METI initiatives on LNG

Global LNG Market Trends

Overview

• The Energy Trilemma and Balanced Approach

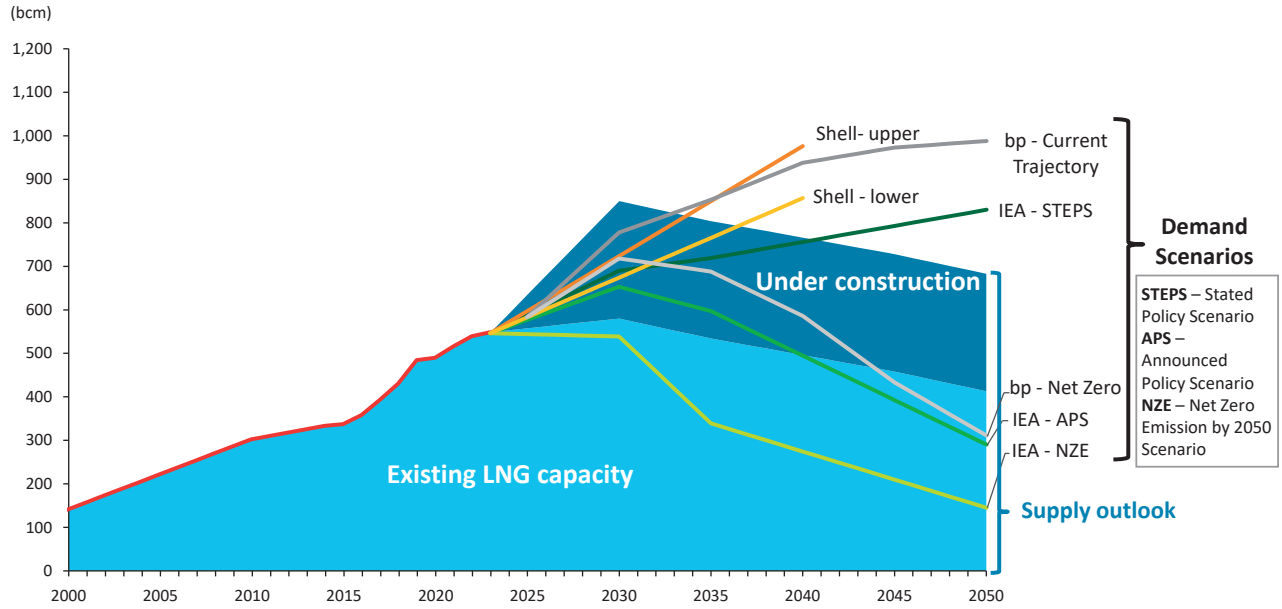
The energy market is facing growing uncertainties, including geopolitical risks, the pace of development and deployment of new energy technologies, and increasing electricity demand driven by emerging industries. In this context, ensuring energy security and affordable energy access remains critical to advancing climate change measures in a realistic and pragmatic manner.

Supply and Demand Outlook Analysis

• Institutional Demand Projections and IEA Sensitivity Analysis

LNG supply is expected to broadly align with demand scenarios projected by various institutions through the early 2030s. However, under high-demand scenarios, supply could become tight in the latter half of the 2030s. On the supply side, projections are subject to significant uncertainty in the energy market, with the realization of planned and future LNG projects dependent on investment profitability and access to financing. On the demand side, particularly in emerging economies across Asia, it is important to recognize that demand levels may fluctuate depending on gas price trends, as these economies continue to grow.

Figure 1: LNG Demand Scenarios and Supply Outlook by Various Institutions



Source: JOGMEC "Natural Gas LNG Data Hub 2025", IEA "World Energy Outlook 2024", Shell "Asian economic growth expected to drive 60% rise in LNG demand to 2040" (2025/2/25), bp "Energy Outlook 2024"

Supply-Demand Cycles and Pricing

Investment in LNG projects has historically followed cyclical patterns: accelerated investment causes LNG prices to fall, while stagnated investment leads to a rise in LNG prices. LNG projects require significant capital expenditures and typically take 5 to 10 years to reach completion. Higher gas prices tend to trigger final investment decisions (FIDs), but once supply from these projects comes online and saturates the market, prices tend to decline, leading to a slowdown in new investment activity.

To sustain stable levels of investment, robust and credible supply-demand outlooks play a crucial role. At present, the LNG market remains structurally tight, with prices staying relatively high and numerous new projects under planning. However, global inflation, supplier-side constraints in equipment and materials, and broader uncertainties are expected to increasingly pose challenges to investment. Ultimately, projects will only be realized to the extent that they can deliver LNG at prices acceptable to key demand regions, particularly in Asia.

