	Equinor* (36.79%); Petoro (30%); TotalEnergies (18.4%); Vaar Energi (12%); Harbour Energy (2.81%)
8	Australia	North West Shelf LNG	North West Shelf LNG T5	AP-C3MR	2008	4.60	Woodside* (33.33%); BP (16.67%); Chevron (16.67%); Shell (16.67%); Mitsubishi Corp (8.33%); Mitsui (8.33%)
9	Qatar	QatarGas LNG	Qatargas 2 T4	AP-X	2009	7.80	QatarEnergy LNG* (0%); QatarEnergy (67.5%); ExxonMobil (24.15%); TotalEnergies (8.35%)
9	Qatar	QatarGas LNG	Qatargas 2 T5	AP-X	2009	7.80	QatarEnergy LNG* (0%); QatarEnergy (67.5%); ExxonMobil (24.15%); TotalEnergies (8.35%)
9	Qatar	QatarGas LNG	Rasgas 3 T6	AP-X	2009	7.80	QatarEnergy LNG* (0%); QatarEnergy (70%); ExxonMobil (30%)
9	Qatar	QatarGas LNG	Rasgas 3 T7	AP-X	2009	7.80	QatarEnergy LNG* (0%); QatarEnergy (70%); ExxonMobil (30%)
18	Yemen	Yemen LNG	Yemen LNG (T1+T2)	AP-C3MR/ SplitMR	2009	6.70	TotalEnergies* (39.62%); Yemen General Oil and Gas (21.73%); Hunt Oil (17.22%); Korea Gas (8.88%); SK Earthon (8.49%); Hyundai (3%); KNOC (S.Korea) (1.06%)

Appendix 1: Table of Global Liquefaction Plants (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
19	Indonesia	Tangguh LNG	Tangguh LNG T1	AP-C3MR/ SplitMR	2009	3.80	BP* (40.22%); CNOOC (13.9%); JOGMEC (11.07%); Mitsubishi Corp (9.92%); Inpex (7.79%); JX Nippon Oil and Gas (7.46%); Sojitz (3.67%); Sumitomo (3.67%); Mitsui (2.3%)
19	Indonesia	Tangguh LNG	Tangguh LNG T2	AP-C3MR/ SplitMR	2009	3.80	BP* (40.22%); CNOOC (13.9%); JOGMEC (11.07%); Mitsubishi Corp (9.92%); Inpex (7.79%); JX Nippon Oil and Gas (7.46%); Sojitz (3.67%); Sumitomo (3.67%); Mitsui (2.3%)
19	Indonesia	Tangguh LNG	Tangguh LNG T3	AP-C3MR/ SplitMR	2023	3.80	BP* (40.22%); CNOOC (13.9%); JOGMEC (11.07%); Mitsubishi Corp (9.92%); Inpex (7.79%); JX Nippon Oil and Gas (7.46%); Sojitz (3.67%); Sumitomo (3.67%); Mitsui (2.3%)
20	Russia	Sakhalin 2	Sakhalin 2 T1	Shell DMR	2009	4.80	Sakhalin Energy LLC* (0%); Gazprom (77.5%); Mitsui (12.5%); Mitsubishi Corp (10%)
20	Russia	Sakhalin 2	Sakhalin 2 T2	Shell DMR	2009	4.80	Sakhalin Energy LLC* (0%); Gazprom (77.5%); Mitsui (12.5%); Mitsubishi Corp (10%)
9	Qatar	QatarGas LNG	Qatargas 3 T6	AP-X	2010	7.80	QatarEnergy LNG* (0%); QatarEnergy (68.5%); ConocoPhillips (30%); Mitsui (1.5%)
21	Peru	Peru LNG	Peru LNG T1	AP-C3MR/ SplitMR	2010	4.45	Hunt Oil* (35%); MidOcean Energy (35%); Shell (20%); Marubeni (10%)
9	Qatar	QatarGas LNG	Qatargas 4 T7	AP-X	2011	7.80	QatarEnergy LNG* (0%); QatarEnergy (70%); Shell (30%)
22	Australia	Pluto LNG	Pluto LNG T1	Shell Propane Precooled Mixed Refrigerant	2012	4.90	Woodside* (90%); Kansai Electric (5%); MidOcean Energy (5%)
23	Angola	Angola LNG	Angola LNG T1	ConocoPhillips Optimized Cascade	2013	5.20	Angola LNG* (0%); Chevron (36.4%); Azule Energy (27.2%); Sonangol (22.8%); TotalEnergies (13.6%)
24	Algeria	Skikda GL1K	Skikda GL1K T1 (rebuild)	AP-C3MR/ SplitMR	2013	4.50	Sonatrach* (100%)
25	Papua New Guinea	PNG LNG	PNG LNG T1	AP-C3MR	2014	3.45	ExxonMobil* (33.2%); Santos (39.9%); Kumul Petroleum Holdings Limited (19.4%); JX Nippon Oil and Gas (3.72%); Mineral Resources Development (2.8%); Marubeni (0.98%)
25	Papua New Guinea	PNG LNG	PNG LNG T2	AP-C3MR	2014	3.45	ExxonMobil* (33.2%); Santos (39.9%); Kumul Petroleum Holdings Limited (19.4%); JX Nippon Oil and Gas (3.72%); Mineral Resources Development (2.8%); Marubeni (0.98%)
26	Algeria	Arzew GL3Z (Gassi Touil)	Arzew GL3Z (Gassi Touil) T1	AP-C3MR/ SplitMR	2014	4.70	Sonatrach* (100%)
27	Indonesia	Donggi-Senoro LNG	Donggi-Senoro LNG T1	AP-C3MR	2015	2.00	Donggi-Senoro LNG (DSLNG)* (0%); Mitsubishi Corp (44.92%); Pertamina (29%); Korea Gas (14.98%); MedcoEnergi (11.1%)
28	Australia	GLNG	GLNG T1	ConocoPhillips Optimized Cascade	2015	3.90	Santos* (30%); Petronas (27.5%); TotalEnergies (27.5%); Korea Gas (15%)
29	Australia	Queensland Curtis LNG	Queensland Curtis LNG T1	ConocoPhillips Optimized Cascade	2015	4.25	Shell* (50%); CNOOC (50%)

Appendix 1: Table of Global Liquefaction Plants (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
29	Australia	Queensland Curtis LNG	Queensland Curtis LNG T2	ConocoPhillips Optimized Cascade	2015	4.25	Shell* (97.5%); MidOcean Energy (2.5%)
28	Australia	GLNG	GLNG T2	ConocoPhillips Optimized Cascade	2016	3.90	Santos* (30%); Petronas (27.5%); TotalEnergies (27.5%); Korea Gas (15%)
30	Australia	Gorgon LNG	Gorgon LNG T1	AP-C3MR/ SplitMR	2016	5.20	Chevron* (47.33%); ExxonMobil (25%); Shell (25%); Osaka Gas (1.25%); MidOcean Energy (1%); JERA (0.42%)
30	Australia	Gorgon LNG	Gorgon LNG T2	AP-C3MR/ SplitMR	2016	5.20	Chevron* (47.33%); ExxonMobil (25%); Shell (25%); Osaka Gas (1.25%); MidOcean Energy (1%); JERA (0.42%)
30	Australia	Gorgon LNG	Gorgon LNG T3	AP-C3MR/ SplitMR	2016	5.20	Chevron* (47.33%); ExxonMobil (25%); Shell (25%); Osaka Gas (1.25%); MidOcean Energy (1%); JERA (0.42%)
31	Australia	Australia Pacific LNG	Australia Pacific LNG T1	ConocoPhillips Optimized Cascade	2016	4.50	ConocoPhillips* (47.5%); Origin Energy (27.5%); Sinopec Group (parent) (25%)
31	Australia	Australia Pacific LNG	Australia Pacific LNG T2	ConocoPhillips Optimized Cascade	2016	4.50	ConocoPhillips* (47.5%); Origin Energy (27.5%); Sinopec Group (parent) (25%)
32	United States	Sabine Pass LNG	Sabine Pass T1-T2	ConocoPhillips Optimized Cascade	2016	10.00	Cheniere Energy* (100%)
6	Malaysia	MLNG	MLNG T9	AP-C3MR/ SplitMR	2017	3.60	Petronas* (80%); JX Nippon Oil and Gas (10%); Sarawak State (10%)
32	United States	Sabine Pass LNG	Sabine Pass T3-T4	ConocoPhillips Optimized Cascade	2017	10.00	Cheniere Energy* (100%)
33	Malaysia	Petronas FLNG 1 Satu	Petronas FLNG Satu (PFLNG1)	AP-N	2017	1.20	Petronas* (100%)
34	Australia	Wheatstone LNG	Wheatstone LNG T1	ConocoPhillips Optimized Cascade	2017	4.45	Chevron* (64.14%); Kuwait Petroleum Corp (KPC) (13.4%); Woodside (13%); JOGMEC (3.36%); Mitsubishi Corp (3.18%); Kyushu Electric (1.46%); Nippon Yusen Kabushiki Kaisha (NYK Line) (0.82%); JERA (0.64%)
34	Australia	Wheatstone LNG	Wheatstone LNG T2	ConocoPhillips Optimized Cascade	2017	4.45	Chevron* (64.14%); Kuwait Petroleum Corp (KPC) (13.4%); Woodside (13%); JOGMEC (3.36%); Mitsubishi Corp (3.18%); Kyushu Electric (1.46%); Nippon Yusen Kabushiki Kaisha (NYK Line) (0.82%); JERA (0.64%)
35	Russia	Yamal LNG	Yamal LNG T1	AP-C3MR	2017	5.50	OOO Yamal LNG* (0%); Novatek (50.1%); CNPC (parent) (20%); TotalEnergies (20%); Silk Road Fund (9.9%)
35	Russia	Yamal LNG	Yamal LNG T2	AP-C3MR	2018	5.50	OOO Yamal LNG* (0%); Novatek (50.1%); CNPC (parent) (20%); TotalEnergies (20%); Silk Road Fund (9.9%)
35	Russia	Yamal LNG	Yamal LNG T3	AP-C3MR	2018	5.50	OOO Yamal LNG* (0%); Novatek (50.1%); CNPC (parent) (20%); TotalEnergies (20%); Silk Road Fund (9.9%)

Appendix 1: Table of Global Liquefaction Plants (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
36	Australia	Ichthys LNG	Ichthys LNG T1	AP-C3MR/ SplitMR	2018	4.45	Inpex* (66.25%); TotalEnergies (26%); CPC Corporation (2.63%); Tokyo Gas (1.58%); Kansai Electric (1.2%); Osaka Gas (1.2%); JERA (0.73%); Toho Gas (0.41%)
36	Australia	Ichthys LNG	Ichthys LNG T2	AP-C3MR/ SplitMR	2018	4.45	Inpex* (66.25%); TotalEnergies (26%); CPC Corporation (2.63%); Tokyo Gas (1.58%); Kansai Electric (1.2%); Osaka Gas (1.2%); JERA (0.73%); Toho Gas (0.41%)
37	United States	Cove Point LNG	Cove Point LNG T1	AP-C3MR	2018	5.25	Berkshire Hathaway Energy* (75%); Brookfield Asset Management (25%)
38	Cameroon	Cameroon FLNG	Cameroon FLNG	Black and Veatch PRICO	2018	2.40	Perenco* (75%); SNH (Cameroon) (25%)
32	United States	Sabine Pass LNG	Sabine Pass T5	ConocoPhillips Optimized Cascade	2019	5.00	Cheniere Energy* (100%)
39	Australia	Prelude FLNG	Prelude FLNG	Shell DMR	2019	3.60	Shell* (67.5%); Inpex (17.5%); Korea Gas (10%); CPC Corporation (5%)
40	United States	Cameron LNG	Cameron LNG T1	AP-C3MR/ SplitMR	2019	4.50	Cameron LNG* (0%); Sempra (50.2%); Mitsui (16.6%); TotalEnergies (16.6%); Mitsubishi Corp (11.62%); Nippon Yusen Kabushiki Kaisha (NYK Line) (4.98%)
41	United States	Elba Island LNG	Elba Island T1	Shell MMLS	2019	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
41	United States	Elba Island LNG	Elba Island T2	Shell MMLS	2019	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
41	United States	Elba Island LNG	Elba Island T3	Shell MMLS	2019	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
41	United States	Elba Island LNG	Elba Island T4	Shell MMLS	2019	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
42	Russia	Vysotsk LNG	Vysotsk LNG T1	Air Liquide Smartfin	2019	0.66	Novatek* (51%); Gazprom (49%)
43	United States	Corpus Christi LNG	Corpus Christi T1	ConocoPhillips Optimized Cascade	2019	4.52	Cheniere Energy* (100%)
43	United States	Corpus Christi LNG	Corpus Christi T2	ConocoPhillips Optimized Cascade	2019	4.52	Cheniere Energy* (100%)
44	United States	Freeport LNG	Freeport LNG T1	AP-C3MR	2019	5.10	Freeport LNG* (50%); JERA (25%); Osaka Gas (25%)
40	United States	Cameron LNG	Cameron LNG T2	AP-C3MR/ SplitMR	2020	4.50	Cameron LNG* (0%); Sempra (50.2%); Mitsui (16.6%); TotalEnergies (16.6%); Mitsubishi Corp (11.62%); Nippon Yusen Kabushiki Kaisha (NYK Line) (4.98%)
40	United States	Cameron LNG	Cameron LNG T3	AP-C3MR/ SplitMR	2020	4.50	Cameron LNG* (0%); Sempra (50.2%); Mitsui (16.6%); TotalEnergies (16.6%); Mitsubishi Corp (11.62%); Nippon Yusen Kabushiki Kaisha (NYK Line) (4.98%)
41	United States	Elba Island LNG	Elba Island T10	Shell MMLS	2020	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)

Appendix 1: Table of Global Liquefaction Plants (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
41	United States	Elba Island LNG	Elba Island T5	Shell MMLS	2020	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
41	United States	Elba Island LNG	Elba Island T6	Shell MMLS	2020	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
41	United States	Elba Island LNG	Elba Island T7	Shell MMLS	2020	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
41	United States	Elba Island LNG	Elba Island T8	Shell MMLS	2020	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
41	United States	Elba Island LNG	Elba Island T9	Shell MMLS	2020	0.25	Southern LNG* (0%); Kinder Morgan (51%); EIG Partners (49%)
44	United States	Freeport LNG	Freeport LNG T2	AP-C3MR	2020	5.10	Freeport LNG* (57.5%); Global Infrastructure Partners (GIP) (25%); Osaka Gas (10%); Dow Chemical Company (7.5%)
44	United States	Freeport LNG	Freeport LNG T3	AP-C3MR	2020	5.10	Freeport LNG* (57.5%); Global Infrastructure Partners (GIP) (25%); Osaka Gas (10%); Dow Chemical Company (7.5%)
35	Russia	Yamal LNG	Yamal LNG T4	Novatek Arctic Cascade	2021	0.90	OOO Yamal LNG* (0%); Novatek (50.1%); CNPC (parent) (20%); TotalEnergies (20%); Silk Road Fund (9.9%)
43	United States	Corpus Christi LNG	Corpus Christi T3	ConocoPhillips Optimized Cascade	2021	4.52	Cheniere Energy* (100%)
45	Malaysia	Petronas FLNG 2 Rotan	Petronas FLNG Rotan (PFLNG2)	AP-N	2021	1.50	Petronas* (100%)
32	United States	Sabine Pass LNG	Sabine Pass T6	ConocoPhillips Optimized Cascade	2022	5.00	Cheniere Energy* (100%)
46	Mozam-bique	Coral South FLNG	Coral South FLNG	AP-DMR	2022	3.40	Eni* (25%); ExxonMobil (25%); CNPC (parent) (20%); ENH (Mozambique) (10%); Galp Energia SA (10%); Korea Gas (10%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T1	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T10	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T11	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T12	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T13	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T14	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T15	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T16	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T17	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T18	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T2	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T3	BHGE SMR	2022	0.63	Venture Global LNG* (100%)

Appendix 1: Table of Global Liquefaction Plants (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T4	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T5	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T6	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T7	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T8	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
47	United States	Calcasieu Pass LNG	Calcasieu Pass LNG T9	BHGE SMR	2022	0.63	Venture Global LNG* (100%)
48	Russia	Portovaya LNG	Portovaya LNG T1	Linde LIMUM	2022	1.50	Gazprom* (100%)
49	Mexico	Altamira LNG	Altamira LNG T1	Fast LNG	2024	1.4	New Fortress Energy* (85%); Comision Federal de Electricidad (15%)
53	United States	Plaquemines LNG	Plaquemines LNG T1	BHGE SCMR	2024	0.556	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T2	BHGE SCMR	2024	0.556	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T3	BHGE SCMR	2024	0.556	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T4	BHGE SCMR	2024	0.556	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T5	BHGE SCMR	2024	0.556	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T6	BHGE SCMR	2024	0.556	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T7	BHGE SCMR	2024	0.556	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T8	BHGE SCMR	2024	0.556	Venture Global LNG* (100%)
62	Congo	Congo Marine XII FLNG	Congo Marine XII FLNG	Black and Veatch PRICO	2024	0.60	Eni* (100%)

Note:
1. In the ownership column, companies with "*" refer to plant operators. If a company doesn't have any ownership stake in the LNG plant, it will be marked with "(0%)".
2. Marsa El Bregas LNG in Libya has not been operational since 2011. It is included for reference only.
3. Yemen LNG has not exported since 2015 due to an ongoing civil war.

Appendix 2: Table of Liquefaction Plants Sanctioned or Under Construction, end-2024

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
9	Qatar	QatarGas LNG	QatarGas LNG T8	AP-X	2026	7.80	QatarEnergy LNG* (0%); QatarEnergy (71.25%); ExxonMobil (6.25%); Shell (6.25%); TotalEnergies (6.25%); ConocoPhillips (3.13%); Eni (3.13%); CNPC (parent) (1.25%); CPC Corporation (1.25%); Sinopec Group (parent) (1.25%)
9	Qatar	QatarGas LNG	QatarGas LNG T9	AP-X	2026	7.80	QatarEnergy LNG* (0%); QatarEnergy (71.25%); ExxonMobil (6.25%); Shell (6.25%); TotalEnergies (6.25%); ConocoPhillips (3.13%); Eni (3.13%); CNPC (parent) (1.25%); CPC Corporation (1.25%); Sinopec Group (parent) (1.25%)
9	Qatar	QatarGas LNG	QatarGas LNG T10	AP-X	2027	7.80	QatarEnergy LNG* (0%); QatarEnergy (71.25%); ExxonMobil (6.25%); Shell (6.25%); TotalEnergies (6.25%); ConocoPhillips (3.13%); Eni (3.13%); CNPC (parent) (1.25%); CPC Corporation (1.25%); Sinopec Group (parent) (1.25%)
9	Qatar	QatarGas LNG	QatarGas LNG T11	AP-X	2027	7.80	QatarEnergy LNG* (0%); QatarEnergy (71.25%); ExxonMobil (6.25%); Shell (6.25%); TotalEnergies (6.25%); ConocoPhillips (3.13%); Eni (3.13%); CNPC (parent) (1.25%); CPC Corporation (1.25%); Sinopec Group (parent) (1.25%)
9	Qatar	QatarGas LNG	QatarGas LNG T12	AP-X	2028	7.80	QatarEnergy LNG* (0%); QatarEnergy (73.13%); Shell (9.38%); TotalEnergies (9.38%); ConocoPhillips (6.25%); Sinopec Group (parent) (1.88%)
9	Qatar	QatarGas LNG	QatarGas LNG T13	AP-X	2028	7.80	QatarEnergy LNG* (0%); QatarEnergy (73.13%); Shell (9.38%); TotalEnergies (9.38%); ConocoPhillips (6.25%); Sinopec Group (parent) (1.88%)
11	Nigeria	NLNG	NLNG T7	AP-C3MR	2027	8.00	Nigeria LNG (NLNG)* (0%); NNPC (Nigeria) (49%); Shell (25.6%); TotalEnergies (15%); Eni (10.4%)
22	Australia	Pluto LNG	Pluto LNG T2 (expansion)	ConocoPhillips Optimized Cascade	2026	5.00	Woodside* (51%); Global Infrastructure Partners (GIP) (49%)
43	United States	Corpus Christi LNG	Corpus Christi Stage 3 T1	ConocoPhillips Optimized Cascade	2025	1.49	Cheniere Energy* (100%)
43	United States	Corpus Christi LNG	Corpus Christi Stage 3 T2	ConocoPhillips Optimized Cascade	2025	1.49	Cheniere Energy* (100%)
43	United States	Corpus Christi LNG	Corpus Christi Stage 3 T3	ConocoPhillips Optimized Cascade	2025	1.49	Cheniere Energy* (100%)

