Climate Resource

The last LNG train home

Australia’s LNG outlook in a demand-constrained world

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Executive summary

Over the past decade, global climate ambition and technological change have altered expectations for future fossil fuel demand. At the time of the Paris Agreement in 2015, emissions trajectories implied warming outcomes exceeding 3°C by end-of-century. Today, as countries design and implement policies to meet their national climate commitments, temperature assessments have shifted much closer to 2°C.

The continuing crisis in the Middle East has again demonstrated how quickly gas markets can tighten and prices spike. Disruptions to LNG infrastructure reinforce global supply vulnerability and can temporarily constrain markets. However, when placed in the context of current supply and new capacity under construction, even recent damage to Qatar's Ras Laffan facility does not alter the core finding of this research: long-term structural forces will shape demand. Infrastructure decisions should be guided by those trends, not short-term volatility.

Global liquefaction capacity - current and under construction (Mt LNG)

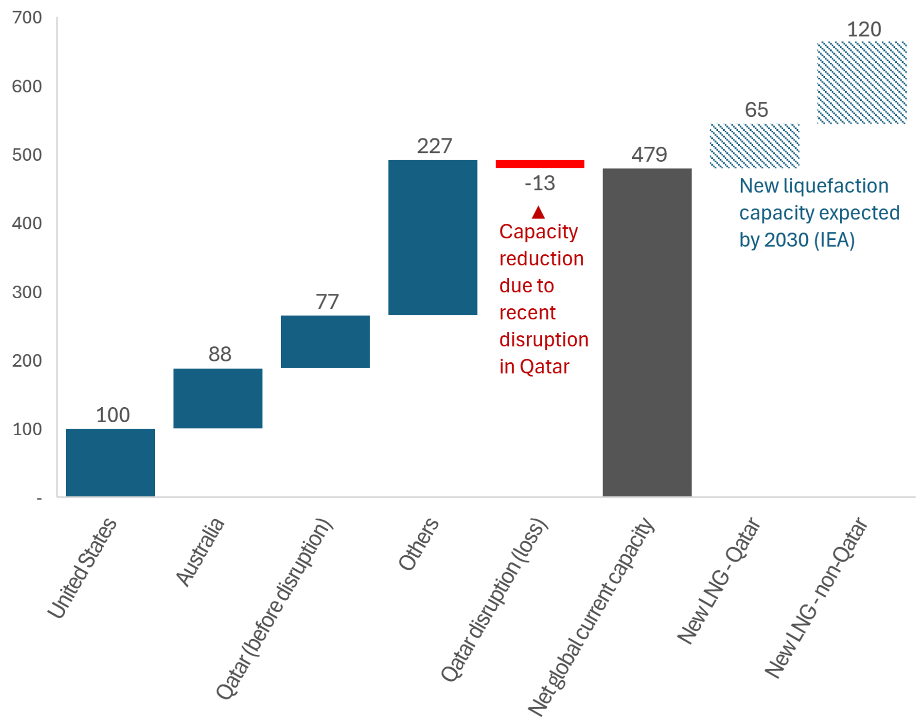

Figure ES-1: Liquefaction capacity by country showing the reported capacity reduction in Qatar as of 30 March 2026 and planned expansion (FID or under construction only) (Mt LNG). Data from IEA LNG tracker, the GIIGNL Annual Report 2025 and media coverage suggesting around 12.8 MTPA loss due to damage.

If current national climate commitments are implemented in full, assessments project global warming of around 1.8°C to 2°C by 2100. This range should be considered the central planning case for governments, investors and energy markets. For major fossil fuel exporters such as Australia, this has significant implications.

However, projections of future gas demand diverge sharply. By 2050, global outlooks range from scenarios in which gas demand grows strongly to pathways in which it declines rapidly as countries implement their climate commitments (Figure ES-2). Fossil fuel consumption determines emissions outcomes, meaning these demand outlooks correspond to very different warming trajectories.

Investment decisions based on high-gas scenarios imply planning for a world in which countries fail to achieve their current targets and global temperature goals are not achieved.

Global gas demand projections from major energy outlooks (bcm)

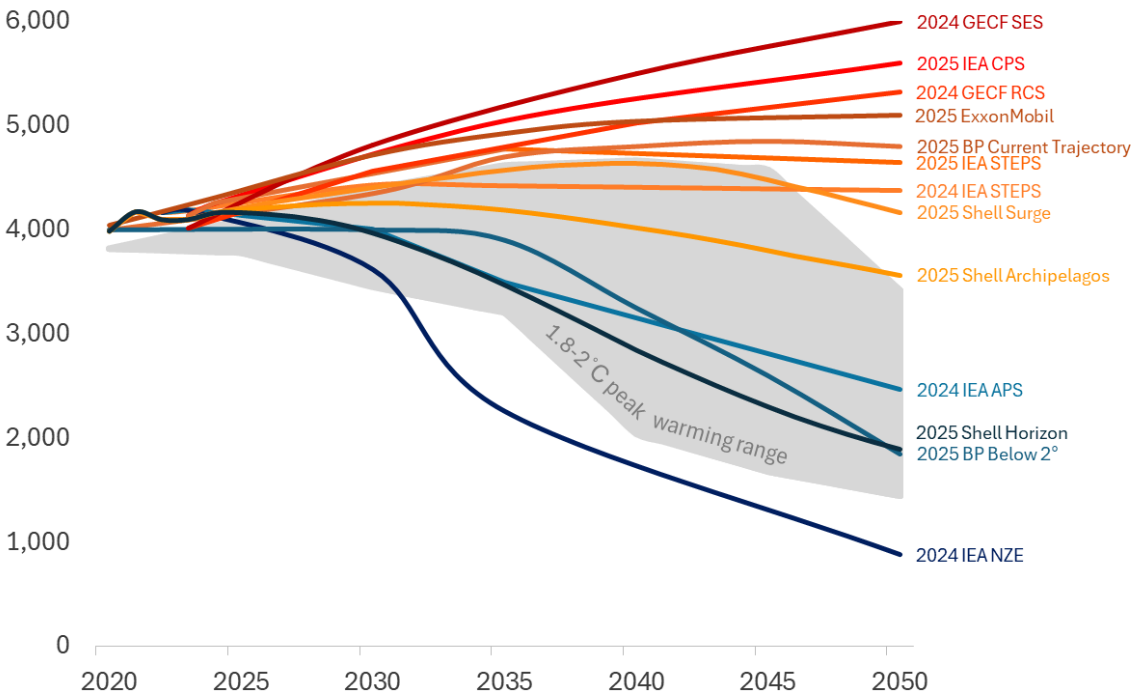

Figure ES-2: Global gas demand projections from key literature (bcm). The grey plume shows pathways that peak at 1.8°C to 2°C warming (33rd percentile of 1.8°C pathway at the lower bound and 66th percentile of 2°C pathway at the upper bound), based on NGFS Phase 5 scenarios.

For policymakers and investors, scenarios consistent with countries' existing climate commitments, implying peak warming of roughly 1.8°C to 2°C, provide a baseline for planning. Understanding how global gas markets evolve under these pathways is critical for assessing future export opportunities, managing the risks and capturing the opportunities in clean energy and other sectors.

A demand-led analysis of LNG market space

Much of the current debate about the future of gas focuses on total global gas demand. For LNG exporters such as Australia, however, the more relevant question is: **how much of that demand translates into LNG imports, and how much of that LNG demand remains uncontracted and available to absorb uncontracted capacity?**

This report introduces a demand-led analytical framework centred on 'uncontracted LNG demand': the portion of future LNG demand not already satisfied by existing long-term supply contracts. By combining climate scenarios with LNG contract data, the analysis estimates what market remains for additional supply. The analysis examines three warming pathways derived from integrated assessment models used by the Network for Greening the Financial System:

- 1.6°C peak warming (consistent with limiting warming to 1.5°C with low overshoot)
- 1.8°C peak warming (consistent with 'well below 2°C')
- 2°C peak warming, broadly consistent with the best estimate of warming under full implementation of countries' current climate commitments.

Key findings

Across all scenarios analysed, a consistent pattern emerges: LNG markets become increasingly demand-constrained as demand plateaus or declines while new liquefaction capacity comes online during the late 2020s or early 2030s.

Uncontracted LNG supply and demand (Mt LNG)

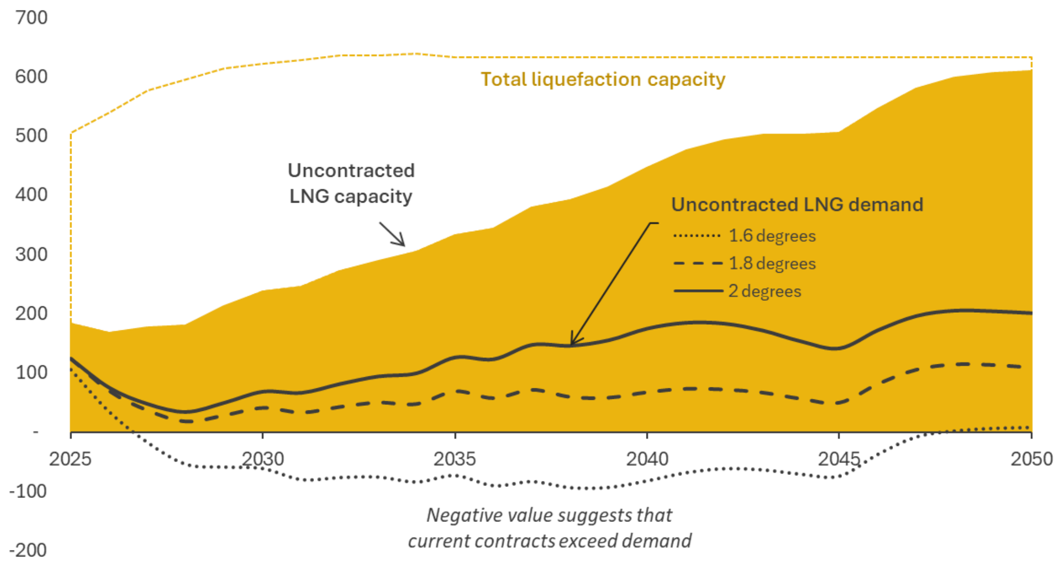

Figure ES-3: Uncontracted LNG supply compared with uncontracted demand under 1.6°C, 1.8°C and 2°C peak warming pathways.

Three key results emerge from the analysis. First, **LNG demand declines faster than overall gas demand in major importing economies**. Countries typically prioritise domestic production and pipeline imports, leaving LNG to function as the flexible marginal supply, except in countries that rely entirely on LNG imports for their gas supply.

Second, there is an emerging oversupply given new LNG capacity, even under moderate climate outcomes (Figure ES-3). Under the 1.6°C pathway, existing LNG supply contracts meet global demand from the late 2020s. **Even in the 1.8°C and 2°C peak warming pathways, only modest volumes of additional LNG are required,** while new supply from Qatar and the US come online over time (even if delayed).

Third, increased **competition between suppliers is likely to push prices toward the short-run marginal cost of the lowest-cost producer needed to supply the market**. Estimates suggest this floor may lie around US$3–5/MMBtu in key Asian markets, placing pressure on higher-cost exporters.

Implications for Australia

Australia occupies a high-cost position on the global LNG cost curve. The industry has been supported by strong demand and long-term contracts, but most contracts will expire between the mid-2030s and 2040. In a demand-constrained global market, these expiring contracts expose Australian LNG projects to increasing competition from lower-cost suppliers. The analysis suggests that Australia's existing LNG contracts (Figure ES-4) may represent the upper bound of what can be sustainably sold internationally if global demand declines and low-cost supply expands as expected.

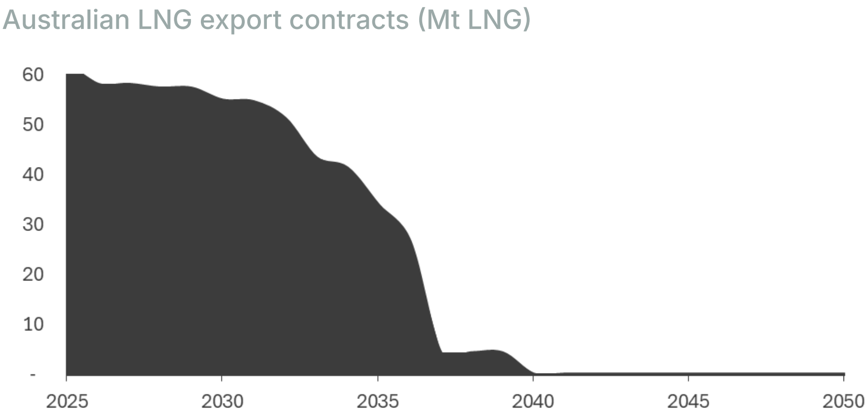

Figure ES-4: Australian LNG supply contracts. Climate Resource compilation.

This dynamic has broader implications for Australia’s economy. If export revenues from LNG decline, alongside similar structural pressures on other fossil fuel exports such as coal, Australia’s trade profile could shift materially by the mid 2030s.

Planning for a demand-contrained LNG world

The central message of this report is that if global gas demand weakens while low-cost supply expands, the commercial space for higher-cost exporters, such as Australia will narrow. For policymakers and investors, the challenge is ensuring that energy and economic strategy is resilient across a range of plausible climate futures.

In a world where current national climate commitments are broadly implemented, and global warming tracks toward 1.8°C to 2°C, Australia’s LNG sector may face a future defined by rapid run-down of exports in line with existing contracts. Recognising this possibility is essential for managing transition risks, safeguarding domestic energy security, and preparing Australia’s economy for a changing global energy system. This underscores the risk of basing investment decisions in long-lived LNG infrastructure in Australia on short-term market conditions arising from disruptions in Qatar and transit through the Strait of Hormuz.