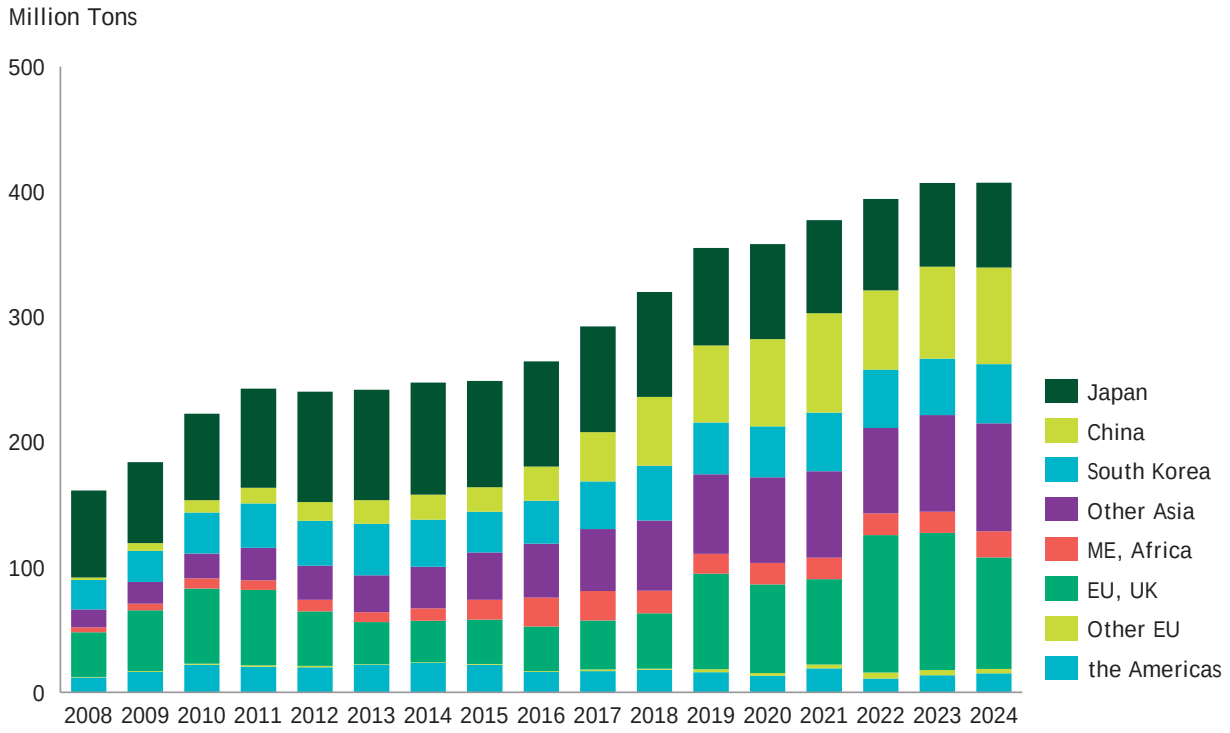
Demand

• Trends in LNG Demand

Global LNG demand is projected to increase steadily over the medium term, driven by both energy security concerns and the ongoing energy transition. In particular, emerging

economies in Asia—especially Southeast and South Asia—are expected to lead demand growth due to rising electricity needs and a shift away from coal. In contrast, Europe's LNG demand, which surged following the reduction of Russian pipeline gas flows in 2022, may enter a phase of gradual adjustment going forward. Globally, LNG demand is expected to grow, although risks remain due to evolving decarbonization policies and price volatility. Demand patterns are likely to become increasingly diverse, reflecting regional differences and a growing need for flexibility.

Figure 2: Global LNG Demand Trends



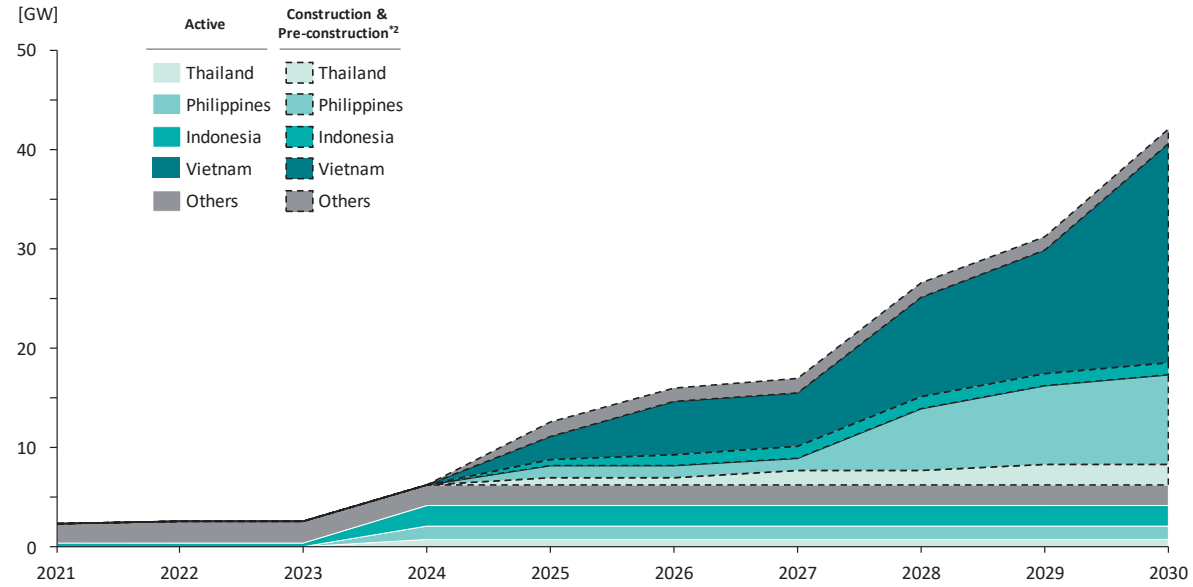
Source: Kpler LNG Import Data, May 2025

Economic growth is expected to drive a continued increase in energy demand, and natural gas—including LNG—is anticipated to play an important role in meeting this growth. Gas-fired power plants contribute to power system stability by balancing the intermittency associated with the expansion of renewable energy. Additionally, as gas-fired generation emits fewer greenhouse gases than coal, fuel switching can support emissions reductions. Moreover, existing gas and LNG infrastructure can be repurposed for emerging low-carbon fuels such as biogas, e-methane, hydrogen, and ammonia, offering further decarbonization potential across the energy value chain. As such, LNG is expected to retain an important role during the energy transition.

In Southeast Asia in particular, numerous LNG-fired power plant construction projects are currently being planned. When realized, total capacity could expand roughly

twentyfold over the decade from 2021 to 2030, reaching approximately 40 GW. This would contribute to a potential increase in LNG demand of around 40 million tonnes per year.