Appendix 2: Table of Liquefaction Plants Sanctioned or Under Construction (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
43	United States	Corpus Christi LNG	Corpus Christi Stage 3 T4	ConocoPhillips Optimized Cascade	2025	1.49	Cheniere Energy* (100%)
43	United States	Corpus Christi LNG	Corpus Christi Stage 3 T5	ConocoPhillips Optimized Cascade	2026	1.49	Cheniere Energy* (100%)
43	United States	Corpus Christi LNG	Corpus Christi Stage 3 T6	ConocoPhillips Optimized Cascade	2026	1.49	Cheniere Energy* (100%)
43	United States	Corpus Christi LNG	Corpus Christi Stage 3 T7	ConocoPhillips Optimized Cascade	2026	1.49	Cheniere Energy* (100%)
49	Mexico	Altamira LNG	Altamira LNG T2	Fast LNG	2026	1.40	New Fortress Energy* (85%); Comision Federal de Electricidad (15%)
51	United States	Golden Pass LNG	Golden Pass LNG T1	AP-C3MR	2026	6.00	Golden Pass Products* (0%); QatarEnergy (70%); ExxonMobil (30%)
51	United States	Golden Pass LNG	Golden Pass LNG T2	AP-C3MR	2026	6.00	Golden Pass Products* (0%); QatarEnergy (70%); ExxonMobil (30%)
51	United States	Golden Pass LNG	Golden Pass LNG T3	AP-C3MR	2027	6.00	Golden Pass Products* (0%); QatarEnergy (70%); ExxonMobil (30%)
52	Mauritania	Greater Tortue Ahmeyim FLNG	Greater Tortue Ahmeyim FLNG T1	Black and Veatch PRICO	2025	2.50	BP* (56.29%); Kosmos Energy (26.71%); Petrosen (10%); Societe Mauritanienne des Hydrocarbures (7%)
53	United States	Plaquemines LNG	Plaquemines LNG T9	BHGE SCMR	2025	0.556	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T10	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T11	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T12	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T13	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T14	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T15	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T16	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T17	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T18	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T9	BHGE SCMR	2025	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T19	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T20	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T21	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T22	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)

Appendix 2: Table of Liquefaction Plants Sanctioned or Under Construction (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
53	United States	Plaquemines LNG	Plaquemines LNG T23	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T24	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T25	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T26	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T27	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T28	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T29	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T30	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T31	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T32	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T33	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T34	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T35	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
53	United States	Plaquemines LNG	Plaquemines LNG T36	BHGE SCMR	2026	0.56	Venture Global LNG* (100%)
54	Russia	Arctic LNG 2	Arctic LNG 2 T1	Linde MFC	2025	6.60	OOO Arctic LNG-2* (0%); Novatek (60%); CNOOC (10%); CNPC (parent) (10%); TotalEnergies (10%); JOGMEC (7.5%); Mitsui (2.5%)
54	Russia	Arctic LNG 2	Arctic LNG 2 T2	Linde MFC	2027	6.60	OOO Arctic LNG-2* (0%); Novatek (60%); CNOOC (10%); CNPC (parent) (10%); TotalEnergies (10%); JOGMEC (7.5%); Mitsui (2.5%)
54	Russia	Arctic LNG 2	Arctic LNG 2 T3	Linde MFC	2032	6.6	OOO Arctic LNG-2* (0%); Novatek (60%); CNOOC (10%); CNPC (parent) (10%); TotalEnergies (10%); JOGMEC (7.5%); Mitsui (2.5%)
55	Mexico	Energía Costa Azul LNG	Energía Costa Azul LNG T1	AP-DMR	2026	3.25	Sempra* (83.4%); TotalEnergies (16.6%)
56	Canada	LNG Canada	LNG Canada T1	Shell DMR	2025	7.00	Shell* (40%); Petronas (25%); Mitsubishi Corp (15%); PetroChina (15%); Korea Gas (5%)
56	Canada	LNG Canada	LNG Canada T2	Shell DMR	2025	7.00	Shell* (40%); Petronas (25%); Mitsubishi Corp (15%); PetroChina (15%); Korea Gas (5%)
58	Mozam-bique	Mozambique LNG (Area 1)	Mozambique LNG (Area 1) T1	AP-C3MR	2029	6.44	TotalEnergies* (26.5%); Mitsui (20%); ONGC (16%); ENH (Mozambique) (15%); Bharat Petroleum Corp (BPCL) (10%); PTTEP (8.5%); Oil India (4%)
58	Mozam-bique	Mozambique LNG (Area 1)	Mozambique LNG (Area 1) T2	AP-C3MR	2029	6.44	TotalEnergies* (26.5%); Mitsui (20%); ONGC (16%); ENH (Mozambique) (15%); Bharat Petroleum Corp (BPCL) (10%); PTTEP (8.5%); Oil India (4%)

Appendix 2: Table of Liquefaction Plants Sanctioned or Under Construction (continued)

Ref No.	Market	Liquefaction plant name	Liquefaction plant train	Liquefaction technology	Infrastructure start year	Liquefaction capacity (MTPA)	Ownership
59	United States	Port Arthur LNG	Port Arthur LNG T1	C3MR	2027	6.75	Sempra* (28%); Kohlberg Kravis Roberts (KKR) (42%); ConocoPhillips (30%)
59	United States	Port Arthur LNG	Port Arthur LNG T2	C3MR	2028	6.75	Sempra* (28%); Kohlberg Kravis Roberts (KKR) (42%); ConocoPhillips (30%)
60	United States	Rio Grande LNG	Rio Grande LNG T1	AP-C3MR	2028	5.87	NextDecade Corporation* (20.83%); Global Infrastructure Partners (GIP) (46.1%); TotalEnergies (16.67%); GIC (9.9%); Mubadala Investment Company (6.5%)
60	United States	Rio Grande LNG	Rio Grande LNG T2	AP-C3MR	2028	5.87	NextDecade Corporation* (20.83%); Global Infrastructure Partners (GIP) (46.1%); TotalEnergies (16.67%); GIC (9.9%); Mubadala Investment Company (6.5%)
60	United States	Rio Grande LNG	Rio Grande LNG T3	AP-C3MR	2029	5.87	NextDecade Corporation* (20.83%); Global Infrastructure Partners (GIP) (46.1%); TotalEnergies (16.67%); GIC (9.9%); Mubadala Investment Company (6.5%)
61	Canada	Woodfibre LNG	Woodfibre LNG T1	Linde	2027	1.05	Pacific Energy Corporation* (70%); Enbridge (30%)
61	Canada	Woodfibre LNG	Woodfibre LNG T2	Linde	2027	1.05	Pacific Energy Corporation* (70%); Enbridge (30%)
62	Congo	Congo Marine XII FLNG	Congo Marine XII FLNG 2		2026	2.40	Eni* (100%)
63	Malaysia	Petronas FLNG 3 Tiga	Petronas FLNG Tiga (PFLNG3)	AP-N	2027	2.00	Petronas* (50%); Sabah State Government (50%)
64	Indonesia	Genting FLNG	Genting FLNG		2027	1.20	Genting Berhad* (100%)
65	Gabon	Gabon LNG	Gabon LNG		2027	0.70	Perenco* (100%)
66	Oman	Marsa LNG	Marsa LNG Train 1		2028	1.00	TotalEnergies* (80%); OQ (20%)
67	UAE	Ruwais LNG	Ruwais LNG T1		2028	4.80	ADNOC LNG* (0%); ADNOC (100%)
67	UAE	Ruwais LNG	Ruwais LNG T2		2028	4.80	ADNOC LNG* (0%); ADNOC (100%)
68	Canada	Cedar FLNG	Cedar FLNG 1		2029	3.00	Pembina Pipeline Corporation* (50.1%); Haisla Nation (49.9%)

Note:
1. In the ownership column, companies with "*" refer to plant operators. If a company doesn't have any ownership stake in the LNG plant, it will be marked with "(0%)".
2. Sengkang LNG T1 is not included in the table as construction progress has been stalled.

Appendix 3: Table of global active LNG fleet, end-2024

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9443401	Aamira	Nakilat	Samsung	266000	Membrane	Q-Max	SSD	2010
9501186	Adam LNG	Asyad Shipping	HD Hyundai	162000	Membrane	Conventional	DFDE	2014
9879698	Adamastos	Capital Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9831220	Adriano Knutsen	Knutsen OAS	HD Hyundai	180000	Membrane	Conventional	ME-GI	2019
9958286	Aktoras	Capital Gas	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9338266	Al Aamriya	NYK Line, K Line, MOL, lino, Mitsui, Nakilat	Hanwha Ocean	216200	Membrane	Q-Flex	SSD	2008
9325697	Al Areesh	Seapeak	Hanwha Ocean	151700	Membrane	Conventional	Steam	2007
9431147	Al Bahiya	Nakilat	Hanwha Ocean	210100	Membrane	Q-Flex	SSD	2010
9132741	Al Bidda	J4 Consortium	Kawasaki	137300	Spherical	Conventional	Steam	1999
9325702	Al Daayen	Seapeak	Hanwha Ocean	151700	Membrane	Conventional	Steam	2007
9443683	Al Dafna	Nakilat	Samsung	266400	Membrane	Q-Max	SSD	2009
9307176	Al Deebel	MOL, NYK Line, K Line	Samsung	145700	Membrane	Conventional	Steam	2005
9337705	Al Gattara	Nakilat, Asyad Shipping	HD Hyundai	216200	Membrane	Q-Flex	SSD	2007
9337987	Al Ghariya	Commerz Real, Nakilat, PRONAV	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2008
9337717	Al Gharrafa	Nakilat, Asyad Shipping	HD Hyundai	216200	Membrane	Q-Flex	SSD	2008
9397286	Al Ghashamiya	Nakilat	Samsung	217600	Membrane	Q-Flex	SSD	2009
9372743	Al Ghuwairiya	Nakilat	Hanwha Ocean	263300	Membrane	Q-Max	SSD	2008
9337743	Al Hamla	Nakilat, Asyad Shipping	Samsung	216200	Membrane	Q-Flex	SSD	2008
9074640	Al Hamra	National Gas Shipping Co	Kvaerner Masa	135000	Spherical	Conventional	Steam	1997
9360879	Al Huwaila	Nakilat, Seapeak	Samsung	217000	Membrane	Q-Flex	SSD	2008
9132791	Al Jasra	J4 Consortium	Mitsubishi	137200	Spherical	Conventional	Steam	2000
9324435	Al Jassasiya	Maran Gas Maritime, Nakilat	Hanwha Ocean	145700	Membrane	Conventional	Steam	2007
9431123	Al Karaana	Nakilat	Hanwha Ocean	210100	Membrane	Q-Flex	SSD	2009
9397327	Al Kharaitiyat	Nakilat	HD Hyundai	216300	Membrane	Q-Flex	SSD	2009
9360881	Al Kharsaah	Nakilat, Seapeak	Samsung	217000	Membrane	Q-Flex	SSD	2008
9431111	Al Khattiya	Nakilat	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2009
9038440	Al Khaznah	National Gas Shipping Co	Mitsui	135000	Spherical	Conventional	Steam	1994
9085613	Al Khor	J4 Consortium	Mitsubishi	137400	Spherical	Conventional	Steam	1996
9360908	Al Khuwair	Nakilat, Seapeak	Samsung	217000	Membrane	Q-Flex	SSD	2008
9397315	Al Mafyar	Nakilat	Samsung	266400	Membrane	Q-Max	SSD	2009
9325685	Al Marrouna	Nakilat, Seapeak	Hanwha Ocean	152600	Membrane	Conventional	Steam	2006
9397298	Al Mayeda	Nakilat	Samsung	266000	Membrane	Q-Max	SSD	2009
9431135	Al Nuaman	Nakilat	Hanwha Ocean	210100	Membrane	Q-Flex	SSD	2009
9360790	Al Oraiq	NYK Line, K Line, MOL, lino, Mitsui, Nakilat	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2008
9976812	Al Qaiyyah	K3 Consortium	Samsung Heavy Industries	174000	Membrane	Conventional	ME-GA	2024
9086734	Al Rayyan	J4 Consortium	Kawasaki	137400	Spherical	Conventional	Steam	1997
9397339	Al Rekayyat	Nakilat	HD Hyundai	216300	Membrane	Q-Flex	SSD	2009
9337951	Al Ruwais	Commerz Real, Nakilat, PRONAV	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2007
9397341	Al Sadd	Nakilat	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2009

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9337963	Al Safliya	Commerz Real, Nakilat, PRONAV	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2007
9360855	Al Sahla	NYK Line, K Line, MOL, lino, Mitsui, Nakilat	HD Hyundai	216200	Membrane	Q-Flex	SSD	2008
9388821	Al Samriya	Nakilat	Hanwha Ocean	263300	Membrane	Q-Max	SSD	2009
9360893	Al Shamal	Nakilat, Seapeak	Samsung	217000	Membrane	Q-Flex	SSD	2008
9360831	Al Sheehaniya	Nakilat	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2009
9965423	Al Shelila (ex-Jiangnan H2700)	ADNOC L&S	Jiangnan	174000	Membrane	Conventional	X-DF	2024
9298399	Al Thakhira	K Line, Qatar Shpg.	Samsung	145700	Membrane	Conventional	Steam	2005
9360843	Al Thumama	NYK Line, K Line, MOL, lino, Mitsui, Nakilat	HD Hyundai	216200	Membrane	Q-Flex	SSD	2008
9360867	Al Utouriya	NYK Line, K Line, MOL, lino, Mitsui, Nakilat	HD Hyundai	215000	Membrane	Q-Flex	SSD	2008
9085625	Al Wajbah	J4 Consortium	Mitsubishi	137300	Spherical	Conventional	Steam	1997
9086746	Al Wakrah	J4 Consortium	Kawasaki	137600	Spherical	Conventional	Steam	1998
9085649	Al Zubarah	J4 Consortium	Mitsui	137600	Spherical	Conventional	Steam	1996
9390185	Alexandroupolis	GasLog	Hanjin H.I.	153000	Membrane	FSRU	DFDE	2010
9904194	Alicante Knutsen	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9343106	Alto Acrux	Karadeniz	Mitsubishi Heavy Industries	147798	Spherical	Conventional	Steam	2008
9682552	Amadi	Brunei Gas Carriers	HD Hyundai	154800	Membrane	Conventional	DFDE	2015
9496317	Amali	Brunei Gas Carriers	Hanwha Ocean	147000	Membrane	Conventional	DFDE	2011
9661869	Amani	Brunei Gas Carriers	HD Hyundai	154800	Membrane	Conventional	DFDE	2014
9845776	Amberjack LNG	TMS Cardiff Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9943841	Amore Mio I	Capital Gas	HD Hyundai	174000	Membrane	Conventional	ME-GA	2023
9317999	Amur River	CDB Leasing	HD Hyundai	149700	Membrane	Conventional	Steam	2008
9957737	Apostolos	Capital Gas	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9645970	Arctic Aurora	CDB Leasing	HD Hyundai	155000	Membrane	Conventional	DFDE	2013
9276389	Arctic Discoverer	K Line, Equinor, Mitsui, lino	Mitsui	142600	Spherical	Conventional	Steam	2006
9284192	Arctic Lady	Hoegh	Mitsubishi	148000	Spherical	Conventional	Steam	2006
9271248	Arctic Princess	Hoegh, MOL, Equinor	Mitsubishi	148000	Spherical	Conventional	Steam	2006
9275335	Arctic Voyager	K Line, Equinor, Mitsui, lino	Kawasaki	142800	Spherical	Conventional	Steam	2006
9862918	Aristarchos	Capital Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9862906	Aristidis I	Capital Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9862891	Aristos I	Capital Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9496305	Arkat	Brunei Gas Carriers	Hanwha Ocean	147000	Membrane	Conventional	DFDE	2011
8125868	Armada LNG Mediterrana	Bumi Armada Berhad	Mitsui	127209	Spherical	FSU	Steam	1985
9319404	Arrow Spirit	Jovo Group	Imabari	155000	Membrane	Conventional	Steam	2008
9377547	Aseem	MOL, NYK Line, K Line, SCI, Nakilat, Petronet	Samsung	155000	Membrane	Conventional	DFDE	2009
9610779	Asia Endeavour	Chevron	Samsung	160000	Membrane	Conventional	DFDE	2015
9606950	Asia Energy	Chevron	Samsung	160000	Membrane	Conventional	DFDE	2014
9610767	Asia Excellence	Chevron	Samsung	160000	Membrane	Conventional	DFDE	2015
9680188	Asia Integrity	Chevron	Samsung	160000	Membrane	Conventional	DFDE	2017

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9680190	Asia Venture	Chevron	Samsung	160000	Membrane	Conventional	DFDE	2017
9606948	Asia Vision	Chevron	Samsung	160000	Membrane	Conventional	DFDE	2014
9884021	Asklipios	Capital Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9957725	Assos (ex-3341)	Capital Gas	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9892298	Asterix I	Capital Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9972672	Athos LNG (ex-Samsung 2635)	TMS Cardiff Gas	Samsung	174000	Membrane	Conventional	ME-GA	2024
9862920	Attalos	Capital Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9943853	Axios II	Capital Gas	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9401295	Barcelona Knutsen	Knutsen OAS	Hanwha Ocean	173400	Membrane	Conventional	DFDE	2009
9713105	Bauhinia Spirit	MOL	Hanwha Ocean	263000	Membrane	FSRU	DFDE	2017
9613159	Beidou Star	MOL, China LNG	Hudong-Zhonghua	171800	Membrane	Conventional	SSD	2015
9256597	Berge Arzew	BW	Hanwha Ocean	138000	Membrane	Conventional	Steam	2004
9236432	Bilbao Knutsen	Knutsen OAS	IZAR	138000	Membrane	Conventional	Steam	2004
9691137	Bishu Maru	Trans Pacific Shipping	Kawasaki	164700	Spherical	Conventional	Steam reheat	2017
9845788	Bonito LNG	TMS Cardiff Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9768394	Boris Davydov	Sovcomflot	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2018
9768368	Boris Vilkitsky	Sovcomflot	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2017
9766542	British Achiever	BP	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9766554	British Contributor	BP	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9766566	British Listener	BP	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019
9766578	British Mentor	BP	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019
9766530	British Partner	BP	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9766580	British Sponsor	BP	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019
9085651	Broog	J4 Consortium	Mitsui	137500	Spherical	Conventional	Steam	1998
9976824	Bu Fintas	K3 Consortium	Samsung	174000	Membrane	Conventional	ME-GI	2024
9388833	Bu Samra	Nakilat	Samsung	266000	Membrane	Q-Max	SSD	2008
9796793	Bushu Maru	NYK Line, JERA	Mitsubishi	180000	Spherical	Conventional	STaGE	2019
9368302	BW Batangas	BW	Hanwha Ocean	162400	Membrane	FSRU	DFDE	2009
9230062	BW Boston	BW, Total	Hanwha Ocean	138000	Membrane	Conventional	Steam	2003
9368314	BW Brussels	BW	Hanwha Ocean	162500	Membrane	Conventional	DFDE	2009
9896933	BW Cassia	BW	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2022
9413327	BW Clear Sky	BW	Hanwha Ocean	173000	Membrane	Conventional	DFDE	2011
9383900	BW ENN Crystal Sky	BW	Hanwha Ocean	173000	Membrane	Conventional	DFDE	2011
9896921	BW ENN Snow Lotus	BW	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2022
9873852	BW Helios	BW	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2021
9724946	BW Integrity	BW, MOL	Samsung	173400	Membrane	FSRU	DFDE	2017
9873840	BW Lesmes	BW	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2021
9758076	BW Lilac	BW	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9792591	BW Magna	BW	Hanwha Ocean	173400	Membrane	FSRU	DFDE	2019
9850666	BW Magnolia	BW	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2020
9792606	BW Pavilion Aranda	BW, Pavilion LNG	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019
9850678	Bw Pavilion Aranthera	BW	Hanwha Ocean	170800	Membrane	Conventional	ME-GI	2020

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9640645	BW Pavilion Leeara	BW, Pavilion LNG	HD Hyundai	162000	Membrane	Conventional	DFDE	2015
9640437	BW Pavilion Vanda	BW, Pavilion LNG	HD Hyundai	162000	Membrane	Conventional	DFDE	2015
9684495	BW Singapore	Snam	Samsung	170200	Membrane	FSRU	DFDE	2015
9236626	BW Tatiana (ex-Gallina)	BW, Invenenergy Investment Company	Mitsubishi	136600	Spherical	FSRU	Steam	2002
9758064	BW Tulip	BW	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9246578	Cadiz Knutsen	Knutsen OAS	IZAR	138000	Membrane	Conventional	Steam	2004
9390680	Cape Ann	Hoegh, MOL, TLTC	Samsung	145000	Membrane	FSRU	DFDE	2010
9742819	Castillo De Caldelas	Elcano	Imabari	178800	Membrane	Conventional	ME-GI	2018
9742807	Castillo De Merida	Elcano	Imabari	178800	Membrane	Conventional	ME-GI	2018
9433717	Castillo De Santisteban	Elcano	STX	173600	Membrane	Conventional	DFDE	2010
9236418	Castillo De Villalba	Elcano	IZAR	138200	Membrane	Conventional	Steam	2003
9864796	Celsius Canberra	Celsius Shipping	Samsung	180000	Membrane	Conventional	X-DF	2021
9878723	Celsius Carolina	Celsius Shipping, Basalt	Samsung	180000	Membrane	Conventional	X-DF	2021
9878711	Celsius Charlotte	Celsius Shipping	Samsung	180000	Membrane	Conventional	X-DF	2021
9864784	Celsius Copenhagen	Celsius Shipping, Basalt	Samsung	180000	Membrane	Conventional	X-DF	2020
9946829	Celsius Gandhinagar (2579)	Celsius Shipping	Samsung	180000	Membrane	Conventional	ME-GA	2024
9945435	Celsius Geneva	Celsius Shipping	Samsung	180000	Membrane	Conventional	ME-GA	2023
9945447	Celsius Giza	Celsius Shipping	Samsung	180000	Membrane	Conventional	ME-GA	2023
9945459	Celsius Glarus	Celsius Shipping	Samsung	180000	Membrane	Conventional	ME-GA	2024
9948736	Celsius Granada (2585)	Celsius Shipping	Samsung	180000	Membrane	Conventional	ME-GA	2024
9948724	Celsius Greenwich (ex-2584)	Celsius Shipping	Samsung	180000	Membrane	Conventional	ME-GA	2024
9672844	Cesi Beihai	China Shipping Group	Hudong-Zhonghua	174100	Membrane	Conventional	DFDE	2017
9672820	Cesi Gladstone	Chuo Kaiun/Shinwa Chem.	Hudong-Zhonghua	174100	Membrane	Conventional	DFDE	2016
9672818	Cesi Lianyungang	China Shipping Group	Hudong-Zhonghua	174100	Membrane	Conventional	DFDE	2018
9672832	Cesi Qingdao	China Shipping Group	Hudong-Zhonghua	174100	Membrane	Conventional	DFDE	2017
9694749	Cesi Tianjin	China Shipping Group	Hudong-Zhonghua	174100	Membrane	Conventional	DFDE	2017
9694751	Cesi Wenzhou	China Shipping Group	Hudong-Zhonghua	174100	Membrane	Conventional	DFDE	2018
9324344	Cheikh Bouamama	HYPROC, Sonatrach, Itochu, MOL	Universal	75500	Membrane	Conventional	Steam	2008
9324332	Cheikh El Mokrani	HYPROC, Sonatrach, Itochu, MOL	Universal	75500	Membrane	Conventional	Steam	2007
9737187	Christophe De Margerie	Sovcomflot	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2016
9886732	Clean Cajun	Dynagas	HD Hyundai	200000	Membrane	Conventional	X-DF	2022
9886744	Clean Copano	Dynagas	HD Hyundai	200000	Membrane	Conventional	X-DF	2022
9943487	Clean Destiny	Dynagas	HD Hyundai	200000	Membrane	Conventional	ME-GA	2023

