LNG PCC 2025

LNG Producer-Consumer Conference

LNGPCC2025

Navigating Global Uncertainty and Economic Growth

Discussion Paper for the LNGPCC 2025

June 20, 2025

METI
Ministry of Economy, Trade and Industry

iea

LNGPCC 2025 Agenda

Session 1 : Public-Private Session (4:00 pm – 6:00 pm)

Opening Speech

- MURASE Yoshifumi, Commissioner, the Agency for Natural Resources and Energy, METI

Panel Discussion 1 : Fostering a Certain Future for LNG in an uncertain world

Moderator:

- Nirmal Shani, Managing Partner, Global Energy & Sustainability, MarketsandMarkets

Panel Discussion 2 : LNG as a driver of clean economic growth in Asia

Moderator:

- Paul Everingham, Chief Executive, Asia Natural Gas and Energy Association (ANGEA)

Panel Discussion 3 : Emissions from LNG supply, abatement opportunities and the role of certification

Moderator:

- SHIRAKAWA Yutaka, Gas Analyst, International Energy Agency (IEA)

Session 2 : Ministerial Session (6:00 pm – 7:00 pm)

Welcome Remarks

- MUTO Yoji, Minister of Economy, Trade and Industry

Ministerial and Executive Perspectives

Ceremonial Part

Session 3 : Government Session (7:00 pm – 8:00 pm)

IEA Presentation

- SADAMORI Keisuke, Director, Energy Markets and Security, IEA

Ceremonial Part

Closing Remarks

- MURASE Yoshifumi, Commissioner, the Agency for Natural Resources and Energy, METI
- SADAMORI Keisuke, Director, Energy Markets and Security, IEA

The History of LNGPCC

LNGPCC is an international LNG conference initiated by Japan's Ministry of Economy, Trade and Industry (METI). The inaugural LNGPCC in 2012 brought together a wide range of stakeholders from producing and consuming countries for the first time. Over the years that followed its launch , LNGPCC served as an important global forum to discuss issues concerning supply stability, energy security, and the development of the LNG market. Since 2023, the International Energy Agency (IEA) has joined forces with METI to co-host the LNGPCC.

The Theme of LNGPCC 2025

The main theme of LNGPCC 2025 is "Navigating Global Uncertainty and Economic Growth". The key questions for conference participants to explore are as follows:

❶ *In what ways can LNG contribute to navigating today's global challenges?*
❷ *In the context of economic growth and increasing energy needs in Asia, what is the strategic role of LNG?*
❸ *Considering the future role of LNG, what forms of international cooperation are required, and what role can the IEA play in this context?*

In this context, the Public-Private Dialogue (Session 1) at LNGPCC 2025 features three panel discussions to explore these key questions further, welcoming senior figures from both government and industry.

Panel Discussion 1. Fostering a Certain Future for LNG in an uncertain world

What role will LNG play amid various uncertainties including geopolitics, the pace of new energy development and deployment, and rising energy demand?

Panel Discussion 2. LNG as a driver of clean economic growth in Asia

What role will LNG play in meeting growing energy demand driven by economic growth, particularly in Asia? What challenges might emerge in this context?

Panel Discussion 3. Emissions from LNG supply, abatement opportunities and the role of certification

What is the role of the Roadmap for Low-Carbon LNG Deployment, and how can low-emission or decarbonized LNG be effectively evaluated?

IEA-METI 2-Year Gas Security Work Programme

The 2022-2023 energy crisis caused widespread disruption in the global energy market and served as a stark reminder of the challenges associated with the energy trilemma: the need to balance energy security, affordable energy prices and climate action simultaneously. As it was recognized in the Joint Chair Summary of LNGPCC 2024 by METI and the IEA:

- LNG-fired power generation can help provide security and flexibility for electricity grids, for example by balancing the intermittency of variable renewables, such as wind and solar.
- LNG can meet energy demand and support the transition away from coal in emerging and developing economies across Asia, Africa, and other parts of the world.
- LNG infrastructure, with its already established supply chain, has the potential to be repurposed to support the development of low-emission gases, such as biomethane and e-methane.

To prevent the recurrence of past crises, the IEA, together with its member countries, has been discussing ways to enhance its role in gas security, including by providing transparent and easily accessible information and developing measures that contribute to global gas security. These topics are being widely discussed within the IEA's new Natural Gas and Sustainable Gases Security Working Party (GWP), which was originally established as the temporary Task Force on Gas Market Monitoring and Supply Security in 2022 in response to the crisis.

At LNGPCC 2024, METI and the IEA launched a two-year work programme on gas supply security and the role of gas and LNG in the energy transition. The aim of the work programme is to reduce the risk of a recurrence of the 2022-2023 energy crisis and to foster global gas security alongside an orderly energy transition. To achieve these goals, the programme began with a comprehensive analysis of the 2022-23 crisis and the lessons learned from that experience. Based on these findings, further investigation into gas reserve mechanisms, a broader concept that includes various measures to stabilize gas markets, has been initiated. The importance of gas reserve mechanisms was recognized in the 2024 IEA Ministerial Communiqué and further reaffirmed in the 2024 G7 Climate, Energy and Environment Ministers' Meeting Communiqué.

In an effort to more comprehensively inform investment decisions, the IEA will continue to assess long-term gas and LNG demand through the scenarios presented in *World Energy Outlook* 2025, recognizing the wide range of uncertainties surrounding future

natural gas demand. In addition, the IEA and METI are collaborating to explore the sources of greenhouse gas emissions that occur along the LNG supply chain and to evaluate the opportunities and costs of reducing these emissions. By providing an overview of emissions from the LNG supply chain and investigating mitigation options, the LNG industry can develop pathways to achieve emission reduction. In this context, international cooperation among all stakeholders, including industry, governments and international organizations, is essential. METI, together with global partners including the IEA, will continue to support the implementation of the Coalition for LNG Emission Abatement toward Net-zero (CLEAN initiative) to enhance international cooperation and explore the possibility of introducing a verification mechanism.

The following is a list of completed and expected deliverables from this work programme.