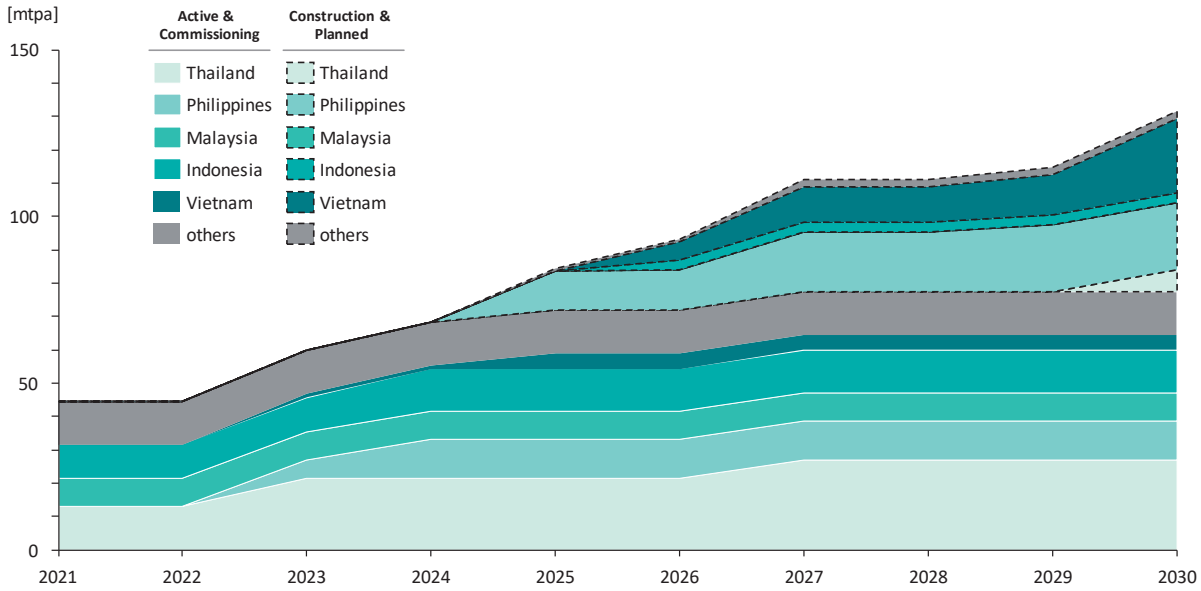
Figure 3: Trends in LNG-Fired Power Plant Development (Southeast Asia)



Source: Global Energy Monitor “Asia Gas Tracker”

Regasification capacity (including FSRUs) in the region is also projected to triple over the same period, reaching approximately 130 million tonnes per annum by 2030.

Figure 4: Trends in Regasification Infrastructure (Southeast Asia)



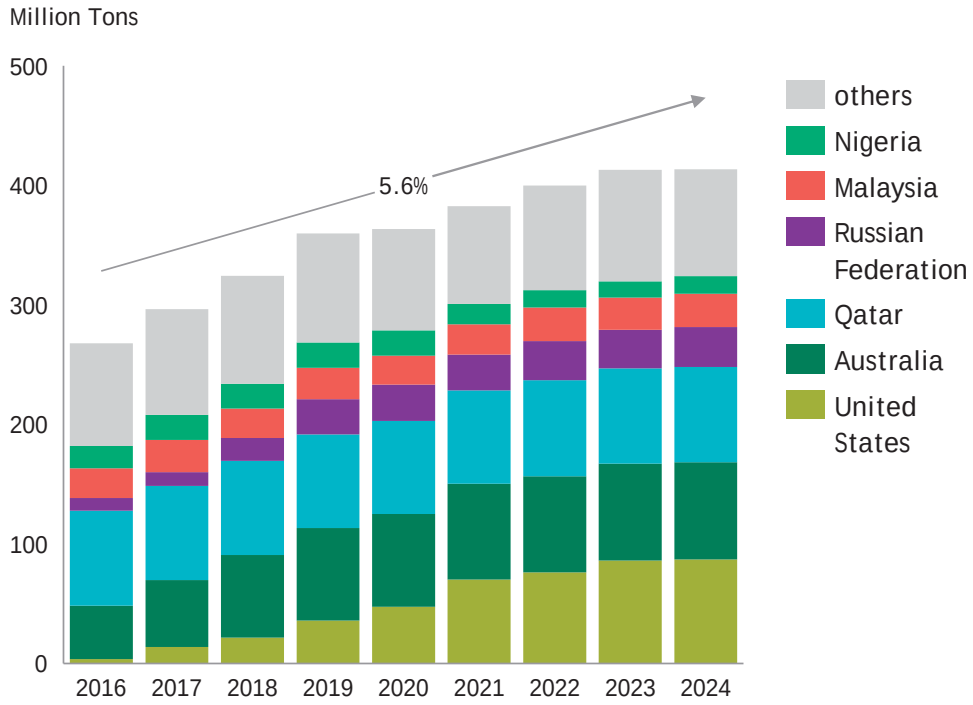
Source: Global Data

Supply

• Global LNG Trade Volume Growth

Global LNG trade has grown significantly, reaching approximately 413 million tonnes in 2024, up from 268 million tonnes in 2016—an average annual growth rate of around 5.6% over the period 2016–2024.

Figure 5: LNG Supply Volume by Exporting Country



Source: Kpler LNG Export Data, May 2025

• Overview of Planned Projects

LNG project development is currently centered around the United States and Qatar. Qatar is planning to expand production by 32 million tonnes by 2026, with further expansions of 16 million tonnes each in 2028 and toward 2030, effectively aiming to double its current production capacity. In the United States, several large-scale LNG projects are scheduled to come online between 2026 and 2030, adding up to approximately 75 million tonnes in new capacity. Key projects include Rio Grande LNG Phase 1, Port Arthur LNG Phase 1, Corpus Christi Stage 3, Plaquemines, and Golden Pass. Additionally, LNG Canada—a 14 million tonne-per-year project—is expected to commence production within the year.