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Acronyms:

ACCC	Australian Competition and Consumer Commission
AEMO	Australian Energy Market Operator
APS	Announced Pledges Scenario
BCM	Billion Cubic Metres
CO_2	Carbon dioxide
CPS	Current Policies Scenario
DES	Delivered Ex-Ship
EU	European Union
FOB	Free On Board
GECF	Gas Exporting Countries Forum
GPG	gas-powered generation
IAMs	Integrated Assessment Models
IEA	International Energy Agency
IEEFA	Institute for Energy Economics and Financial Analysis
IIASA	International Institute for Applied Systems Analysis
LRMC	Long-Run Marginal Cost
LT-LEDS	Long-Term Low-Emission Development Strategy
NDC	Nationally Determined Contribution
NEM	National Electricity Market
NGFS	Network for Greening the Financial System
NZE	Net Zero Emissions
SPAs	Sale and Purchase Agreements
SRMC	Short-Run Marginal Cost
STEPS	Stated Policies Scenario
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework on Climate Change
US	United States
WEM	WA's Wholesale Electricity Market

1. Introduction: Australia's gas dilemma in a transforming global market

Australia is one of the world's largest exporters of LNG, accounting for roughly a fifth of global LNG trade.[1] Over the past decade, the Australian economy has benefited from the capital investment, export revenues, and jobs generated by this industry.[2] However, the global energy landscape is undergoing a transformation.[3] Driven by the plummeting costs of renewable energy and strengthening national climate policies, the world's major economies are actively transitioning toward net-zero emissions.[4] At the same time, the global LNG market is preparing for an unprecedented wave of new export capacity, led by the US and Qatar, which is likely to come online by 2030, considering the risk of material delays to Qatari projects.[5]

Recent supply disruptions in global LNG markets have created short-term supply risks and constraints in many markets. However, these events occur within a system already characterised by significant capacity expansion and weakening long-term demand under climate-aligned pathways. For example, the 18 March attacks that damaged two LNG trains and a gas-to-liquids facility in Qatar, knocking out 17% of Qatar's export capacity, would not materially alter the structural outlook for LNG markets presented in this analysis.[6]

Against this backdrop, there are differing views about the future trajectory of global gas demand. Industry and producer-led outlooks project robust, continuous growth in global LNG demand, relying on the assumption that emerging markets in Asia will absorb existing and future supply.[7] These forecasts assume a slower pace of climate action and are incompatible with the latest emissions reduction commitments governments have pledged under their national climate plans.[8] If governments successfully implement their climate pledges and limit warming to 1.5°C, or even 2°C, global gas demand will face structural decline. This creates a risk of global oversupply. Australian LNG is characterised by high costs relative to its global competitors.[9] It is vulnerable to margin erosion and asset stranding in a crowded, demand-constrained market.[10] Australia's domestic gas market is also linked to the scale and economics of its export sector.[11] A structural decline in global LNG demand could pose complex, counter-intuitive risks for domestic energy security and pricing.

This report bridges the gap between climate science and gas market realities. Rather than relying on industry forecasts that assume the failure of global climate targets, this report stress-tests the global LNG market against climate pathways. It adopts a demand-led methodology, aiming to quantify the space for uncontracted LNG in a decarbonising world and assess what a demand-constrained global market means for the commercial viability of Australian exports and the stability of its domestic gas system. The analysis asks several critical questions:

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[1] Australian Government, Department of Industry, Science and Resources. (2024). *Future Gas Strategy Analytical Report.*

[2] Australian Government, Department of Climate Change, Energy, the Environment and Water. (2025). *Gas Market Review Repor*t (Report to Government).

[3] Treasury. (2025). *Australia's net zero transformation: Treasury modelling and analysis*. Commonwealth of Australia.

[4] ibid

[5] IEA. (2025). *World energy outlook 2025*. International Energy Agency.

[6] Reuters. (2026). *Iran attack damage wipes out 17% of Qatar's LNG capacity for up to five years.*

[7] Australasian Centre for Corporate Responsibility. (2023). *Australia's LNG growth wave – did it wash for shareholders?*

[8] Australasian Centre for Corporate Responsibility. (2024). *Shell's LNG strategy: Overcooked?*

[9] *Future Gas Strategy Analytical Report.*

[10] IEEFA. (2024). *The future of Australian LNG.*

[11] *Gas Market Review Report*.

- How quickly does global LNG demand decline under 1.6°C, 1.8°C, and 2°C peak warming pathways?
- At what point will existing contracted global supply exceed structural global demand, leading to a saturated market?
- As the lowest-cost producers set the price in an oversupplied market, how will Australia's high-cost uncontracted LNG fare against competitors like Qatar and the US?
- Are the assumptions that Asian demand grows over the coming decades grounded in the reality of those countries' domestic energy transitions?
- What are the flow-on consequences for Australian domestic gas users if the export industry faces structural decline and rationalisation?

Addressing these questions is vital for policymakers, investors, and the gas industry. Forecasting gas demand is not a neutral market exercise. Betting on continued high-gas futures means implicitly aligning capital with a slow transition to clean energy sources and severe climate failure. If the analytical community and decision-makers continue to underestimate the pace of the energy transition, billions of dollars of capital risk being misallocated into stranded fossil fuel infrastructure.[12] For Australia, understanding the true risk of a demand-constrained LNG world is a necessary prerequisite for managing an orderly transition, protecting trade-exposed domestic manufacturing, and ensuring sovereign energy security over the coming decades.

The report is structured as follows:

- Section 2 (Background) establishes the global climate context, demonstrating how emissions trajectories have changed over the past decade and why 1.5°C-aligned scenarios remain a critical baseline for assessing transition risk.
- Section 3 (Methodology) briefly outlines the demand-led analytical framework used to model global LNG balances based on the Network for Greening the Financial System (NGFS) scenarios (further detail, including the limitations of the approach, is in the Appendix).
- Section 4 (Results) presents the outputs of the model, detailing the timeline and scale of global LNG oversupply under 1.6°C, 1.8°C, and 2°C peak-warming pathways.
- Section 5 (LNG export implications for Australia) explores Australia's cost-competitiveness in a saturated market and examines the narrative that future Asian demand guarantees export growth.
- Section 6 (Domestic gas implications for Australia) outlines the structure of Australia's domestic gas market and explores how a changing global LNG export environment could affect domestic supply conditions, demand trends, and investment decisions.
- Section 7 (Policy considerations), examines the implications of these findings for Australian policymakers and investors as global LNG markets become increasingly demand-constrained.
- Section 8 (Conclusions) summarises the strategic findings and asks whether Australia is prepared for the realities of a demand-constrained LNG world.

[12] Australian Competition and Consumer Commission (ACCC). (2025). *Gas Inquiry 2017-2030 [Inquiry overview and reports]*. ACCC.

2. Background: the climate context and why 1.5°C scenarios remain relevant

The 2035 moment: NDCs and LT-LEDS

The year 2025 marked a critical juncture in global climate policy and the ten-year anniversary of the Paris Agreement, requiring countries to submit their third round of Nationally Determined Contributions (NDCs) with mitigation targets for 2035. At COP28 in 2023, governments agreed to keep the 1.5°C goal within reach and explicitly called for these new 2035 targets to align with this temperature limit.[13]

The ‘2035 moment’ is significant because it operationalises countries' Long-Term Low-Emission Development Strategies (LT-LEDS), which generally comprise mid-century net-zero commitments. In the past, it was unclear whether LT-LEDS functioned primarily as aspirational signals or as credible constraints on future emissions. The 2035 NDCs bridge this gap by anchoring expectations about post-2030 policy direction and investment.[14]

The 2035 NDCs submitted to date, in aggregate, broadly reaffirm a linear path from 2030 targets down to stated long-term net-zero goals, notwithstanding the current geopolitical uncertainty, and withdrawal of the US from the Paris Agreement. Rather than representing a departure from climate ambitions, the commitments made in the last year through the 2035 NDCs confirm that countries are actively planning their transitions toward net-zero economies in the second half of the century.[15]

Global temperature outlook based on latest national targets (°C above 1850-1900)

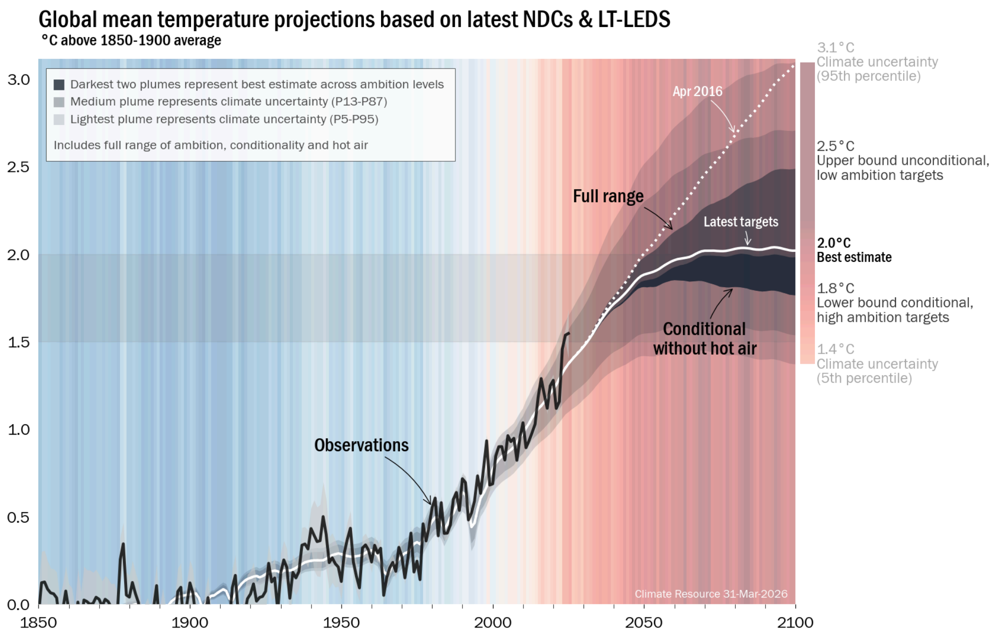

Figure 1: Projected warming over the 21st century based on latest NDCs and LT-LEDS. Climate Resource analysis.

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[13] UNFCCC. (2023). *COP28 agreement signals “beginning of the end” of the fossil fuel era*. United Nations Framework Convention on Climate Change.

[14] Burdon, R, Self, A., Lewis, J., Spiller, K., Meinshausen, M., Pflüger, M., &. Talberg, A. (2026). B*ehind the Curves: Projected global emissions and warming taking into account India’s new (announced) 2035 targe*t. Climate Resource Pty Ltd.

[15] ibid

When current 2030 and 2035 NDCs are combined with LT-LEDS and assumed to be met in full, assessments consistently estimate that global warming in 2100 will fall in the range of 1.8°C to 2.2°C, with our best estimates centering around 1.9°C or 2.0°C (Figure 1). These estimates incorporate the current policy landscape, including the US withdrawal from the Paris Agreement, and India's announced 2035 NDC.

This still leaves an 'ambition gap' for achieving a 1.5°C temperature with overshoot, but it establishes that scenarios driving towards temperatures 'just below 2°C' remain firmly in play.

The 2035 NDCs send a powerful and legally grounded signal to energy markets: a linear path to long-term climate targets now plays a central role in shaping global climate outlooks. For major energy exporters, scenarios that deliver 1.8°C to 2.0°C of peak warming must now be considered the base case for policy, planning, and investment, representing a structural shift that will directly constrain future global demand for fossil fuels.[16]

The unfolding crisis in the Middle East will affect near term oil and gas prices. It will also serve to highlight the energy security risks associated with oil and gas inputs. The short-term is as uncertain as at any time in recent history. In this context, scenarios premised on countries' existing medium- and long-term commitments provide an important baseline scenario to guide policy and investment.

We have bent the curve

To understand the trajectory of global energy markets, it is helpful to recognise that the outlook for global warming has fundamentally shifted. A decade ago, at the time of the Paris Agreement's initiation, modelled scenarios suggested the world was on a trajectory toward approximately 3°C or higher by 2100.[17] Today, assuming the full implementation of current NDCs and LT-LEDS, best estimates project that global warming by 2100 will fall into the range of 1.8°C to 2.2°C (Figure 2).[18]

This narrowing of the temperature gap demonstrates global momentum, underpinned by rapid, real-world improvements across three key dimensions:

- **Emissions trajectories**: Driven by the rapid deployment of renewable energy and a slowdown in fossil fuel demand in key regions, global greenhouse gas emissions are now widely projected to peak within this current decade. This marks a structural shift compared to assessments from just the early 2020s, which still projected continued emissions growth well into the 2030s under the policies implemented at that time.[19]
- **Renewable costs:** The underlying economics of the energy sector have been transformed. Since 2010, the costs of solar photovoltaic electricity and battery storage have plummeted by roughly 90%.[20] These cost declines have repeatedly outpaced the assumptions built into climate models, which generally underestimated the speed and scale of technology uptake.[21]

[16] ibid
[17] UNEP. (2025). *Emissions Gap Report 2025: Off target – Continued collective inaction puts global temperature goal at risk* (A. Olhoff, W. Lamb, T. Kuramochi, J. Rogelj, & M. den Elzen, Eds.) United Nations Environment Programme.
[18] Talberg, A., Self, A., Lewis, J., Spiller, K., Meinshausen, M., Pflüger, M., & Burdon, R. (2026). *Behind the curves: Comparing 2100 temperature projections and underlying assumptions*. Climate Resource Pty Ltd.
[19] ibid.
[20] IEA. (2025). *World energy outlook 2025*.
[21] Treasury. (2025). *Australia's net zero transformation: Treasury modelling and analysis*. Commonwealth of Australia

- **Policy coverage:** The global regulatory landscape has thickened. Today, 102 countries, accounting for around 72% of emissions, have formally submitted national net-zero commitments to the UNFCCC.[22] The last decade has seen a sharp rise in the adoption of targeted policies like renewable energy auctions and energy performance standards.[23]

Global GHG emissions based on latest national targets (Gt CO_2e/year)

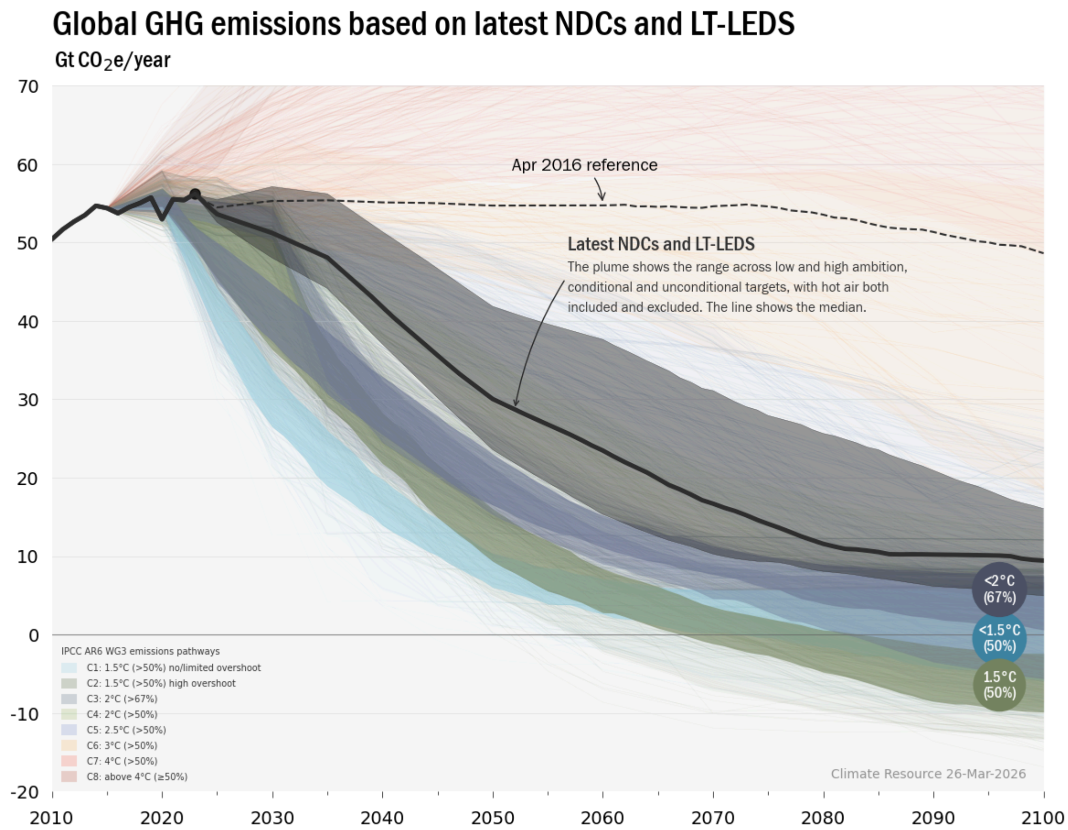

Figure 2: Global emissions pathways implied by NDCs + LT-LEDS compared to the projection in 2016. Climate Resource analysis.