1. Lessons Learned from Past Energy Crises
- Online workshop (February 2025)
- Orbital event ahead of the IEA Summit on the Future Energy Security (April 2025)
- Draft report (LNGPCC 2025)
- Final report (G7 Ministerial Meeting on Climate, Energy and Environment 2025)

2. Study on a Voluntary Gas Reserve Mechanism
- Online workshop series (starting February 2025)
- Orbital event ahead of the IEA Summit on the Future Energy Security (April 2025)
- Full report (IEA Ministerial Meeting 2026)
- Final report (LNGPCC 2026)

3. Sensitivity Analysis of Long-Term Gas and LNG Demand
- WEO 2025 publication and scenario development (November 2025)
- Full report (IEA Ministerial Meeting 2026)
- Final report (LNGPCC 2026)

4. Roadmap for Low-Carbon LNG Technology Deployment
- Online workshop series and dialogue with industry (starting March 2025)
- Interim report (LNGPCC 2025)
- Final report (LNGPCC 2026)

Abstracts of key deliverables

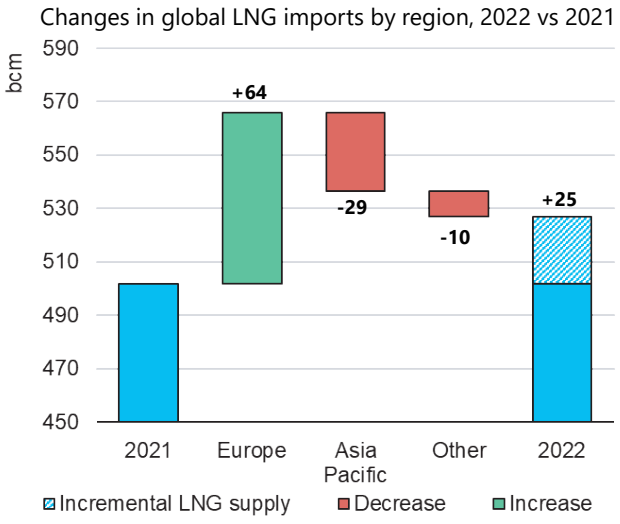
Lessons Learned from Past Energy Crises

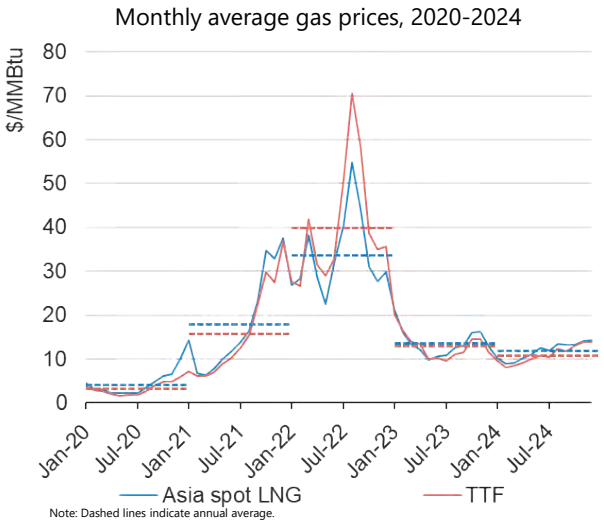
Over the course of 2022 and 2023, the largest natural gas supply shock in history unfolded, developing from seemingly regional dynamics in Europe into a global shockwave in gas and wider energy markets. This report identifies the key factors that contributed to the crisis, evaluates the range of policy and market responses, and provides a comprehensive review of the lessons learned.

Anatomy of a crisis

The 2022-2023 crisis exposed deep structural vulnerabilities in global gas and LNG markets. The sudden and sharp reduction of Russian pipeline flows to Europe led to an unprecedented supply shock and also marked the loss of a key lever of global gas supply-demand flexibility. This impacted the global LNG market extremely severely. LNG liquification plants typically operate close to their nameplate capacity, leaving little room to increase production on short notice.

In EU, the share of Russian natural gas (including pipeline gas and LNG) supply fell dramatically from over 45% in 2019 to below 15% by 2023. European countries were forced to rush to the thin LNG spot market, because they have not been securing sufficient LNG long-term contract and faced difficulties in switching to the alternative energy sources to compensate in full scale. This resulted in the unprecedented surge of the spot LNG price and pulling volumes away from other LNG importing markets, especially relatively vulnerable regions in Asia.





The shock affected disproportionally on the global LNG market. With the strong

purchasing power, well-integrated gas and electricity market across the continent and the availability of alternative fuels, Europe has managed the crisis and did not cause physical gas supply shortages. In contrast, outright LNG shortages led to rolling blackouts in some of Asia's most vulnerable markets, including Pakistan and Bangladesh.

Re-emerging realities and lessons learned

A number of lessons emerge from analysing the unfolding of the 2022-23 crisis.

First, the global gas market has entered a structurally more fragile phase, compounded by geopolitical uncertainty. This means that policymakers will have to prepare more systematically for the unimaginable, including by updating emergency frameworks and considering additional safety buffers such as reserve mechanisms.

Second, in a more fragile and uncertain energy landscape, infrastructure needs are likely to increase, requiring additional investment in redundancy and security, and mechanisms to safeguard not only supply availability, but also affordability are essential.

Finally, strengthening dialogue, cooperation, and coordination among like-minded importers and responsible suppliers is critical to reduce uncertainty and enhancing predictability in the balancing of the global gas market.

Study on a Voluntary Gas Reserve Mechanism

Gas reserve mechanisms have been a key topic of discussion within the IEA's Natural Gas and Sustainable Gases Security Working Party and its predecessor, the Task Force on Gas Market Monitoring and Supply Security. Their importance was further reaffirmed in both the 2024 IEA Ministerial Communiqué and the 2024 G7 Climate, Energy and Environment Ministers' Meeting Communiqué.

Gas reserve mechanisms are applicable throughout the gas and LNG value chain – from upstream production to end-use consumption – but the nature and extent of flexibility vary significantly. Enhancing gas market flexibility through physical assets, policy measures, and more flexible commercial arrangements should therefore be a priority for governments seeking to strengthen gas system resilience.