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9323687	Clean Energy	CDB Leasing	HD Hyundai	149700	Membrane	Conventional	Steam	2007
9943504	Clean Future (ex-3293)	Dynagas	HD Hyundai	200000	Membrane	Conventional	ME-GA	2024
9655444	Clean Horizon	Dynagas	HD Hyundai	162000	Membrane	Conventional	DFDE	2015
9637492	Clean Ocean	Dynagas	HD Hyundai	162000	Membrane	Conventional	DFDE	2014
9637507	Clean Planet	Dynagas	HD Hyundai	162000	Membrane	Conventional	DFDE	2014
9943475	Clean Resolution	Dynagas	HD Hyundai	200000	Membrane	Conventional	ME-GA	2023
9655456	Clean Vision	Dynagas	HD Hyundai	162000	Membrane	Conventional	DFDE	2016
9943499	Clean Vitality	Dynagas	HD Hyundai	200000	Membrane	Conventional	ME-GA	2024
9869306	Cobia LNG	TMS Cardiff Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9307205	Condor LNG	TMS Cardiff Gas	Samsung	145000	Membrane	Conventional	Steam	2006
9861031	Cool Discoverer	Thenamaris	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9640023	Cool Explorer	Thenamaris	Samsung	160000	Membrane	Conventional	DFDE	2015
9869265	Cool Racer	Thenamaris	HD Hyundai	174000	Membrane	Conventional	ME-GI	2021
9333606	Cool Ranger	BP	HD Hyundai	155000	Membrane	Conventional	DFDE	2008
9333591	Cool Rider	BP	HD Hyundai	155000	Membrane	Conventional	DFDE	2007
9333618	Cool Rover	BP	HD Hyundai	155000	Membrane	Conventional	DFDE	2008
9636797	Cool Runner	Thenamaris	Samsung	160000	Membrane	Conventional	DFDE	2014
9636785	Cool Voyager	Thenamaris	Samsung	160000	Membrane	Conventional	DFDE	2013
9693719	Coral Encanto	Anthony Veder	Ningbo Xinle Shipbuilding Co Ltd	30000	Type C	Small-scale	DFDE	2020
9955521	Coral Evolutionist	Anthony Veder	HD Hyundai	30000	Type C	Small-scale	X-DF	2023
9919890	Coral Nordic	Anthony Veder	Jiangnan	30000	Type C	Small-scale	X-DF	2022
9636711	Corcovado LNG	TMS Cardiff Gas	Hanwha Ocean	160100	Membrane	Conventional	DFDE	2014
9491812	Cubal	Mitsui, NYK Line, Seapeak	Samsung	160000	Membrane	Conventional	DFDE	2012
9376294	Cygnus Passage	TEPCO, NYK Line, Mitsubishi	Mitsubishi	147000	Spherical	Conventional	Steam	2009
9308481	Dapeng Moon	China LNG Ship Mgmt	Hudong-Zhonghua	147200	Membrane	Conventional	Steam	2008
9937907	Dapeng Princess	Shenzhen Gas	Hudong-Zhonghua	80000	Membrane	Mid-scale	X-DF	2023
9369473	Dapeng Star	China LNG Ship Mgmt	Hudong-Zhonghua	147600	Membrane	Conventional	Steam	2009
9308479	Dapeng Sun	China LNG Ship Mgmt	Hudong-Zhonghua	147200	Membrane	Conventional	Steam	2008
9874454	Diamond Gas Crystal	MISC, Mitsubishi, NYK Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9862487	Diamond Gas Metropolis	NYK Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9779226	Diamond Gas Orchid	NYK Line	Mitsubishi	165000	Spherical	Conventional	STaGE	2018
9779238	Diamond Gas Rose	NYK Line	Mitsubishi	165000	Spherical	Conventional	STaGE	2018
9810020	Diamond Gas Sakura	NYK Line	Mitsubishi	165000	Spherical	Conventional	STaGE	2019
9874466	Diamond Gas Victoria	MISC, Mitsubishi, NYK Line, Toho LNG Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9250713	Disha	MOL, NYK Line, K Line, SCI, Nakilat, Petronet	Hanwha Ocean	138100	Membrane	Conventional	Steam	2004
9085637	Doha	J4 Consortium	Mitsubishi	137300	Spherical	Conventional	Steam	1999

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9863182	Dorado LNG	TMS Cardiff Gas	Samsung	174000	Membrane	Conventional	X-DF	2020
9337975	Duhail	Commerz Real, Nakilat, PRONAV	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2008
9265500	Dukhan	J4 Consortium	Mitsui	137500	Spherical	Conventional	Steam	2004
9216298	East Energy	Nur Global Shipping	HD Hyundai	137000	Spherical	Conventional	Steam	2002
9750696	Eduard Toll	Seapeak	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2017
9334076	Ejnan	K Line, MOL, NYK Line, Mitsui, Nakilat	Samsung	145000	Membrane	Conventional	Steam	2007
8706155	Ekaputra 1	P.T. Humpuss Trans	Mitsubishi	137000	Spherical	Conventional	Steam	1990
9884473	Elisa Aquila	NYK Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9980540	Elisa Ardea	NYK Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9852975	Elisa Larus	GazOcean	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9958640	Emei	Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2023
9626027	Energos Celsius	Energos	Samsung	160000	Membrane	FSRU	DFDE	2013
9624940	Energos Eskimo	Energos	Samsung	160000	Membrane	FSRU	DFDE	2014
9861811	Energos Force	Energos	Hudong-Zhonghua	174000	Membrane	FSRU	DFDE	2021
7361922	Energos Freeze	Energos	HDW	125000	Spherical	FSRU	Steam	1977
9303560	Energos Grand	Energos	Hanwha Ocean	145000	Membrane	Conventional	Steam	2005
9633991	Energos Igloo	Energos	Samsung	170000	Membrane	FSRU	DFDE	2014
9320374	Energos Maria	Energos	Hanwha Ocean	145000	Membrane	Conventional	Steam	2006
9785500	Energos Nanook	Energos	Samsung	170000	Membrane	FSRU	DFDE	2018
9624938	Energos Penguin	Energos	Samsung	160000	Membrane	Conventional	DFDE	2014
9861809	Energos Power	Energos	Hudong-Zhonghua	174000	Membrane	FSRU	DFDE	2021
9253715	Energos Princess	Energos	Hanwha Ocean	138000	Membrane	Conventional	Steam	2003
9256614	Energos Winter	Energos	Hanwha Ocean	138000	Membrane	FSRU	Steam	2004
9269180	Energy Advance	Tokyo Gas	Kawasaki	147000	Spherical	Conventional	Steam	2005
9649328	Energy Atlantic	Alpha Gas	STX	159700	Membrane	Conventional	DFDE	2015
9405588	Energy Confidence	NYK Line, Tokyo Gas	Kawasaki	155000	Spherical	Conventional	Steam	2009
9854624	Energy Endeavour	Alpha Gas	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2021
9948695	Energy Endurance	Alpha Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9540089	Energy Fidelity (ex-Jules Verne)	Alpha Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9948700	Energy Fortitude (ex-Victor Hugo (8107)	Alpha Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9245720	Energy Frontier	Tokyo Gas	Kawasaki	147000	Spherical	Conventional	Steam	2003
9752565	Energy Glory	NYK Line, Tokyo Gas	Japan Marine	165000	Self-Supporting Prismatic	Conventional	DFDE	2019
9483877	Energy Horizon	NYK Line, TLTC	Kawasaki	177000	Spherical	Conventional	Steam	2011
9758832	Energy Innovator	MOL, Tokyo Gas	Japan Marine	165000	Self-Supporting Prismatic	Conventional	DFDE	2019
9859739	Energy Integrity	Alpha Gas	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2021
9881201	Energy Intelligence	Alpha Gas	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2021

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9736092	Energy Liberty	MOL, Tokyo Gas	Japan Marine	165000	Self-Supporting Prismatic	Conventional	DFDE	2018
9355264	Energy Navigator	MOL, Tokyo Gas	Kawasaki	147000	Spherical	Conventional	Steam	2008
9854612	Energy Pacific	Alpha Gas	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2020
9274226	Energy Progress	MOL	Kawasaki	147000	Spherical	Conventional	Steam	2006
9269207	Energy Spirit	Jovo Group	Chantiers de l'Atlantique	74500	Membrane	Conventional	Steam	2006
9758844	Energy Universe	MOL, Tokyo Gas	Japan Marine	165000	Self-Supporting Prismatic	Conventional	DFDE	2019
9749609	Enshu Maru	K Line	Kawasaki	164700	Spherical	Conventional	Steam reheat	2018
9859820	Ertugrul Gazi	Turkish Petroleum Corp	HD Hyundai	170000	Membrane	FSRU	DFDE	2021
9666560	Esshu Maru	MOL, Tokyo Gas	Mitsubishi	153000	Spherical	Conventional	Steam	2014
9236614	Etyfa Prometheas	Natural Gas Infrastructure Company of Cyprus	Mitsubishi	135000	Spherical	FSRU	Steam	2002
9230050	Excalibur	Exmar	Hanwha Ocean	138000	Membrane	FSU	Steam	2002
9820843	Excelerate Sequoia	Excelerate Energy	Hanwha Ocean	173400	Membrane	FSRU	DFDE	2020
9252539	Excellence	Excelerate Energy	Hanwha Ocean	138000	Membrane	FSRU	Steam	2005
9239616	Excelsior	Excelerate Energy	Hanwha Ocean	138000	Membrane	FSRU	Steam	2005
9444649	Exemplar	Excelerate Energy	Hanwha Ocean	150900	Membrane	FSRU	Steam	2010
9389643	Expedient	Excelerate Energy	Hanwha Ocean	150900	Membrane	FSRU	Steam	2010
9638525	Experience	Excelerate Energy	Hanwha Ocean	173400	Membrane	FSRU	DFDE	2014
9361079	Explorer	Excelerate Energy	Hanwha Ocean	150900	Membrane	FSRU	Steam	2008
9361445	Express	Excelerate Energy	Hanwha Ocean	150900	Membrane	FSRU	Steam	2009
9381134	Exquisite	Excelerate Energy, Nakilat	Hanwha Ocean	150900	Membrane	FSRU	Steam	2009
9918157	Extremadura Knutsen	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9768370	Fedor Litke	LITKE	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2017
9918145	Ferrol Knutsen	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9857377	Flex Amber	Flex LNG	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9851634	Flex Artemis	Flex LNG	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2020
9857365	Flex Aurora	Flex LNG	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9825427	Flex Constellation	Flex LNG	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019
9825439	Flex Courageous	Flex LNG	Hanwha Ocean	173400	Spherical	Conventional	ME-GI	2019
9762261	Flex Endeavour	Flex LNG	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9762273	Flex Enterprise	Flex LNG	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9862308	Flex Freedom	Flex LNG	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2021
9709037	Flex Rainbow	Flex LNG	Samsung	174000	Membrane	Conventional	ME-GI	2018
9709025	Flex Ranger	Flex LNG	Samsung	174000	Membrane	Conventional	ME-GI	2018
9851646	Flex Resolute	Flex LNG	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2020
9862475	Flex Vigilant	Flex LNG	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9862463	Flex Volunteer	Flex LNG	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9360817	Fraiha	NYK Line, K Line, MOL, Iino, Mitsui, Nakilat	Hanwha Ocean	210100	Membrane	Q-Flex	SSD	2008
9253284	FSRU Toscana	OLT Offshore LNG Toscana	HD Hyundai	137100	Spherical	FSRU	Steam	2004

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9256200	Fuwairit	MOL	Samsung	138300	Membrane	Conventional	Steam	2004
9877145	Gail Bhuwan	MOL	Hanwha Ocean	176500	Membrane	Conventional	X-DF	2021
9949027	Gail Urja	MOL	Hanwha Ocean	174000	Membrane	Conventional	X-DF	2024
9864928	Gaslog Galveston	GasLog	Samsung	174000	Membrane	Conventional	X-DF	2021
9707508	Gaslog Geneva	GasLog	Samsung	174000	Membrane	Conventional	DFDE	2016
9744013	Gaslog Genoa	GasLog	Samsung	174000	Membrane	Conventional	X-DF	2018
9864916	Gaslog Georgetown	GasLog	Samsung	174000	Membrane	Conventional	X-DF	2020
9707510	Gaslog Gibraltar	GasLog	Samsung	174000	Membrane	Conventional	DFDE	2016
9744025	Gaslog Gladstone	GasLog	Samsung	174000	Membrane	Conventional	X-DF	2019
9687021	Gaslog Glasgow	GasLog	Samsung	174000	Membrane	Conventional	DFDE	2016
9687019	Gaslog Greece	GasLog	Samsung	174000	Membrane	Conventional	DFDE	2016
9748904	Gaslog Hongkong	GasLog	HD Hyundai	174000	Membrane	Conventional	X-DF	2018
9748899	Gaslog Houston	GasLog	HD Hyundai	174000	Membrane	Conventional	X-DF	2018
9962407	Gaslog Italy (2532)	Gaslog	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2024
9638915	Gaslog Salem	CDB Leasing	Samsung	155000	Membrane	Conventional	DFDE	2015
9600530	Gaslog Santiago	GasLog	Samsung	155000	Membrane	Conventional	DFDE	2013
9638903	Gaslog Saratoga	CDB Leasing	Samsung	155000	Membrane	Conventional	DFDE	2014
9352860	Gaslog Savannah	GasLog	Samsung	155000	Membrane	Conventional	DFDE	2010
9634086	Gaslog Seattle	GasLog	Samsung	155000	Membrane	Conventional	DFDE	2013
9600528	Gaslog Shanghai	CDB Leasing	Samsung	155000	Membrane	Conventional	DFDE	2013
9355604	Gaslog Singapore	GasLog	Samsung	155000	Membrane	FSU	DFDE	2010
9626285	Gaslog Skagen	CDB Leasing	Samsung	155000	Membrane	Conventional	DFDE	2013
9626273	Gaslog Sydney	CDB Leasing	Samsung	155000	Membrane	Conventional	DFDE	2013
9853137	Gaslog Wales	GasLog	Samsung	180000	Membrane	Conventional	X-DF	2020
9816763	Gaslog Warsaw	GasLog	Samsung	180000	Membrane	Conventional	X-DF	2019
9876660	Gaslog Wellington	GasLog	Samsung	180000	Membrane	Conventional	X-DF	2021
9855812	Gaslog Westminster	GasLog	Samsung	180000	Membrane	Conventional	X-DF	2020
9876737	Gaslog Winchester	GasLog	Samsung	180000	Membrane	Conventional	X-DF	2021
9819650	Gaslog Windsor	GasLog	Samsung	180000	Membrane	Conventional	X-DF	2020
9768382	Georgiy Brusilov	Dynagas	Hanwha Ocean	172600	Membrane	Icebreaker	DFDE	2018
9750749	Georgiy Ushakov	Seapeak, China LNG Shipping	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2019
9038452	Ghasha	National Gas Shipping Co	Mitsui	135000	Spherical	Conventional	Steam	1995
9360922	Gigira Laitebo	MOL, Itochu	HD Hyundai	155000	Membrane	Conventional	DFDE	2010
9845013	Global Energy	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2020
9880465	Global Sea Spirit	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	X-DF	2021
9880477	Global Sealine	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	X-DF	2022
9859741	Global Star	Maran Gas Maritime, Nakilat	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2021
9253105	Golar Arctic	Golar	Hanwha Ocean	140000	Membrane	Conventional	Steam	2003
9655808	Golar Tundra	Snam	Samsung	170000	Membrane	FSRU	DFDE	2015
9321756	Golden Isaia (ex-Methane Shirley Elizabeth)	Sillo Maritime	Samsung	145000	Membrane	Conventional	Steam	2007

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9946374	Gordonwaters Knutsen	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9315707	Grace Acacia	NYK Line	HD Hyundai	150000	Membrane	Conventional	Steam	2007
9315719	Grace Barleria	NYK Line	HD Hyundai	150000	Membrane	Conventional	Steam	2007
9323675	Grace Cosmos	Sino Commerce Offshore	HD Hyundai	150000	Membrane	Conventional	Steam	2008
9540716	Grace Dahlia	NYK Line	Kawasaki	177400	Spherical	Conventional	Steam	2013
9884174	Grace Emelia	NYK Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9903920	Grace Freesia	NYK Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9338955	Grand Aniva	NYK Line, Sovcomflot	Mitsubishi	147000	Spherical	Conventional	Steam	2008
9332054	Grand Elena	NYK Line, Sovcomflot	Mitsubishi	147000	Spherical	Conventional	Steam	2007
9338929	Grand Mereya	MOL, K Line, Primorsk	Mitsui	147600	Spherical	Conventional	Steam	2008
9922988	Grazyna Gesicka	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9961477	Greenergy Ocean (1880A)	MOL	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2024
9961489	Greenergy Pearl (ex-Hudong-Zhonghua H1881A)	MOL	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2024
9878888	Gui Ying	CSSC Shpg Leasing	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2021
9696266	Hai Yang Shi You 301	CNOOC	Jiangnan	30000	Membrane	Bunkering vessel	DFDE	2015
9872999	Hellas Athina	Latsco (London)	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9872987	Hellas Diana	Latsco (London)	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9155078	HL Muscat	H-Line Shipping	Hanjin H.I.	138000	Membrane	Conventional	Steam	1999
9176008	HL Ras Laffan	H-Line Shipping	Hanjin H.I.	138000	Membrane	Conventional	Steam	2000
9176010	HL Sur	H-Line Shipping	Hanjin H.I.	138300	Membrane	Conventional	Steam	2000
9953262	Hlaitan (ex-H1792A)	MOL	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2024
9941013	HLS Bilbao	Hyundai LNG Shipping	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2024
9947691	HLS Cartagena (2522)	Hyundai LNG Shipping	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2024
9780354	Hoegh Esperanza	Hoegh	HD Hyundai	170000	Membrane	FSRU	DFDE	2018
9653678	Hoegh Gallant	Hoegh	HD Hyundai	170100	Membrane	FSRU	DFDE	2014
9820013	Hoegh Galleon	Hoegh	Samsung	170000	Membrane	FSRU	DFDE	2019
9624914	Hoegh Gandria	Hoegh	Samsung	160000	Membrane	Conventional	DFDE	2013
9822451	Hoegh Gannet	Hoegh	HD Hyundai	170000	Membrane	FSRU	DFDE	2018
9762962	Hoegh Giant	Hoegh	HD Hyundai	170000	Membrane	FSRU	DFDE	2017
9674907	Hoegh Grace	Hoegh	HD Hyundai	170000	Membrane	FSRU	DFDE	2016
9250725	Hongkong Energy	Sinokor Merchant Marine	Hanwha Ocean	140500	Membrane	Conventional	Steam	2004
9958652	Huashan (1835A)	United Liquefied Gas	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2024
9904209	Huelva Knutsen	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9179581	Hyundai Aquapia	Hyundai LNG Shipping	HD Hyundai	135000	Spherical	Conventional	Steam	2000
9155157	Hyundai Cosmopia	Hyundai LNG Shipping	HD Hyundai	135000	Spherical	Conventional	Steam	2000
9372999	Hyundai Ecopia	Hyundai LNG Shipping	HD Hyundai	150000	Membrane	Conventional	Steam	2008
9183269	Hyundai Oceanpia	Hyundai LNG Shipping	HD Hyundai	135000	Spherical	Conventional	Steam	2000