The analytical community has routinely underestimated the pace of the energy transition. If the global community was capable of bending the emissions curve from a ~3°C+ trajectory down to a ~2°C trajectory in the span of one decade, it is unsound to dismiss the possibility of further acceleration, even (and especially) in the context of the current crisis in global energy markets. Movement toward the Paris Agreement's 1.5°C goal, after temporary overshoot, remains firmly in play. Scenarios that reflect both current targets, and continued action to close the gap towards 1.5°C are an essential baseline for strategic planning.

The spread of gas futures

Global gas demand projections show large divergences in long-term demand. By 2050, the spread between scenarios suggests contradictory visions of the decades ahead. Figure 3 shows global gas demand projections from key literature, overlaid with a grey plume showing the span for pathways consistent with 1.8°C to 2°C of warming.

[22] This refers to 2019 party reported emissions only, and excludes aviation and shipping emissions, as well as land-use, land-use change and forestry emissions; based on Climate Resource tracking and analysis.
[23] IEA. (2025). *World energy outlook 2025*.

Global gas demand projections from major energy outlooks (bcm)

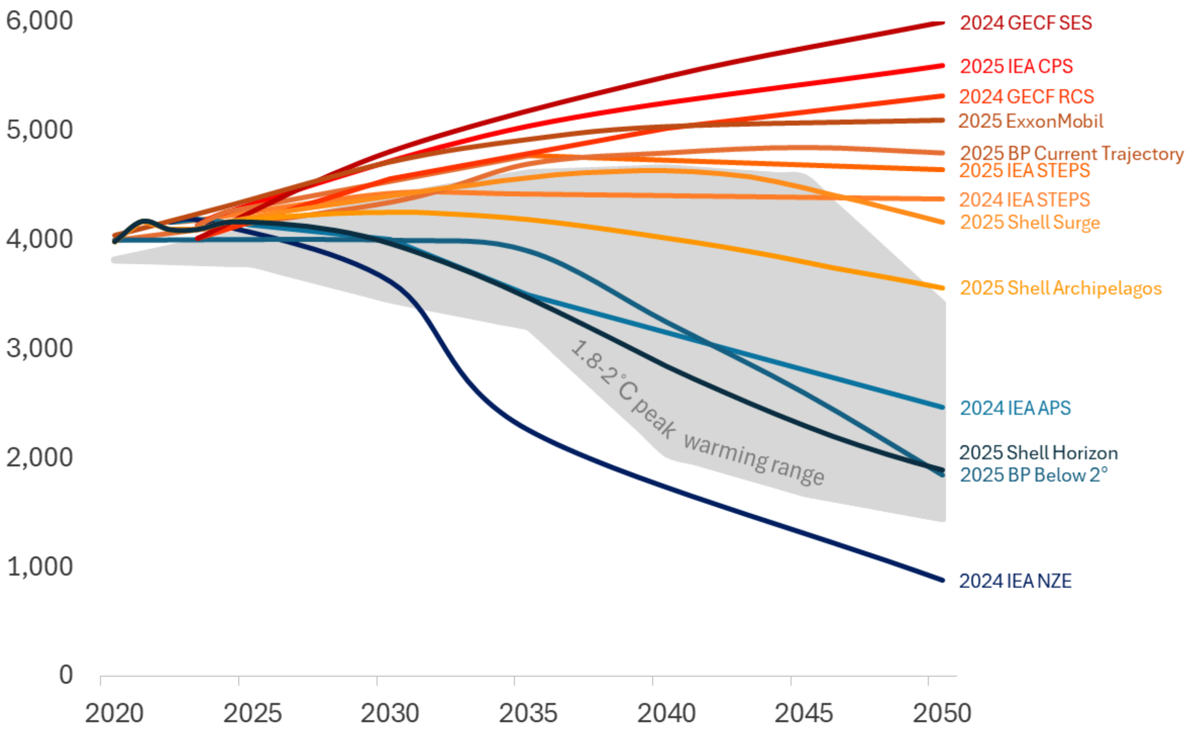

Figure 3: Global gas demand projections from key literature (bcm). These projections include all natural gas (not just LNG).[24] The grey plume shows 1.8°C to 2°C warming pathways (33rd percentile of 1.8°C pathway at the lower bound and 66th percentile of 2°C pathway at the upper bound), based on NGFS Phase 5 scenarios.

At the upper end of the spectrum, industry, producer, and baseline policy outlooks project robust, continuous growth, assuming that gas demand will not peak before mid-century. For instance, the Gas Exporting Countries Forum (GECF) explicitly states there is 'no peak in sight', projecting demand to reach 5,317 bcm under its Reference Case (RCS) and surging to 5,997 bcm under its Sustainable Energy Scenario (SES).[25] The 2025 IEA Current Policies Scenario (CPS) reaches 5,596 bcm, while in corporate outlooks, like ExxonMobil's, demand exceeds 5,100 bcm.[26]

Mid-range models that assume governments meet their current commitments (but with no further strengthening of targets), such as the 2024 IEA Announced Pledges Scenario (APS), project a drop down to 2,466 bcm.[27]

In contrast, scenarios aligned with the Paris Agreement's 1.5°C target show gas demand peaking immediately and declining sharply. Under the 2024 IEA Net Zero Emissions (NZE) scenario, global natural gas demand plummets to just 882 bcm by 2050.[28] Other ambitious transition pathways

[24] IEA WEO 2024; IEA WEO 2025; BP. (2025). *Energy outlook 2025*. BP p.l.c.; GECF (2025). *Global gas outlook 2050: 9th edition*; Shell plc. (2025). *The 2025 energy security scenarios: Energy and artificial intelligence*. Shell; Exxon Mobil Corporation. (2025). *Global Outlook: Our view to 2050.* Exxon Mobil Corporation.
[25] GECF (2025). *Global gas outlook 2050: 9th edition*.
[26] Exxon Mobil Corporation. (2025). *Global Outlook: Our view to 2050.* Exxon Mobil Corporation.; IEA. (2025). *World energy outlook 2025*. International Energy Agency.
[27] IEA. (2024). *World energy outlook 2024*. International Energy Agency.
[28] IEA. (2024). *World energy outlook 2024*. International Energy Agency.

similarly show deep structural declines, such as the 2025 BP Below 2° scenario (1,850 bcm) and the Shell Horizon scenario (1,888 bcm)[29].

The primary reason for this 5,000+ bcm spread is that industry and baseline outlooks tend to assume a slower pace of policy tightening, technological disruption, and climate action. Scenarios like the 2025 IEA Stated Policies Scenario (STEPS) at 4,645 bcm, or the 2025 BP Current Trajectory at 4,800 bcm, reflect a world where emissions reductions targets do not lead to implementation of additional policies to drive the required reductions, or where the transition is delayed.[30] Corporate outlooks often lean on this slower transition narrative, anchoring growth expectations in emerging markets.[31]

This divergence means that forecasting gas demand is not a neutral market exercise. Fossil fuel consumption dictates global emissions. Therefore, every demand scenario is inextricably linked to a specific climate outcome. When investors and governments base their infrastructure and capital allocation decisions on gas demand outlooks of 4,600 to 6,000 bcm, they are implicitly choosing a temperature pathway. Betting on these high-gas futures means actively aligning capital with a world that warms by 2.5°C to 2.9°C,[32] outcomes that are incompatible with the Paris Agreement and global climate stability, and with country targets already in place.

1.5°C overshoot scenarios are still in play

The window to limit global warming to 1.5°C is narrowing. However, pathways from the NGFS and the IEA confirm that achieving the goals of the Paris Agreement remains technically feasible. Due to delayed near-term emissions reductions, models such as the IEA's NZE scenario now acknowledge that a temporary 'overshoot' of the 1.5°C threshold is highly likely, peaking around 1.65°C by mid-century before cooling back to below 1.5°C by 2100.[33]

To assess the future of fossil fuel demand, the scientific community, including recent assessments by Climate Resource,[34] relies on integrated assessment models (IAMs) to map out varying degrees of climate ambition. In this analysis we explore three warming pathways:

- **1.6°C peak and decline (1.5°C with limited overshoot)**: Scenarios reaching 1.6°C, often described as '1.5°C with limited overshoot', limit end-of-century warming to 1.5°C, while permitting a temporary exceedance of up to 0.1°C for several decades.
- **1.8°C peak (well-below 2°C)**: In 1.8°C scenarios, warming falls back toward 1.5°C (reaching between 1.6°C and 1.75°C in 2100) following a peak of approximately 1.8°C.
- **2°C peak**: Scenarios peaking at 2°C aim to stabilise warming close to 2°C by 2100, but tend to still be increasing very slightly beyond 2100.[35]

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[29] bp. (2025). *bp energy outlook 2025*. bp.; Shell plc. (2025). *LNG Outlook 2025;* Shell plc. (2025). *The 2025 energy security scenarios: Energy and artificial intelligence*. Shell plc.
[30] bp. (2024). *bp energy outlook 2024*. bp; bp. (2025). *bp energy outlook 2025*. bp; IEA. (2025). *World energy outlook 2025*. International Energy Agency.
[31] Shell plc. (2025). *LNG Outlook 2025;* Shell plc.; IEA. (2025). *World energy outlook 2025*. International Energy Agency.
[32] IEA. (2025). *World energy outlook 2025*. International Energy Agency.
[33] IEA. (2025). *World energy outlook 2025*. International Energy Agency.; Talberg, A., Self, A., Lewis, J., Spiller, K., Meinshausen, M., Pflüger, M., & Burdon, R. (2026). *Behind the curves: Comparing 2100 temperature projections and underlying assumptions*. Climate Resource Pty Ltd.
[34] Burdon, R., Talberg, A., Spiller, K., Meinshausen, M., & Lewis, J. (2025). *Australia's coal outlook in a warming world: Insights from integrated assessment models*. Climate Resource Pty Ltd.
[35] NGFS Climate Scenarios for central banks and supervisors - Phase V; Burdon, R., Talberg, A., Spiller, K., Meinshausen, M., & Lewis, J. (2025). *Australia's coal outlook in a warming world: Insights from integrated assessment models*. Climate Resource Pty Ltd.

The difference between a 1.6°C and a 2°C pathway dictates the timing of peak gas. It alters the outlook for energy markets. It also affects the electrification pace, with more ambitious scenarios requiring aggressive, near-term substitution of gas appliances and industrial processes with electric alternatives. The steepness of fossil fuel demand decline determines which temperature pathway the world tracks toward.[36]

The global gas system: trade, uses and Australia's role

To understand the strategic risks facing the Australian gas sector in a decarbonising world, it is first necessary to understand how the global gas system is structured. Global natural gas trade is highly geographically concentrated, defined by a structural imbalance between gas producing nations and gas importing regions. Three quarters of all produced gas is consumed domestically within its country of origin, the remaining volumes are traded internationally through two primary methods: regional cross-border pipelines and global seaborne LNG.[37]

Global production and export are dominated by a small handful of major players. The US, Qatar, and Australia are the biggest players in the LNG export market, collectively accounting for roughly 60% of all global LNG supply.[38] They are followed by Russia and Malaysia (Figure 4).

Global LNG liquefaction capacity by exporting country (MTPA)

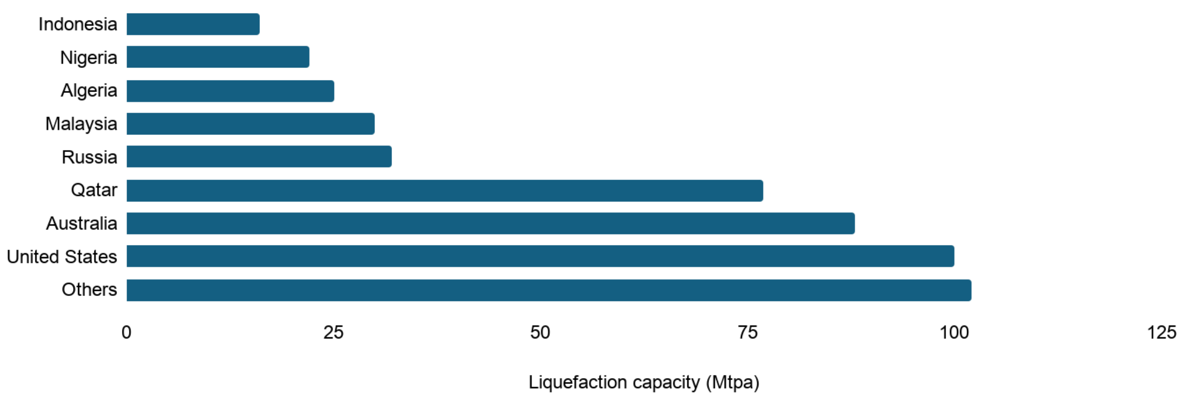

Figure 4: Global LNG liquefaction capacity by exporting country (MTPA). Data from GIIGNL Annual Report 2025 (global liquefaction capacity).

Global demand is heavily concentrated in industrialised and rapidly industrialising economies, particularly in Asia.[39] The Asia Pacific region absorbs nearly 70% of all global LNG imports.[40] The world's LNG imports are dominated by China, Japan, South Korea, India, and the European Union, which together dictate the overarching trends of global gas demand and trade flows.[41]

Across these major importing economies, natural gas primarily functions as a fuel for electricity generation and as a source of high-temperature heat or chemical feedstock for industrial processes.[42]

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[36] IEA. (2024). *World energy outlook 2024*. International Energy Agency; IEA. (2025). *World energy outlook 2025*. International Energy Agency.
[37] *Future Gas Strategy Analytical Report.*
[38] Energy Institute. (2025). *Statistical review of world energy 2025 (74th ed.).* Energy Institute.
[39] International Gas Union. (2025). *World LNG report 2025*. International Gas Union.
[40] Energy Institute. (2025). *Statistical review of world energy 2025 (74th ed.)*
[41] International Gas Union. (2025). *World LNG report 2025.*
[42] GECF (2025). *Global gas outlook 2050: 9th edition*.