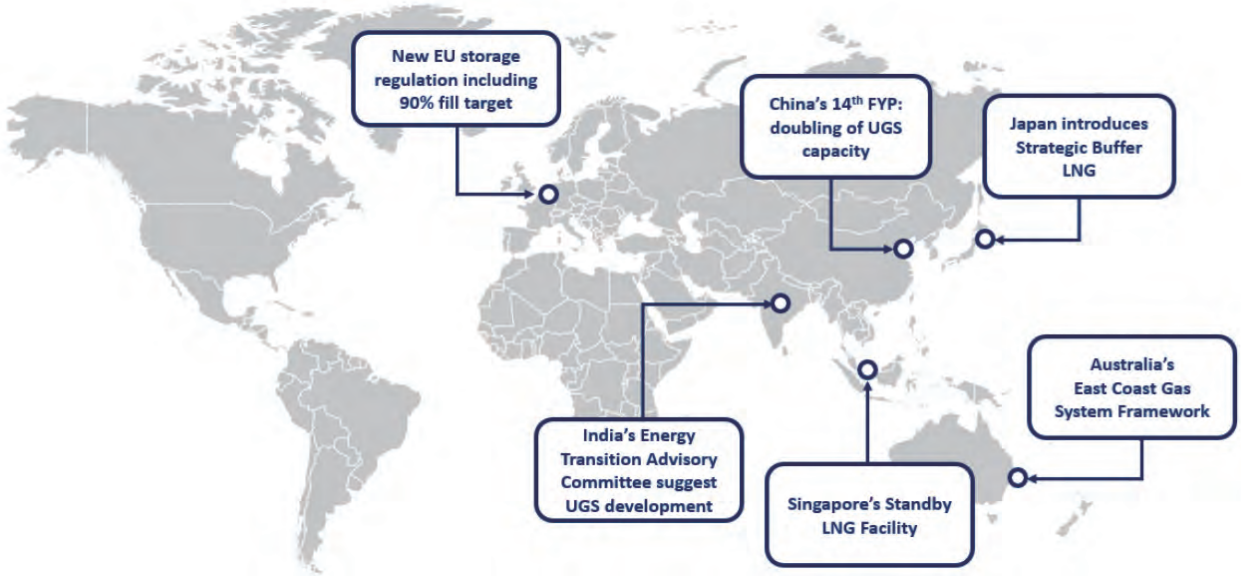
Physical gas reserves

Physical reserves—particularly underground gas storage (UGS) and LNG tanks at regasification terminals—remain a cornerstone of supply security. The IEA will examine the global distribution of these assets, assess capacity currently under construction

through 2030, and highlight regions with significant untapped potential, such as Ukraine's large and underused gas storage capacity. It will also review the economics and use cases of LNG floating storage, both as a temporary buffer and as part of longer-term strategic planning. In addition, the IEA will identify gaps in gas storage data and reporting practices across countries and offer guidance on improving transparency, which is essential for coordinated reserve planning and emergency response.

Policy measures

Governments have access to a range of policy instruments to enhance gas security. These include mandatory storage obligations, strategic gas reserves, LNG tank flexibility mandates, public support for infrastructure investment, and other options. The report will evaluate recent regional initiatives, such as the EU's gas storage regulation, China's 14th Five-Year Plan targeting a doubling of underground storage capacity, India's proposal to develop strategic gas reserves, Japan's Strategic Buffer LNG scheme, and Singapore's Standby LNG Facility, and assess their effectiveness. It will also explore what gas reserve mechanisms can be most suitable in different regions, and what such mechanisms can learn from the more established oil security frameworks, especially in terms of governance, stockholding models, and the coordination of emergency response.



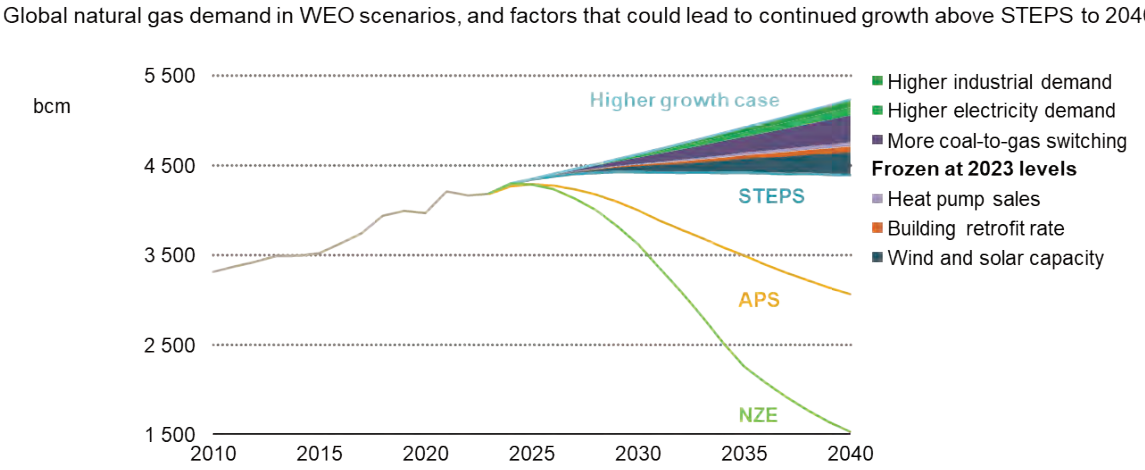
Flexible commercial arrangements

Commercial flexibility complements physical reserves and policy measures by enabling more dynamic responses to regional and seasonal imbalances. The report will explore a variety of options to enhance supply adaptability, including greater use of destination-flexible contracts, the inclusion of more flexible volume terms in existing and future agreements, the expanded use of LNG cargo swaps, the role of portfolio players in providing market flexibility, and buyer participation in LNG export projects.

Sensitivity Analysis of Long-Term Gas and LNG Demand

Natural gas demand faces a wide range of uncertainties and is highly sensitive to policy, technology, and market forces. The 2024 edition of the IEA's *World Energy Outlook* explored the potential impact of these uncertainties on future natural gas demand. The analysis found that factors such as higher electricity demand, higher demand in industry, widespread coal-to-gas switching, and a slower rollout of clean energy sources could significantly increase natural gas demand above the levels projected in the Stated Policies Scenario (STEPS) by 2040. The IEA will continue assessing long-term gas and LNG demand through the scenarios presented in WEO 2025, which will include a Current Policies Scenario.

Natural gas use is sensitive to policy, technology and market forces



Natural gas faces an uncertain outlook, especially in emerging economies. The World Energy Outlook explores the impact of potential uncertainties on the outlook for natural gas and other fuels

Roadmap for Low-Carbon LNG Technology Deployment

Natural gas and LNG are expected to remain part of the global energy system for years to come. Therefore, it is important for emissions from their supply chains to be reduced to the fullest extent possible. The IEA's new report "Greenhouse gas emissions from liquefied natural gas supply and abatement opportunities" provides a comprehensive assessment of greenhouse gas emissions from across the LNG supply chain and evaluates the technical and economic potential of reducing these emissions.