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9761853	Hyundai Peacepia	Hyundai LNG Shipping	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2017
9761841	Hyundai Princepia	Hyundai LNG Shipping	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2017
9155145	Hyundai Technopia	Hyundai LNG Shipping	HD Hyundai	135000	Spherical	Conventional	Steam	1999
9018555	Hyundai Utopia	Hyundai LNG Shipping	HD Hyundai	125200	Spherical	Conventional	Steam	1994
9326603	Iberica Knutsen	Knutsen OAS	Hanwha Ocean	138000	Membrane	Conventional	Steam	2006
9326689	Ibra LNG	Asyad Shipping, MOL	Samsung	147600	Membrane	Conventional	Steam	2006
9317315	Ibri LNG	Asyad Shipping, MOL, Mitsubishi	Mitsubishi	147600	Spherical	Conventional	Steam	2006
9977220	Id'Asah (2596)	JP Morgan	Samsung	174000	Membrane	Conventional	ME-GA	2024
9946398	Ignacy Lukasiewicz	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9629536	Independence	Klaipedos Nafta	HD Hyundai	170100	Membrane	FSRU	DFDE	2014
9874820	Isabella	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	X-DF	2021
9035864	Ish	National Gas Shipping Co	Mitsubishi	137300	Spherical	FSU	Steam	1995
9854935	Jawa Satu	Jawa Satu Regas	Samsung	170000	Membrane	FSRU	DFDE	2021
9901350	John A Angelicoussis	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2022
9157636	K. Acacia	Korea Line	Hanwha Ocean	138000	Membrane	Conventional	Steam	2000
9186584	K. Freesia	Korea Line	Hanwha Ocean	138000	Membrane	Conventional	Steam	2000
9373008	K. Jasmine	Korea Line	Hanwha Ocean	145700	Membrane	Conventional	Steam	2008
9373010	K. Mugungwha	Korea Line	Hanwha Ocean	151700	Membrane	Conventional	Steam	2008
9306495	Karadeniz LNGT Powership Anatolia	Karpowership	Chantiers de l'Atlantique	154472	Membrane	Conventional	DFDE	2006
9043677	Karmol LNGT Powership Africa	Karpowership, MOL	Mitsubishi	127386	Spherical	FSRU	Steam	1994
8608705	Karmol LNGT Powership Asia	Karpowership, MOL	Kawasaki	127000	Spherical	FSRU	Steam	1991
9020766	Karmol LNGT Powership Europe (ex-LNG Vesta)	Karpowership, MOL	Mitsubishi	128000	Spherical	FSRU	Steam	1994
9785158	Kinisis	Chandris Group	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9636723	Kita LNG	TMS Cardiff Gas	Hanwha Ocean	160100	Membrane	Conventional	DFDE	2014
9064073	KLNGTP Black Sea	MISC	Sestri	65000	Membrane	Conventional	Steam	1996
9064085	KLNGTP Marmara	MISC	Sestri	65000	Membrane	Conventional	Steam	1998
9333620	Kmarin Diamond	BP	HD Hyundai	155000	Membrane	Conventional	DFDE	2008
9958664	Kongtong (ex-Hudong-Zhonghua H1836A)	United Liquefied Gas	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2024
9654878	Kool Baltic	CoolCo	STX	170200	Membrane	Conventional	DFDE	2015
9635315	Kool Blizzard	CoolCo	Samsung	160000	Membrane	Conventional	DFDE	2015
9654880	Kool Boreas	CoolCo	STX	170200	Membrane	Conventional	DFDE	2015
9624926	Kool Crystal	CoolCo	Samsung	160000	Membrane	Conventional	DFDE	2014
9864746	Kool Firn	CoolCo	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9655042	Kool Frost	CoolCo	Samsung	160000	Membrane	Conventional	DFDE	2014
9654696	Kool Glacier	CoolCo	HD Hyundai	162000	Membrane	Conventional	DFDE	2014

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9626039	Kool Husky	CoolCo	Samsung	160000	Membrane	Conventional	DFDE	2014
9637325	Kool Ice	CoolCo	Samsung	160000	Membrane	Conventional	DFDE	2015
9654701	Kool Kelvin	CoolCo	HD Hyundai	162000	Membrane	Conventional	DFDE	2015
9870525	Kool Orca	CoolCo	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9976135	Kool Tiger (HSHI-8196)	CoolCo	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9613161	Kumul	MOL, China LNG	Hudong-Zhonghua	172000	Membrane	Conventional	SSD	2016
9915911	Kunlun	COSCO	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2023
9721724	La Mancha Knutsen	Knutsen OAS	HD Hyundai	176000	Membrane	Conventional	ME-GI	2016
9845764	La Seine	TMS Cardiff Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9165011	Lady Eva	PT Mitrausaha Tanker Persada	Mitsubishi Heavy Industries	135225	Spherical	Conventional	Steam	2000
9905980	Lagenda Serenity	K Line	Hudong-Zhonghua	80000	Membrane	Mid-scale	X-DF	2022
9952816	Lagenda Setia	K Line	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2023
9905978	Lagenda Suria	K Line	Hudong-Zhonghua	80000	Membrane	Mid-scale	X-DF	2022
9275347	Lalla Fatma N'soumer	HYPROC	Kawasaki	147300	Spherical	Conventional	Steam	2004
9922976	Lech Kaczynski	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9629598	Lena River	Dynagas	HD Hyundai	155000	Membrane	Conventional	DFDE	2013
9388819	Lijmiliya	Nakilat	Hanwha Ocean	263300	Membrane	Q-Max	SSD	2009
9690171	LNG Abalamabie	BGT LTD	Samsung	175000	Membrane	Conventional	DFDE	2016
9690169	LNG Abuja II	BGT LTD	Samsung	175000	Membrane	Conventional	DFDE	2016
9262211	LNG Adamawa	BGT LTD	HD Hyundai	141000	Spherical	Conventional	Steam	2005
9870159	LNG Adventure	France LNG Shipping	Samsung	174000	Membrane	Conventional	X-DF	2021
9262209	LNG Akwa Ibom	BGT LTD	HD Hyundai	141000	Spherical	Conventional	Steam	2004
9320075	LNG Alliance	GazOcean	Chantiers de l'Atlantique	154500	Membrane	Conventional	DFDE	2007
7390181	LNG Aquarius	Hanochem	General Dynamics	126300	Spherical	Conventional	Steam	1977
9341299	LNG Barka	Asyad Shipping, Osaka Gas, NYK Line, K Line	Kawasaki	153600	Spherical	Conventional	Steam	2008
9241267	LNG Bayelsa	BGT LTD	HD Hyundai	137000	Spherical	Conventional	Steam	2003
9267015	LNG Benue	BW	Hanwha Ocean	145700	Membrane	Conventional	Steam	2006
9692002	LNG Bonny II	BGT LTD	HD Hyundai	177000	Membrane	Conventional	DFDE	2015
9322803	LNG Borno	NYK Line	Samsung	149600	Membrane	Conventional	Steam	2007
9256767	LNG Croatia	LNG Hrvatska	HD Hyundai	138000	Membrane	FSRU	Steam	2005
9262223	LNG Cross River	BGT LTD	HD Hyundai	141000	Spherical	Conventional	Steam	2005
9277620	LNG Dream	NYK Line	Kawasaki	145300	Spherical	Conventional	Steam	2006
9834296	LNG Dubhe	MOL, COSCO	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2019
9329291	LNG Ebisu	MOL, KEPCO	Kawasaki	147500	Spherical	Conventional	Steam	2008
9893606	LNG Endeavour	NYK Line	Samsung	174000	Membrane	Conventional	X-DF	2021
9874492	LNG Endurance	NYK Line	Samsung	174000	Membrane	Conventional	X-DF	2021
9874480	LNG Enterprise	NYK Line	Samsung	174000	Membrane	Conventional	X-DF	2021
9266994	LNG Enugu	BW	Hanwha Ocean	145000	Membrane	Conventional	Steam	2005
9690145	LNG Finima II	BGT LTD	Samsung	175000	Membrane	Conventional	DFDE	2015

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9666986	LNG Fukurokuju	MOL, KEPCO	Kawasaki	165100	Spherical	Conventional	Steam reheat	2016
9892133	LNG Geneva	CSSC Shpg Leasing	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2024
9917555	LNG Harmony	JP Morgan	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9311581	LNG Imo	BW	Hanwha Ocean	148500	Membrane	Conventional	Steam	2008
9200316	LNG Jamal	NYK Line, Osaka Gas	Mitsubishi	137000	Spherical	Conventional	Steam	2000
9769855	LNG Jia Xing	Landmark Capital	Xiamen Shipbuilding Industry	45000	Self-Supporting Prismatic	Small-scale	DFDE	2019
9774628	LNG Juno	MOL	Mitsubishi	177300	Spherical	Conventional	STaGE	2018
9341689	LNG Jupiter	NYK Line, Osaka Gas	Kawasaki	156000	Spherical	Conventional	Steam	2009
9666998	LNG Jurojin	MOL, KEPCO	Mitsubishi	155300	Spherical	Conventional	Steam reheat	2015
9311567	LNG Kano	BW	Hanwha Ocean	148300	Membrane	Conventional	Steam	2007
9372963	LNG Kolt	Pan Ocean	Hanjin H.I.	153000	Membrane	Conventional	Steam	2008
9692014	LNG Lagos II	BGT LTD	HD Hyundai	177000	Membrane	Conventional	DFDE	2016
9269960	LNG Lokoja	BW	Hanwha Ocean	148300	Membrane	Conventional	Steam	2006
8701791	LNG Maleo	MOL, NYK Line, K Line	Mitsui	127700	Spherical	Conventional	Steam	1989
9645748	LNG Mars	MOL, Osaka Gas	Mitsubishi	155000	Spherical	Conventional	Steam reheat	2016
9834325	LNG Megrez	MOL, COSCO	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2020
9834301	LNG Merak	MOL, COSCO	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2020
9322815	LNG Ogun	NYK Line	Samsung	149600	Membrane	Conventional	Steam	2007
9311579	LNG Ondo	BW	Hanwha Ocean	148300	Membrane	Conventional	Steam	2007
9267003	LNG Oyo	BW	Hanwha Ocean	145800	Membrane	Conventional	Steam	2005
9834313	LNG Phecda	MOL, COSCO	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2020
9690157	LNG Port-Harcourt II	BGT LTD	Samsung	175000	Membrane	Conventional	DFDE	2015
9902938	LNG Prosperity	JP Morgan	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9262235	LNG River Niger	BGT LTD	HD Hyundai	141000	Spherical	Conventional	Steam	2006
9266982	LNG River Orashi	BW	Hanwha Ocean	145900	Membrane	Conventional	Steam	2004
9877133	LNG Rosenrot	MOL	Hanwha Ocean	174000	Membrane	Conventional	X-DF	2021
9774135	LNG Sakura	NYK Line, KEPCO	Kawasaki	177000	Spherical	Conventional	DFDE	2018
9696149	LNG Saturn	MOL	Mitsubishi	155700	Spherical	Conventional	Steam reheat	2016
9771913	LNG Schneewei-sschen	MOL	Hanwha Ocean	180000	Membrane	Conventional	X-DF	2018
9216303	LNG Sokoto	BGT LTD	HD Hyundai	137000	Spherical	Conventional	Steam	2002
9645736	LNG Venus	MOL, Osaka Gas	Mitsubishi	155000	Spherical	Conventional	Steam	2014
9872949	LNGships Athena	TMS Cardiff Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9875800	LNGships Empress	TMS Cardiff Gas	Samsung	174000	Membrane	Conventional	X-DF	2021
9872901	LNGships Manhatten	TMS Cardiff Gas	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9045132	LNGT Americas	Karpowership	Mitsubishi	126800	Spherical	Conventional	Steam	1994
9490961	Lobito	Mitsui, NYK Line, Seapeak	Samsung	160400	Membrane	Conventional	DFDE	2011
9285952	Lusail	K Line, MOL, NYK Line, Nakilat	Samsung	145700	Membrane	Conventional	Steam	2005
9705653	Macoma	Seapeak	Hanwha Ocean	173000	Membrane	Conventional	ME-GI	2017

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9770921	Magdala	Seapeak	Hanwha Ocean	173000	Membrane	Conventional	ME-GI	2018
9904182	Malaga Knutsen	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9490959	Malanje	Mitsui, NYK Line, Seapeak	Samsung	160400	Membrane	Conventional	DFDE	2011
9682588	Maran Gas Achilles	Maran Gas Maritime	HD Hyundai	174000	Membrane	Conventional	DFDE	2015
9682590	Maran Gas Agamemnon	Maran Gas Maritime	HD Hyundai	174000	Membrane	Conventional	ME-GI	2016
9650054	Maran Gas Alexandria	Maran Gas Maritime	HD Hyundai	161900	Membrane	Conventional	DFDE	2015
9887217	Maran Gas Amorgos	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	X-DF	2021
9701217	Maran Gas Amphipolis	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	DFDE	2016
9810379	Maran Gas Andros	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019
9941520	Maran Gas Antibes (2474)	Maran Gas Maritime	Samsung	174000	Membrane	Conventional	X-DF	2024
9633422	Maran Gas Apollonia	Maran Gas Maritime	HD Hyundai	161900	Membrane	Conventional	DFDE	2014
9302499	Maran Gas Asclepius	Maran Gas Maritime, Nakilat	Hanwha Ocean	145800	Membrane	Conventional	Steam	2005
9753014	Maran Gas Chios	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019
9331048	Maran Gas Coronis	Maran Gas Maritime, Nakilat	Hanwha Ocean	145700	Membrane	Conventional	Steam	2007
9633173	Maran Gas Delphi	Maran Gas Maritime	Hanwha Ocean	159800	Membrane	Conventional	DFDE	2014
9627497	Maran Gas Efessos	Maran Gas Maritime	Hanwha Ocean	159800	Membrane	Conventional	DFDE	2014
9682605	Maran Gas Hector	Maran Gas Maritime	HD Hyundai	174000	Membrane	Conventional	DFDE	2016
9767962	Maran Gas Hydra	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019
9892717	Maran Gas Ithaca	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	X-DF	2021
9883742	Maran Gas Kalymnos	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	X-DF	2021
9956408	Maran Gas Kastelorizo	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2024
9956393	Maran Gas Kimolos	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2024
9682576	Maran Gas Leto	Maran Gas Maritime	HD Hyundai	174000	Membrane	Conventional	DFDE	2016
9627502	Maran Gas Lindos	Maran Gas Maritime	Hanwha Ocean	159800	Membrane	Conventional	DFDE	2015
9924869	Maran Gas Marseille	Maran Gas Maritime	Samsung	174000	Membrane	Conventional	X-DF	2023
9658238	Maran Gas Mystras	Maran Gas Maritime	Hanwha Ocean	159800	Membrane	Conventional	DFDE	2015
9941518	Maran Gas Nice (2473)	Maran Gas Maritime	Samsung	174000	Membrane	Conventional	X-DF	2024
9732371	Maran Gas Olympias	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	DFDE	2017
9709489	Maran Gas Pericles	Maran Gas Maritime	HD Hyundai	174000	Membrane	Conventional	DFDE	2016
9633434	Maran Gas Posidonia	Maran Gas Maritime	HD Hyundai	161900	Membrane	Conventional	DFDE	2014
9844863	Maran Gas Psara	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2020

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9701229	Maran Gas Roxana	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	DFDE	2017
9650042	Maran Gas Sparta	Maran Gas Maritime	HD Hyundai	161900	Membrane	Conventional	DFDE	2015
9767950	Maran Gas Spetses	Maran Gas Maritime, Nakilat	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9658240	Maran Gas Troy	Maran Gas Maritime	Hanwha Ocean	159800	Membrane	Conventional	DFDE	2015
9709491	Maran Gas Ulysses	Maran Gas Maritime	HD Hyundai	174000	Membrane	Conventional	DFDE	2017
9732369	Maran Gas Vergina	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	DFDE	2016
9659725	Maria Energy	Tsakos	HD Hyundai	174000	Membrane	Conventional	DFDE	2016
9778313	Marshal Vasilevskiy	Gazprom	HD Hyundai	174000	Membrane	FSRU	DFDE	2018
9770438	Marvel Crane	NYK Line	Mitsubishi	177000	Spherical	Conventional	STaGE	2019
9964182	Marvel Dove (Hull 8173)	SK Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9759240	Marvel Eagle	MOL	Kawasaki	155000	Spherical	Conventional	DFDE	2018
9760768	Marvel Falcon	MOL	Samsung	174000	Membrane	Conventional	X-DF	2018
9760770	Marvel Hawk	MOL	Samsung	174000	Membrane	Conventional	X-DF	2018
9770440	Marvel Heron	MOL	Mitsubishi	177000	Spherical	Conventional	STaGE	2019
9760782	Marvel Kite	Meiji Shipping	Samsung	174000	Membrane	Conventional	X-DF	2019
9759252	Marvel Pelican	MOL	Kawasaki	155985	Spherical	Conventional	DFDE	2019
9962419	Marvel Phoenix	Gaslog	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2024
9963449	Marvel Swallow (2536)	MOL	Hanwha Ocean	174000	Membrane	Conventional	ME-GA	2024
9880192	Marvel Swan	Navigare Capital Partners	Samsung	174000	Membrane	Conventional	DFDE	2021
9770945	Megara	Seapeak	Hanwha Ocean	173000	Membrane	Conventional	ME-GI	2018
9397303	Mekaines	Nakilat	Samsung	266500	Membrane	Q-Max	SSD	2009
9250191	Merchant	Sinokor Merchant Marine	Samsung	138200	Membrane	Conventional	Steam	2003
9337729	Mesaimeer	Nakilat	HD Hyundai	216300	Membrane	Q-Flex	SSD	2009
9243148	Metagas Everest	Nur Global Shipping	Hanwha Ocean	138000	Membrane	Conventional	Steam	2003
9321768	Methane Alison Victoria	Gaslog	Samsung	145000	Membrane	FSU	Steam	2007
9516129	Methane Becki Anne	GasLog	Samsung	170000	Membrane	Conventional	DFDE	2010
9321744	Methane Heather Sally	Huaxia Financial Leasing	Samsung	145000	Membrane	Conventional	Steam	2007
9307190	Methane Jane Elizabeth	GasLog	Samsung	145000	Membrane	Conventional	Steam	2006
9412880	Methane Julia Louise	MOL	Samsung	170000	Membrane	Conventional	DFDE	2010
9520376	Methane Mickie Harper	Meiji Shipping	Samsung	170000	Membrane	Conventional	DFDE	2010
9321770	Methane Nile Eagle	Shell, Gaslog	Samsung	145000	Membrane	Conventional	Steam	2007
9425277	Methane Patricia Camila	Meiji Shipping	Samsung	170000	Membrane	Conventional	DFDE	2010
9307188	Methane Rita Andrea	Shell, Gaslog	Samsung	145000	Membrane	Conventional	Steam	2006
9321732	Milaha Qatar	Nakilat, Qatar Shpg., SocGen	Samsung	145600	Membrane	Conventional	Steam	2006
9255854	Milaha Ras Laffan	Nakilat, Qatar Shpg., SocGen	Samsung	138300	Membrane	Conventional	Steam	2004

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9305128	Min Lu	China LNG Ship Mgmt	Hudong-Zhonghua	147200	Membrane	Conventional	Steam	2009
9305116	Min Rong	China LNG Ship Mgmt	Hudong-Zhonghua	147600	Membrane	Conventional	Steam	2009
9885855	Minerva Amorgos	Minerva Marine	Samsung	174000	Membrane	Conventional	X-DF	2022
9877341	Minerva Chios	Minerva Marine	Samsung	174000	Membrane	Conventional	X-DF	2021
9869942	Minerva Kalymnos	Minerva Marine	Samsung	174000	Membrane	Conventional	X-DF	2021
9854375	Minerva Limnos	Minerva Marine	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2021
9854363	Minerva Psara	Minerva Marine	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2021
9885996	MOL Hestia	MOL	Hanwha Ocean	173400	Membrane	Conventional	X-DF	2021
9337755	Mozah	Nakilat	Samsung	266300	Membrane	Q-Max	SSD	2008
9074638	Mraweh	National Gas Shipping Co	Kvaerner Masa	135000	Spherical	Conventional	Steam	1996
9878876	Mu Lan	CSSC Shpg Leasing	Hudong-Zhonghua	178000	Membrane	Conventional	X-DF	2021
9074626	Mubaraz	National Gas Shipping Co	Kvaerner Masa	135000	Spherical	Conventional	Steam	1996
9864837	Mulan Spirit	Nur Global Shipping	Jiangnan	79800	Membrane	Mid-scale	X-DF	2023
9705641	Murex	Seapeak	Hanwha Ocean	173000	Membrane	Conventional	ME-GI	2017
9360805	Murwab	NYK Line, K Line, MOL, Iino, Mitsui, Nakilat	Hanwha Ocean	210100	Membrane	Q-Flex	SSD	2008
9770933	Myrina	Seapeak	Hanwha Ocean	173000	Membrane	Conventional	ME-GI	2018
9926714	Nantes Knutsen (Hull 8100)	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9324277	Neo Energy	Nur Global Shipping	HD Hyundai	150000	Spherical	Conventional	Steam	2007
9385673	Neptune	Hoegh, MOL, TLTC	Samsung	145000	Membrane	FSRU	DFDE	2009
9929106	New Apex	Pan Ocean	Samsung	174000	Membrane	Conventional	X-DF	2023
9926908	New Brave (ex-3221)	Pan Ocean	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9947500	New Green ST (ex-3224)	Pan Ocean	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9926910	New Nature (ex-3222)	Pan Ocean	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9750660	Nikolay Urvantsev	MOL, COSCO	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2019
9750725	Nikolay Yevgenov	Seapeak, China LNG Shipping	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2019
9768526	Nikolay Zubov	Dynagas	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2019
9294264	Nizwa LNG	Asyad Shipping, MOL	Kawasaki	147700	Spherical	Conventional	Steam	2005
9796781	Nohshu Maru	MOL, JERA	Mitsubishi	177300	Spherical	Conventional	STaGE	2019
9953509	North Air	White Fox Ship Management	Samsung	174000	Membrane	Conventional	X-DF	2023
9958298	North Light (Hull 2523)	MOL	Hanwha Ocean	174000	Membrane	Conventional	ME-GA	2024
9958303	North Moon (Hull 2524)	MOL	Hanwha Ocean	174000	Membrane	Conventional	ME-GA	2024
9953511	North Mountain	White Fox Ship Management	Samsung	174000	Membrane	Conventional	X-DF	2024
9958315	North Ocean	MOL	Hanwha Ocean	174000	Membrane	Conventional	ME-GA	2024
9953523	North Star	White Fox Ship Management	Samsung	174000	Membrane	Conventional	X-DF	2024
9953535	North Way (Hull 2583)	White Fox Ship Management	Samsung	174000	Membrane	Conventional	X-DF	2024