However, the specific demand profile varies depending on the jurisdiction's economic structure and climate. For LNG importers specifically, these uses can be broadly categorised:

- **Japan and South Korea:** LNG is heavily relied upon for electricity generation. In Japan, power generation accounted for roughly 69% of the country's total gas supply in 2023, while in South Korea it accounted for 53%.[43]
- **China:** Demand is split, but heavily skewed toward industry, which accounted for roughly 55% of gas use in 2023 (driven by manufacturing and industrial heat), while power generation accounted for approximately 20%.[44]
- **The European Union:** Gas demand is strongly driven by building heating, with the residential sector comprising 41% of demand in 2023, alongside power generation at 19%.[45]
- **India:** As a price-sensitive market, Indian natural gas demand is largely driven by the industrial sector, specifically for the production of fertilisers, refining, and petrochemicals, which accounted for 32% of gas used in 2023.[46]

As a point of reference, global LNG demand was approximately 410-420 Mt in 2024 and 420-425 Mt in 2025, while global liquefaction capacity stood at around 494 MTPA. This capacity is expected to expand, with a further 220-230Mt of new liquefaction capacity expected by the end of the decade.[47]

BREAK-OUT BOX: Qatar LNG expansion likely delayed, not cancelled

As of March 2026, Qatar's North Field expansion, which is expected to increase capacity from around 77 MTPA to around 142 MTPA,[48] is continuing but facing delays following conflict-related disruptions at Ras Laffan.

Recent attacks on energy infrastructure have led to temporary suspension of some construction activities and the withdrawal of contractors, contributing to schedule slippage. [49] Current expectations suggest:

- North Field East start-up shifting from 2026 toward 2027
- North Field South and subsequent phases also delayed[50]

While timelines are uncertain, these projects remain strategically important and are widely expected to proceed. Although contractors are physically exiting for safety reasons, design work continues remotely.[51] At the time of writing, the primary impact of events is likely to be on timing rather than affecting the total capacity coming on line.

Within this global system, LNG plays a distinct role. LNG requires active infrastructure across its entire value chain: the gas must be cooled to roughly -161°C in liquefaction facilities, transported on

[43] IEA. (2025) World Energy Balances Highlights. IEA, Paris.
[44] ibid.
[45] IEA, EU, Natural gas data.
[46] Oxford Institute for Energy Studies. (2025). *Energy Insight 163: Japan's energy transition: The interplay of renewables, gas and energy security* (Insight 163). Oxford Institute for Energy Studies.
[47] IEA. (2025). *Gas 2025:* IEA. (2025); *Global LNG capacity tracker;* IGU. (2025). *2025 World LNG report.*
[48] QatarEnergy. (2026). *QatarEnergy awards EPC contract for North Field South LNG project*.
[49] Reuters. (2026). *Iran attack damage wipes out 17% of Qatar's LNG capacity for up to five years*.
[50] Reuters. (2025). *Qatar's LNG expansion faces timing pressures amid global supply chain constraints*
[51] Malek, M. (2026). *Qatar's North Field expansion delayed as EPC contractors pull out*. Gas Outlook.

cryogenic shipping vessels, and finally returned to a gaseous state at receiving regasification terminals.[52] As a result, LNG is generally more expensive than domestic or pipeline gas.

Gas-importing countries typically meet demand through a layered supply mix shaped by cost, infrastructure, contractual arrangements, and geopolitics. Domestic production generally supplies demand first where available, reflecting lower transport costs and energy security considerations. Cross-border pipeline imports often follow, as pipeline transport tends to have lower unit costs once infrastructure is established. LNG usually sits higher on the delivered cost curve due to the additional costs of liquefaction, shipping and regasification.[53] However, LNG provides flexibility because cargoes can be redirected between markets, allowing it to act as a balancing supply in global gas systems. As a result, LNG imports often adjust most quickly when gas demand falls or prices rise.[54]

Australia became one of the world's largest LNG exporters during the 2010s, following a wave of liquefaction investment. Driven by the commercialisation of offshore gas in Western Australia and onshore coal seam gas in Queensland, eight major LNG projects reached final investment decisions between 2007 and 2012, deploying over $230 billion in capital expenditure.[55] Australia now supplies approximately one-fifth of the global LNG trade.

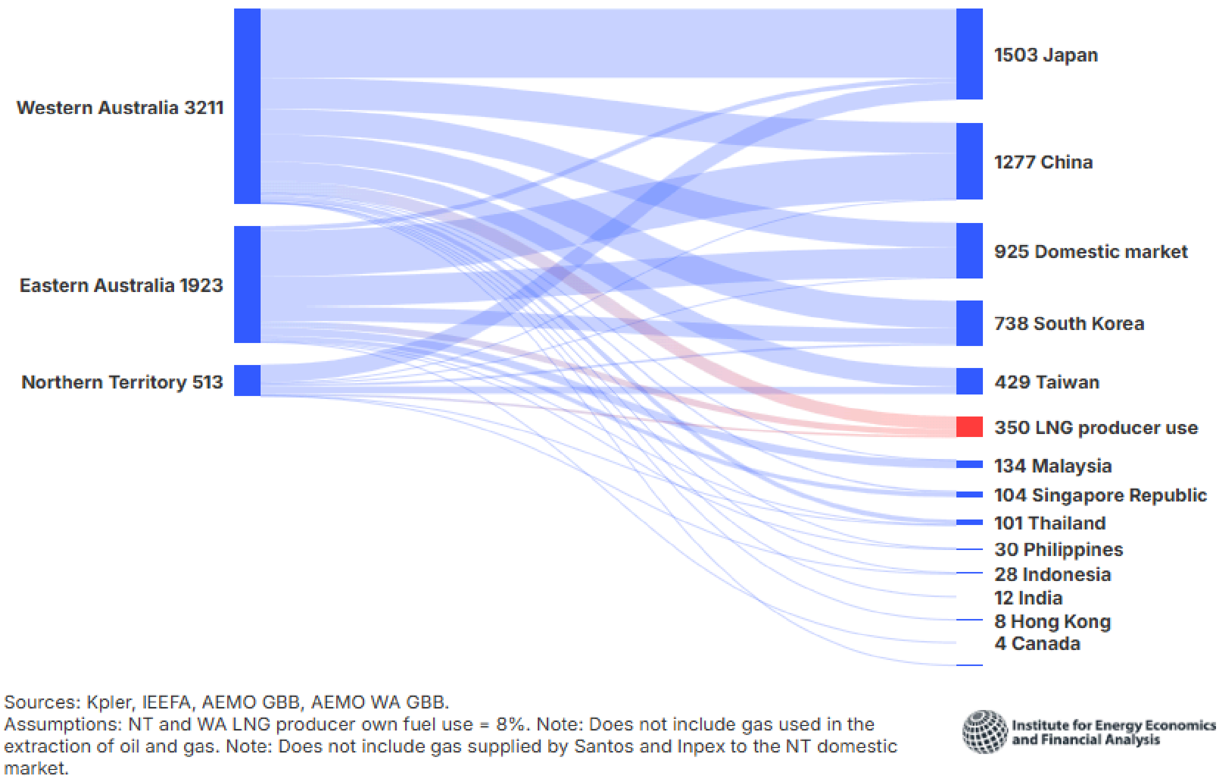

Figure 5: Australian fossil gas flows (2024-25) in petajoules. From IEEFA's Australian Gas and LNG Tracker https://ieefa.org/australian-gas-and-lng-tracker .

[52] *Future Gas Strategy Analytical Report.*
[53] Molnar, G. (2022). *Economics of gas transportation by pipeline and LNG*. In M. Hafner & G. Luciani (Eds.), The Palgrave handbook of international energy economics (pp. 23–57).
[54] IEA. (2025). *Gas Market Report, Q3-2025; GIIGNL Annual Report 2023;* IEEFA. (2024). *LNG is not displacing coal in China's power mix.*
[55] Australasian Centre for Corporate Responsibility. (2023). *Australia's LNG growth wave – did it wash for shareholders? ; Future Gas Strategy Analytical Report.*

The majority of Australia's LNG exports flow to mature North Asian markets, underpinned by a framework of long-term legacy contracts. In 2022–23, almost 90% of Australian LNG was exported to just four economies: Japan (36%), China (28%), South Korea (14%), and Taiwan (11%). These long-term sale and purchase agreements (SPAs) offer price and volume security. They have historically dominated the Australian export landscape, providing revenue certainty to underwrite initial project capital costs.[56] Total Australian gas production is roughly four times the size of domestic demand, with three-quarters exported on ships (Figure 5). However, the liquefaction process itself is energy-intensive. When including gas combusted on-site to run LNG compressors and generate electricity at terminals, the LNG export sector accounts for 80% of gas produced in Australia.[57]

IAMs provide a window into how global gas demand evolves as major importing economies act on their climate commitments. Figure 6 shows the distribution of global gas demand trajectories under different peak warming levels, disaggregated into gas-powered electricity generation, industrial use, and residential/commercial use.

Global gas pathways by peak warming level based on NGFS Phase 5 scenarios (bcm)

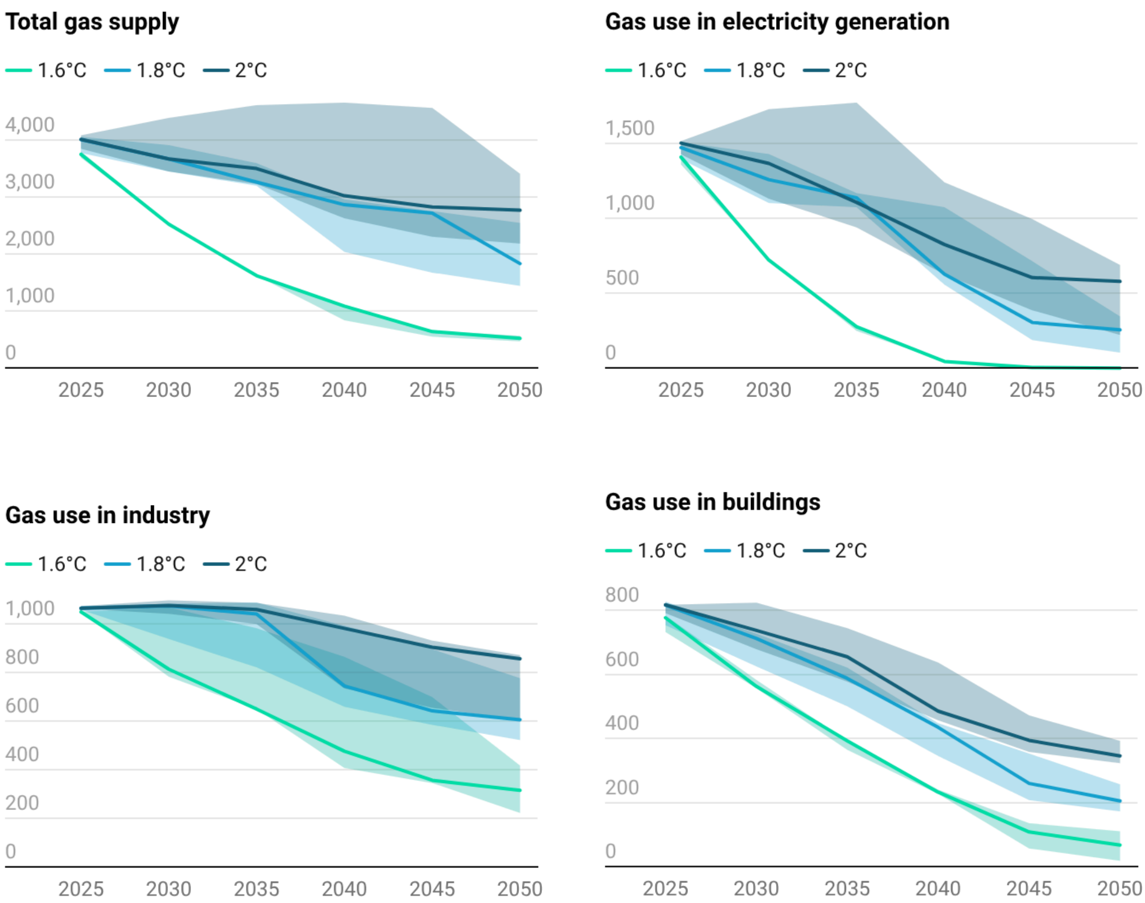

Figure 6: Global gas demand pathways (median and 33rd–66th percentile range) by peak warming level, disaggregated by sector, based on NGFS Phase 5 scenarios. *Note:* Total gas supply and gas use in electricity generation are reported for primary energy. Gas use in industry and buildings is reported as final energy gaseous fuels, which also includes biogas or

[56] *Future Gas Strategy Analytical Report.*
[57] Australian Bureau of Statistics. (2025). *Energy Account, Australia, 2023-24 financial year*; Australian Government, Department of Industry, Science and Resources. (2024). *How gas can help get us to net zero* (Future Gas Strategy background).

synthetic gases. Gas used to produce district heat, losses in the gas supply chain, and gas consumed in natural gas production and processing are excluded. Climate Resource.

The models demonstrate that the trajectory of demand decline is sector-specific. The most rapid and substantial declines occur within power generation, driven by declining costs and by policy support as renewable energy technologies, primarily wind and solar, displace baseload gas generation.[58] The industrial sector declines more slowly. Industrial and mining consumers offer more challenging prospects for abatement, as processes require high-temperature heat or chemical feedstocks that cannot easily or cheaply be electrified. Industrial demand for gas will remain relatively 'sticky' until alternative low-emissions technologies, such as green hydrogen or advanced heat pumps, reach commercial maturity and scale.[59] Understanding how these structural shifts translate into global LNG demand helps assess the future role of LNG exporters such as Australia.

[58] IEA. (2024). *World Energy Outlook 2024.*
[59] ibid; *Future Gas Strategy Analytical Report.*

3. Methodology overview

Analytical objective

This report evaluates how much space exists in future global LNG markets for uncontracted liquefaction capacity under different climate pathways. To do this, we isolate the metric 'uncontracted LNG demand', which is the portion of future LNG demand not already satisfied by long-term supply contracts. This focus on uncontracted LNG demand is a key analytical contribution of this study, providing a practical metric for assessing the real market space for LNG supply in a decarbonising world. This distinction is important because the global LNG trade has historically been dominated by long-term contracts that lock in delivery volumes for decades.

Long-term contracts typically run for 15–25 years and commit buyers to fixed annual delivery volumes. The relevant question for assessing future market opportunities is not simply how much LNG will be consumed globally, but how much of that demand is not already locked in through contracts. The concept of uncontracted LNG demand therefore provides a measure of the remaining market space for spot cargoes or LNG export projects seeking new contracts. Where contracted supply exceeds structural demand, the model identifies a surplus of LNG liquefaction capacity.

Analytical approach

To estimate surplus LNG capacity under countries' current climate commitments, the analysis applies a demand-led framework using climate-aligned energy scenarios:

- First, future natural gas demand is derived from NGFS IAM scenarios for the 19 largest LNG-importing economies, which together account for around 90% of global LNG trade. Demand pathways are constructed for 1.6°C, 1.8°C, and 2°C peak-warming outcomes.
- Second, the analysis determines how much of this gas demand must be met by LNG. A supply merit-order framework is applied in which countries are assumed to meet demand first from domestic production, followed by pipeline imports, with LNG as the residual supply source. This reflects the structure of gas markets, where domestic and pipeline gas are typically prioritised for being lower cost than LNG and often governed by long-term infrastructure relationships with destination inflexibility. After subtracting domestic supply and pipeline imports, the remaining volume represents each country's structural LNG import requirement. These are aggregated to estimate total global LNG demand.
- Third, the analysis compares this demand with the volume of existing LNG supply contracts. Some contracts allow cargoes to be redirected, so the model incorporates assumptions regarding destination flexibility based on contract terms. After accounting for redistribution of contracted volumes, the remaining market balance defines uncontracted LNG demand.