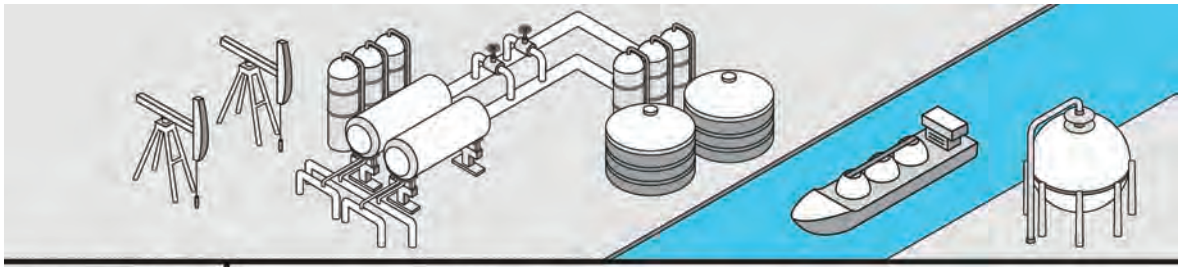
Quantifying emissions from across the LNG supply chain

There is a wide range of reported LNG emission intensities in the literature, largely driven by differing process assumptions, system boundaries, and allocation methods. Reported methane emissions from the LNG supply chain alone vary by more than tenfold across different sources and CO_2 emissions can differ by nearly threefold. By applying a consistent and transparent methodology across production, processing, transmission, liquefaction, shipping, and regasification, this analysis provides a comprehensive view of emissions along the LNG supply chain.

The analysis estimates total GHG emissions from the LNG supply chain are around 350 Mt CO_2-eq. This excludes emissions from combustion of the natural gas at the point of use. Around 70% of this is in the form of CO_2 emissions which are either combusted or vented, and the remaining 30% is methane that escapes, unburnt, into the atmosphere. The main source of methane is leakage during upstream production and processing, while the main source of CO_2 emissions comes from the large energy requirements needed to compress and liquefy natural gas at LNG export terminals.

Globally, the average emissions intensity of LNG is just under 20 gCO_2-eq/MJ, compared with an average of 12 gCO_2/MJ for natural gas supply overall. This average masks a very wide range, with the highest-intensity LNG supply having around five times the emissions of the lowest-intensity supply.

Global average emissions from LNG supply by part of the supply chain, 2024



GLOBAL AVERAGE EMISSIONS INTENSITY (g CO_2-eq/MJ)		PRODUCTION, PROCESSING AND TRANSMISSION	LIQUEFACTION	SHIPPING	REGASIFICATION
19.5	% total GHG emissions	47%	33%	18%	1%
14.0	% of supply chain CO_2 emissions	34%	43%	22%	1%
5.5	% of supply chain CH_4 emissions	80%	9%	10%	2%
	Key levers to lower GHG emissions	• Leak detection and repair • Electrification	• Electrification • Carbon capture, utilisation and storage	• Low-emissions fuels • Slow steaming	• Low-emissions vaporisers • Cold energy recovery

IEA. CC BY 4.0.

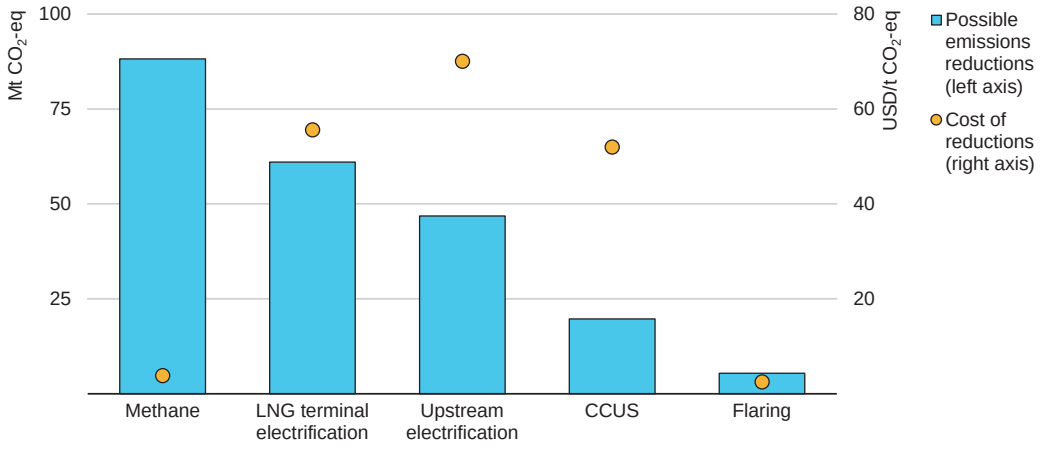
Technical pathways for emission reduction

Large emission reductions across the LNG supply chain are technically achievable today. Many measures can achieve this at low or moderate cost. Tackling methane emissions is the most important and cost-effective contributor to overall emission reductions from LNG supply. Other options include electrification using low-emissions electricity, implementing efficiency improvements and CCUS, and eliminating routine flaring.

While the upfront costs may be steep, electrification may have the greatest impact on overall emissions from LNG and will continue to pay dividends. Establishing electrified LNG facilities has already been proven. More than 40% of upstream natural gas production sites that feed LNG terminals are near an electricity grid and electrifying these is also an option to reduce emissions. Reducing methane leaks can cut emissions by close to 90 Mt CO_2-eq, and around half of methane emissions from the LNG supply could be cut at no net cost. The use of CCUS is also under way in the LNG supply chain. The sharing of lessons learned from the establishment of routine and at-capacity gas capture and injection will be key to further benefitting from this technology.

In total, the IEA estimates that the cost of implementing the main technically available emission reductions measures would require about USD 100 billion in upfront investment. Electrifying upstream operations that feed gas to LNG terminals would cost USD 50 billion, and electrifying operations at LNG terminals would cost USD 35 billion. CCUS to capture naturally occurring CO_2 at fields with high concentrations would require USD 7 billion, and methane abatement and flaring reductions just over USD 5 billion. Implementing all these measures would avoid a total of 220 Mt CO_2-eq of GHG emissions per year at a weighted average CO_2 cost of USD 40/t CO_2. Globally, on average, this would add around USD 1/MMBtu to the delivered cost of LNG.