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9976903	Nuaijah (Hull 2546)	K3 Consortium	Samsung	174000	Membrane	Conventional	ME-GA	2024
7382744	Nusantara Regas Satu	Energos	Rosenberg Verft	125000	Spherical	FSRU	Steam	1977
9315692	Ob River	CDB Leasing	HD Hyundai	149700	Membrane	Conventional	Steam	2007
9698111	Oceanic Breeze	K Line, Inpex	Mitsubishi	155300	Spherical	Conventional	Steam reheat	2018
9397353	Onaiza	Nakilat	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2009
9902926	Orion Bohemia	JP Morgan	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9956604	Orion Iris (2594)	JP Morgan	Samsung	174000	Membrane	Conventional	ME-GA	2024
9917543	Orion Jessica	JP Morgan	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9888766	Orion Monet	JP Morgan	Samsung	174000	Membrane	Conventional	X-DF	2022
9889904	Orion Sea	JP Morgan	Samsung	174000	Membrane	Conventional	X-DF	2022
9926922	Orion Sinead	JP Morgan	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9956587	Orion Spirit (ex-2592)	JP Morgan	Samsung	174000	Membrane	Conventional	ME-GA	2024
9889916	Orion Sun	JP Morgan	Samsung	174000	Membrane	Conventional	X-DF	2022
9761267	Ougarta	HYPROC	HD Hyundai	171800	Membrane	Conventional	DFDE	2017
9621077	Pacific Arcadia	NYK Line	Mitsubishi	145400	Spherical	Conventional	Steam	2014
9698123	Pacific Breeze	K Line	Kawasaki	182000	Spherical	Conventional	DFDE	2018
9351971	Pacific Enlighten	Kyushu Electric, TEPCO, Mitsubishi, Mitsui, NYK Line, MOL	Mitsubishi	145000	Spherical	Conventional	Steam	2009
9743875	Pacific Mimosa	NYK Line	Mitsubishi	155300	Membrane	Conventional	Steam reheat	2018
9247962	Pacific Notus	TEPCO, NYK Line, Mitsubishi	Mitsubishi	137000	Spherical	Conventional	Steam	2003
9903425	Pacific Success (ex-Samsung Heavy Industries 2315)	Sinokor Maritime Co Ltd	Samsung	174000	Membrane	Conventional	X-DF	2024
9636735	Palu LNG	TMS Cardiff Gas	Hanwha Ocean	160000	Membrane	Conventional	DFDE	2014
9750256	Pan Africa	Seapeak, China LNG Shipping, CETS Investment Management, BW	Hudong-Zhonghua	174000	Membrane	Conventional	DFDE	2019
9750232	Pan Americas	Seapeak	Hudong-Zhonghua	174000	Membrane	Conventional	DFDE	2018
9750220	Pan Asia	Seapeak	Hudong-Zhonghua	174000	Membrane	Conventional	DFDE	2017
9750244	Pan Europe	Seapeak	Hudong-Zhonghua	174000	Membrane	Conventional	DFDE	2018
9613135	Papua	MOL, China LNG	Hudong-Zhonghua	172000	Membrane	Conventional	SSD	2015
9946350	Paris Knutsen	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9766889	Patris	Chandris Group	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2018
9862346	Pearl LNG	TMS Cardiff Gas	Samsung	174000	Membrane	Conventional	X-DF	2020
9629524	PGN FSRU Lampung	Hoegh	HD Hyundai	170000	Membrane	FSRU	DFDE	2014
9256602	Pioneer Spirit (ex-LNG Pioneer)	Nur Global Shipping	Hanwha Ocean	138000	Membrane	Conventional	Steam	2005
9375721	Point Fortin	MOL, Sumitomo, LNG JAPAN	Imabari	154200	Membrane	Conventional	Steam	2010
9246621	Portovyy	Gazprom	Hanwha Ocean	138100	Membrane	FSU	Steam	2003
9723801	Prachi	MOL, NYK Line, K Line, SCI, Nakilat, Petronet	HD Hyundai	173000	Membrane	Conventional	DFDE	2016

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9264910	Prima Carrier (ex-Pacific Eurus)	Soechi Lines	Mitsubishi	137000	Spherical	Conventional	Steam	2006
9256793	Prima Concord	Soechi Lines	Samsung	138000	Membrane	Conventional	Steam	2004
9810549	Prism Agility	SK Shipping	HD Hyundai	180000	Membrane	Conventional	X-DF	2019
9810551	Prism Brilliance	SK Shipping	HD Hyundai	180000	Membrane	Conventional	X-DF	2019
9888481	Prism Courage	SK Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9904651	Prism Diversity	SK Shipping	HD Hyundai	180000	Membrane	Conventional	X-DF	2022
9630028	Pskov	Sovcomflot	STX	170200	Membrane	Conventional	DFDE	2014
9030814	Puteri Delima	MISC	Chantiers de l'Atlantique	130000	Membrane	Conventional	Steam	1995
9248502	Puteri Firus Satu	MISC	Mitsubishi	137500	Membrane	Conventional	Steam	2004
9030802	Puteri Intan	MISC	Chantiers de l'Atlantique	130000	Membrane	Conventional	Steam	1994
9947598	Puteri Ledang (ex-Hull 3297)	Hyundai LNG Shipping	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9947603	Puteri Mahsuri (ex-Hull 3298)	Hyundai LNG Shipping	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9261205	Puteri Mutiara Satu	MISC	Mitsui	137000	Membrane	Conventional	Steam	2005
9030826	Puteri Nilam	MISC	Chantiers de l'Atlantique	130000	Membrane	Conventional	Steam	1995
9229647	Puteri Nilam Satu	MISC	Mitsubishi Heavy Industries	134833	Membrane	Conventional	Steam	2003
9937945	Puteri Saadong	Hyundai LNG Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9937957	Puteri Santubong (ex-Hull 3295)	Hyundai LNG Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9937969	Puteri Sejinjang - 3 (Hull 3296)	Hyundai LNG Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2024
9030838	Puteri Zamrud	MISC	Chantiers de l'Atlantique	130000	Membrane	Conventional	Steam	1996
9245031	Puteri Zamrud Satu	MISC	Mitsui	137500	Membrane	Conventional	Steam	2004
9851787	Qogir	TMS Cardiff Gas	Samsung	174000	Membrane	Conventional	X-DF	2020
9963853	Quest Kirishima (2604)	NYK Line	Samsung	174000	Membrane	Conventional	X-DF	2024
9253703	Raahi	MOL, NYK Line, K Line, SCI, Nakilat, Petronet	Hanwha Ocean	138100	Membrane	Conventional	Steam	2004
9443413	Rasheeda	Nakilat	Samsung	266300	Membrane	Q-Max	ME-GI	2010
9874040	Ravenna Knutsen	Knutsen OAS	HD Hyundai	30000	Type C	Small-scale	X-DF	2021
9953248	Rex Tillerson (1790A)	MOL	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2024
9825568	Rias Baixas Knutsen	Knutsen OAS	HD Hyundai	180000	Membrane	Conventional	ME-GI	2019
9477593	Ribera Duero Knutsen	Knutsen OAS	Hanwha Ocean	173400	Membrane	Conventional	DFDE	2010
9721736	Rioja Knutsen	Knutsen OAS	HD Hyundai	176000	Membrane	Conventional	ME-GI	2016
9750713	Rudolf Samoylovich	Seapeak	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2018
9946386	Saint Barbara	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9300817	Salalah LNG	Asyad Shipping, MOL	Samsung	147000	Membrane	Conventional	Steam	2005
9904170	Santander Knutsen	Knutsen OAS	HD Hyundai	174000	Membrane	Conventional	X-DF	2022

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9849887	SCF La Perouse	Sovcomflot	HD Hyundai	174000	Membrane	Conventional	X-DF	2020
9339260	Seapeak Arwa	Seapeak, Marubeni	Samsung	168900	Membrane	Conventional	DFDE	2008
9771080	Seapeak Bahrain	Seapeak	Hanwha Ocean	173400	Membrane	FSU	ME-GI	2018
9236420	Seapeak Catalunya	Seapeak	IZAR	138200	Membrane	Conventional	Steam	2003
9681687	Seapeak Creole	Seapeak	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2016
9247364	Seapeak Galicia	Seapeak	Hanwha Ocean	140500	Membrane	Conventional	Steam	2004
9781918	Seapeak Glasgow	Seapeak	HD Hyundai	174000	Membrane	Conventional	ME-GI	2018
9230048	Seapeak Hispania	Seapeak	Hanwha Ocean	140500	Membrane	Conventional	Steam	2002
9259276	Seapeak Madrid	Seapeak	IZAR	138000	Membrane	Conventional	Steam	2004
9342487	Seapeak Magellan	Seapeak, Marubeni	Samsung	165500	Membrane	Conventional	DFDE	2009
9336749	Seapeak Marib	Seapeak	Samsung	165500	Membrane	Conventional	DFDE	2008
9369904	Seapeak Meridian	Seapeak, Marubeni	Samsung	165500	Membrane	Conventional	DFDE	2010
9336737	Seapeak Methane	Seapeak, Marubeni	Samsung	165500	Membrane	Conventional	DFDE	2008
9681699	Seapeak Oak	Seapeak	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2016
9721401	Seapeak Vanvouver	Seapeak	Hanwha Ocean	173000	Membrane	Conventional	ME-GI	2017
9781920	Seapeak Yamal	Seapeak	HD Hyundai	174000	Membrane	Conventional	ME-GI	2019
9666558	Seishu Maru	Mitsubishi, NYK Line, Chubu Electric	Mitsubishi	153000	Membrane	Conventional	Steam	2014
9293832	Seri Alam	MISC	Samsung	145700	Membrane	Conventional	Steam	2005
9293844	Seri Amanah	MISC	Samsung	145700	Membrane	Conventional	Steam	2006
9321653	Seri Anggun	MISC	Samsung	145700	Membrane	Conventional	Steam	2006
9321665	Seri Angkasa	MISC	Samsung	145700	Membrane	Conventional	Steam	2006
9329679	Seri Ayu	MISC	Samsung	145700	Membrane	Conventional	Steam	2007
9331634	Seri Bakti	MISC	Mitsubishi	152300	Membrane	Conventional	Steam	2007
9331660	Seri Balhaf	MISC	Mitsubishi	157000	Membrane	Conventional	DFDE	2009
9331672	Seri Balqis	MISC	Mitsubishi	152000	Membrane	Conventional	DFDE	2009
9331646	Seri Begawan	MISC	Mitsubishi	152300	Membrane	Conventional	Steam	2007
9331658	Seri Bijaksana	MISC	Mitsubishi	152300	Membrane	Conventional	Steam	2008
9714305	Seri Camar	PETRONAS	HD Hyundai	150200	Membrane	Conventional	Steam reheat	2018
9714276	Seri Camellia	PETRONAS	HD Hyundai	150200	Membrane	Conventional	Steam reheat	2016
9756389	Seri Cemara	PETRONAS	HD Hyundai	150200	Spherical	Conventional	Steam reheat	2018
9714290	Seri Cempaka	PETRONAS	HD Hyundai	150200	Spherical	Conventional	ME-GI	2017
9714288	Seri Cenderawasih	PETRONAS	HD Hyundai	150200	Spherical	Conventional	Steam reheat	2017
9896440	Seri Damai	MISC	Samsung	174000	Membrane	Conventional	X-DF	2023
9896452	Seri Daya	MISC	Samsung	174000	Membrane	Conventional	X-DF	2023
9338797	Sestao Knutsen	Knutsen OAS	IZAR	138000	Membrane	Conventional	Steam	2007
9414632	Sevilla Knutsen	Knutsen OAS	Hanwha Ocean	173400	Membrane	Conventional	DFDE	2010
9418365	Shagra	Nakilat	Samsung	266300	Membrane	Q-Max	SSD	2009
9035852	Shahamah	National Gas Shipping Co	Kawasaki	135000	Spherical	Conventional	Steam	1994
9253222	Shandong Juniper	Shell	Mitsubishi	135000	Spherical	Conventional	Steam	2004

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9915894	Shaolin	COSCO	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2022
9583677	Shen Hai	China LNG, CNOOC, Shanghai LNG	Hudong-Zhonghua	147600	Membrane	Conventional	Steam	2012
9791200	Shinshu Maru	MOL	Kawasaki	177000	Spherical	Conventional	DFDE	2019
9320386	Simaisma	Maran Gas Maritime, Nakilat	Hanwha Ocean	145700	Membrane	Conventional	Steam	2006
9238040	Singapore Energy	Sinokor Merchant Marine	Samsung	138000	Membrane	Conventional	Steam	2003
9693161	SK Audace	SK Shipping, Marubeni	Samsung	180000	Membrane	Conventional	X-DF	2017
9693173	SK Resolute	SK Shipping, Marubeni	Samsung	180000	Membrane	Conventional	X-DF	2018
9247194	SK Sunrise	SK Shipping	Samsung	138200	Membrane	Conventional	Steam	2003
9902902	SM Albatross	Korea Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9902914	SM Bluebird	Korea Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9761827	SM Eagle	Korea Line	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2017
9917567	SM Golden Eagle	Korea Line	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9917579	SM Kestrel	Korea Line	HD Hyundai	174000	Membrane	Conventional	ME-GA	2023
9761839	SM Seahawk	Korea Line	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2017
9210816	Sohar LNG	Asyad Shipping, MOL	Mitsubishi	137200	Spherical	Conventional	Steam	2001
9791212	Sohshu Maru	MOL, JERA	Kawasaki	177300	Spherical	Conventional	DFDE	2019
9634098	Solaris	GasLog	Samsung	155000	Membrane	Conventional	DFDE	2014
9482304	Sonangol Benguela	Mitsui, Sonangol, Sojlitz	Hanwha Ocean	160000	Membrane	Conventional	Steam	2011
9482299	Sonangol Etosha	Mitsui, Sonangol, Sojlitz	Hanwha Ocean	160000	Membrane	Conventional	Steam	2011
9475600	Sonangol Sambizanga	Mitsui, Sonangol, Sojlitz	Hanwha Ocean	160000	Membrane	Conventional	Steam	2011
9613147	Southern Cross	MOL, China LNG	Hudong-Zhonghua	168400	Membrane	Conventional	SSD	2015
9475208	Soyo	Mitsui, NYK Line, Seapeak	Samsung	160400	Membrane	Conventional	DFDE	2011
9361639	Spirit Of Hela	MOL, Itochu	HD Hyundai	177000	Membrane	Conventional	DFDE	2009
9315393	Stena Blue Sky	Unknown	Hanwha Ocean	145700	Membrane	Conventional	Steam	2006
9322255	Summit LNG	Excelerate Energy	Hanwha Ocean	138000	Membrane	FSRU	Steam	2006
9330745	Symphonic Breeze	K Line	Kawasaki	147600	Spherical	Conventional	Steam	2007
9403669	Taitar No.1	CPC, Mitsui, NYK Line	Mitsubishi	145300	Spherical	Conventional	Steam	2009
9403645	Taitar No.2	MOL, NYK Line	Kawasaki	145300	Spherical	Conventional	Steam	2009
9403671	Taitar No.3	MOL, NYK Line	Mitsubishi	145300	Spherical	Conventional	Steam	2010
9403657	Taitar No.4	CPC, Mitsui, NYK Line	Kawasaki	145300	Spherical	Conventional	Steam	2010
9334284	Tangguh Batur	NYK Line, Sovcomflot	Hanwha Ocean	145700	Membrane	Conventional	Steam	2008
9349007	Tangguh Foja	K Line, PT Meratus	Samsung	154800	Membrane	Conventional	DFDE	2008
9333632	Tangguh Hiri	Seapeak	HD Hyundai	155000	Membrane	Conventional	DFDE	2008
9349019	Tangguh Jaya	K Line, PT Meratus	Samsung	155000	Membrane	Conventional	DFDE	2008
9355379	Tangguh Palung	K Line, PT Meratus	Samsung	155000	Membrane	Conventional	DFDE	2009
9361990	Tangguh Sago	Seapeak	HD Hyundai	155000	Membrane	Conventional	DFDE	2009
9325893	Tangguh Towuti	NYK Line, PT Samudera, Sovcomflot	Hanwha Ocean	145700	Membrane	Conventional	Steam	2008

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9337731	Tembek	Nakilat, Asyad Shipping	Samsung	216200	Membrane	Q-Flex	SSD	2007
7428433	Tenaga Empat	MISC	CNIM	130000	Membrane	FSU	Steam	1981
7428457	Tenaga Satu	MISC	Dunkerque Chantiers	130000	Membrane	FSU	Steam	1982
9892456	Tenergy	Tsakos	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9761243	Tessala	HYPROC	HD Hyundai	171800	Membrane	Conventional	DFDE	2016
9006681	Torman II (ex-LNG Flora)	NYK Line	Kawasaki	127700	Spherical	FSU	Steam	1993
9238038	Trader II	Capital Gas	Samsung	138000	Membrane	Conventional	Steam	2002
9213416	Trader III	Capital Gas	Mitsubishi	137500	Membrane	Conventional	Steam	2002
9854765	Traiano Knutsen	Knutsen OAS	HD Hyundai	180000	Membrane	Conventional	ME-GI	2020
9350927	Trinity Glory	K Line	Imabari	155000	Membrane	Conventional	Steam	2009
9823883	Turquoise P	Pardus Energy	HD Hyundai	170000	Membrane	FSRU	DFDE	2019
9360829	Umm Al Amad	NYK Line, K Line, MOL, Iino, Mitsui, Nakilat	Hanwha Ocean	210200	Membrane	Q-Flex	SSD	2008
9074652	Umm Al Ashtan	National Gas Shipping Co	Kvaerner Masa	135000	Spherical	Conventional	Steam	1997
9308431	Umm Bab	Maran Gas Maritime, Nakilat	Hanwha Ocean	145700	Membrane	Conventional	Steam	2005
9953250	Umm Ghuwailina (1791A)	MOL	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2024
9977232	Umm Graybah (2597)	JP Morgan	Samsung	174000	Membrane	Conventional	ME-GA	2024
9372731	Umm Slal	Nakilat	Samsung	266000	Membrane	Q-Max	SSD	2008
9434266	Valencia Knutsen	Knutsen OAS	Hanwha Ocean	173400	Membrane	Conventional	DFDE	2010
9837066	Vasant 1	Botas	HD Hyundai	180000	Membrane	FSRU	DFDE	2020
9630004	Velikiy Novgorod	Sovcomflot	STX	170200	Membrane	Conventional	DFDE	2014
9958846	Venture Bayou	Venture Global	Samsung	174000	Membrane	Conventional	ME-GA	2024
9956599	Venture Gator	Venture Global	Samsung	174000	Membrane	Conventional	ME-GA	2024
9895238	Vivirt City LNG	H-Line Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2021
9950105	Vivit Africa LNG	H-Line Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2023
9864667	Vivit Americas LNG	TMS Cardiff Gas	HD Hyundai	170520	Membrane	Conventional	X-DF	2020
9902756	Vivit Arabia LNG	H-Line Shipping	HD Hyundai	174000	Membrane	Conventional	X-DF	2022
9750701	Vladimir Rusanov	MOL	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2018
9750658	Vladimir Vize	MOL	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2018
9750737	Vladimir Voronin	Seapeak, China LNG Shipping	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2019
9892121	Wen Cheng	CSSC Shpg Leasing	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2023
9627954	Wilforce	CDB Leasing	Hanwha Ocean	160000	Membrane	Conventional	DFDE	2013
9627966	Wilpride	CDB Leasing	Hanwha Ocean	160000	Membrane	Conventional	DFDE	2013
9753026	Woodside Chaney	Maran Gas Maritime	HD Hyundai	174000	Membrane	Conventional	ME-GI	2019
9859753	Woodside Charles Allen	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2020
9369899	Woodside Donaldson	Seapeak, Marubeni	Samsung	165500	Membrane	Conventional	DFDE	2009
9633161	Woodside Goode	Maran Gas Maritime	Hanwha Ocean	159800	Membrane	Conventional	DFDE	2013
9810367	Woodside Rees Wither	Maran Gas Maritime	Hanwha Ocean	173400	Membrane	Conventional	ME-GI	2019

Appendix 3: Table of global active LNG fleet (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cm)	Cargo Type	Vessel Type	Propulsion Type	Delivery Year
9627485	Woodside Rogers	Maran Gas Maritime	Hanwha Ocean	159800	Membrane	Conventional	DFDE	2013
9975040	Woodside Scarlet Ibis (8170)	Hyundai Glovis	HD Hyundai	174000	Membrane	Conventional	ME-GA	2024
9915909	Wudang	COSCO	Hudong-Zhonghua	174000	Membrane	Conventional	X-DF	2022
9210828	Xinhang Energy	Xinhang Shipping Co. Ltd.	Mitsubishi	137000	Spherical	Conventional	Steam	2002
9750672	Yakov Gakkel	Seapeak, China LNG Shipping	Hanwha Ocean	172000	Membrane	Icebreaker	DFDE	2019
9636747	Yari LNG	TMS Cardiff Gas	Hanwha Ocean	160000	Membrane	Conventional	DFDE	2014
9629586	Yenisei River	Dynagas	HD Hyundai	155000	Membrane	Conventional	DFDE	2013
9879674	Yiannis	Maran Gas Maritime	Hanwha Ocean	174000	Membrane	Conventional	ME-GI	2021
9431214	Zarga	Nakilat	Samsung	266000	Membrane	Q-Max	SSD	2010
9132818	Zekreet	J4 Consortium	Mitsui	137500	Spherical	Conventional	Steam	1998