Comparing this metric with global liquefaction capacity allows assessment of whether additional LNG supply, including potential Australian exports, can be absorbed in a decarbonising energy system.

This analysis assumes that major LNG projects under construction, including Qatar's North Field expansion, proceed with delays but are completed within the projection period. Disruptions to LNG supply, including outages at major export facilities, can raise questions about market tightness. Such events affect prices and trade flows in the short term, but their impact must be considered in context. The loss of supply from damage to LNG trains in Qatar's Ras Laffan facility, for example, is a small share of global capacity and does not shift long-term supply-demand balances. It is important to distinguish between short-term volatility and structural trends. This analysis focuses on the latter.

Full methodological detail, datasets, and assumptions are provided in the Appendix.

4. Results: global LNG balance

The analysis reveals a disconnect between the trajectory of global LNG demand under these scenarios and the wave of export capacity under construction. Across 1.6°C, 1.8°C and 2°C pathways, the market is defined by structural oversupply, severely limiting the space for uncontracted volumes or new greenfield investments.

To illustrate how the LNG trajectory is derived, the graphs below (Figure 7) show the total natural gas demand for the major LNG-importing economies, in 1.6°C, 1.8°C and 2°C scenarios, disaggregated into supply from local production, pipeline imports, and LNG imports. Across all three scenarios, LNG import demand falls faster than overall natural gas demand.

Gas demand for major LNG importing countries by supply source (bcm)

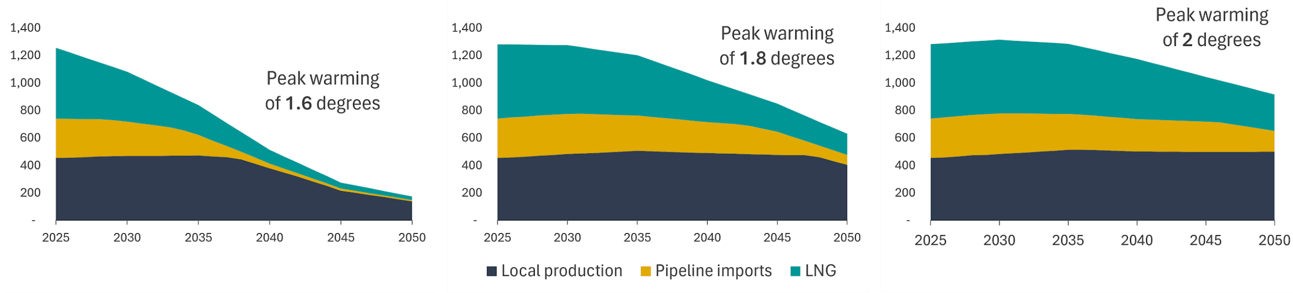

Figure 7: Projected gas demand (bcm) for major LNG importers[60], broken down by that sourced from local production, pipeline imports, and LNG imports, in 1.6°C, 1.8°C, and 2°C scenarios. Climate Resource analysis.

LNG typically functions as the flexible marginal supply in global gas markets, adjusting to balance regional shortages after domestic production and pipeline flows are accounted for.[61] Where available, importing countries generally prioritise domestic production and pipeline supplies, with LNG serving as the flexible balancing source, especially as their overall demand shrinks.[62] Some economies with limited domestic resources or pipeline access, such as Japan and South Korea, rely on LNG as their primary source of gas supply. In these markets governments seek to limit exposure to spot LNG volatility through long-term contracts and diversification strategies. National energy plans also tend to prioritise domestic production to achieve energy security and reliability, deliberately insulating their economies from volatile price spikes and geopolitical supply chain risks associated with the global LNG market.[63] Figure 7 illustrates this trend at the global level.

To further illustrate this dynamic, Figure 8 presents the case of China, showing projected gas demand to 2050 disaggregated by domestic production, pipeline imports and contracted LNG imports overlaid with the 1.6 °C, 1.8 °C and 2 °C NGFS5 gas demand pathways. While total gas demand declines gradually across the pathways, demand for LNG imports falls to zero by 2045 in all scenarios, reaching this point earlier under the lower-warming pathways.

[60] The 19 LNG-importing countries that together account for 90% of global LNG imports.

[61] GECF (2025). *Global gas outlook 2050: 9th edition*; IEA. (2025). *Gas Market Report, Q3-2025*. IEA.

[62] IEA. (2025). *Gas Market Report, Q3-2025; GIIGNL Annual Report 2023;* IEEFA. (2024). *LNG is not displacing coal in China's power mix.*

[63] GECF (2025). *Global gas outlook 2050: 9th edition.*

China gas production and imports vs. demand (bcm)

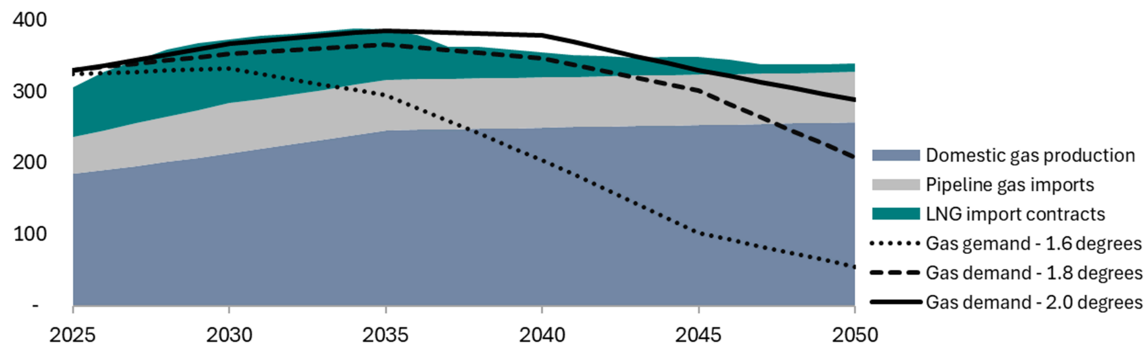

Figure 8: Projected domestic gas production, pipeline imports, and existing LNG contracts, overlaid with 1.6°C, 1.8°C, and 2°C NGFS5 China gas demand pathways. Climate Resource analysis.

While China provides a clear illustration of the marginal role of LNG, similar dynamics appear across many importing markets. The following sections examine how these patterns shape the global LNG balance under different warming pathways.

Global LNG balance under 1.6°C

Under the 1.6°C pathway, global LNG import demand is constrained by rapid decarbonisation and electrification, and projected to fall from the mid-2020s onwards. It is important to note here again that these '1.5°C with limited overshoot' pathways are becoming increasingly unlikely under current policy trajectories. Yet these scenarios remain valuable as a stress test of how global gas markets would respond if decarbonisation accelerates further. LNG demand falls from current levels to just 22Mt by 2050, in 1.6°C peak-warming pathways (Figure 9). The broader conclusion of tightening LNG markets is not unique to this scenario: even under less ambitious warming pathways explored in this report, the space for additional LNG supply remains limited.

LNG supply and demand under scenarios that limit peak warming to 1.6°C (Mt LNG)

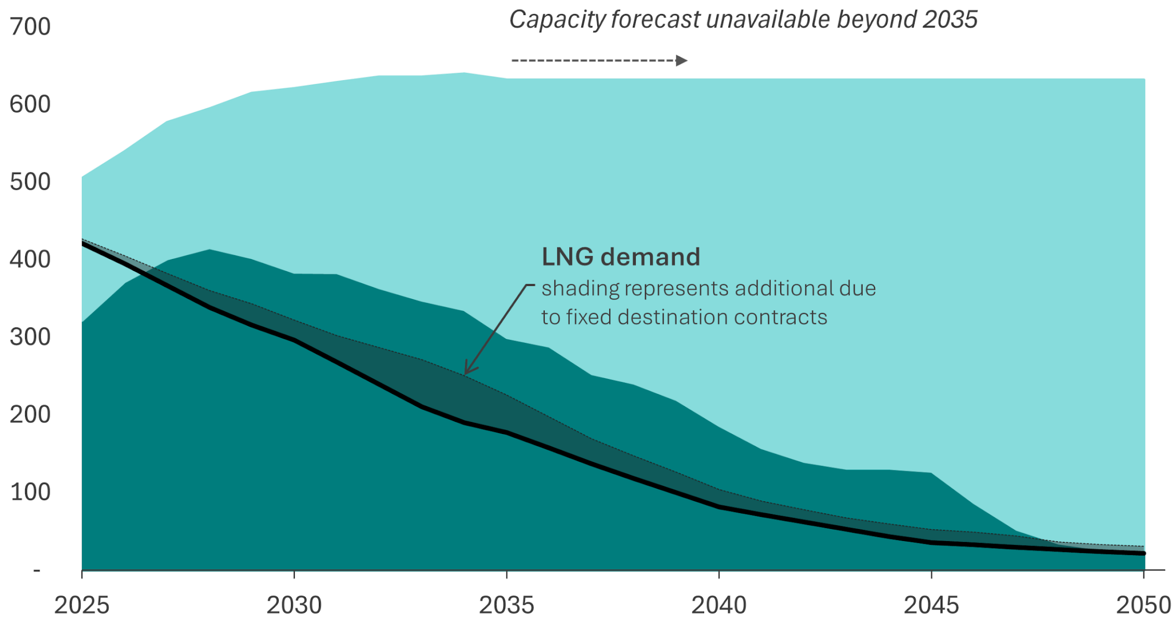

Figure 9: LNG liquefaction capacity vs LNG demand in scenarios that limit peak warming to 1.6°C (Mt LNG). Climate Resource analysis.

When this rapidly shrinking demand profile is compared against existing contractual obligations, the market hits a critical inflection point almost immediately. By 2027, existing contracts exceed total global demand, tipping the market into a 'negative balance'. The market remains in this state of absolute over-contracting until 2049.

During this period, the volume of surplus contracts, gas that buyers are legally obligated to take (or pay for) but do not fundamentally need, grows. This contracted surplus reaches a peak of around 95 Mt in the mid-2030s and remains elevated until 2045. It then declines toward 2050 as the volume of contracted supply tapers off.

In the 1.6°C scenario, there is no uncontracted demand beyond 2027. In this environment, any new or uncontracted spot cargoes would struggle to find buyers, as the market is already saturated by existing agreements. In practice, this may result in increased contractual renegotiation, deferrals, or cancellations, as has been observed in recent market conditions.[64]

Under 1.8°C and 2°C

Although the 1.8°C and 2°C pathways assume a slower pace of transition, they do not offer much reprieve for uncontracted LNG supply.

In the 1.8°C pathway, LNG demand declines more slowly over the current decade than in the 1.6°C pathways, dropping 7% from current levels to around 410 Mt in 2030. The decline steepens considerably thereafter, falling to 250 Mt by 2040 and reaching 125 Mt in 2050 (Figure 10).

LNG supply and demand under scenarios that limit peak warming to 1.8°C (Mt LNG)

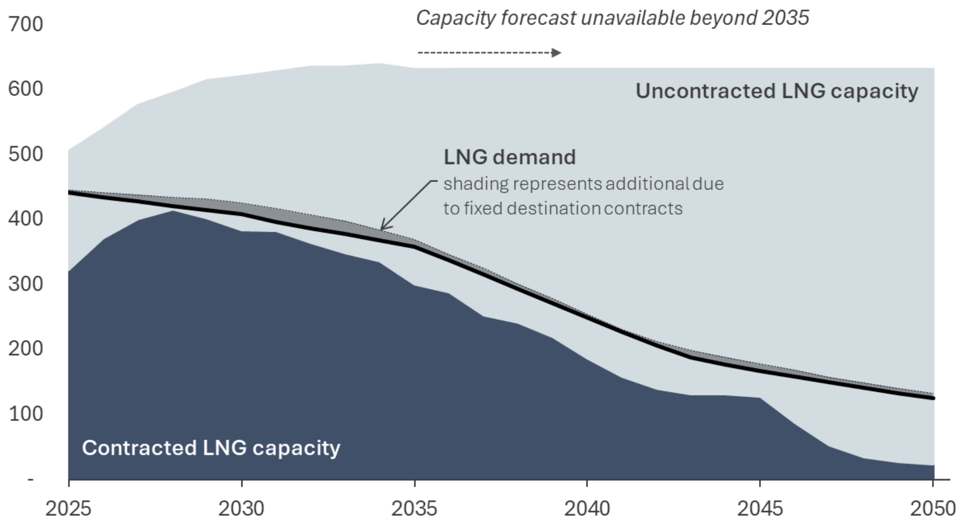

Figure 10: LNG liquefaction capacity vs LNG demand in scenarios that limit peak warming to 1.8°C (Mt LNG). Climate Resource analysis.

In the 2°C pathway, which allows for a slightly delayed transition, demand remains relatively stable until 2030, before declining to around 360 Mt by 2040 and around 220 Mt by 2050 (Figure 11).

In both of these scenarios, the analysis shows that uncontracted LNG demand can be fully met by existing uncontracted LNG capacity for the entire period through to 2050. While there is technically space for new contracts and spot volumes in these pathways, the available global supply capacity outstrips the demand.

[64] Reuters. (2025). *Pakistan cancels Eni LNG cargoes, seeks to renegotiate Qatar supplies*.

LNG supply and demand under scenarios that limit peak warming to 2°C (Mt LNG)

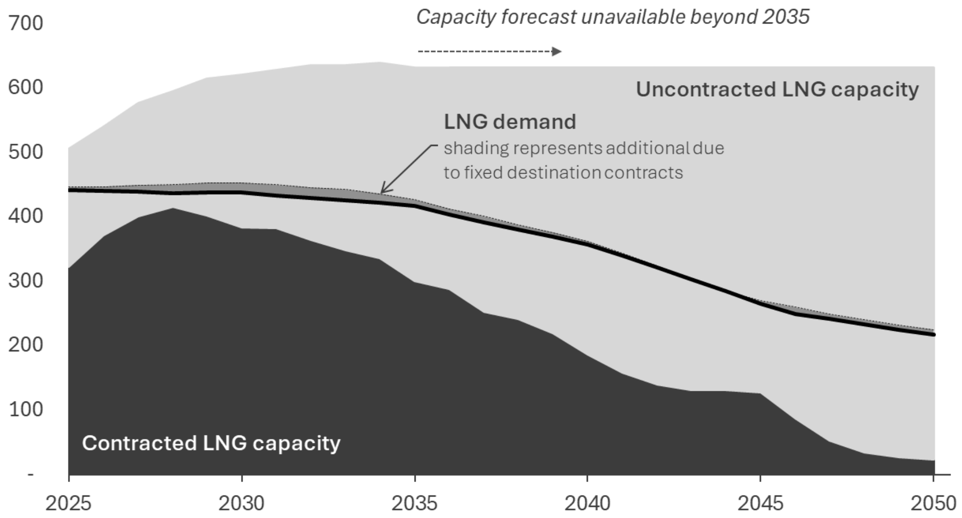

Figure 11: LNG liquefaction capacity vs LNG demand in scenarios that limit peak warming to 2°C (Mt LNG). Climate Resource analysis.