Annual emissions reduction potential across the LNG supply chain and global production weighted average CO_2 cost, 2024



Source: IEA analysis

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Annex 1

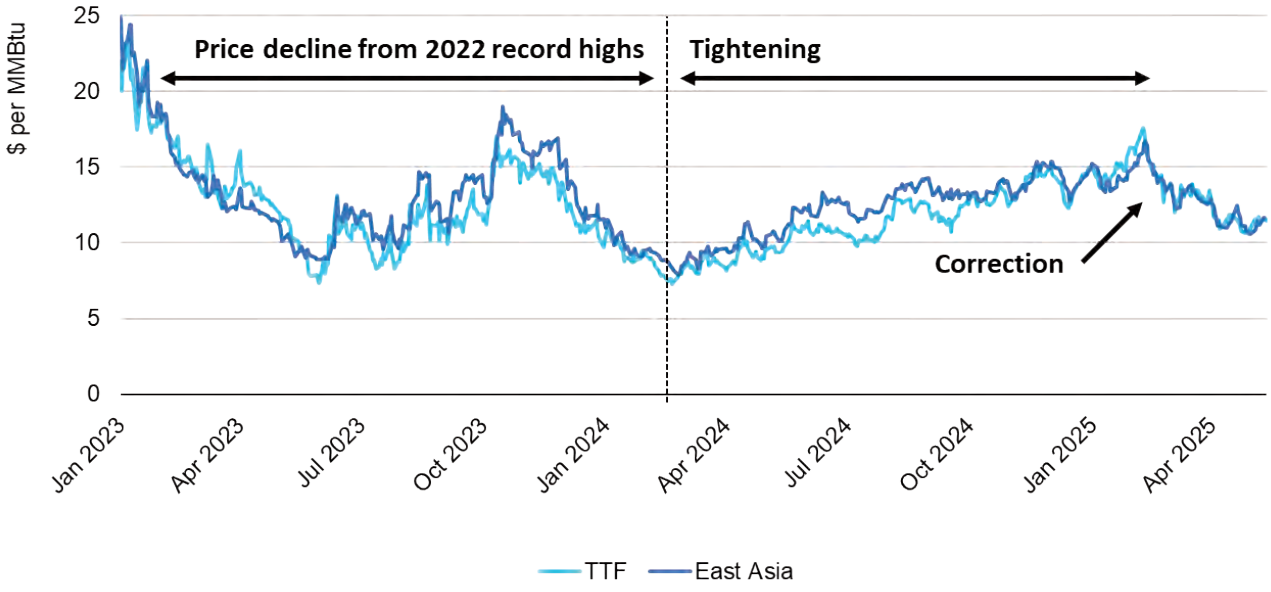
Global Gas Market Developments Since LNGPCC 2024

Less than nine months have passed since the previous edition of the LNGPCC in October 2024, and since then the global gas market has seen many twists and turns, with considerable volatility even within this short period. Supply constraints, geopolitical tensions and an uncertain macroeconomic environment have contributed to a fragile market balance, complicating the ongoing transition from an energy crisis to a period of more abundant supply in the near term.

Gas price roller coaster fuelled by imbalances, weather, variability and geopolitics

After reaching all-time highs in 2022, global gas prices were on a declining trend for most of 2023. By February 2024, both European and Asian benchmarks had returned to pre-crisis levels. However, this trend reversed in early 2024, with prices doubling between February 2024 and February 2025. This was driven by relatively strong demand growth and limited LNG supply growth in 2024, cold weather in the Northern Hemisphere in the second half of the year, periods of low renewable electricity generation, and the cessation of Russian pipeline gas flows through Ukraine to Europe in January 2025. Since February 2025, global gas prices have corrected sharply, supported by easing market fundamentals, a weakening macroeconomic outlook and expectations of softer mandatory storage fill targets in the European Union.

The evolution of European and Asia price benchmarks



Source: IEA analysis based on ICIS

Tight market conditions are set to continue in 2025

LNG supply growth is expected to accelerate in 2025 following a relatively stagnant 2024, driven by the ramp-up of new LNG projects including Plaquemines LNG and Corpus Christi Stage 3 in the United States, LNG Canada in Canada, and Tortue FLNG in Mauritania and Senegal. This will be complemented by higher Russian pipeline gas deliveries to China, following the ramp-up of Power of Siberia to full capacity at the end of 2024. However, this additional supply is partly offset by the complete halt of Russian pipeline gas transit through Ukraine as of 1 January 2025, as well as by up to 20 bcm of additional storage injection requirements in the European Union, following significant withdrawals during the 2024/25 heating season. Ukraine is also expected to require increased natural gas imports from the EU due to earlier attacks on its upstream infrastructure and depleted storage levels at the end of the winter. These offsetting factors are likely to keep the global gas market relatively tight in 2025.

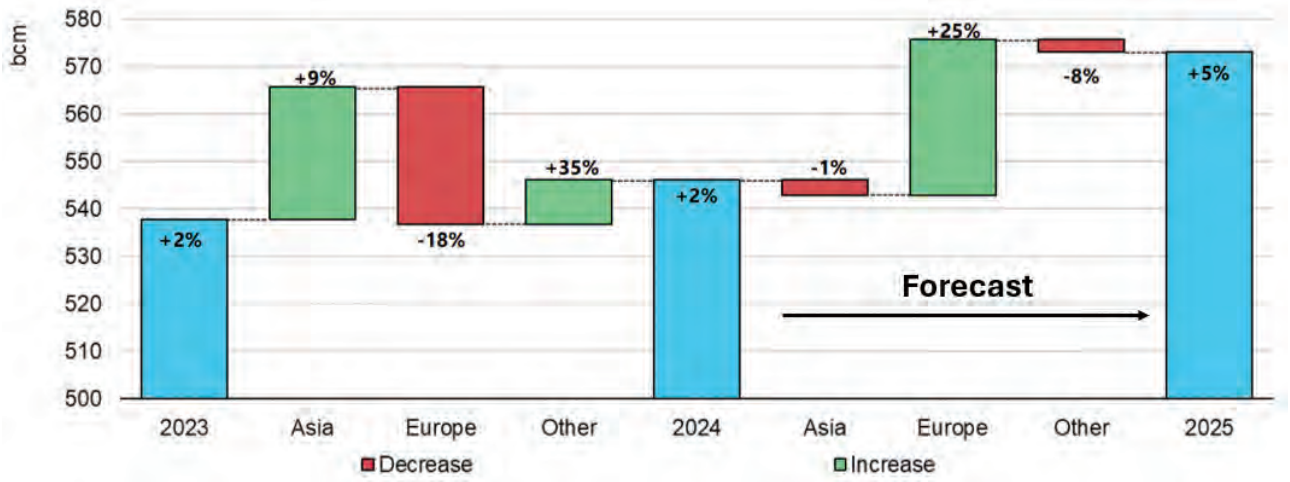
Slower demand growth amid tight supply and macroeconomic uncertainties

These tight market conditions, combined with renewed macroeconomic uncertainties, are expected to weigh on global gas demand growth in 2025. In 2024, natural gas consumption grew by 2.8%, well above the historical average of 2%. However, demand growth is forecast to slow to around 1.5% in 2025. Asia will remain the main driver of demand, but its share in incremental global gas consumption is expected to fall to around one-third in 2025, down from 45% in 2024.