From the perspective of geographic and strategic supply diversification, as well as future growth potential or symbolic challenges, the following LNG projects are particularly notable:

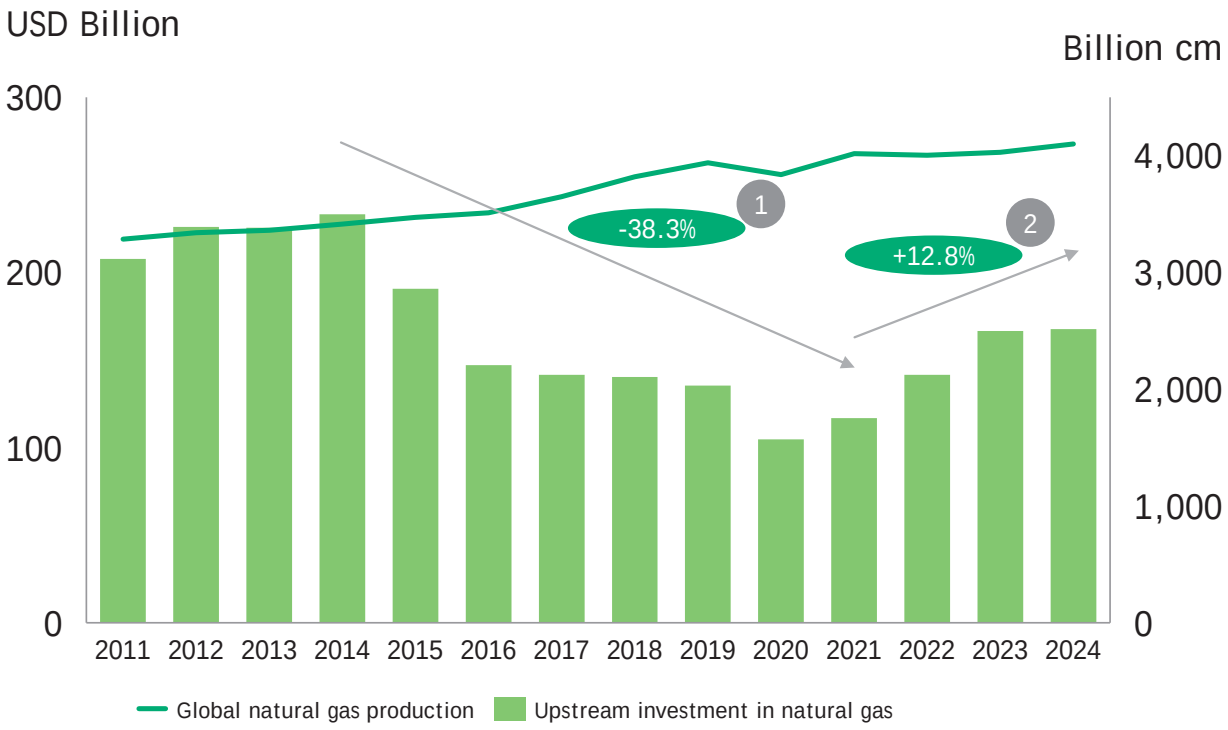
- Mozambique (Mozambique LNG / Coral North): One of the largest developments on Africa's east coast. The project features a hybrid structure combining an onshore facility (Area 1) and a floating LNG plant (Coral FLNG). It represents a symbolic case of navigating trade-offs between geopolitical risk and supply development.
- Mauritania / Senegal (Tortue FLNG): The first LNG export project in West Africa and the region's first offshore FLNG initiative. It serves as a symbolic example of a complex model combining capital, technology, and local political dynamics.
- Indonesia (Abadi LNG): Led by INPEX, this project is positioned as a medium- to long-term LNG supply source for Japan and South Korea. Strategically, it represents a geopolitically stable, autonomous supply option within the broader Asia-Pacific region.
- Argentina (Vaca Muerta FLNG): South America's first full-scale LNG export project. Combining shale gas with FLNG infrastructure, it offers a non-traditional model that could serve as a future anchor for global supply balance.
- Australia (Gorgon, Wheatstone, etc.): Upgrades and decarbonization initiatives are underway at existing plants. The country serves as a model for continuous LNG supply in mature markets through facility modernization and low-carbon investments.

These projects are expected to contribute to supply diversification beyond 2030, though uncertainties remain in terms of political stability and financing feasibility.

• Investment Trends

Investment in upstream natural gas assets declined between 2015 and around 2020. This was due to a combination of factors, including the oil price decrease, policy and demand uncertainty following the Paris Agreement, increasingly stringent regulations on upstream oil and gas investments, and a strategic shift among energy companies toward renewables. Additionally, energy companies with high leverage suffered from the sharp decline in oil prices. However, since 2021, heightened concerns over energy security—particularly following Russia's invasion of Ukraine—and the associated spike in commodity prices have reignited upstream investment.