Appendix 4: Table of global LNG vessel orderbook, end-2024

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
9904546	Alexey Kosygin	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9982677	Al-Kheesha	H-Line Shipping	Samsung Heavy Industries	174000	ME-GA	2025
9968944	BW Borealis	BW	Hanwha Ocean	174000	ME-GI	2025
9968932	BW Nivalis	BW	Hanwha Ocean	174000	ME-GI	2025
9967330	Clean Levant	Dynagas	HD Hyundai Heavy Industries	200000	X-DF	2025
9967328	Clean Mistral	Dynagas	HD Hyundai Heavy Industries	200000	X-DF	2025
9967342	Clean Srocco	Dynagas	HD Hyundai Heavy Industries	200000	X-DF	2025
9970650	Dalian No 1 G175K-1	China Merchants Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2025
9970662	Dalian No 1 G175K-2	China Merchants Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2025
9989118	Dalian No 1 G175K-3	China Merchants Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2025
1013494	Dalian No 1 G175K-5	China Merchants Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2025
9976147	Gail Sagar	CoolCo	Hyundai Samho Heavy Industries	174000	ME-GA	2025
9972359	HL Alyssa Warner	H-Line Shipping	Samsung Heavy Industries	174000	ME-GA	2025
9972361	HL Edward Austin	H-Line Shipping	Samsung Heavy Industries	174000	ME-GA	2025
9986283	HL Fortuna	H-Line Shipping	Hyundai Samho Heavy Industries	174000	X-DF	2025
9972373	HL Sea Eagle	H-Line Shipping	Samsung Heavy Industries	174000	ME-GA	2025
9904704	Hull 045	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9918779	Hull 046	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9918781	Hull 047	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9918793	Hull 048	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9918808	Hull 049	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9918810	Hull 050	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9918846	Hull 053	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9918858	Hull 054	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9918860	Hull 055	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9928061	Hull 2393	NYK Line	Samsung Heavy Industries	174000	X-DF	2025
9928073	Hull 2394	NYK Line	Samsung Heavy Industries	174000	X-DF	2025
9928085	Hull 2395	Lantus Marine Inc.	Samsung Heavy Industries	174000	X-DF	2025
9928097	Hull 2396	Tarrace Navigation Corp.	Samsung Heavy Industries	174000	X-DF	2025
9961398	Hull 2537	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2025
9961403	Hull 2538	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2025
9963815	Hull 2539	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2025
9963827	Hull 2540	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2025
9970686	Hull 2551	MOL	Hanwha Ocean	174000	ME-GA	2025
9991850	Hull 2566	Meiji Shipping	Hanwha Ocean	174000	X-DF	2025
9958999	Hull 2598	Celsius Shipping	Samsung Heavy Industries	180000	ME-GA	2025

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
9959008	Hull 2599	Celsius Shipping	Samsung Heavy Industries	180000	ME-GA	2025
9982689	Hull 2612	H-Line Shipping	Samsung Heavy Industries	174000	ME-GA	2025
9969223	Hull 2619	Celsius Shipping	Samsung Heavy Industries	180000	ME-GA	2025
9974149	Hull 2631	H-Line Shipping	Samsung Heavy Industries	174000	X-DF	2025
9977244	Hull 2634	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9977256	Hull 2637	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9977268	Hull 2638	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9980851	Hull 2639	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9977270	Hull 2641	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9977282	Hull 2642	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9977294	Hull 2643	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9977309	Hull 2644	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9977311	Hull 2645	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9977335	Hull 2647	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9988700	Hull 2651	Celsius Shipping	Samsung Heavy Industries	180000	ME-GA	2025
9975521	Hull 3370	SK Shipping	HD Hyundai Heavy Industries	175000	ME-GA	2025
9981386	Hull 3383	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2025
9981398	Hull 3384	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2025
9946362	Hull 8102	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2025
9972218	Hull 8181	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2025
1023906	Hull 8238	NYK Line	Hyundai Samho Heavy Industries	174000	X-DF	2025
1023918	Hull 8239	NYK Line	Hyundai Samho Heavy Industries	174000	X-DF	2025
9953274	Hull H1793A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2025
9986609	Hull H1797A	MISC, NYK Line, K Line, China LNG	Hudong-Zhonghua	174000	X-DF	2025
9986611	Hull H1798A	MISC, NYK Line, K Line, China LNG	Hudong-Zhonghua	174000	X-DF	2025
9979761	Hull H1892A	Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2025
9979773	Hull H1893A	Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2025
9997701	Hull H1894A	K Line, China Merchants Energy Shipping, CMC	Hudong-Zhonghua	174000	X-DF	2025
9997672	Hull H1895A	K Line, China Merchants Energy Shipping, CMC	Hudong-Zhonghua	174000	X-DF	2025
9997684	Hull H1896A	K Line, China Merchants Energy Shipping, CMC	Hudong-Zhonghua	174000	X-DF	2025
1023865	Hull H1908A	United Liquefied Gas	Hudong-Zhonghua	174000	X-DF	2025
9969388	Ignacy Jan Paderewski	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2025
9918030	Ilya Mechnikov	MOL	Hanwha Ocean	172600	DFDE	2025
9965435	Jiangnan H2701	ADNOC L&S	Jiangnan	174000	X-DF	2025
9972945	Jiangnan H2702	ADNOC L&S	Jiangnan	174000	X-DF	2025

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
9904699	Konstantin Posiet	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9976927	Lebrethah	K3 Consortium	Hanwha Ocean	174000	ME-GA	2025
9918016	Lev Landau	Hanwha Ocean	Hanwha Ocean	172600	DFDE	2025
1040447	LNG Ping Hu	Huaxiang Shipping	Jiangsu YiXiang Shipbuilding	78900	X-DF	2025
9975507	Mareekh	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2025
9975519	Mesaieed	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2025
9956953	MOL Azure	MOL	Hanwha Ocean	174000	ME-GA	2025
9947512	New Oasis	Pan Ocean	HD Hyundai Heavy Industries	174000	X-DF	2025
9918042	Nikolay Basov	MOL	Hanwha Ocean	172600	DFDE	2025
9918054	Nikolay Semenov	MOL	Hanwha Ocean	172600	DFDE	2025
9958327	North Valley	MOL	Hanwha Ocean	174000	ME-GA	2025
9947639	Orion Gaugin	JP Morgan	Hyundai Samho Heavy Industries	174000	X-DF	2025
9947627	Orion Hugo	JP Morgan	Hyundai Samho Heavy Industries	174000	X-DF	2025
9958858	Orion Saint (Hull 2601)	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9956616	Orion Sirius	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2025
9947615	Puteri Mayang	Hyundai LNG Shipping	Hyundai Samho Heavy Industries	174000	ME-GA	2025
9918004	Pyotr Kapitsa	Hanwha Ocean	Hanwha Ocean	172600	DFDE	2025
9904675	Pyotr Stolypin	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9904687	Sergei Witte	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2025
9976915	Umm Swayyah	K3 Consortium	Hanwha Ocean	174000	ME-GA	2025
9960588	Venture Acadia	BW	Hanwha Ocean	174000	ME-GI	2025
9960590	Venture Creole	BW	Hanwha Ocean	174000	ME-GI	2025
9981374	Wadi Al Syl	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2025
9962433	Woodside Barrumbara	Gaslog	Hanwha Ocean	174000	ME-GI	2025
9962421	Woodside Jirrubakura	Gaslog	Hanwha Ocean	174000	ME-GI	2025
9918028	Zhores Alferov	Hanwha Ocean	Hanwha Ocean	172600	DFDE	2025
9975337	Agamemnon	Capital Gas	Hyundai Samho Heavy Industries	174000	ME-GA	2026
9995727	Alcaios I	Capital Gas	Hyundai Samho Heavy Industries	174000	X-DF	2026
9986087	Al-Slaimi	K3 Consortium	Hanwha Ocean	174000	ME-GA	2026
9995739	Antaios I	Capital Gas	Hyundai Samho Heavy Industries	174000	X-DF	2026
9975325	Archimidis	Capital Gas	Hyundai Samho Heavy Industries	174000	ME-GA	2026
9994046	Clean Brownsville	Dynagas	HD Hyundai Heavy Industries	200000	ME-GA	2026
9989120	Dalian No 1 G175K-4	China Merchants Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2026
1013509	Dalian No 1 G175K-6	China Merchants Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2026
1013511	Dalian No 1 G175K-7	China Merchants Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2026

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
9972385	HL Puffin	H-Line Shipping	Samsung Heavy Industries	174000	ME-GA	2026
9918822	Hull 051	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2026
9918834	Hull 052	Smart LNG	Zvezda Shipbuilding	172600	DFDE	2026
9903437	Hull 2316	Sinokor Maritime Co Ltd	Samsung Heavy Industries	174000	X-DF	2026
9970569	Hull 2541	Venture Global	Hanwha Ocean	200000	ME-GI	2026
9970571	Hull 2542	Venture Global	Hanwha Ocean	200000	ME-GI	2026
9970583	Hull 2543	Venture Global	Hanwha Ocean	200000	ME-GI	2026
9976939	Hull 2549	K3 Consortium	Hanwha Ocean	174000	ME-GA	2026
9970674	Hull 2550	MOL	Hanwha Ocean	174000	ME-GA	2026
9974606	Hull 2552	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2026
9974618	Hull 2553	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2026
9983176	Hull 2558	MOL	Hanwha Ocean	174000	ME-GA	2026
9986051	Hull 2559	K3 Consortium	Hanwha Ocean	174000	ME-GA	2026
9986104	Hull 2561	K3 Consortium	Hanwha Ocean	174000	ME-GA	2026
9986063	Hull 2562	K3 Consortium	Hanwha Ocean	174000	ME-GA	2026
9986099	Hull 2563	K3 Consortium	Hanwha Ocean	174000	ME-GA	2026
9986116	Hull 2564	K3 Consortium	Hanwha Ocean	174000	ME-GA	2026
9986075	Hull 2565	K3 Consortium	Hanwha Ocean	174000	ME-GA	2026
9991862	Hull 2567	Meiji Shipping	Hanwha Ocean	174000	X-DF	2026
9991874	Hull 2568	Meiji Shipping	Hanwha Ocean	174000	X-DF	2026
9991903	Hull 2569	Meiji Shipping	Hanwha Ocean	174000	X-DF	2026
9991915	Hull 2570	MISC	Hanwha Ocean	174000	X-DF	2026
9991927	Hull 2571	MISC	Hanwha Ocean	174000	X-DF	2026
9991939	Hull 2572	TMS Cardiff Gas	Hanwha Ocean	174000	X-DF	2026
9991941	Hull 2573	TMS Cardiff Gas	Hanwha Ocean	174000	X-DF	2026
9997634	Hull 2574	Venture Global	Hanwha Ocean	200000	ME-GI	2026
9997658	Hull 2575	Venture Global	Hanwha Ocean	200000	ME-GI	2026
9989429	Hull 2576	MOL	Hanwha Ocean	174000	ME-GA	2026
9987445	Hull 2579	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2026
9972684	Hull 2636	TMS Cardiff Gas	Samsung Heavy Industries	174000	ME-GA	2026
9981049	Hull 2640	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2026
9977323	Hull 2646	JP Morgan	Samsung Heavy Industries	174000	ME-GA	2026
9988023	Hull 2652	Minerva Marine	Samsung Heavy Industries	174000	ME-GA	2026
9988035	Hull 2653	Minerva Marine	Samsung Heavy Industries	174000	ME-GA	2026
1019668	Hull 2662	MOL	Samsung Heavy Industries	174000	ME-GA	2026
1019670	Hull 2663	MOL	Samsung Heavy Industries	174000	ME-GA	2026
1023401	Hull 2664	K Line	Samsung Heavy Industries	174000	ME-GA	2026
1023413	Hull 2665	K Line	Samsung Heavy Industries	174000	ME-GA	2026
1063384	Hull 2693	MISC	Samsung Heavy Industries	174000	X-DF	2026

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
1063396	Hull 2695	Shandong Marine Energy	Samsung Heavy Industries	174000	X-DF	2026
1063401	Hull 2697	MISC	Samsung Heavy Industries	174000	X-DF	2026
1063413	Hull 2698	Shandong Marine Energy	Samsung Heavy Industries	174000	X-DF	2026
9975533	Hull 3371	SK Shipping	HD Hyundai Heavy Industries	174000	ME-GA	2026
9981403	Hull 3385	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2026
9981415	Hull 3386	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2026
9981427	Hull 3387	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2026
9981439	Hull 3393	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2026
9981441	Hull 3394	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2026
9981491	Hull 3395	MISC, NYK Line, K Line, China LNG	HD Hyundai Heavy Industries	174000	X-DF	2026
9981506	Hull 3396	MISC, NYK Line, K Line, China LNG	HD Hyundai Heavy Industries	174000	X-DF	2026
9981518	Hull 3397	MISC, NYK Line, K Line, China LNG	HD Hyundai Heavy Industries	174000	X-DF	2026
9981520	Hull 3398	MISC, NYK Line, K Line, China LNG	HD Hyundai Heavy Industries	174000	X-DF	2026
9981532	Hull 3399	MISC, NYK Line, K Line, China LNG	HD Hyundai Heavy Industries	174000	X-DF	2026
9981544	Hull 3400	MISC, NYK Line, K Line, China LNG	HD Hyundai Heavy Industries	174000	X-DF	2026
9981556	Hull 3401	MISC, NYK Line, K Line, China LNG	HD Hyundai Heavy Industries	174000	X-DF	2026
9984209	Hull 3407	Excelerate Energy	HD Hyundai Heavy Industries	174000	DFDE	2026
1017646	Hull 3441	NYK Line	HD Hyundai Heavy Industries	174000	ME-GA	2026
9992220	Hull 8182	TMS Cardiff Gas	Hyundai Samho Heavy Industries	174000	X-DF	2026
9976109	Hull 8188	SK Shipping	Hyundai Samho Heavy Industries	174000	ME-GA	2026
9976111	Hull 8189	SK Shipping	Hyundai Samho Heavy Industries	174000	ME-GA	2026
9992232	Hull 8200	TMS Cardiff Gas	Hyundai Samho Heavy Industries	174000	X-DF	2026
9992244	Hull 8201	TMS Cardiff Gas	Hyundai Samho Heavy Industries	174000	X-DF	2026
9992880	Hull 8204	Asyad Shipping	Hyundai Samho Heavy Industries	174000	ME-GA	2026
9992878	Hull 8205	Asyad Shipping	Hyundai Samho Heavy Industries	174000	ME-GA	2026
1023891	Hull 8210	NYK Line	Hyundai Samho Heavy Industries	174000	X-DF	2026
1018676	Hull CMHI-282-01	Celsius Shipping	China Merchants Heavy Industries	180000	ME-GA	2026
1018688	Hull CMHI-282-02	Celsius Shipping	China Merchants Heavy Industries	180000	ME-GA	2026
9986623	Hull H1799A	MISC, NYK Line, K Line, China LNG	Hudong-Zhonghua	174000	X-DF	2026
9986635	Hull H1800A	MISC, NYK Line, K Line, China LNG	Hudong-Zhonghua	174000	X-DF	2026
9986647	Hull H1801A	MISC, NYK Line, K Line, China LNG	Hudong-Zhonghua	174000	X-DF	2026

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
9961491	Hull H1882A	MOL	Hudong-Zhonghua	174000	X-DF	2026
9961506	Hull H1883A	MOL	Hudong-Zhonghua	174000	X-DF	2026
9961518	Hull H1884A	MOL	Hudong-Zhonghua	174000	X-DF	2026
9961520	Hull H1885A	MOL	Hudong-Zhonghua	174000	X-DF	2026
1023633	Hull H1886A	MOL	Hudong-Zhonghua	174000	X-DF	2026
1023645	Hull H1887A	CNOOC/CMES/NYK JV	Hudong-Zhonghua	174000	X-DF	2026
1023657	Hull H1888A	CNOOC/CMES/NYK JV	Hudong-Zhonghua	174000	X-DF	2026
9994319	Hull H1889A	CNOOC/CMES/NYK JV	Hudong-Zhonghua	174000	X-DF	2026
9994321	Hull H1890A	CNOOC/CMES/NYK JV	Hudong-Zhonghua	174000	X-DF	2026
1023669	Hull H1891A	CNOOC/CMES/NYK JV	Hudong-Zhonghua	174000	X-DF	2026
9997696	Hull H1897A	K Line, China Merchants Energy Shipping, CMC	Hudong-Zhonghua	174000	X-DF	2026
1024754	Hull H1909A	United Liquefied Gas	Hudong-Zhonghua	174000	X-DF	2026
1040693	Hull No.YZJ2022-1475	Unknown	Yangzijiang Shipbuilding	175000	ME-GA	2026
1040708	Hull No.YZJ2022-1476	Unknown	Yangzijiang Shipbuilding	175000	ME-GA	2026
9972957	Jiangnan H2703	ADNOC L&S	Jiangnan	174000	X-DF	2026
9972969	Jiangnan H2704	ADNOC L&S	Jiangnan	174000	X-DF	2026
9972971	Jiangnan H2705	ADNOC L&S	Jiangnan	174000	X-DF	2026
9969376	Josef Pilsudski	Knutsen OAS	HD Hyundai Heavy Industries	174000	X-DF	2026
9974151	Puteri Perak	H-Line Shipping	Hyundai Samho Heavy Industries	174000	X-DF	2026
9974163	Puteri Sarawak	H-Line Shipping	Samsung Heavy Industries	174000	X-DF	2026
Unknown	Unknown Hull No.	CNOOC/CMES/NYK JV	Hudong-Zhonghua	174000	X-DF	2026
1096769	Unknown Hull No.	K Line	Samsung Heavy Industries	174000	X-DF	2026
9999993	Archon	Capital Gas	Hyundai Samho Heavy Industries	174000	X-DF	2027
9315379	Athlos	Capital Gas	Hyundai Samho Heavy Industries	174000	X-DF	2027
9994034	Clean Rio Grande	Dynagas	HD Hyundai Heavy Industries	200000	ME-GA	2027
9994008	Clean Texas	Dynagas	HD Hyundai Heavy Industries	200000	ME-GA	2027
1058327	Dalian No 1 G175K-10	China Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2027
1030569	Dalian No 1 G175K-13	Wah Kwong, China Gas, CSSC	Dalian Shipbuilding Industry Co	175000	X-DF	2027
1108421	Dalian No 1 G175K-16	Cosco Shipping Energy Transportation	Dalian Shipbuilding Industry Co	175000	X-DF	2027
1108433	Dalian No 1 G175K-17	Cosco Shipping Energy Transportation	Dalian Shipbuilding Industry Co	175000	X-DF	2027
1013523	Dalian No 1 G175K-8	China Merchants Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2027
1058315	Dalian No 1 G175K-9	China Energy Shipping	Dalian Shipbuilding Industry Co	175000	X-DF	2027
9980552	Elisa Halycon	NYK Line	Hyundai Samho Heavy Industries	174000	X-DF	2027
1056410	Gdansk FSRU	MOL	HD Hyundai Heavy Industries	174000	DFDE	2027

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
9903449	Hull 2317	Sinokor Maritime Co Ltd	Samsung Heavy Industries	174000	X-DF	2027
9903451	Hull 2318	Sinokor Maritime Co Ltd	Samsung Heavy Industries	174000	X-DF	2027
1022031	Hull 2581	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2027
1014709	Hull 2583	MOL	Hanwha Ocean	174000	ME-GA	2027
1097658	Hull 2602	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2027
1097660	Hull 2603	Maran Gas Maritime	Hanwha Ocean	174000	ME-GI	2027
9992103	Hull 2656	Seapeak	Samsung Heavy Industries	174000	ME-GA	2027
9992115	Hull 2657	Seapeak	Samsung Heavy Industries	174000	ME-GA	2027
9992127	Hull 2658	Seapeak	Samsung Heavy Industries	174000	ME-GA	2027
9992139	Hull 2659	Seapeak	Samsung Heavy Industries	174000	ME-GA	2027
9992141	Hull 2660	Seapeak	Samsung Heavy Industries	174000	ME-GA	2027
1041439	Hull 2687	MOL	Samsung Heavy Industries	174000	ME-GA	2027
1063425	Hull 2700	MISC	Samsung Heavy Industries	174000	X-DF	2027
1105053	Hull 2709	MISC	Samsung Heavy Industries	174000	X-DF	2027
1105065	Hull 2710	MISC	Samsung Heavy Industries	174000	X-DF	2027
1017658	Hull 3442	NYK Line	HD Hyundai Heavy Industries	174000	ME-GA	2027
1017660	Hull 3443	NYK Line	HD Hyundai Heavy Industries	174000	ME-GA	2027
1017672	Hull 3444	NYK Line	HD Hyundai Heavy Industries	174000	ME-GA	2027
1017165	Hull 3452	Dynagas	HD Hyundai Heavy Industries	200000	ME-GA	2027
1017177	Hull 3453	Dynagas	HD Hyundai Heavy Industries	200000	ME-GA	2027
1032713	Hull 3454	Evalend Shipping	HD Hyundai Heavy Industries	174000	X-DF	2027
1032725	Hull 3455	Evalend Shipping	HD Hyundai Heavy Industries	174000	X-DF	2027
1048918	Hull 3476	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1048920	Hull 3477	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1048932	Hull 3478	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1048944	Hull 3479	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1048956	Hull 3480	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1048982	Hull 3481	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1048994	Hull 3482	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1049003	Hull 3483	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1049015	Hull 3484	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1049027	Hull 3485	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1049039	Hull 3486	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1049041	Hull 3487	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1049053	Hull 3488	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1049065	Hull 3489	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1049089	Hull 3490	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2027
1023877	Hull 8208	NYK Line	Hyundai Samho Heavy Industries	174000	X-DF	2027