Europe returns to the driving seat for global LNG demand

Europe’s tight supply-demand balance is expected to result in a significant increase in LNG imports, once again positioning the region as the primary destination for incremental LNG volumes. In 2025, European LNG demand is projected to rise by around 25% (33 bcm), marking a sharp rebound from the 18% (29 bcm) decline recorded in 2024. By contrast, Asian LNG imports are expected to decline slightly, effectively serving as a market balancer amid intensified competition from European buyers.

Incremental LNG imports by region, 2024-2025



Source: IEA analysis based on ICIS

LNG investments continue despite headwinds

Despite ongoing geopolitical and macroeconomic headwinds, rising costs and the prospect of a substantial wave of new LNG supply, global LNG investment activity has remained resilient since October 2024. In the United States, Woodside Energy reached a final investment decision on its 22 bcm/yr Louisiana LNG project in April 2025 and the first phase of the CP2 LNG project (20 bcm/yr) started construction without a formal FID announcement to date. In Argentina, Southern Energy advanced the first phase (3 bcm/yr) of its floating LNG initiative, marking a significant milestone in the region's export capabilities. Meanwhile, in Mozambique, TotalEnergies is finalising plans to restart construction of the 18 bcm/yr Mozambique LNG project, with a large portion of financing secured and security conditions showing signs of improvement at the time of writing.

Annex 2

Key Takeaways from the IEA–METI Orbital Event on Gas Security (23 April 2025, London)

As part of our long-standing collaboration and ongoing two-year work programme, the IEA and METI – in cooperation with the Embassy of Japan in the United Kingdom – organised an orbital event on gas security in London on 23 April 2025.
The high-level roundtable, entitled "*Enhancing Gas Security Through Gas Reserve Mechanisms and Flexibility Options,*" was held on the sidelines of the Summit on the Future of Energy Security.

Set against the backdrop of volatile energy markets and ongoing geopolitical tensions, the event brought together senior government representatives, international organisations, and select industry stakeholders for a full-day, closed-door discussion on strengthening global natural gas security.
Convened under the Chatham House Rule, the event aimed to explore pragmatic policy responses to vulnerabilities exposed by the 2022–2023 energy crisis, assess future supply risks, and advance international cooperation on gas reserve mechanisms and flexibility options.

High-Level Dialogue on Lessons from the Energy Crisis and Gas Reserve Mechanisms, 23 April 2025, London. IEA Executive Director Fatih Birol and Japan's Ambassador to the United Kingdom Hiroshi Suzuki delivered the opening remarks at the event and former METI Vice-Minister for International Affairs Shin Hosaka shared insights from his experiences during the recent energy crisis. European Commission Director-General for Energy Ditte Juul Jørgensen then gave a keynote address, followed by remarks from Acting Assistant Secretary Tommy Joyce of the US Department of Energy and senior officials from several other major economies. The discussion was chaired by IEA Director of Energy Markets and Security Keisuke Sadamori.

Framing the Challenge: From Crisis to Resilience

The 2022–23 energy crisis—sparked by the curtailment of Russian gas supplies—was the most severe disruption in the history of the global gas market. Although widespread physical shortages were largely avoided, the shock led to extreme price volatility, market instability, and severe economic consequences, particularly in import-dependent regions. This crisis has since served as a focal point for reassessing the resilience of gas infrastructure and the reliability of international gas markets.

The crisis catalysed a reassessment of the foundations of gas security. The global market response—marked by a sharp redirection of LNG flows from Asia to Europe and by demand reductions through both price response and consumption cuts—underscored the deeply interconnected nature of today's gas system.

While the crisis was triggered by a unique confluence of geopolitical events, its effects were magnified by underlying vulnerabilities that remain relevant. These include over-dependence on individual suppliers, limited flexibility in supply contracts, underdeveloped reserve capacity, and insufficient coordination between markets and states. Gas storage—often treated as a commercial activity—proved to be a critical component of energy security, prompting a re-evaluation of its governance and regulatory frameworks.

Core Themes: Diversification, Predictability, and Cooperation

Three unifying concepts guided much of the discussion: diversification, predictability, and cooperation.

Diversification was emphasised as the cornerstone of gas security. Participants noted that reliance on a single supplier, region, or infrastructure corridor represents a critical risk. Diversification must go beyond route expansion to include genuine source diversification—ensuring that different molecules, regions, and contract types can be drawn upon flexibly. LNG played a crucial role in the 2022 response, enabling countries to reorient away from pipeline dependencies, but it remains subject to global competition and pricing pressures. Some noted that physical interconnectivity alone does not guarantee resilience. For instance, supply pathways may appear diversified but still rely on the same upstream sources. Similarly, long-term contractual relationships—particularly those with destination restrictions—can limit the ability to respond to short-term imbalances. The conclusion was clear: meaningful diversification must include infrastructural, contractual, and geographic dimensions.

Predictability was identified as essential for securing investment. Given the capital-intensive nature and long lead times of gas infrastructure, investors require clear signals, policy stability, and regulatory certainty. Participants emphasised that political signals must align with market realities, noting that erratic or overly politicised

policy environments can deter upstream investment and slow the development of infrastructure critical to supply security and resilience. Governments were urged to provide clarity on the role of gas in long-term transition strategies, along with clear policy frameworks to align infrastructure development with both energy security and climate goals.

Cooperation—both regional and international—was regarded as the linchpin of energy security in a globalised market. It was widely acknowledged that national approaches, while necessary, are insufficient in isolation. The global nature of LNG trade, the interdependence of electricity and gas systems, and the cross-border effects of national policy decisions make coordination imperative. Effective cross-border collaboration is essential to manage crises, build joint reserve capacities, and develop common standards for market transparency, resilience, and emergency response. Several participants highlighted the importance of platforms such as the IEA in convening such cooperation and helping to bridge differences in capacity, resources, and regulatory maturity. Still, many called for even stronger institutional mechanisms to ensure that future crisis responses are guided by pre-agreed principles and operational frameworks.