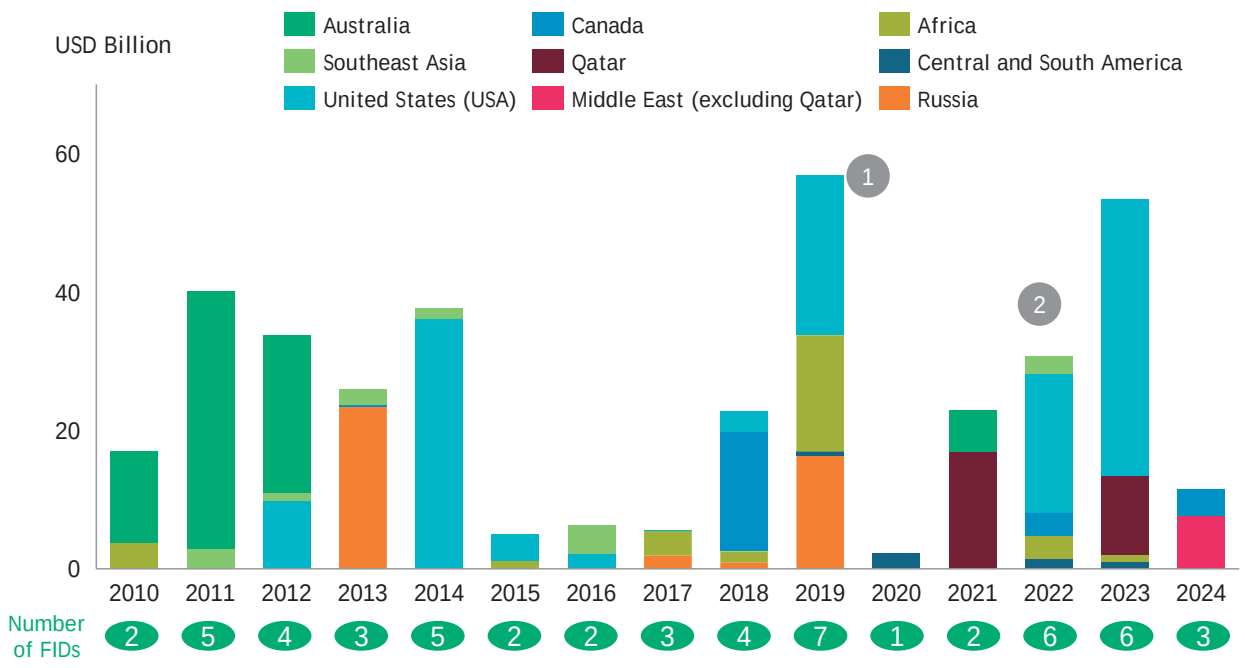
Figure 6: Trends in Upstream Investment in Natural Gas Assets



Source: Rystad Energy

Investment in LNG liquefaction projects, which had been constrained during the oil price slump, surged in 2018–2019 in anticipation of the increase of oil price and demand recovery. In 2019, the volume of liquefaction capacity reaching final investment decision (FID) marked a record high. Since 2021, large-scale projects such as Rio Grande Phase 1, Port Arthur Phase 1, and Plaquemines Phase 2 in the United States, and the North Field expansion in Qatar, have also reached FID, pushing liquefaction investment volumes upward.

Figure 7: FID Amount and Count for Liquefaction Projects



Source: Rystad Energy

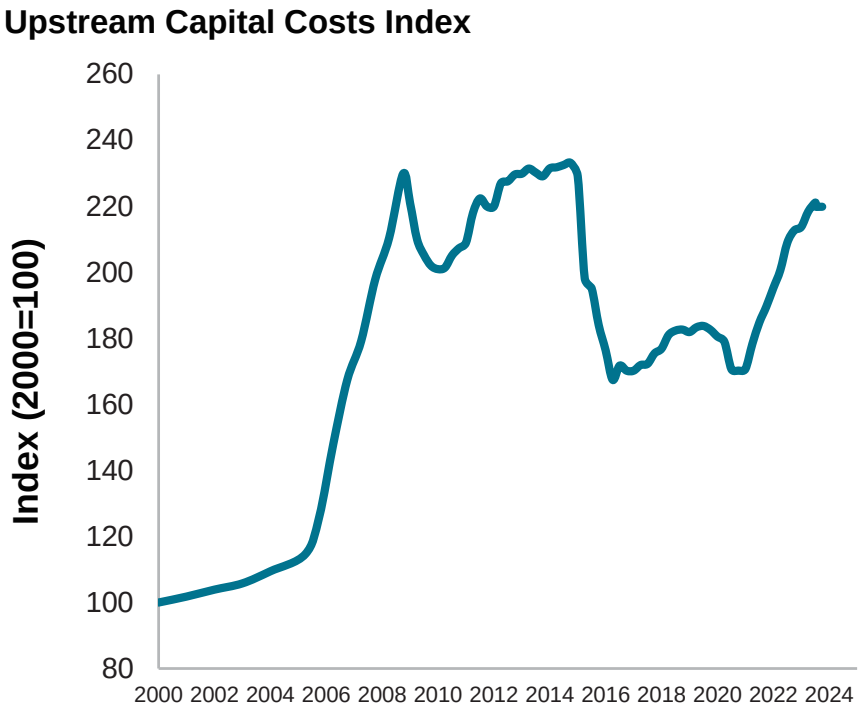
• Rising Costs and Longer Timelines for LNG Projects

Since 2015, there has been an increase in mega-scale LNG projects (over 10 mtpa), leading to growing burdens in project design, construction, and management. EPC costs have been on the rise—not only has CAPEX per unit of capacity increased, but cost overruns due to delays and scope changes have also been reported in multiple projects. EPC costs are affected by factors such as construction method (modular vs. stick-built), local content requirements, regulatory complexity, supply chain concentration, and rising prices for materials and labor due to inflation.

According to S&P Global's Upstream Capital Costs Index (UCCI) and Operating Costs Index (UOCI), capital and operating costs dropped significantly between 2016 and 2020. This decline was largely driven by reduced upstream investment following the 2014 oil price collapse, as well as downward pressure on EPC contract costs due to surplus construction capacity.