Under the 1.8°C scenario, the demand for uncontracted LNG averages around 65 Mt per annum between 2035 and 2045 and then increases slightly to around 110 Mt by 2050. Under the 2.0°C scenario, uncontracted LNG demand is slightly higher, averaging around 180 Mt per year between 2040 and 2050 (Figure 12).

Uncontracted LNG supply and demand (Mt LNG)

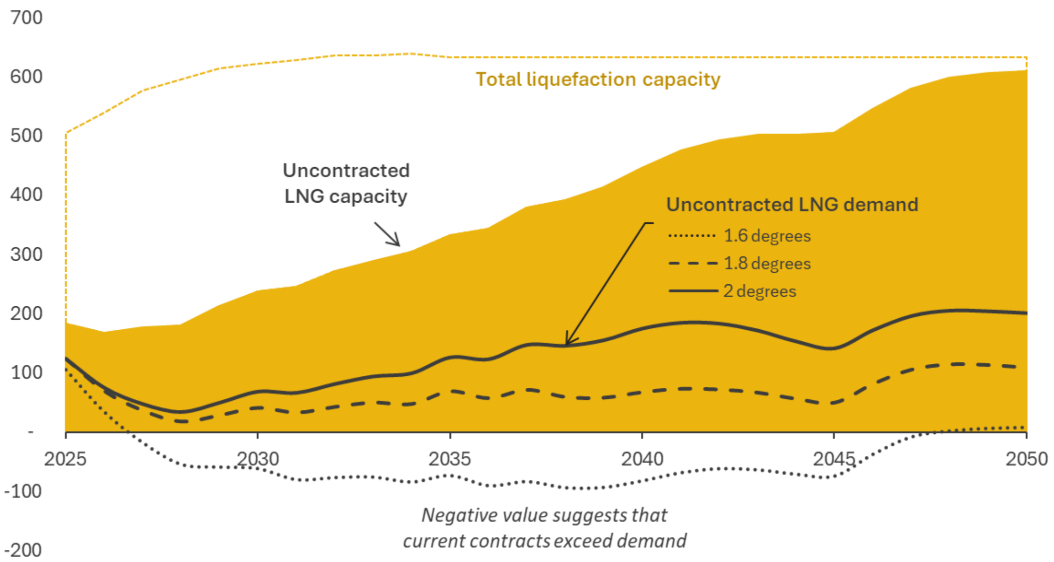

Figure 12: Uncontracted LNG liquefaction capacity vs uncontracted demand (Mt LNG) in 1.6°C, 1.8°C and 2°C peak warming scenarios. Climate Resource analysis.

These results must be viewed in the context of the unprecedented wave of new liquefaction capacity expected to come online over the second half of the decade, led primarily by the US and Qatar, although recent disruptions are likely to delay and stagger the timing of new supply additions. Even under the most conservative 2°C transition scenario, the overhang of uncontracted capacity will create a competitive market, favouring buyers and placing downward pressure on prices. In this environment, prices will be forced down toward short-run marginal costs of the market-clearing producers, and high-cost producers will be squeezed out of the market. These results are robust also to moderate delays in new supply: even where capacity additions are deferred by several years, the scale of planned expansion remains large relative to projected demand under climate-aligned scenarios.

Recent disruptions to LNG supply provide additional context. Damage to infrastructure in Qatar, for example, has reduced available capacity in the near term and is expected to delay some new capacity additions. However, as illustrated in Figure 13, the scale of these disruptions is small relative to total global liquefaction capacity. The loss of supply from affected trains represents only a small share of the global system and, if resolved within expected timeframes of 3 to 5 years, does not materially alter the long-term supply–demand balance.[65]

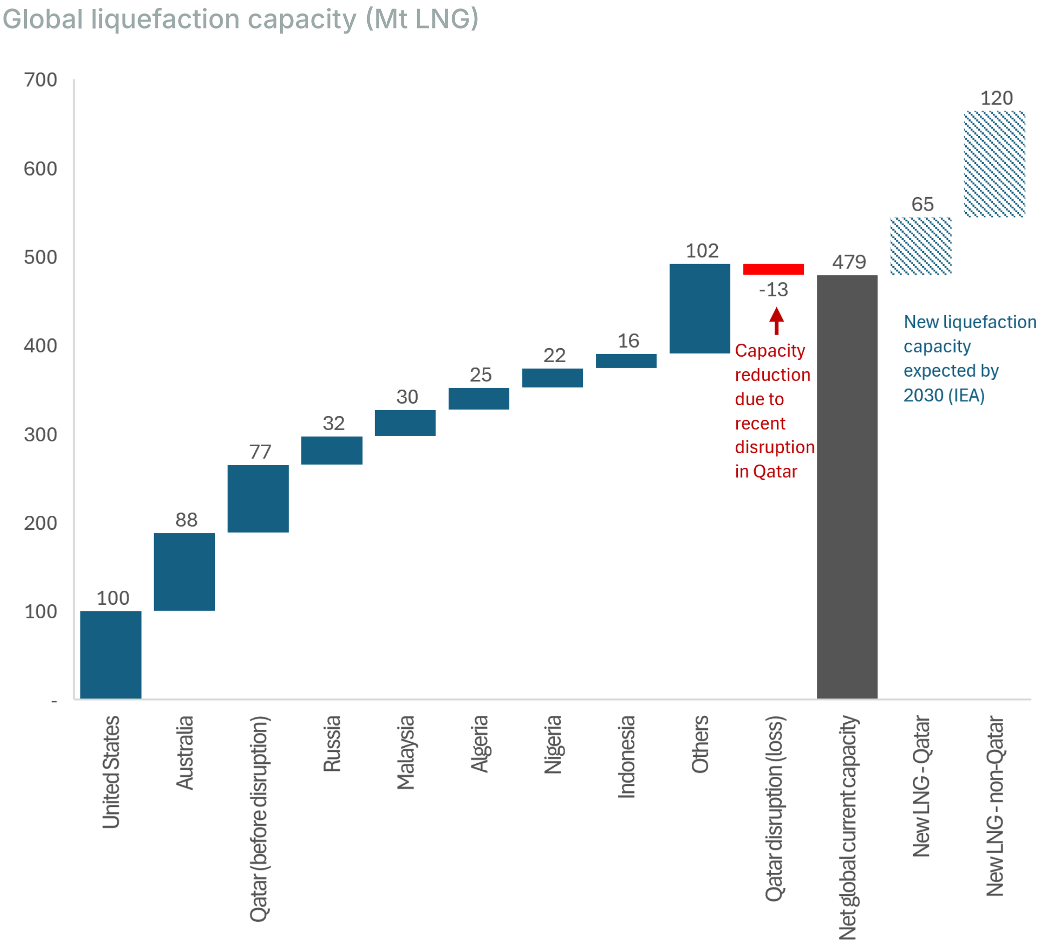

Figure 13: Liquefaction capacity by country showing capacity reduction in Qatar as of 30 March 2026 and planned expansion (FID or under construction only) (Mt LNG). Data from IEA LNG tracker, the GIIGNL Annual Report 2025 and media coverage suggesting around 12.8 MTPA loss due to damage.

In such oversupplied conditions, contractual structures may also come under pressure. Buyers facing excess volumes may seek to defer deliveries, renegotiate terms, or cancel cargoes, reducing the effective rigidity of long-term contracts in practice. This behaviour has already been observed, such as Pakistan cancelling LNG cargoes from Eni and seeking to renegotiate contracted volumes with Qatar in 2025 amid changing market conditions.[66] Short-term supply disruptions may reinforce this behaviour by increasing price volatility and uncertainty, further weakening contractual discipline.

[65] Reuters. (2026). *Iran attack damage wipes out 17% of Qatar's LNG capacity for up to five years*.
[66] Reuters. (2025). *Pakistan cancels Eni LNG cargoes, seeks to renegotiate Qatar supplies*.

While lower prices could in principle stimulate additional gas demand, the scenarios analysed here assume that demand is increasingly shaped by national policy choices rather than short-term market signals. Climate policies, electrification, renewable deployment and energy security strategies constrain the role of gas in energy systems. As a result, lower LNG prices may influence utilisation at the margin but do not fundamentally alter the structural decline in gas demand embedded in these pathways. In this context, temporary supply disruptions may be more likely to accelerate demand-side adjustments than to reverse underlying trends.

5. LNG export implications for Australia

The relative cost of Australian LNG

Market clearing and price setting: SRMC vs. LRMC

The premise that lowest-cost production needed to meet demand dictates the market clearing price is a reasonable approximation in the case of LNG. In a tight, growing market, global gas prices generally reflect the long-run marginal cost (LRMC) of supply, allowing developers to recover their full capital costs for liquefaction, shipping, and regasification.[67] However, in a demand-constrained market facing a wave of new export capacity, the pricing dynamic fundamentally shifts.

As oversupply emerges, competition between suppliers intensifies, and prices are pushed downward toward the short-run marginal cost (SRMC) of the market clearing producer.[68] Higher-cost suppliers are squeezed out. High-cost production is likely to be 'shut in', meaning production is partially or completely ceased for a period, or shut down.[69]

The global cost curve: Qatar and the US

To understand Australia's vulnerability, it must be positioned against the two biggest drivers of the 2025–2030 supply wave: Qatar and the US.

Qatar sits at the lowest end of the global LNG cost curve under normal operating conditions. As it expands its North Field complex to boost liquefaction capacity by around 65 MTPA by 2030, it is expected to reinforce this advantage over the medium term, notwithstanding the current disruptions to supply.[70] Qatar benefits from abundant, easily accessible gas that is rich in liquid condensates.[71] This allows Qatar to deliver LNG to North Asia for an estimated US$3.80 to $5.80/MMBtu.[72] While recent geopolitical events highlight that even low-cost supply can be disrupted in the short term, they likely do not fundamentally alter Qatar's structural cost advantage over the longer run. This positions Qatar as an anchor of the global cost curve, particularly in oversupplied market conditions.

The US operates on a highly flexible, destination-free tolling model.[73] The delivered cost of US LNG to Asia sits higher on the cost curve.[74] Under this structure, buyers reserve liquefaction capacity and bear the volume risk. If global spot prices fall below the short-run marginal cost of lifting a cargo (roughly the cost of Henry Hub feedgas, liquefaction variable fees and shipping) buyers may choose not to nominate cargoes, while still paying the fixed liquefaction capacity fee. This dynamic makes the US the effective 'floor' of the global market, as demonstrated in mid-2020 when a price collapse triggered mass cancellations and temporary shut-ins of US LNG facilities.[75]

Reported LNG cost estimates, quoted in this section and subsequent sections, vary across sources because they reflect different cost concepts and system boundaries, including upstream production costs, liquefaction costs, and delivered prices to importing markets. The figures here are drawn from

[67] IEA. (2025). *World energy outlook 2025.*
[68] ibid
[69] Rystad Energy. (2020). *US LNG export economics and shut-in risk.* Oil & Gas Journal.
[70] IEEFA. (2024). *Global LNG Outlook 2024-2028.*
[71] IEEFA. (2024). *The future of Australian LNG;* IEEFA. (2024). *Global LNG Outlook 2024-2028.*
[72] IEEFA. (2025). *Browse gas: Expensive, emissions-intensive, unnecessary.*
[73] ACCC. (2023). *LNG netback price series review: Issues paper*. ACCC.
[74] IEEFA. (2024). *LNG is not displacing coal in China's power mix.*
[75] International Gas Union. (2025). *Wholesale Gas Price Survey 2025 Edition: A global review of price formation mechanisms (2005–2024)*. International Gas Union.; IEEFA. (2024). *Global LNG Outlook 2024-2028.*

their respective sources and are intended to illustrate relative cost positioning rather than provide directly comparable estimates.

Australia's cost position and market vulnerability

Against this competitive backdrop, Australian LNG faces a substantial cost disadvantage. As highlighted in the Australian Government's Future Gas Strategy Analytical Report, Australia has the highest average production (plus liquefaction) cost among major global exporters (at US$10.28/MMBtu), largely reflecting its high fixed costs (Figure 14).[76] Historically, Australia's cost disadvantage has been masked by strong LNG demand and long-term contracts signed during periods of tighter global supply.

Global LNG supply: cost competitiveness and market scale

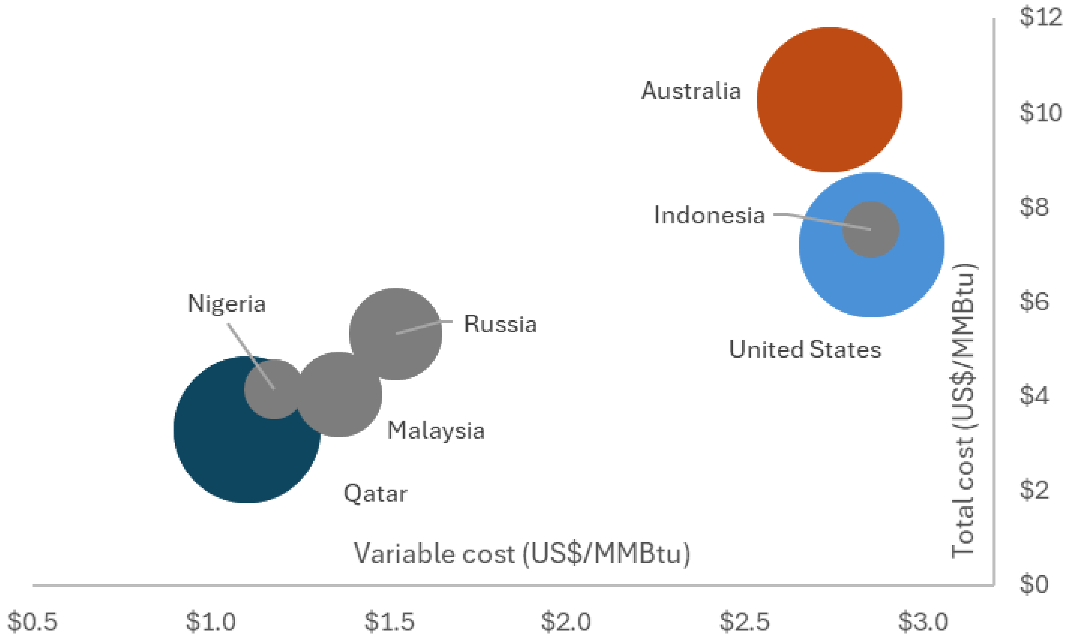

Figure 14: LNG exporter volumes and production costs in 2022-23. Data from the Australian Government's Future Gas Strategy Analytical Report (2024).