Lessons Learned: System Flexibility and Structural Exposure

Reflecting on the events of 2022–2023, participants shared their experiences and ongoing adjustments to national energy strategies. Several key lessons emerged:

1. **Physical infrastructure matters**: While market liberalisation and procurement flexibility are important, they are irrelevant without the physical ability to deliver gas where it is needed. Investment in gas infrastructure, including LNG export and import terminals, pipeline interconnectors, and storage, can play a central role in resilience. The rapid construction of floating storage and regasification units (FSRUs) during the crisis was cited as proof that permitting and procedural reforms can accelerate delivery timelines under pressure.
2. **Storage needs rethinking**: The role of gas storage shifted from a purely commercial tool to a strategic asset. Governments adopted mandatory storage fill obligations and public-private storage partnerships to ensure buffer capacity during peak demand periods. However, some noted potential downsides—such as encouraging speculative behaviour or distorting market signals. There was consensus, however, that underinvestment in storage poses systemic risk and that storage policy would benefit from more structured frameworks and regional coordination.
3. **Contractual flexibility is vital for security**: The ability to redirect LNG cargoes—especially those not bound by destination clauses—was viewed as critical during the crisis. The global gas system functioned more effectively thanks

to destination-flexible LNG volumes, enabling supply to flow to markets experiencing acute shortages. Flexible LNG contracts were widely highlighted as a vital component of today's—and tomorrow's—global gas security architecture.

4. **Market-based pricing is far from perfect**: Liberalised energy markets played a role in rebalancing supply and demand during the crisis. However, there were significant economic and social costs associated with this adjustment. Some markets experienced demand destruction, particularly in energy-intensive industries. The experience highlighted the need to balance liberalised markets with public safeguards during crises. Several participants advised heeding time-tested principles when policy intervention becomes necessary—such as targeting and time-limiting subsidies—and noted that the alternative to market-based pricing is often worse, including physical shortages and blackouts.
5. **Affordability and competitiveness are security issues**: It was stressed that energy security is not just about volumes—it is also about affordability. Unchecked price volatility can drive industries out of business, damage household welfare, and create political instability. Several participants warned that future gas security strategies must be designed with cost impacts in mind, avoiding policies that disproportionately burden vulnerable consumers or undermine national competitiveness.

A Role for the IEA: Frameworks, Forecasts, and Facilitation

The IEA's role in global gas security was a major focus of the event. Participants highlighted the agency's capacity to act as a convener, knowledge hub, and technical advisor. Several areas for expanded IEA engagement were identified:

1. **Data and transparency**: Accurate, timely, and granular data was deemed foundational. Calls were made for enhanced monitoring of gas storage levels, LNG trade flows, cross-border capacities, and contract structures. Reliable data is critical for understanding system vulnerabilities and making timely decisions. Transparent reporting can also help counter misinformation and build public trust during crises.
2. **Market monitoring and stress testing**: The IEA's ability to produce robust, realistic forecasts—grounded in both policy ambition and economic trends—was viewed as a public good. Regular stress tests, regional outlooks, and simulations of demand and supply shocks were recommended to help governments better prepare for potential disruptions.
3. **Knowledge-sharing and international coordination**: The IEA was seen as a unique platform for convening like-minded buyers, responsible sellers, and other stakeholders to exchange best practices and coordinate strategies. Sharing international experience between established and emerging markets

was considered particularly valuable. Ongoing initiatives such as the Natural Gas and Sustainable Gases Security Working Party (GWP) and the LNG Producer–Consumer Conference were cited as valuable spaces for fostering dialogue. There was also support for the IEA to facilitate the development of gas reserve mechanisms tailored to regional circumstances.

Balancing Gas Supply Security and the Energy Transition

A recurring theme was the challenge of balancing immediate gas security needs with longer-term decarbonisation and affordability objectives. While renewables are scaling rapidly, in many cases natural gas remains indispensable for system flexibility—particularly during peak demand periods or seasonal shortfalls. It continues to play a key role in enabling coal-to-gas switching, providing firm capacity alongside variable renewables, and supporting industrial heat processes that are difficult to electrify.
At the same time, there was agreement that gas use must be compatible with net-zero goals. Several countries are developing biomethane or hydrogen blending strategies, while others are pursuing carbon capture to reduce the emissions intensity of gas systems. There was interest in certification schemes for low-carbon gases and in using gas infrastructure as a transition tool—not a long-term lock-in.

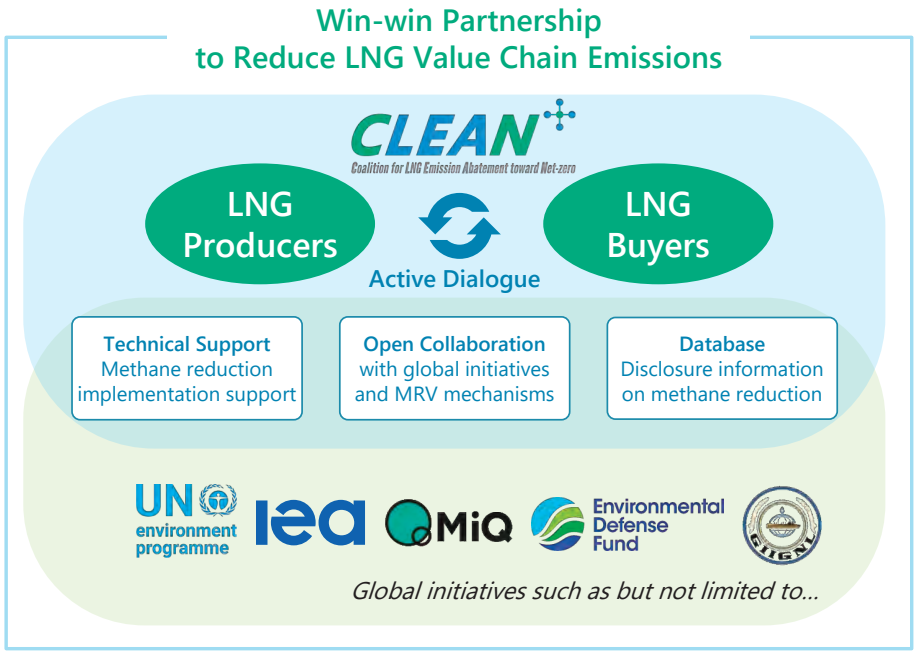
Participants stressed that gas security and decarbonisation are not mutually exclusive. On the contrary, a secure gas system is often a prerequisite for accelerating the energy transition. If energy systems cannot meet demand reliably and affordably, the shift to cleaner alternatives may lose momentum.