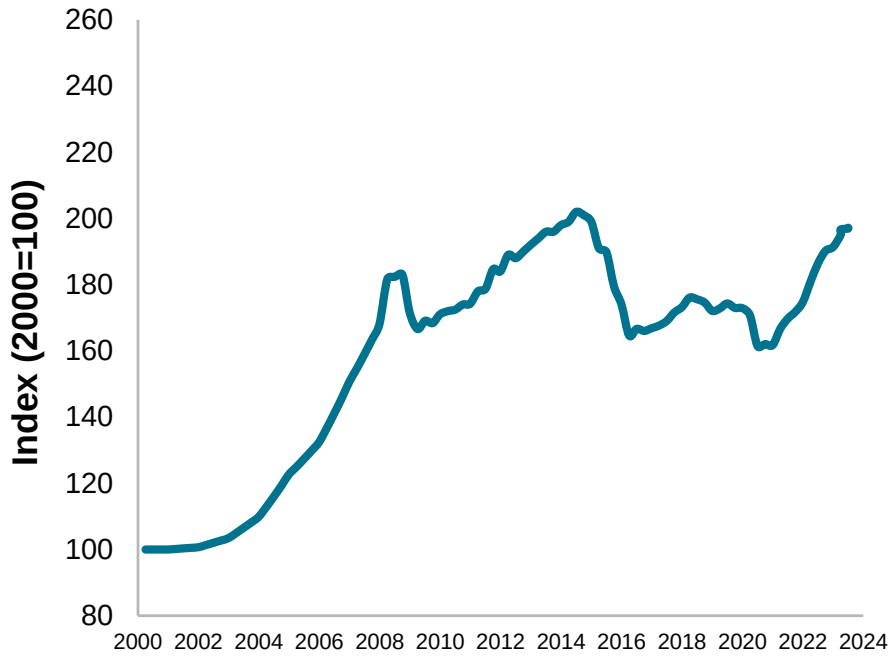
However, since 2021, capital and operating costs have trended upward again due to renewed inflation, surging material prices, and logistics constraints. These developments are expected to impact both the timing and financial viability of future LNG project FIDs.

Figure 8: Upstream Capital Costs Index



Data compiled Febuary 2024.
Source: S&P Global Commodity Insights.

Figure 9: Upstream Operating Costs Index



Data compiled January 2024.
Source: S&P Global Commodity Insights.

• Financing Environment for Natural Gas and LNG

In 2021, the Net-Zero Banking Alliance (NZBA) was established by the United Nations Environment Programme Finance Initiative (UNEP FI) to accelerate the development of decarbonization finance frameworks in support of the Paris Agreement. Member financial institutions of NZBA commit to achieving net-zero greenhouse gas emissions associated with their lending and investment portfolios ("Financed Emissions") by 2050. They are required to set reduction targets and transition plans for balance sheet assets and disclose their progress on an annual basis.

Within this framework, natural gas stands out as a challenge, as its classification remains ambiguous. Unlike renewable energy—which is clearly designated as "green"—natural gas does not have a consistent position in decarbonization finance taxonomies.

In this context, "transition finance" has attracted growing attention as a financing mechanism that supports companies and industries shifting toward a sustainable, low-carbon economy. The Japanese government has also played an active role in developing guidelines and related policy frameworks. However, the global scale of transition finance—including instruments such as transition bonds and loans that meet the required principles and have clearly defined use of proceeds—remains limited at several billion USD annually. This suggests significant room for future expansion.

Toward the end of 2024, six major U.S. banks announced their withdrawal from NZBA. This was followed in early 2025 by similar announcements from major banks in Canada, Australia, and Japan. However, many of the banks that exited NZBA have clarified that they are not rejecting decarbonization finance altogether. Rather, they intend to maintain their support for net-zero goals while adopting a more pragmatic and flexible stance aligned with client needs.

One of the main factors behind these exits appears to be a growing concern over regulatory and reputational risks. In the U.S., for instance, some financial institutions promoting decarbonization have been excluded from transactions with state pension funds or accused of violating antitrust laws. These developments have raised fears that continued NZBA membership could be interpreted as an unwillingness to finance fossil energy sectors, leading banks to withdraw as a form of risk management.

Figure 10: Post-NZBA Climate Finance Policies of Withdrawing Banks

Financial Institution	Country	Reason for NZBA Withdrawal	Future Decarbonization Finance Policy
Goldman Sachs		Not disclosed	• - Continues to support decarbonization targets • - Continues annual progress reporting
Morgan Stanley		Not disclosed	• - No change in commitment to support transition to global net-zero CO_2 emissions • - Will continue 2030 target efforts and reporting
BMO		Needs to follow implementation and regulatory sequencing of international standards; has strong internal capacity	• - Will align with Canadian government climate strategy • - Supports transition to net-zero, especially in domestic energy sectors • - Emphasizes fiduciary duty
Royal Bank of Canada		Officially not disclosed; multiple reports cite regulatory/legal risks and concerns	• - States it is "committed to financing the low-carbon economy" • - Particularly in Canada, support for existing energy clients continues • - Withdrew from May comment on sustainable finance
SMFG		Comprehensive judgment considering global trends	• - Continues with decarbonization investment planning and climate action response
MUFG		Comprehensive judgment of merits of continuing NZBA membership	• - Continues with decarbonization investment planning and climate action response

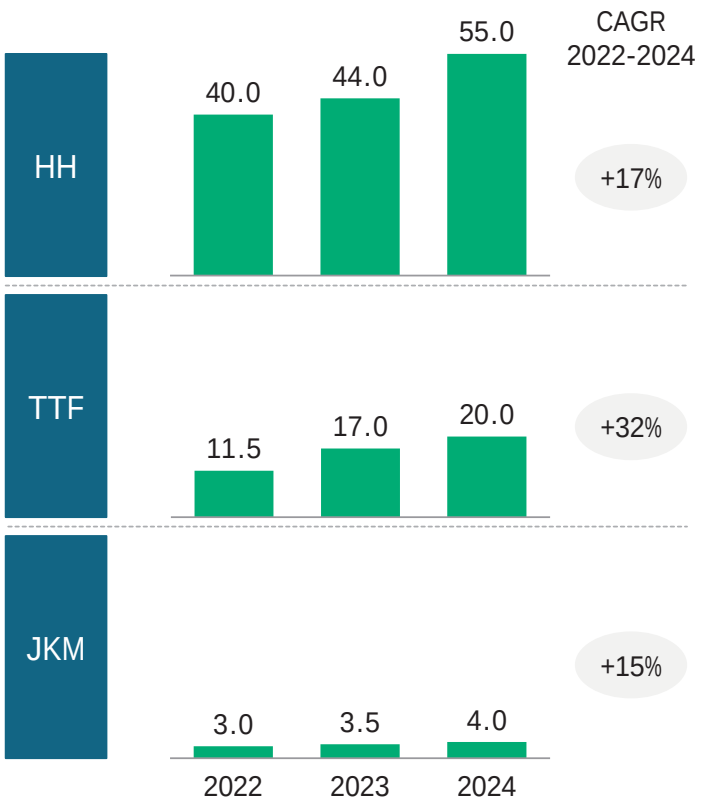
Various public sources

Market

• Long-Term vs. Spot Contracts and Growing Market Flexibility

Liquidity in the LNG futures market has been increasing, and the share of spot contracts is on the rise. However, the market remains relatively immature, with a churn rate of only around 3–4—still low compared to benchmarks like Brent, Henry Hub (HH), and the Title Transfer Facility (TTF)—indicating significant price volatility and limited opportunities for effective hedging.