Offshore fields are expensive to develop and contain high levels of reservoir CO_2, which may require additional emissions mitigation measures, such as carbon capture or the purchase of offsets, under Australia's Safeguard Mechanism.[77] Currently, Australian producers are partially insulated from spot LNG price volatility because most exports are sold under long-term oil-indexed SPAs.[78] However, most of these foundation contracts will expire between the mid-2030s and the 2040s.[79] If Australian exporters cannot secure new SPAs in a competitive, oversupplied global market, the volume of uncontracted Australian LNG exposed to spot prices could reach 34 MTPA by 2030 and 89 MTPA by 2040.[80]

In the 1.6 °C, 1.8 °C, and 2 °C peak warming pathways, as demand decreases, uncontracted Australian gas will be exposed to downward pressure on prices and returns. The IEA notes that for gas to competitively displace coal (or renewables) in emerging Asian markets, delivered prices need to drop

[76] *Future Gas Strategy Analytical Report.*
[77] ibid.
[78] ibid.
[79] *Gas Market Review Report*.
[80] IEEFA. (2024). *The future of Australian LNG.*

to US$3 to $5/MMBtu.[81] At these price levels, Australian uncontracted capacity may be displaced by lower-cost capacity from Qatar, and because Australian projects lack the flexible 'tolling' shut-in mechanisms of the US, operators risk selling at a loss, reducing utilisation of existing trains, or stranding high-cost assets over time.[82]

To illustrate the impact of this low-cost competition on Australia's prospects, Figure 15 overlays the estimated uncontracted LNG capacity of the Middle East (Qatar, Oman, UAE, and Yemen) onto the uncontracted global LNG demand across the three scenarios. Consistent with a typical cost-based supply merit order (in scenarios where there is uncontracted demand to fill):

- Under a 1.8°C pathway, Middle Eastern uncontracted capacity is large enough to absorb 100% of the available global uncontracted demand from around 2028.
- Under a 2.0°C pathway, the Middle East uncontracted capacity is large enough to meet more than half of the uncontracted demand out to 2050.

Across these pathways, there may be little space in the global market for higher-cost, uncontracted Australian LNG.

Middle Eastern uncontracted LNG capacity relative to global uncontracted demand (Mt LNG)

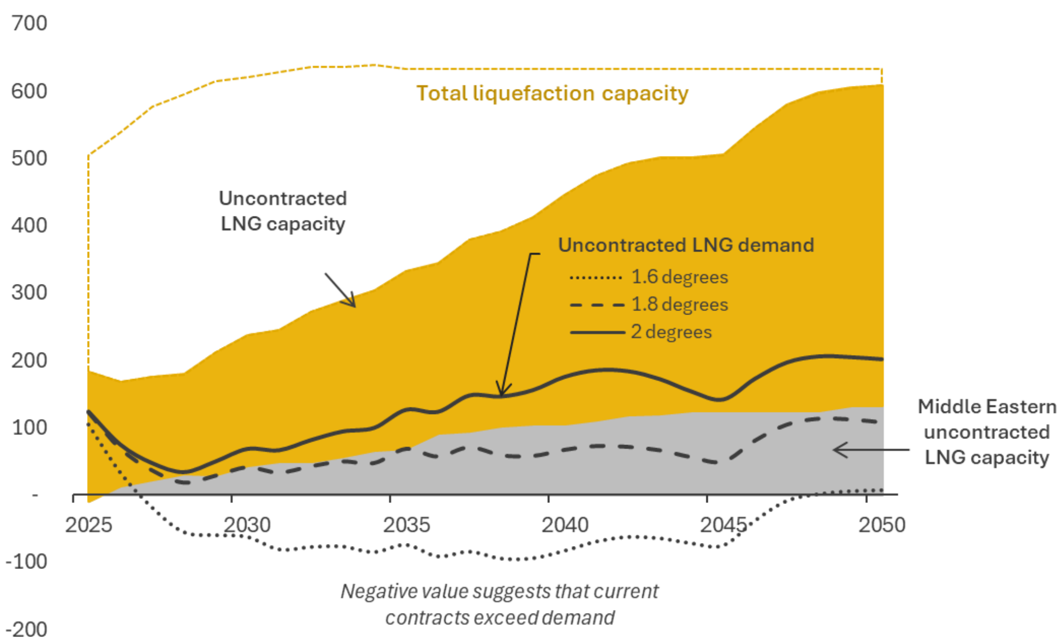

Figure 15: Middle Eastern uncontracted liquefaction capacity (in pale grey), rest of world uncontracted liquefaction capacity and uncontracted LNG demand in 1.6°C, 1.8°C and 2°C peak warming scenarios (Mt LNG). Climate Resource analysis.

If Australian producers are unable to sell uncontracted volumes or secure new long-term contracts in this environment, the industry's future will be dictated by the run-down of its existing legacy contracts. Currently, Australia sells roughly three-quarters of its LNG under long-term agreements. There are around 50 medium to long-term contracts currently in force, but these agreements will progressively expire over the coming decade and a half.

[81] IEA. (2024). *World energy outlook 2024.*
[82] IEEFA. (2025). *Browse gas: Expensive, emissions-intensive, unnecessary;* IEEFA. (2024). *The future of Australian LNG;* IEEFA. (2024). *LNG is not displacing coal in China's power mix.*

Figure 16 charts the shape of Australia's LNG export market out to 2050, assuming no uncontracted LNG is sold.

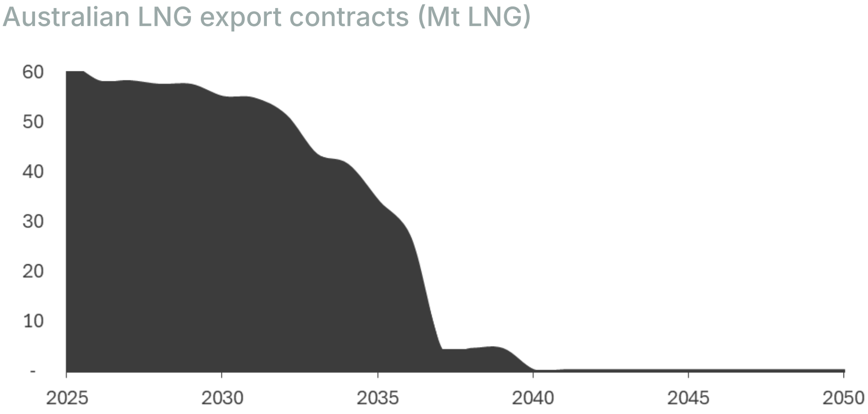

Figure 16: Australian LNG supply contracts. Climate Resource compilation from GIIGNL Annual Reports 2023, 2024, and 2025.

As these legacy agreements expire, Australia's exposure to the spot market will grow. In a market where lower-cost Middle Eastern and US gas absorbs the available demand, these expiring Australian contracts represent a steep contract exposure cliff. In an oversupplied market, some buyers may also seek to renegotiate or defer contracted volumes, further weakening the effective value of these agreements.

Ultimately, the headline conclusion of this analysis is stark: in a decarbonising world where demand declines and low-cost supply expands, Australia's existing LNG contracts may come to define the upper bound of what the country is able to sell internationally.

Asia and the 'demand will grow' argument

Demand trends in major LNG importers are already shifting

A justification for the ongoing expansion of the Australian LNG industry is the narrative of strong growth in Asian demand.[83] Proponents argue that as Asian economies industrialise, raise their living standards, and transition away from coal, their appetite for imported natural gas will provide a lucrative, decades-long safety net for Australian exporters.[84] Others argue that demand growth in Asia's mature LNG markets may plateau or decline as clean power expands and nuclear capacity returns, meaning that any remaining growth may be insufficient to absorb new LNG supply expected from Qatar and the US before 2030.[85]

Figure 17 shows the projected natural gas demand under the 1.6°C, 1.8°C, and 2.0°C scenarios derived from NGFS5 for the world's five largest LNG-importing economies: China, Japan, South Korea, India, and the European Union (median projections with the 33rd to 66th percentile ranges),and also for the Asian region as a whole. Notably, Japan, China, and South Korea alone accounted for almost 80% of Australia's LNG export volumes in 2022-23.[86]

[83] Martinez, C. (2025). *Twofold jump in LNG demand places Australian gas at the heart of Asia's energy security and emissions cuts*. World Ports Organization

[84] Australian Government, Department of Industry, Science and Resources. (2024). *Future Gas Strategy.*

[85] Fulwood, M., Honoré, A., Meidan, M., & Bakshi, P. (2025). *The global outlook for gas demand in a $6 world* (NG202). Oxford Institute for Energy Studies; IEA. (2025). *Gas 2025: Analysis and forecast to 2030*. IEA.

[86] *Future Gas Strategy Analytical Report.*

Gas demand under scenarios that limit warming to 1.6°C , 1.8°C and 2°C (bcm)

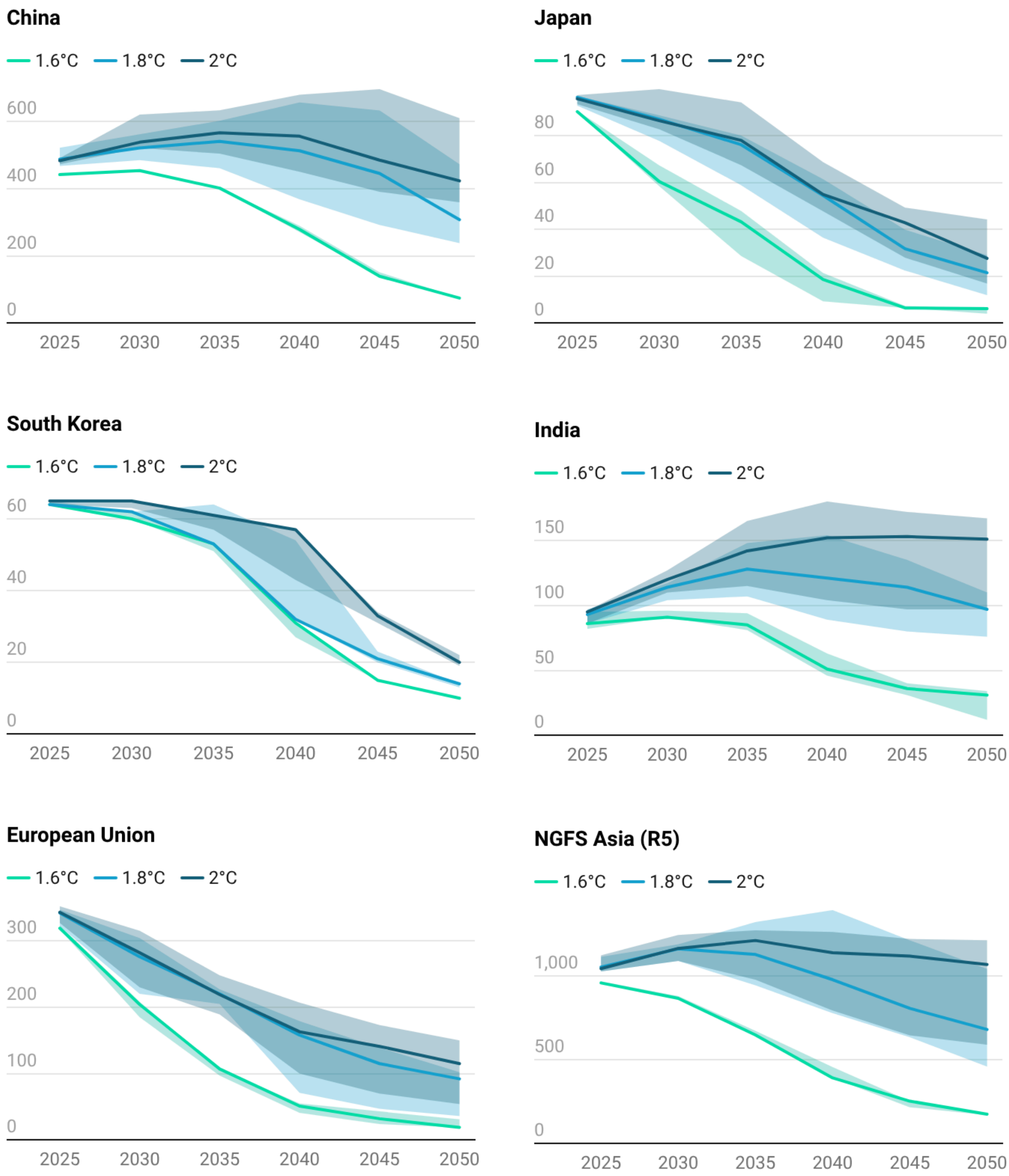

Figure 17: Natural gas demand by peak warming level (bcm) for China, Japan, South Korea, India and the European Union and the NGFS R5 Asia region. *Note:* The NGFS R5 Asia region includes Central Asia, China, India, Indonesia, Pakistan, South Asia, South Korea, Southeast Asia, and Taiwan, and excludes Asian countries assigned to other R5 regions (e.g., Japan and Middle Eastern countries). Shaded areas indicate the 33rd to 66th percentile range around the median projection. Estimates are derived from NGFS Phase 5 scenarios using a rolling quantile regression analysis. [87]

As the trajectories demonstrate, sustained growth in LNG demand across these markets is difficult to reconcile with global decarbonisation pathways and the warming outcomes implied by countries'

[87] Note that the NGFS Phase 5 database contains a limited number of scenarios consistent with limiting peak warming to 1.6°C, which constrains the regression distribution and results in a narrow or absent percentile range (plume) at this level. Also, due to limited country-level data availability for South Korea across the underlying models, its 1.6°C projection specifically incorporates scenario data points with peak warming of up to 1.7°C.

current targets. Across all three warming pathways evaluated, gas demand in almost all of these major economies tracks downwards by 2050:

- In mature, advanced economies like Japan, South Korea, and the EU, we see a structural decline of gas demand.
- China, frequently cited as the primary growth engine for future global LNG, sees its gas demand peak and then fall across all three scenarios.
- The sole exception is India, which is the only economy among the top five that sees an increase in gas demand from now to 2050 in the 1.8°C and 2.0°C scenarios, and a decline under a 1.6°C pathway.
- The Asian region, which here captures China, India, and South Korea but not Japan, sees moderate growth to 2050 in some 2.0°C scenarios, but a decline in 1.8°C and 1.6°C pathways.

Structural drivers of gas demand decline in key markets

To understand what is driving these projected trajectories, we examine how natural gas is currently used within each of these economies. Table 1 outlines the current role of natural gas within the primary energy mix of each jurisdiction and identifies the sectors responsible for the largest share of that consumption.

Table 1 - Natural gas share of primary energy mix and primary gas consuming sector in Japan, EU, South Korea, China and India

Jurisdiction	Gas share of primary energy mix	Primary gas-consuming sector(s)
China[88]	8% (in 2023)	Industry (accounts for ~55% of gas use in 2023) and power generation (accounts for ~20% of total gas supply)
Japan[89]	21% (in 2023)	Power generation (accounted for ~69% of total gas supply in 2023)
South Korea[90]	18% (in 2023)	Power generation (accounts for ~53% of total gas supply)
India[91]	5% (in 2023)	Industry (accounts for 32% of gas used in 2023 specifically fertilisers, refining, and petrochemicals)
European Union[92]	21% (in 2023)	Residential (41%) and power generation (gas provided 19% of EU power in 2023)

By looking at the dominant gas-consuming sectors identified above, we can break down how policy, economics, and technology are combining to displace gas in each market.