Conclusion: A Strong Mandate for Ongoing Cooperation on Gas Supply Security

The Gas Security Orbital Event provided a candid and wide-ranging assessment of the state of global gas security. The event concluded with a strong collective understanding that the global gas system is undergoing structural change—and that navigating this shift requires practical, flexible, and cooperative approaches.
The diversity of views underscored both the complexity and urgency of the challenge. While participants differed in their policy preferences and national strategies, there was broad convergence on core priorities: ensuring diversification, investing in infrastructure and reserves, strengthening international cooperation, and enhancing data transparency and preparedness.
The event demonstrated a collective willingness to engage deeply with those questions and to forge a more resilient and inclusive foundation for the gas market of the future. The IEA was recognised as a key actor in enabling this dialogue and in providing the tools needed to anticipate, manage, and respond to future gas security challenges.

METI initiatives on LNG

Way forward of the CLEAN Initiative



- Technical Support for LNG Producers to accelerate emission reductions
- Open Collaboration with global initiatives and MRV mechanisms
- Database with transparent, project-based data, as much as agreed with LNG producers

The Coalition for LNG Emission Abatement toward Net-zero (CLEAN initiative) is a voluntary and mutually beneficial partnership between LNG producers and buyers, facilitating collective actions across the entire LNG supply chain to reduce emissions. The core value of the CLEAN initiative lies in the voluntary and active dialogue between LNG producers and buyers. LNG buyers participating in the initiative send a questionnaire to LNG producers, inquiring about the status of emission management and reduction efforts for each project. LNG producers are encouraged to provide as much information as possible, because the CLEAN initiative offers an information platform to enhance visibility on LNG-related emissions and disseminate best practices being implemented by LNG producers. Under the concept of the CLEAN initiative, technical and financial support to facilitate methane reduction implementation is also provided by the government of Japan.

While there are multiple initiatives for emission reductions and accounting, and emissions data may be reported on different bases, the ultimate goal remains the same: to reduce emissions and improve energy security. In this context, the CLEAN initiative accepts variations in emissions reporting methods and serves as an inclusive catalyst to navigate the entire LNG supply chain toward low emissions. The CLEAN initiative is well-

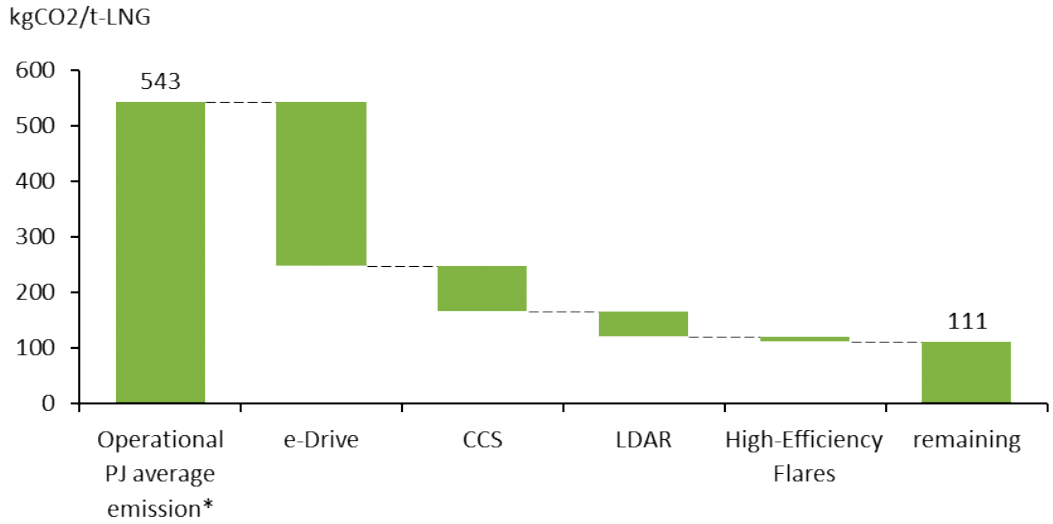
known for its open collaborative approach with a number of global initiatives and MRV mechanisms.

METI initiatives on LNG

Provisional impact analysis of emission abatement measures

Although reducing large-scale methane leakages is certainly one of the most effective measures to reduce greenhouse gas (GHG) emissions across the LNG value chain, METI has been analyzing further opportunities to reduce GHG emissions from LNG plants and the potential reductions achievable through low-carbon technologies. The study focused on upstream processes, from gas field production to liquefaction, identifying key emission points and evaluating mitigation measures.

Even after large-scale methane leakages are reduced, the adoption of low-carbon technologies—including electric motor conversion for gas turbines, carbon capture and storage (CCS), methane leak detection and repair (LDAR), and high-efficiency flare control—can reduce GHG emissions from 543 kgCO2/t-LNG to 111 kgCO2/t-LNG, an 80% reduction. Additionally, lowering self-consumption gas improves yield rates, offsetting the costs of these technologies through increased LNG sales revenue.



* Source: Wood Mackenzie LNG Cargo Emissions Tool

Key Insights:

- e-Drive: In cooling and liquefaction processes, the introduction of electric motors in place of gas turbines reduces GHG emissions from fuel consumption by 73%. While investment and electricity costs increase, reduced self-consumption gas improves yield rates, enhancing cost-effectiveness.

- Carbon Capture and Storage (CCS)+EOR: Capturing and storing CO2 removed during liquefaction can reduce CO2 emissions released into the atmosphere by 80–90%. Injecting captured CO2 into oil fields also creates additional revenue opportunities through enhanced oil recovery.

- Methane Leak Detection and Repair (LDAR): Quarterly repairs can reduce methane emissions by 80%, while monthly repairs can achieve a 90% reduction. Quarterly repairs are recommended for cost efficiency.

- High-Efficiency Flares: Ensuring flare combustion efficiency of 98% reduces GHG emissions by 57% compared to a 95% efficiency rate. Installing high-efficiency flare control systems is a low-cost solution.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