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
1023889	Hull 8209	NYK Line	Hyundai Samho Heavy Industries	174000	X-DF	2027
1051616	Hull 8262	Nakilat	Hyundai Samho Heavy Industries	174000	X-DF	2027
1051628	Hull 8263	Nakilat	Hyundai Samho Heavy Industries	174000	X-DF	2027
1018690	Hull CMHI-282-03	Celsius Shipping	China Merchants Heavy Industries	180000	ME-GA	2027
1018705	Hull CMHI-282-04	Celsius Shipping	China Merchants Heavy Industries	180000	ME-GA	2027
1053004	Hull CMHI-282-05	Celsius Shipping	China Merchants Heavy Industries	180000	ME-GA	2027
1066104	Hull CMHI-282-06	Celsius Shipping	China Merchants Heavy Industries	180000	ME-GA	2027
9986570	Hull H1794A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2027
9986582	Hull H1795A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2027
9986594	Hull H1796A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2027
1013913	Jiangnan H2716	China Taiping Insurance Holdings Co	Jiangnan	175000	X-DF	2027
1013925	Jiangnan H2717	China Taiping Insurance Holdings Co	Jiangnan	175000	X-DF	2027
1069194	Dalian No 1 G175K-11	Cosco Shipping Energy Transportation	Dalian Shipbuilding Industry Co	175000	X-DF	2028
1030557	Dalian No 1 G175K-12	Wah Kwong, China Gas, CSSC	Dalian Shipbuilding Industry Co	175000	X-DF	2028
1093896	Dalian No 1 G175K-14	Wah Kwong, China Gas, CSSC	Dalian Shipbuilding Industry Co	175000	X-DF	2028
1093901	Dalian No 1 G175K-15	Wah Kwong, China Gas, CSSC	Dalian Shipbuilding Industry Co	175000	X-DF	2028
1017074	H1901A	Tianjin Southwest Maritime	Hudong-Zhonghua	174000	X-DF	2028
1017086	H1902A	Tianjin Southwest Maritime	Hudong-Zhonghua	174000	X-DF	2028
1017098	H1903A	Tianjin Southwest Maritime	Hudong-Zhonghua	174000	X-DF	2028
1069821	Hull 2585	Nakilat	Hanwha Ocean	174000	X-DF	2028
1069845	Hull 2586	Nakilat	Hanwha Ocean	174000	X-DF	2028
1069869	Hull 2587	Nakilat	Hanwha Ocean	174000	X-DF	2028
1069871	Hull 2588	Nakilat	Hanwha Ocean	174000	X-DF	2028
1069895	Hull 2589	Nakilat	Hanwha Ocean	174000	X-DF	2028
1069924	Hull 2590	Nakilat	Hanwha Ocean	174000	X-DF	2028
1069936	Hull 2591	Nakilat	Hanwha Ocean	174000	X-DF	2028
1069948	Hull 2592	Nakilat	Hanwha Ocean	174000	X-DF	2028
1022251	Hull 2668	Chevron	Samsung Heavy Industries	174000	ME-GA	2028
1022263	Hull 2669	Chevron	Samsung Heavy Industries	174000	ME-GA	2028
1069950	Hull 2693	K-LINE / HYUNDAI GLOVIS	Hanwha Ocean	174000	X-DF	2028
1069962	Hull 2694	K-LINE / HYUNDAI GLOVIS	Hanwha Ocean	174000	X-DF	2028
1070727	Hull 2694	CMES	Samsung Heavy Industries	174000	X-DF	2028

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
1069974	Hull 2695	K-LINE / HYUNDAI GLOVIS	Hanwha Ocean	174000	X-DF	2028
1069986	Hull 2696	K-LINE / HYUNDAI GLOVIS	Hanwha Ocean	174000	X-DF	2028
1070739	Hull 2696	CMES	Samsung Heavy Industries	174000	X-DF	2028
1070741	Hull 2699	CMES	Samsung Heavy Industries	174000	X-DF	2028
1063437	Hull 2701	Shandong Marine Energy	Samsung Heavy Industries	174000	X-DF	2028
1070806	Hull 2702	CMES	Samsung Heavy Industries	174000	X-DF	2028
1063449	Hull 2703	Shandong Marine Energy	Samsung Heavy Industries	174000	X-DF	2028
1070818	Hull 2704	CMES	Samsung Heavy Industries	174000	X-DF	2028
1063451	Hull 2705	Shandong Marine Energy	Samsung Heavy Industries	174000	X-DF	2028
1070820	Hull 2706	CMES	Samsung Heavy Industries	174000	X-DF	2028
1063463	Hull 2707	Shandong Marine Energy	Samsung Heavy Industries	174000	X-DF	2028
1083372	Hull 2711	ADNOC L&S	Samsung Heavy Industries	174000	X-DF	2028
1083384	Hull 2712	ADNOC L&S	Samsung Heavy Industries	174000	X-DF	2028
1083396	Hull 2713	ADNOC L&S	Samsung Heavy Industries	174000	X-DF	2028
1083401	Hull 2714	ADNOC L&S	Samsung Heavy Industries	174000	X-DF	2028
1048839	Hull 3456	Evalend Shipping	HD Hyundai Heavy Industries	174000	X-DF	2028
1048841	Hull 3457	Evalend Shipping	HD Hyundai Heavy Industries	174000	X-DF	2028
1049091	Hull 3491	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2028
1049118	Hull 3492	Nakilat	HD Hyundai Heavy Industries	174000	X-DF	2028
1054888	Hull 8254	Capital Gas	Hyundai Samho Heavy Industries	174000	X-DF	2028
1054890	Hull 8255	Capital Gas	Hyundai Samho Heavy Industries	174000	X-DF	2028
1054905	Hull 8256	Capital Gas	Hyundai Samho Heavy Industries	174000	X-DF	2028
1054917	Hull 8257	Capital Gas	Hyundai Samho Heavy Industries	174000	X-DF	2028
1023841	Hull H1898A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2028
1023853	Hull H1899A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2028
1025198	Hull H1900A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	174000	X-DF	2028
1085265	Hull H1917A	Nakilat	Hudong-Zhonghua	271000	X-DF	2028
1085370	Hull H1920A	Nakilat	Hudong-Zhonghua	271000	X-DF	2028
1085306	Hull H1921A	Nakilat	Hudong-Zhonghua	271000	X-DF	2028
1085318	Hull H1923A	Nakilat	Hudong-Zhonghua	271000	X-DF	2028
1085409	Hull H1956A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	271000	X-DF	2028
Unknown	Singapore FSRU	MOL	Hanwha Ocean	204000	DFDE	2028
Unknown	Unknown Hull No.	ADNOC L&S	Hanwha Ocean	174000	X-DF	2028
Unknown	Unknown Hull No.	ADNOC L&S	Hanwha Ocean	174000	X-DF	2028
Unknown	Unknown Hull No.	ADNOC L&S	Hanwha Ocean	174000	X-DF	2028
Unknown	Unknown Hull No.	ADNOC L&S	Hanwha Ocean	174000	X-DF	2028

Appendix 4: Table of global LNG vessel orderbook (continued)

IMO Number	Name	Shipowner	Shipbuilder	Capacity (cbm)	Propulsion Type	Delivery Year
Unknown	Unknown Hull No.	Evalend Shipping	HD Hyundai Heavy Industries	174000	X-DF	2028
Unknown	Unknown Hull No.	Evalend Shipping	HD Hyundai Heavy Industries	174000	X-DF	2028
1095870	Hull H1913A	Shandong Shipping	Hudong-Zhonghua	271000	X-DF	2029
1085368	Hull H1914A	China Merchants Energy Shipping	Hudong-Zhonghua	271000	X-DF	2029
1085253	Hull H1916A	Shandong Shipping	Hudong-Zhonghua	271000	X-DF	2029
1085277	Hull H1918A	China Merchants Energy Shipping	Hudong-Zhonghua	271000	X-DF	2029
1095882	Hull H1919A	Shandong Shipping	Hudong-Zhonghua	271000	X-DF	2029
1085382	Hull H1922A	China Merchants Energy Shipping	Hudong-Zhonghua	271000	X-DF	2029
1085289	Hull H1924A	Nakilat	Hudong-Zhonghua	271000	X-DF	2029
1085320	Hull H1926A	Nakilat	Hudong-Zhonghua	271000	X-DF	2029
1085332	Hull H1927A	Nakilat	Hudong-Zhonghua	271000	X-DF	2029
1085344	Hull H1928A	Nakilat	Hudong-Zhonghua	271000	X-DF	2029
1085356	Hull H1929A	Nakilat	Hudong-Zhonghua	271000	X-DF	2029
1085394	Hull H1955A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	271000	X-DF	2029
1085411	Hull H1957A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	271000	X-DF	2029
1085291	Hull H1925A	China Merchants Energy Shipping	Hudong-Zhonghua	271000	X-DF	2030
1085423	Hull H1958A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	271000	X-DF	2030
1085435	Hull H1959A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	271000	X-DF	2030
1085239	Hull H1912A	China LNG Shipping	Hudong-Zhonghua	271000	X-DF	2031
1085241	Hull H1915A	China LNG Shipping	Hudong-Zhonghua	271000	X-DF	2031
1085447	Hull H1960A	MOL, Cosco Shipping Energy Transportation	Hudong-Zhonghua	271000	X-DF	2031

Appendix 5: Table of Global LNG Receiving Terminals, end-2024

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Owners	Concept
1	Argentina	GNL Escobar - Excelerate Expedient	2011	3.80	YPF (50%); Enarsa (50%);	Floating
2	Bahrain	Bahrain LNG	2020	6.00	NOGA (30%); Teekay Corporation (30%); Gulf Investment Corporation (20%); Samsung (20%);	Floating
3	Bangladesh	Moheshkhali - Excelerate Excellence	2018	3.75	Excelerate Energy (100%);	Floating
4	Bangladesh	Summit FSRU	2019	3.80	Summit Asia Pacific (75%); Mitsubishi (25%);	Floating
5	Belgium	Zeebrugge	1987	11.30	Fluxys LNG SA (100%);	Onshore
6	Brazil	Acu Port LNG	2020	5.60	Prumo Logistica (46.9%); Siemens (33%); BP (20.1%);	Floating
7	Brazil	Bahia LNG	2021	5.37	Petrobras (100%);	Floating
8	Brazil	Guanabara LNG	2020	8.05	Petrobras (100%);	Floating
9	Brazil	KARMOL LNGT ASIA	2022	2.27	Kapowership(50%); Mitsui OSK Lines(50%);	Floating
10	Brazil	Para LNG (Barcarena)	2024	6.00	Apollo (80%); New Fortress Energy (20%);	Floating
11	Brazil	Sao Paulo LNG	2024	3.78	Cosan (100%);	Floating
12	Brazil	Sergipe LNG	2020	5.64	Eneva (100%);	Floating
13	Brazil	Terminal Gas Sul (TGS) LNG	2024	4.00	New Fortress Energy (100%);	Floating
14	Canada	Saint John LNG	2009	7.50	Repsol (100%);	Onshore
15	Chile	GNL Mejillones	2014	1.50	ENGIE (63%); Ameris Capital (37%);	Onshore
16	Chile	GNL Quintero	2009	4.00	Fluxys (40%); EIG (40%); ENAP (20%)	Onshore
17	China	Caofeidian (Tangshan) LNG	2013	10.00	CNPC (51%); Beijing Enterprises Group Company (29%); Hebei Natural Gas (20%);	Onshore
18	China	Chaozhou Huaying LNG	2024	6.00	Huaying Investment Holding Group (50%); Sinopec Natural Gas Co Ltd (50%);	Onshore
19	China	Dalian LNG	2011	6.00	PipeChina (75%); Dalian Port (20%); Dalian Construction Investment Corporation (5%);	Onshore
20	China	Diefu LNG (Shenzhen)	2018	4.00	PipeChina (70%); Shenzhen Energy Group (30%);	Onshore
21	China	Fangchenggang LNG	2019	0.60	PipeChina (51%); Guangxi Beibu Gulf Port Group (49%)	Onshore
22	China	Fujian LNG	2009	6.30	CNOOC (60%); Fujian Investment and Development Co (40%);	Onshore
23	China	Guangdong Dapeng LNG	2006	6.80	CNOOC (33%); Guangdong Province Consortium (31%); BP (30%); HK & China Gas (3%); Hong Kong Electric (3%);	Onshore
24	China	Guangxi Beihai LNG	2016	6.00	PipeChina (80%); Guangxi Beibu Gulf Port Group (20%)	Onshore
25	China	Guangzhou Nansha LNG	2023	1.00	Guangdong Panyu Petrochemical Storage & Transportation Ltd. (100%)	Onshore
26	China	Hainan Shennan LNG	2014	0.28	Hainan CNPC Shennan Petroleum Technology Development (90%); Hainan Fushan Oil and Gas Chemical (10%);	Onshore
27	China	Hainan Yangpu LNG	2014	2.00	PipeChina (65%); China Energy Group Haikong New Energy (35%);	Onshore

Note:
[1] Small-scale (<0.5 MTPA) regasification terminals which have an impact on import markets are included as well.
[2] Updated as of end-2024.

Appendix 5: Table of Global LNG Receiving Terminals (continued)

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Owners	Concept
28	China	Hong Kong FSRU	2023	6.13	Castle Peak Power Company Limited (70%); Hongkong Electric Co., Ltd. (30%);	Floating
29	China	Huizhou LNG	2024	6.10	Guangdong Energy Group (100%);	Onshore
30	China	Jiangsu Rudong LNG	2011	6.50	CNPC (55%); Pacific Oil and Gas (35%); Jiangsu Guoxin (10%);	Onshore
31	China	Jiangsu Yancheng Binhai LNG	2022	3.00	CNOOC (100%);	Onshore
32	China	Jiaxing Pinghu LNG	2022	1.00	Jiaxing Gas Group (51%); Hangzhou Gas (49%);	Onshore
33	China	Jieyang (Yuedong) LNG	2018	6.00	PipeChina (100%);	Onshore
34	China	Jovo Dongguan	2012	1.00	Jovo Group (100%);	Onshore
35	China	Qidong LNG	2017	5.00	Xinjiang Guanghui Petroleum (100%);	Onshore
36	China	Shandong (Qingdao) LNG	2014	11.00	Sinopec (99%); Qingdao Port(1%);	Onshore
37	China	Shanghai Wuhaogou LNG	2008	1.50	Shenergy (100%);	Onshore
38	China	Shanghai Yangshan LNG	2009	6.00	Shenergy Group (55%); CNOOC (45%);	Onshore
39	China	Shenzhen Gas LNG	2019	0.80	Shenzhen Gas (100%);	Onshore
40	China	Tangshan LNG	2023	5.00	Suntien Green Energy (51%); Hebei Construction Investment Group (29%); Tangshan Caofeidian Development Investment Group (20%);	Onshore
41	China	Tianjin Nangang LNG	2023	5.00	Beijing Gas (100%);	Onshore
42	China	Tianjin PipeChina LNG	2023	12.00	PipeChina (100%);	Onshore
43	China	Tianjin Sinopec LNG	2018	10.80	Sinopec (98%); Tianjin Nangang Industrial Zone Developemnt Co (2%);	Onshore
44	China	Wenzhou LNG	2023	3.00	Sinopec (41%); Zhejiang Energy Group (51%); Local firms (8%);	Onshore
45	China	Zhangzhou LNG	2024	3.00	PipeChina (60%); Fujian Investment and Development Co (40%);	Onshore
46	China	Zhejiang Ningbo LNG	2012	6.00	CNOOC (51%); Zhejiang Energy Company (29%); Ningbo Power (20%);	Onshore
47	China	Zhoushan ENN LNG	2018	5.00	ENN (90%); Prism Energy (10%);	Onshore
48	China	Zhuhai LNG	2013	3.50	CNOOC (30%); Guangdong Energy (25%); Guangzhou Gas Group (25%); Local companies (20%);	Onshore
49	Chinese Taipei	Taichung LNG	2009	6.00	CPC (100%);	Onshore
50	Chinese Taipei	Yung-An	1990	10.50	CPC (100%);	Onshore
51	Colombia	SPEC FSRU	2016	3.00	Promigas (51%); Royal Vopak (49%);	Floating
52	Croatia	Krk LNG terminal	2021	2.13	HEP (85%); Plinacro (15%);	Floating
53	Dominican Republic	AES Andres LNG	2003	1.90	AES (80%); Grupo Linda (10%); AFI Popular (10%);	Onshore
54	Egypt	Ain Sokhna FSRU	2024	2.94	EGAS (100%);	Floating
55	El Salvador	El Salvador FSRU	2022	2.15	Energía del Pacífico (100%);	Floating

Appendix 5: Table of Global LNG Receiving Terminals (continued)

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Owners	Concept
56	Finland	Hamina LNG-terminal	2022	0.12	Hamina LNG Oy (100%);	Onshore
57	Finland	Inkoo FSRU	2023	3.68	Gasgrid Finland (100%);	Floating
58	Finland	Pori LNG	2016	0.15	Gasum (100%);	Onshore
59	Finland	Tornio Manga LNG	2018	0.40	Outokumpu Group (45%); SSAB (25%); Gasum (25%); EPV Energy (5%);	Onshore
60	France	Dunkirk LNG	2017	9.60	Fluxys and AXA Investment Managers & Crédit Agricole Assurances (60.76%); IPM Group and Samsung Asset Management (39.24%);	Onshore
61	France	Fos Cavaou	2010	6.00	ENGIE (100%);	Onshore
62	France	Fos Tonkin	1972	1.10	ENGIE (100%);	Onshore
63	France	Le Havre FSRU	2023	3.68	TotalEnergies (100%);	Floating
64	France	Montoir-de-Bretagne	1980	8.00	ENGIE (100%);	Onshore
65	Germany	Mukran LNG	2024	9.93	Deutsche Regas (100%);	Floating
66	Germany	Stade LNG	2024	3.68	Hanseatic Energy Hub (50%); Uniper (50%);	Floating
67	Germany	Wilhelmshaven LNG	2022	5.51	Uniper (100%);	Floating
68	Germany	Elbehafen LNG	2023	3.68	RWE (100%);	Floating
69	Greece	Alexandroupolis LNG	2024	4.04	Gastrade S.A. (100%);	Floating
70	Greece	Revithoussa	2000	4.93	DESFA SA (100%);	Onshore
71	India	Dabhol LNG	2013	2.00	Gail (31.52%); NTPC (31.52%); Indian Financial Institutions (20.28%); MSEB Holding Co. (16.68%);	Onshore
72	India	Dahej LNG	2004	17.50	Petronet LNG (100%);	Onshore
73	India	Dhamra LNG	2023	5.00	Adani Group (50%); Total (50%);	Onshore
74	India	Ennore LNG	2019	5.00	Indian Oil Corporation (95%); Tamil Nadu Industrial Development Corporation (5%);	Onshore
75	India	Hazira LNG	2005	5.00	Shell (100%);	Onshore
76	India	Kochi LNG	2013	5.00	Petronet LNG (100%);	Onshore
77	India	Mundra LNG	2020	5.00	GSPC (50%); Adani Group (50%);	Onshore
78	Indonesia	Arun LNG	2015	3.00	Pertamina (70%); Aceh Regional Government (30%);	Onshore
79	Indonesia	Benoa LNG (Bali)	2016	0.30	PT Pelindo (50%); JSK Group (50%);	Floating
80	Indonesia	Lampung LNG - PGN FSRU Lampung	2014	1.80	LNG Indonesia (100%);	Floating
81	Indonesia	Nusantara Regas Satu - FSRU Jawa Barat	2012	3.80	Pertamina (60%); PGN (40%);	Floating
82	Indonesia	Powership Zeynep Sultan Amurang - Hua Xiang 8 FSRU	2020	0.10	PLT(50%); PT Humpuss (50%);	Floating

Appendix 5: Table of Global LNG Receiving Terminals (continued)

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Owners	Concept
83	Indonesia	Jawa Satu FSRU	2021	2.40	Pertamina (26%); Humpuss (25%); Marubeni (20%); MOL (19%); Sojitz (10%);	Floating
84	Italy	Adriatic LNG	2009	7.06	VTTI (70%); Snam (30%);	Floating
85	Italy	HIGAS LNG terminal	2021	0.20	Avenir LNG (80%); Gas and Heat (10%); CPL Concordia (10%);	Onshore
86	Italy	Panigaglia LNG	1971	2.58	Snam (100%);	Onshore
87	Italy	Piombino FSRU	2023	3.68	Snam (100%);	Floating
88	Italy	Ravenna LNG	2021	0.70	Petrolifera Italo Rumena (51%); Edison S.p.A. (30%); Scale Gas Solutions (19%);	Onshore
89	Italy	Toscana - Toscana FSRU	2013	2.70	First State Investments (48.24%); Snam (49.07%); Golar LNG (2.69%);	Floating
90	Jamaica	Old Harbour FSRU	2019	3.60	New Fortress Energy (100%);	Floating
91	Japan	Akita LNG Terminal	2015	0.58	Tobu Gas (100%);	Onshore
92	Japan	Chikko Terminal	2003	0.20	Okayama Gas (100%);	Onshore
93	Japan	Chita LNG	1983	10.90	Chubu Electric (50%); Toho Gas (50%);	Onshore
94	Japan	Chita LNG	1977	7.50	JERA (50%); Toho Gas (50%);	Onshore
95	Japan	Chita Midorihama Works	2001	8.30	Toho Gas (100%);	Onshore
96	Japan	Futtsu LNG	1985	16.00	JERA (100%);	Onshore
97	Japan	Hachinohe	2015	1.50	JX Nippon Oil & Energy (100%);	Onshore
98	Japan	Hakodate-Minato Terminal	2006	0.22	Hokkaido Gas (100%);	Onshore
99	Japan	Hatsukaichi	1996	0.90	Hiroshima Gas (100%);	Onshore
100	Japan	Hibiki LNG	2014	2.40	Saibu Gas (90%); Kyushu Electric (10%);	Onshore
101	Japan	Higashi-Niigata	1984	8.90	Nihonkai LNG (58.1%); Tohoku Electric (41.9%);	Onshore
102	Japan	Higashi-Ohgishima	1984	14.70	JERA (100%);	Onshore
103	Japan	Hitachi LNG	2016	6.40	Tokyo Gas (100%);	Onshore
104	Japan	Ishikari LNG	2012	2.70	Hokkaido Gas (100%);	Onshore
105	Japan	Joetsu	2012	2.30	JERA (100%);	Onshore
106	Japan	Kagoshima	1996	0.20	Nippon Gas (100%);	Onshore
107	Japan	Kawagoe	1997	7.70	JERA (100%);	Onshore
108	Japan	Kushiro LNG	2015	0.50	Nippon Oil (100%);	Onshore
109	Japan	Matsuyama Terminal	2008	0.38	Shikoku Gas (100%);	Onshore
110	Japan	Mizushima	2006	4.30	Chugoku Electric (50%); JX Nippon Oil & Energy (50%);	Onshore
111	Japan	Nagasaki	2003	0.15	Saibu Gas (100%);	Onshore
112	Japan	Naoetsu LNG	2013	1.50	INPEX (100%);	Onshore
113	Japan	Negishi	1969	12.00	JERA (50%); Tokyo Gas (50%);	Onshore