Figure 11: Trend of churn rate



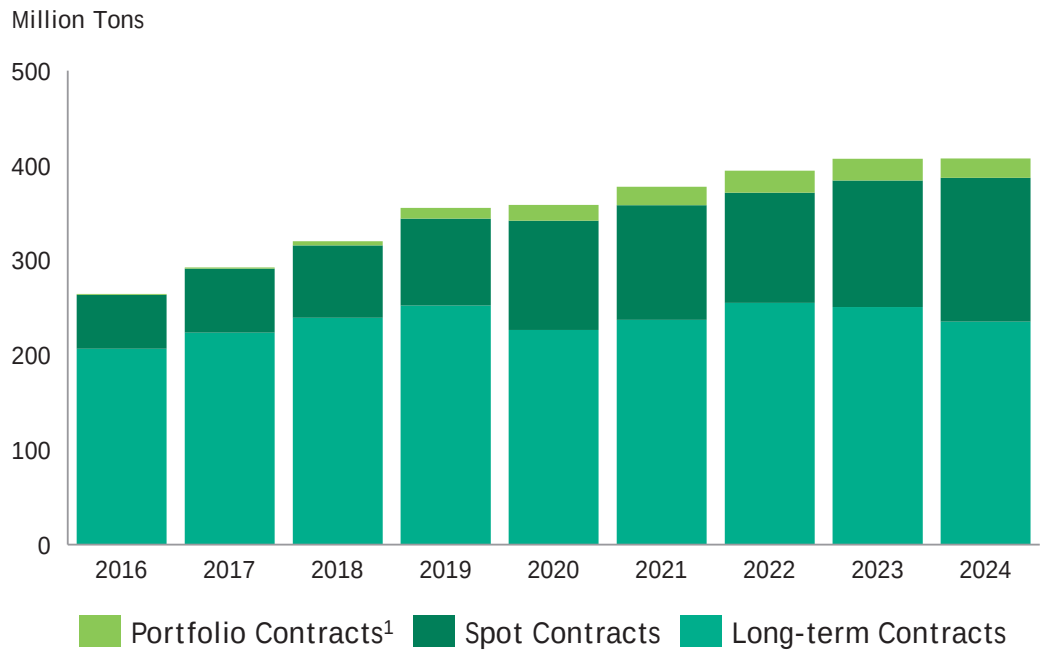
Source: IEA "Gas Market Report"

Reflecting on lessons from past crises, maintaining a certain level of long-term contracts—often indexed to oil prices—remains important to ensure price stability in LNG procurement. On the other hand, demand-side trends such as declining predictability in electricity sales due to market liberalization and increasing variability in consumption from growing renewable energy deployment have made surplus inventory risk more pronounced. Combined with the long-term goal of carbon neutrality by 2050, these developments are leading to a growing preference for shorter-term contracts.

In response to such needs, portfolio players have begun to play an increasingly important role in offering more flexible supply structures. Additionally, in order to address uncertain future demand and the absence of viable underground storage in many geographic regions, greater reliance on trading is emerging as a way to enable more flexible inventory management and ensure supply stability.

However, long-term contracts sometimes contain clauses—such as destination restrictions, profit-sharing mechanisms, and take-or-pay obligations—that may hinder the free trade of LNG. These contractual limitations can also be a barrier to the broader adoption of long-term agreements.

Figure 12: Global LNG Trade by Contract Types



1. Contract that does not assume consumption by the offtaker itself
Source: Kpler LNG Import Data, May 2025

Player Dynamics

• Strategies of Major Players (Return to O&G)
LNG continues to be a core pillar of growth strategies for many oil and gas (O&G) majors. Given its lower carbon intensity relative to other fossil fuels, LNG is widely regarded as a key “transition fuel” during the global energy shift. Based on this positioning, major companies are working to expand their supply capacity in alignment with medium- to long-term demand forecasts.

These companies view LNG not merely as a source of revenue but as a strategic asset throughout the transition period, and they are actively investing to that end. Underpinning this approach is the expectation of steady LNG demand growth over the next 10–15 years, particularly in Asia. Emerging demand from data centers, AI, and other electricity-intensive industries is also reinforcing the need for reliable, gas-fired power supply—further validating LNG’s long-term strategic value.

• Procurement Trends and the Rise of Portfolio Players
While the absolute volume of LNG procured through long-term contracts increased slightly from 209 million tonnes in 2016 to 238 million tonnes in 2024, its share of total trade dropped sharply from 78% to 59%. In contrast, the share of spot contracts rose from 22% to 38%, reflecting a shift toward more flexible transaction structures aligned

with market conditions. Nonetheless, the churn rate in LNG trading remains low at 3–4, still well below levels seen in the TTF and HH gas markets.

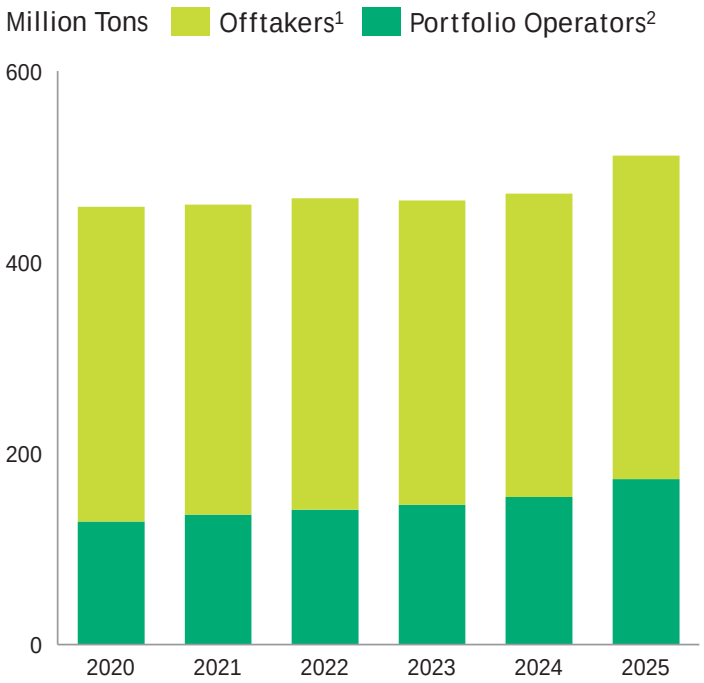
The first major driver of this market shift has been the emergence of the U.S. LNG model. Since initiating full-scale exports in 2016, the United States has expanded its share of global LNG supply from just 1% (around 4 million tonnes) in 2016 to 21% (about 87 million tonnes) in 2024. U.S. LNG is predominantly supplied by pure-play liquefaction companies that lack shipping capabilities, driven by shale gas development and the growing preference for Free on Board (FOB) transactions. Under the FOB model, buyers take delivery of LNG at the liquefaction terminal and arrange their own shipping. This allows buyers greater resale flexibility, enabling arbitrage and spot trading. As a result, FOB transactions have significantly boosted market liquidity and contributed to the growing share of spot trades.

The second key factor is the growing influence of portfolio players. Since 2020, in addition to traditional equity holders like Shell, BP, and Total, dedicated trading firms such as Vitol have become increasingly active in the LNG market. These portfolio players aggregate LNG from multiple supply sources and dynamically optimize sales and procurement based on market conditions. Their share of long-term contract procurement stood at 28% in 2020 and is expected to rise to 34% by 2025. Notably, Shell is forecast to hold 43 million tonnes of long-term contracts in 2025, followed by Total at 31 million tonnes and BP at 19 million tonnes, underscoring their strong positions.

Among independent traders, firms like Gunvor and Vitol—despite lacking upstream assets—are strengthening their presence in LNG trading through mid- and short-term contracts, especially across Europe and North America.

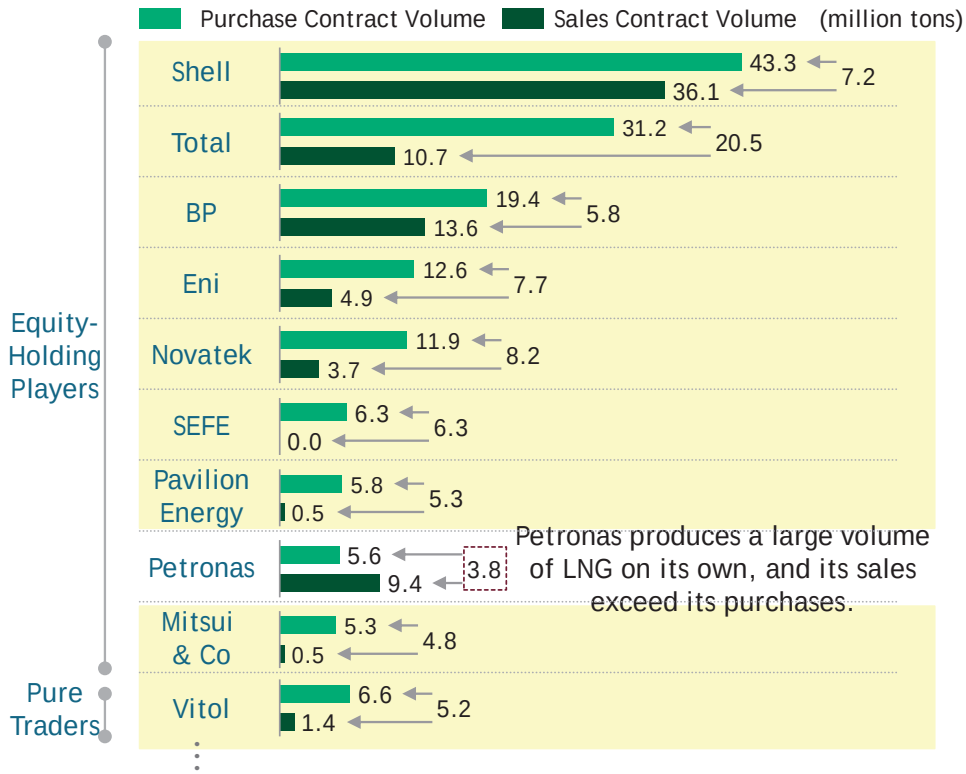
The third driver is growing uncertainty on the demand side. The acceleration of renewable energy deployment and tightening decarbonization policies have created increasing ambiguity around mid- to long-term LNG demand. In response, buyers are becoming more cautious about entering into long-term contracts, instead favoring flexible arrangements such as spot or portfolio-based agreements. This trend is closely linked to the aforementioned growth in spot transactions.

Figure 13: Share of Long-Term Contracts Held by Portfolio Players



1. Offtakers: Power/gas utilities, energy companies, etc. 2. Portfolio Operators: Operators who buy and sell LNG for profit 3. Among Portfolio Operators, top 10 by long-term contracted volume (on a delivery number basis) are extracted.
Source: Rystad, May 2025

Figure 14: Long-Term Procurement Volumes by Leading Portfolio Players



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