Appendix 5: Table of Global LNG Receiving Terminals (continued)

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Owners	Concept
114	Japan	Niihama LNG	2022	1.00	Tokyo Gas (50.1%); Shikoku Electric Power (30.1%); Other Japanese Partneers (19.8%);	Onshore
115	Japan	Ohgishima	1998	9.90	Tokyo Gas (100%);	Onshore
116	Japan	Oita LNG	1990	5.10	Kyushu Electric (100%);	Onshore
117	Japan	Sakai LNG	2006	6.40	Kansai Electric (70%); Cosmo Oil (12.5%); Iwatani (12.5%); Ube Industries (5%);	Onshore
118	Japan	Sakaide LNG	2010	1.20	Shikoku Electric Power Co. (70%); Cosmo Oil Co. Ltd (20%); Shikoku Gas Co. (10%);	Onshore
119	Japan	Senboku I & II	1972	15.30	Osaka Gas (100%);	Onshore
120	Japan	Shin-Minato	1997	0.30	Gas Bureau (100%);	Onshore
121	Japan	Shin-Sendai	2015	1.50	Tohoku Electric (100%);	Onshore
122	Japan	Sodegaura	1973	29.40	JERA (50%); Tokyo Gas (50%);	Onshore
123	Japan	Sodeshi	1996	2.90	Shizuoka Gas (65%); ENEOS Corporation (35%);	Onshore
124	Japan	Soma LNG	2018	1.50	JAPEX (100%);	Onshore
125	Japan	Takamatsu Terminal	2003	0.40	Shikoku Gas (100%);	Onshore
126	Japan	Tobata	1977	6.80	Kitakyushu LNG (100%);	Onshore
127	Japan	Tokushima LNG Terminal	2019	0.18	Shikoku Gas (100%);	Onshore
128	Japan	Toyama Shinko	2018	0.38	Hokuriku Electric (100%);	Onshore
129	Japan	Yanai	1990	2.40	Chugoku Electric (100%);	Onshore
130	Japan	Yokkaichi LNG Center	1987	6.40	JERA (100%);	Onshore
131	Japan	Yokkaichi Works	1991	2.10	Toho Gas (100%);	Onshore
132	Japan	Yufutsu Terminal	2011	0.14	JAPEX (100%);	Onshore
133	Japan	Himeji LNG	1984	5.50	Osaka Gas (100%);	Onshore
134	Japan	Himeji LNG	1979	8.10	Kansai Electric (100%);	Onshore
135	Jordan	Jordan LNG - Golar Eskimo	2015	3.80	Jordan MEMR (100%);	Floating
136	Kuwait	Al-Zour LNG Import Facility	2021	11.30	Kuwait Petroleum Corporation (100%);	Onshore
137	Lithuania	Klaipeda LNG	2014	2.94	Klaipedos Nafta (100%);	Floating
138	Malaysia	Melaka LNG	2013	3.80	Petronas (100%);	Floating
139	Malaysia	Pengerang LNG	2017	3.50	PETRONAS (65%); Dialog Group (25%); Johor Government (10%);	Onshore
140	Malta	Electrogas Malta	2017	0.40	Reganosa (100%);	Floating
141	Mexico	Energia Costa Azul	2008	7.60	Sempra Energy (100%);	Onshore
142	Mexico	Pichilingue LNG	2021	0.80	New Fortress Energy (100%);	Onshore
143	Mexico	Terminal de LNG Altamira	2006	5.40	Vopak (60%); ENAGAS (40%);	Onshore
144	Mexico	Terminal KMS	2012	3.80	Samsung (37.5%); Mitsui (37.5%); KOGAS (25%);	Onshore
145	Myanmar	Thilawa LNG	2020	0.40	CNTIC VPower (100%);	Floating

Appendix 5: Table of Global LNG Receiving Terminals (continued)

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Owners	Concept
146	Myanmar	Thilawa LNG	2020	3.00	CNTIC VPower (100%);	Onshore
147	Netherlands	Eemshaven FSRU	2022	5.88	Gasunie (50%); Vopak (50%);	Floating
148	Netherlands	Gate LNG terminal (LNG Rotterdam)	2011	11.76	Gasunie (50%); Vopak (50%);	Onshore
149	Norway	Fredrikstad LNG terminal	2011	0.10	Gasum (100%);	Onshore
150	Norway	Mosjøen LNG terminal	2007	0.40	Gasnor (100%);	Onshore
151	Pakistan	Pakistan GasPort	2017	5.20	Pakistan GasPort Limited (100%);	Floating
152	Pakistan	Port Qasim Karachi LNG	2015	4.80	Engro (56%); Royal Vopak (44%);	Floating
153	Panama	Costa Norte LNG	2018	1.50	AES (65%); Grupo Linda (35%);	Onshore
154	Philippines	Philippines LNG Import Terminal (PHLNG) – Ish FSU	2023	5.00	Meralco PowerGen Corporation (40%); Aboitiz Power Corporation (30%); San Miguel Global Power Holdings Corp. (30%);	Floating
155	Philippines	FGEN FSRU	2023	5.00	First Gen LNG (80%); Tokyo Gas (20%);	Floating
156	Poland	Swinoujscie LNG	2016	3.68	Gaz-System (100%);	Onshore
157	Portugal	Sines LNG Terminal	2004	5.80	REN (100%);	Onshore
158	Singapore	Jurong LNG	2013	11.00	SLNG (100%);	Onshore
159	South Korea	Boryeong LNG	2017	3.00	GS Caltex (50%); SK E&S (50%);	Onshore
160	South Korea	Gwangyang LNG	2005	3.10	POSCO (100%);	Onshore
161	South Korea	Incheon	1996	54.90	KOGAS (100%);	Onshore
162	South Korea	Jeju LNG	2019	1.00	KOGAS (100%);	Onshore
163	South Korea	Pyeongtaek LNG	1986	41.00	KOGAS (100%);	Onshore
164	South Korea	Samcheok LNG	2014	11.60	KOGAS (100%);	Onshore
165	South Korea	Tongyeong LNG	2002	26.50	KOGAS (100%);	Onshore
166	South Korea	Ulsan LNG	2024	2.40	SK gas (50%); Korea National Oil Corporation (50%);	Onshore
167	Spain	Bahía de Bizkaia Gas	2003	5.10	ENAGAS (50%); EVE (50%);	Onshore
168	Spain	Barcelona LNG	1969	12.60	Enagas (100%);	Onshore
169	Spain	Cartagena	1989	8.60	Enagas (100%);	Onshore
170	Spain	El Musel	2023	5.88	Enagas (100%);	Onshore
171	Spain	Huelva	1988	8.60	Enagas (100%);	Onshore
172	Spain	Mugardos LNG	2007	2.60	Tojeiro Group (51%); Sojitz (15%); Sonatrach (10%); the Government of Galicia (24%);	Onshore
173	Spain	Sagunto	2006	6.40	ENAGAS (72.5%); Osaka Gas (20%); Oman Oil (7.5%);	Onshore
174	Sweden	Lysekil LNG	2014	0.20	Skangas (100%);	Onshore
175	Sweden	Nynäshamn LNG	2011	0.40	AGA (100%);	Onshore
176	Thailand	Map Ta Phut LNG Terminal 1 LMPT1	2011	11.50	PTT LNG (100%);	Onshore

Appendix 5: Table of Global LNG Receiving Terminals (continued)

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Owners	Concept
177	Thailand	Map Ta Phut LNG Terminal 2 LMPT2 (Nong Fab)	2022	7.50	PTT LNG (100%);	Onshore
178	Turkey	Aliaga Izmir LNG	2006	4.40	EgeGaz (100%);	Onshore
179	Turkey	Dortyol LNG terminal	2021	7.51	Botas (100%);	Floating
180	Turkey	Etki LNG terminal	2019	7.50	Etki Liman (100%);	Floating
181	Turkey	Gulf of Saros FSRU	2023	5.60	Botas (100%);	Floating
182	Turkey	Marmara Ereglisi	1994	5.90	Botas (100%);	Onshore
183	UAE	Dubai Jebel Ali	2015	6.00	DUSUP (100%);	Floating
184	UAE	Ruwais LNG Terminal	2016	3.80	Excelerate Energy (50%); ADNOC (50%);	Floating
185	United Kingdom	Dragon LNG	2009	5.60	Shell (50%); Ancala (50%);	Onshore
186	United Kingdom	Gibraltar LNG	2019	0.04	Shell (20%); Gibraltar government (80%);	Onshore
187	United Kingdom	Grain LNG	2005	15.00	National Grid Transco (100%);	Onshore
188	United Kingdom	Mowi LNG terminal	2021	0.22	Mowi (100%);	Onshore
189	United Kingdom	South Hook LNG	2009	15.60	Qatar Petroleum (67.5%); Exxon Mobil (24.25%); ELF Petroleum (8.35%);	Onshore
190	United States	Cove Point LNG	2003	11.00	Dominion Cove Point LNG (100%);	Onshore
191	United States	EcoElectrica	2000	2.00	Gas natural Fenosa (47.5%); ENGIE (35%); Mitsui (15%); Capital (2.5%);	Onshore
192	United States	Elba Island LNG	1978	12.00	Kinder Morgan (100%);	Onshore
193	United States	Everett	1971	5.40	Exelon Generation (100%);	Onshore
194	United States	Neptune Deepwater LNG Port	2010	5.40	Northeast Gateway Energy Bridge LLC (100%);	Onshore
195	United States	Northeast Gateway	2008	4.50	Excelerate Energy (100%);	Floating
196	United States	San Juan - New Fortress LNG	2020	1.10	New Fortress Energy (100%);	Floating
197	Vietnam	Thi Vai LNG	2023	1.00	PetroVietnam Gas (100%);	Onshore

Appendix 6: Table of LNG Receiving Terminals Under Construction, end-2024

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Ownership	Concept
198	Antigua and Barbuda	Antigua LNG	2025	0.0001	Eagle LNG Partners (50%); Antigua Power Company (50%);	Onshore
199	Australia	Port Kembla LNG - Hoegh Galleon	2026	2.00	Andrew Forrest's Squadron Energy (100%);	Floating
200	Belgium	Zeebrugge 2 Expansion Step 2	2026	1.30	Fluxys LNG SA (100%);	Onshore
201	China	China Resources Rudong LNG 1	2026	6.50	China resources gas Runxing Energy (50%); Jiangsu Yangkou Port (50%);	Onshore
202	China	CNPC Fuqing LNG	2025	3.00	PetroChina (100%);	Onshore
203	China	Guangxi Beihai LNG 3	2025	6.00	PipeChina (80%); Guangxi Beibu Gulf Port Group (20%)	Onshore
204	China	Guangzhou Nansha LNG 2	2025	1.00	Guangdong Panyu Petrochemical Storage & Transportation Ltd. (100%)	Onshore
205	China	Hainan Yangpu LNG 2	2027	4.00	PipeChina (65%); China Energy Group Haikong New Energy (35%);	Onshore
206	China	Huafeng Zhongtian LNG	2025	4.00	Sinoenergy (55%); Chaozhou Huafeng Group (45%);	Onshore
207	China	Jiangsu Ganyu (Huadian) LNG	2026	3.00	China Huadian (51%); Lianyungang Port Group (20%); SK (14%); BP (10%); JERA (5%);	Onshore
208	China	Jiangsu Guoxin Rudong LNG 1	2025	- Only consists of storage capacity addition	Jiangsu Guoxin (95%); Jiangsu Yangkou Port (5%);	Onshore
209	China	Jiangsu Guoxin Rudong LNG 2	2025	3.05	Jiangsu Guoxin (95%); Jiangsu Yangkou Port (5%);	Onshore
210	China	Jiangsu Yancheng Binhai LNG 1 expansion	2025	3.00	CNOOC (100%);	Onshore
211	China	Jiangsu Yancheng Binhai LNG 2	2025	10.00	CNOOC (100%);	Onshore
212	China	Jieyang (Yuedong) LNG 2	2026	2.00	PipeChina (100%);	Onshore
213	China	PipeChina Longkou Nanshan LNG 1	2025	5.00	PipeChina (60%); Nanshan Group (40%)	Onshore
214	China	Putian LNG	2026	5.65	Ningxia Hanas (100%);	Onshore
215	China	Qidong LNG 5	2025	5.00	Xinjiang Guanghui Petroleum (100%);	Onshore
216	China	Shanghai LNG 1	2025	3.00	Shenergy Group (60%); Zhejiang Energy (20%); CNOOC (20%);	Onshore
217	China	Shenzhen Gas LNG 2	2025	2.00	Shenzhen Gas (100%);	Onshore
218	China	Sinopec Longkou LNG	2025	6.50	Sinopec Gas (50%); Hengtong Logistics (32%); Longkou port (18%)	Onshore
219	China	Sinopec Zhoushan Liuheng LNG 1	2025	7.18	Sinopec (90%); Liuheng Tidal Flat Reclamation Co., Ltd. (10%)	Onshore
220	China	Tangshan LNG 2	2025	5.00	Suntien Green Energy (51%); Hebei Construction Investment Group (29%); Tangshan Caofeidian Development Investment Group (20%);	Onshore
221	China	Tangshan LNG 3	2030	2.00	Suntien Green Energy (51%); Hebei Construction Investment Group (29%); Tangshan Caofeidian Development Investment Group (20%);	Onshore
222	China	Tianjin PipeChina LNG 3	2026	6.50	PipeChina (100%);	Onshore

Appendix 6: Table of LNG Receiving Terminals Under Construction (continued)

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Ownership	Concept
223	China	Tianjin Sinopec LNG 3	2026	0.85	Sinopec (98%); Tianjin Nangang Industrial Zone Developemnt Co (2%);	Onshore
224	China	Wenzhou Huagang LNG 1	2025	1.00	Huafeng Group (100%);	Onshore
225	China	Wuhu LNG terminal	2025	1.50	Huaihe Energy (100%);	Onshore
226	China	Yangjiang LNG	2025	2.80	Guangdong Yangjiang Hailing Bay LNG (100%);	Onshore
227	China	Yantai West Port (Xigang) LNG	2025	5.90	China Urban-Rural Energy (35%); Shandong Poly-GCL Pan-Asia International Energy (33%); Circle Asia Energy International Distribution Center(32%);	Onshore
228	China	Yingkou LNG terminal	2026	6.20	China Urban Rural Energy (60%); Hebei Shenneng Industry Group (40%);	Onshore
229	China	Yueyang LNG 1	2026	0.50	Guanghui Energy (50%); China Huadian (50%);	Onshore
230	China	Zhangzhou LNG 2	2025	3.00	PipeChina (60%); Fujian Investment and Development Co (40%);	Onshore
231	China	Zhejiang Energy Liuheng LNG 1	2026	6.00	Zhejiang Energy International (40.8889%); New Industrial Limited (39.1111%); Zhoushan Putuo Liuheng Tial Flat Reclamation (10%); Zhejiang Energy Natural Gas Group (5.1111%); Shenzhen Energy (4.8889%)	Onshore
232	China	Zhejiang Ningbo LNG 3	2025	6.00	CNOOC (51%); Zhejiang Energy Company (29%); Ningbo Power (20%);	Onshore
233	China	Zhoushan ENN LNG 3	2025	5.00	ENN (90%); Prism Energy (10%);	Onshore
234	China	Zhuhai LNG 2	2025	3.50	CNOOC (30%); Guangdong Energy (25%); Guangzhou Gas Group (25%); Local companies (20%);	Onshore
235	China	Jiangsu Rudong LNG Expansion	2026	- Only consists of storage capacity addition	Pacific Oil and Gas (42%); CNPC (27.5%); GCL (25.5%); Jiangsu Guoxin (5%);	Onshore
236	China	GCL Jiangsu Rudong LNG 1	2025	3.00	Pacific Energy (49%); GCL (51%);	Onshore
237	China	PipeChina Shenzhen LNG	2025	3.00	PipeChina (100%);	Onshore
238	China	Garson Gas Jiangyin LNG Terminal	2027	2.20	Yangzijiang Shipbuilding Ltd. (100%);	Onshore
239	Chinese Taipei	Taichung LNG 3 (expansion)	2026	4.50	CPC (100%);	Onshore
240	Chinese Taipei	Taoyuan LNG	2025	3.00	CPC (100%);	Onshore
241	Cyprus	Cyprus FSRU	2025	0.60	CMC Ltd (100%);	Floating
242	Estonia	Paldiski LNG	2025	1.80	Alexela (100%);	Floating
243	France	Fos Cavaou 2	2026	2.00	ENGIE (100%);	Onshore
244	Germany	Elbehafen LNG 2	2027	5.88	Kreditanstalt für Wiederaufbau (50%); Gasunie (40%); RWE (10%);	Onshore
245	Germany	Stade LNG 2	2027	9.78	Hanseatic Energy Hub (100%);	Onshore
246	Germany	Wilhelmshaven FSRU 2	2025	3.68	E.ON (33.4%); Tree Energy Solutions (33.3%); Engie (33.3%);	Floating
247	Ghana	Tema LNG Terminal - Vasant	2025	1.70	Helios Investment Partners (100%);	Floating
248	India	Chhara LNG	2025	5.00	HPCL (50%); Shapoorji Pallonji (50%);	Onshore

Appendix 6: Table of LNG Receiving Terminals Under Construction (continued)

Reference Number	Market	Terminal Name	Start Year	Nameplate Receiving Capacity (MTPA)	Ownership	Concept
249	India	Dabhol LNG 2	2026	5.00	Gail (31.52%); NTPC (31.52%); Indian Financial Institutions (20.28%); MSEB Holding Co. (16.68%);	Onshore
250	India	Dabhol LNG Breakwater Completition	2025	3.00	Gail (31.52%); NTPC (31.52%); Indian Financial Institutions (20.28%); MSEB Holding Co. (16.68%);	Onshore
251	India	Dahej LNG 4 (capacity expansion phase I)	2025	2.50	Petronet LNG (100%);	Onshore
252	India	Dahej LNG 4 (capacity expansion phase II)	2026	2.50	Petronet LNG (100%);	Onshore
253	India	Gopalpur LNG	2026	4.00	Petronet LNG (100%);	Floating
254	India	Karaikal LNG	2026	5.00	AG&P (100%);	Floating
255	Italy	Ravenna FSRU (BW Singapore)	2025	3.68	Snam (100%);	Floating
256	Italy	Venice LNG (Porto Marghera terminal)	2025	0.0007	Venice LNG (100%);	Onshore
257	Jordan	Aqaba LNG	2026	6.57	Aqaba Development Corporation (100%);	Onshore
258	Netherlands	Gate LNG terminal (LNG Rotterdam) expansion 2	2026	2.94	Gasunie (50%); Vopak (50%);	Onshore
259	Nicaragua	Puerto Sandino FSRU	2025	5.00	New Fortress Energy (100%);	Floating
260	Pakistan	Energas Terminal	2025	5.60	Energas (50%); Yunus Group (50%);	Floating
261	Pakistan	Pakistan Onshore LNG	2025	8.50	Vopak LNG Holding B.V. (50%); Engro Corporation (50%);	Onshore
262	Panama	Sinolam LNG (Gaslog Singapore)	2025	1.10	Sinolam Smarter Energy LNG Power Co. (100%);	Floating
263	Philippines	Pagbilao LNG	2028	3.00	Energy World Corporation (100%);	Onshore
264	Philippines	Luzon LNG Terminal FSRU (Excelerate)	2028	4.40	Excelerate Energy (100%);	Floating
265	Poland	Swinoujscie Phase 1 Jetty Expansion	2025	0.59	Gaz-System (100%);	Onshore
266	Poland	Swinoujscie Phase 1 Storage Expansion	2025	1.84	Gaz-System (100%);	Onshore
267	Poland	Swinoujscie Phase 2	2025	1.90	Gaz-System (100%);	Onshore
268	Senegal	Senegal FSRU (Karmol LNGT Powership Africa)	2025	2.50	Karadeniz Energy Group (100%);	Floating
269	South Korea	Dangjin 1	2025	6.00	KOGAS (100%);	Onshore
270	South Korea	Gwangyang LNG 2	2026	2.10	POSCO (100%);	Onshore
271	Vietnam	Cai Mep LNG Terminal	2025	3.00	Hai Linh Co Ltd (51%); AG&P (49%);	Onshore

The International Gas Union wishes to express its gratitude to **Tokyo Gas**, the **Daigas Group**, and **Toho Gas** for their support. Their continued commitment to the advancement of the global LNG industry and support of this Report are gratefully acknowledged.

International Gas Union (IGU)
44 Southampton Buildings
WC2A 1AP London
United Kingdom

Telephone: +44 203 889 0161
E-mail: info@igu.org