China: cheap renewables and industrial electrification

Although gas comprises only about 8% of China's primary energy, its use is heavily concentrated in the industrial and power sectors.[93] However, gas is failing to capture growth in either. In China, LNG is too expensive to displace coal or compete with renewables. The levelised cost of standalone solar PV and onshore wind are now the cheapest sources of power generation in the country. Coal generation

[88] IEA. (2025) World Energy Balances Highlights. IEA, Paris.
[89] ibid.
[90] ibid.
[91] ibid.; IEEFA. (2025). *Browse gas: Expensive, emissions-intensive, unnecessary*; GECF (2025). *Global gas outlook 2050: 9th edition*; IEA. (2025). *Gas Market Report, Q3-2025*.
[92] IEA, EU, Natural gas data.
[93] IEA. (2024). *World energy outlook 2024.*

remains US$30–40/MWh cheaper than gas, meaning coal, rather than gas, is being used to firm the massive influx of intermittent renewables. Long-term, integrated renewables-plus-storage projects pose the threat to gas power in China.[94] In China's industrial sector, electricity is gaining ground over gas. Industrial production is already highly electrified, meeting 27% of industry energy consumption compared to nearly 10% for gas.[95] Any remaining gas demand will increasingly be met by domestic production and cheaper pipeline imports, which Beijing prioritises for energy security.[96] LNG acts as a marginal, supply-side balancing factor; the rapid expansion of China's pipeline capacity with Russia and Central Asia means that LNG imports may decline much faster than the country's overall gas demand.[97]

Japan: nuclear restarts and renewables replacing power generation

Power generation consumes roughly two-thirds of Japan's gas.[98] The power sector is the primary target for demand reduction. Japan is actively restarting its idle nuclear fleet to reduce fossil fuel import costs and emissions. Every 1 GW of nuclear capacity brought back online reduces Japan's LNG demand by approximately 1 to 1.5 bcm.[99] The restart of reactors was a primary driver behind Japan's 8% drop in LNG demand in 2023.[100] At the same time, under the 7th Strategic Energy Plan, Japan is explicitly elevating renewables to a mainstream power source, targeting 40–50% of total power generation by 2040, up from 24% in 2024.[101] Japan has also emphasised LNG as a transitional fuel for energy security, with the Ministry of Economy, Trade and Industry encouraging Japanese utilities and trading houses to secure long-term LNG supplies and invest in overseas projects. However, these measures ensure supply stability during the transition rather than expanding long-term gas demand, and the combination of nuclear restarts and expanding renewable capacity is expected to progressively reduce LNG use in the power sector.[102]

South Korea: a nuclear and renewables pivot in power

Like Japan, South Korea's gas consumption is heavily weighted toward power generation, but government targets project the share of LNG in the power mix to reduce from 30% in 2024 to just 9.3% by 2036.[103] The government has reversed previous nuclear phase-out policies. South Korea aims to raise nuclear power to 34.6% of the power mix by 2036, with five new reactors scheduled to come online between 2024 and 2033.[104] High LNG fuel costs have also placed financial strain on the state-run power utility KEPCO, which suffered significant losses.[105] As a result of the comparatively low unit costs of solar and wind power generation, the country is expanding renewable capacity (aiming for 54.16 GW by 2033) to reduce exposure to volatile LNG prices.[106] At the same time, South

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[94] IEEFA. (2024). *LNG is not displacing coal in China's power mix.*
[95] IEA. (2025). *World energy outlook 2025.*
[96] Zhang, Z., Nie, S., & Downs, E. (2023). *Inside China's 2023 Natural Gas Development Report* (Center on Global Energy Policy, Columbia University); Australasian Centre for Corporate Responsibility. (2024). *Shell's LNG strategy: Overcooked?*
[97] Zhang, Z., Nie, S., & Downs, E. (2023). *Inside China's 2023 Natural Gas Development Report* (Center on Global Energy Policy, Columbia University); IEA. (2025). *Gas Market Report, Q3-2025*. IEA.
[98] Oxford Institute for Energy Studies. (2025). *Energy Insight 163: Japan's energy transition: The interplay of renewables, gas and energy security* (Insight 163). Oxford Institute for Energy Studies.
[99] IEA. (2025). *World energy outlook 2025.*
[100] IEEFA. (2024). *Global LNG Outlook 2024-2028.*
[101] Ministry of Economy, Trade and Industry (METI), Japan. (2025). 第7次エネルギー基本計画 [7th Strategic Energy Plan]. Government of Japan.
[102] METI. (2023). *GX implementation roadmap: Basic policy for the realisation of green transformation*. Government of Japan.
[103] Tachev, V. (2024). *South Korea's Energy Mix and Its 10th Basic Energy Plan*. Energy Tracker Asia.
[104] ibid; IEEFA. (2024). *Global LNG Outlook 2024-2028.*
[105] The Korea Times. (2023). *KEPCO suffers record operating loss in 2022 on high fuel costs.*
[106] IEEFA. (2023). *South Korea's LNG Overbuild.*

Korea continues to invest in LNG import infrastructure and long-term supply arrangements to ensure energy security as it meets commitments to phase out coal fired generation by 2040. These investments reflect a strategy of maintaining gas as a flexible balancing fuel during the transition rather than expanding its long-term role in the power system.[107]

India: gas uncompetitive in industry and power

India is a price-sensitive market where natural gas demand is driven largely by the industrial sector (fertilisers and petrochemicals), with power generation historically playing a secondary role.[108] LNG is uncompetitive against domestic renewables and coal. High LNG prices caused the share of gas in electricity generation to fall to less than 2% in FY2025, leading to underutilised gas infrastructure.[109] Although industrial demand for gas remains, India's broader decarbonisation and energy security policies are targeting alternative non-fossil solutions. The deployment of domestic renewable energy and future targets for green hydrogen and green ammonia present long-term structural threats to industrial gas consumption. Expensive imported LNG may struggle to permanently embed itself in the energy mix.[110] In our analysis, India's overall natural gas demand increases under the 1.8°C and 2.0°C scenarios, but demand for Australian LNG likely remains limited.

European Union: heat pumps in buildings and renewables in power

The EU is dismantling its reliance on gas across its two biggest consuming sectors: buildings and power generation. The domestic buildings sector is projected to see the most significant decline in gas demand, driven by the electrification of space heating.[111] By 2035, the share of space heating provided by electric heat pumps is projected to double in the EU.[112] Stricter regulations, such as the revised Energy Performance of Buildings Directive and national bans on fossil fuel boilers, are accelerating this transition.[113] In the power sector, the combination of solar and wind generation has now surpassed fossil fuels, driving gas-fired power downward.[114] In the industrial sector, the EU is advancing industrial heat pumps for low- and medium-temperature processes, which use significantly less energy than gas boilers and decouple industries from imported gas.[115]

Emerging Asia: potential growth but uncertain LNG demand

Some analysts argue that even if demand plateaus in mature markets, future LNG growth could come from emerging Asian economies such as Vietnam, Thailand, and the Philippines.[116] While gas demand may increase in some of these markets, this does not translate into sustained LNG import growth beyond 2035 in any of the scenarios evaluated, as shown in the Asia region vignette of Figure 17. Many Asian countries are pursuing rapid renewable deployment, domestic energy security strategies, and electrification policies that may limit long-term LNG dependence. Relying on emerging Asian demand to absorb large volumes of new LNG supply represents an uncertain strategy.

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[107] Ministry of Trade, Industry and Energy. (2023). *The 10th Basic Plan for Long-Term Electricity Supply and Demand (2023–2036)*. Government of the Republic of Korea.
[108] GECF (2025). *Global gas outlook 2050: 9th edition*; IEA. (2025). *Gas Market Report, Q3-2025*. IEA.
[109] IEEFA. (2025). *Can LNG Displace Coal Demand in India?*
[110] GECF (2025). *Global gas outlook 2050: 9th edition.*
[111] GECF (2025). *Global gas outlook 2050: 9th edition*.
[112] IEA. (2025). *World energy outlook 2025.*
[113] IEA. (2024). *World energy outlook 2024.*
[114] IEA. (2025). *World energy outlook 2025; GIIGNL Annual Report 2025.*
[115] IEA. (2025). *World energy outlook 2025.*
[116] Quadros, J., Huang, M., Mathur, R., Dong, K., Omarali, F., Du, J., Gupta, A., Kadavla, H., & Ranjan, S. (2025). *How Asia will drive global gas and LNG investment to 2050*. Wood Mackenzie.

The physical limit: gas turbine supply chain bottlenecks

Even if emerging Asian economies maintain the political and economic appetite to expand gas-fired power generation, they may run into a physical constraint, at least up to 2030: the global supply of heavy-duty gas turbines. While the demand trajectories in this report are driven primarily by climate policy, electrification and renewable deployment, near-term infrastructure bottlenecks may further constrain the pace at which new gas-fired power capacity can be built in this region.

The global supply chain for heavy-duty gas turbines is highly concentrated. Historically, project developers rely on just three major manufacturers: GE Vernova, Siemens Energy, and Mitsubishi Heavy Industries (MHI). Together these three suppliers have accounted for roughly 90% of all heavy-duty gas turbine orders globally since 2015.[117]

A surge in global turbine orders has overwhelmed the manufacturing capacity of these three suppliers, creating a backlog. In 2024, approximately 80 GW of turbine orders were placed globally.[118] However, the estimated combined annual production capacity of GE, Siemens, and MHI is only about 30 GW.[119] The backlog is expected to worsen, with annual orders projected to surpass 100GW starting in 2027.[120] Waitlists for new gas plant turbines are now extending to 2028 and beyond.[121]

For emerging Asian markets to secure these turbines, they must compete against established buyers in the US and the Middle East.[122] In the US alone, utilities and independent power providers are planning to build an average of 19 GW of new gas-fired capacity each year through to 2030, double the recent rate of construction, driven heavily by the soaring energy demands of data centres.[123] Some industry projections of cumulative gas turbine capacity additions to 2030 are higher than capacity additions underpinning the scenarios evaluated in this report.

For prospective LNG importers in Southeast Asia, such as Vietnam and the Philippines, this global turbine shortage may translate into higher project costs and longer development timelines for gas-to-power infrastructure.[124] Both countries received their first LNG shipments in 2023, and are facing delays related to power purchase agreements, financing arrangements and infrastructure development.[125] These supply chain realities do not determine the long-term demand trajectory for gas, which in this analysis is shaped primarily by climate policy and energy transition dynamics. However, supply chain constraints may also reinforce the broader structural shift underway. Renewable energy technologies such as solar and wind can be deployed more quickly and at lower cost, meaning delays to gas-fired capacity may further accelerate the transition away from LNG-dependent power systems in emerging markets.[126]

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[117] IEEFA. (2025). *Global gas turbine shortages set to increase delays and costs for gas-to-power projects in Vietnam and the Philippines*
[118] ibid.
[119] ibid.
[120] ibid.
[121] Larson, A. (2026). *Gas turbine supply chain bottlenecks could reshape the generation mix in 2030 and beyond*. POWER Magazine; Cohen, J., Fitch, T., & Shwisberg, L. (2025). *Gas turbine supply constraints threaten grid reliability; more affordable near-term solutions can help*. Rocky Mountain Institute (RMI).
[122] IEEFA. (2025). *Global gas turbine shortages set to increase delays and costs for gas-to-power projects in Vietnam and the Philippines.*
[123] Cohen, J., Fitch, T., & Shwisberg, L. (2025). *Gas turbine supply constraints threaten grid reliability; more affordable near-term solutions can help*. Rocky Mountain Institute (RMI); IEEFA. (2025). *Global gas turbine shortages set to increase delays and costs for gas-to-power projects in Vietnam and the Philippines.*
[124] IEEFA. (2025). *Global gas turbine shortages set to increase delays and costs for gas-to-power projects in Vietnam and the Philippines.*
[125] IEEFA. (2024). *Global LNG Outlook 2024-2028.*
[126] IEEFA. (2025). *Global gas turbine shortages set to increase delays and costs for gas-to-power projects in Vietnam and the Philippines.*

6. Domestic gas implications for Australia

How Australian domestic gas looks today

To assess the impact of the global energy transition on Australia's gas market, it is important to understand current production and consumption patterns.

Australia does not operate a single national gas market; rather, it is divided into two distinct, physically separate markets with no interconnected pipelines: Western Australia and the east coast (this includes Northern Territory).[127]

WA is the nation's largest gas-producing state by a significant margin, producing nearly 75% more gas than eastern Australia. In 2024, approximately 87.5% of WA's gas production was exported.[128] The fraction that remains onshore is governed by a state-level domestic gas reservation policy, shielding local users from some global market volatility.[129]

The east coast market links the Northern Territory, Queensland, NSW, the ACT, Victoria, South Australia, and Tasmania.[130] In the mid-2010s, Queensland developed LNG export terminals, which linked east coast domestic prices and supply to international LNG dynamics.[131] Legacy gas fields in the southern states (like the Bass Strait) are declining. As a result, the domestic market is increasingly reliant on transporting gas southward from Queensland, which places domestic users in direct competition with the LNG export customers.[132] Figure 18 shows Australia's gas pipelines.

If we remove volumes for export and LNG feedgas from the equation, the remaining 20% of Australia's gas production supports three primary domestic sectors, each with different consumption profiles:

- **Industry and manufacturing**: Natural gas is the largest source of energy for Australian industry. It is used in mining, minerals processing, and manufacturing.[133] Approximately 74% of industrial gas consumption is used to generate heat (in such things as alumina refining, brickmaking, and cement). Another 17% is used as a chemical feedstock for products like fertilisers, plastics, and explosives.[134]
- **Electricity (gas-powered generation - GPG)**: The electricity sector is another major domestic consumer, accounting for around 33% of domestic gas demand.[135] GPG plays a flexible, 'firming' role in both the National Electricity Market (NEM) and WA's Wholesale Electricity Market (WEM). Gas is used to firm the grid when variable renewable energy (wind and solar) output is low, or to step in when coal-fired power stations experience outages.[136]
- **Residential and commercial**: About 5 million Australian households rely on natural gas for space heating, water heating, and cooking. This sector consumes roughly 200 PJ annually, representing a relatively small slice of national demand. Residential demand is highly concentrated in Victoria, NSW, and the ACT. It is driven by winter space heating. Therefore,

[127] *Gas Market Review Report.*
[128] IEEFA. (2025). *Browse gas: Expensive, emissions-intensive, unnecessary*.
[129] ENXGY. (2025). *Gas reservation policies and market implications in Australia: What you need to know.* ENXGY.
[130] *Gas Market Review Report*; ACCC. (2025). *Gas Inquiry 2017–30: September 2025 interim repor*t. ACCC.
[131] ACCC. (2025). *Gas Inquiry 2017-2030 [Inquiry overview and reports]*. ACCC; *Gas Market Review Report*.
[132] ibid.
[133] *Future Gas Strategy*.
[134] *Future Gas Strategy Analytical Report.*
[135] ibid.
[136] ibid.

this sector creates massive seasonal peaks in daily demand, often doubling or tripling during colder months, which places strain on southern pipeline and storage infrastructure.[137]

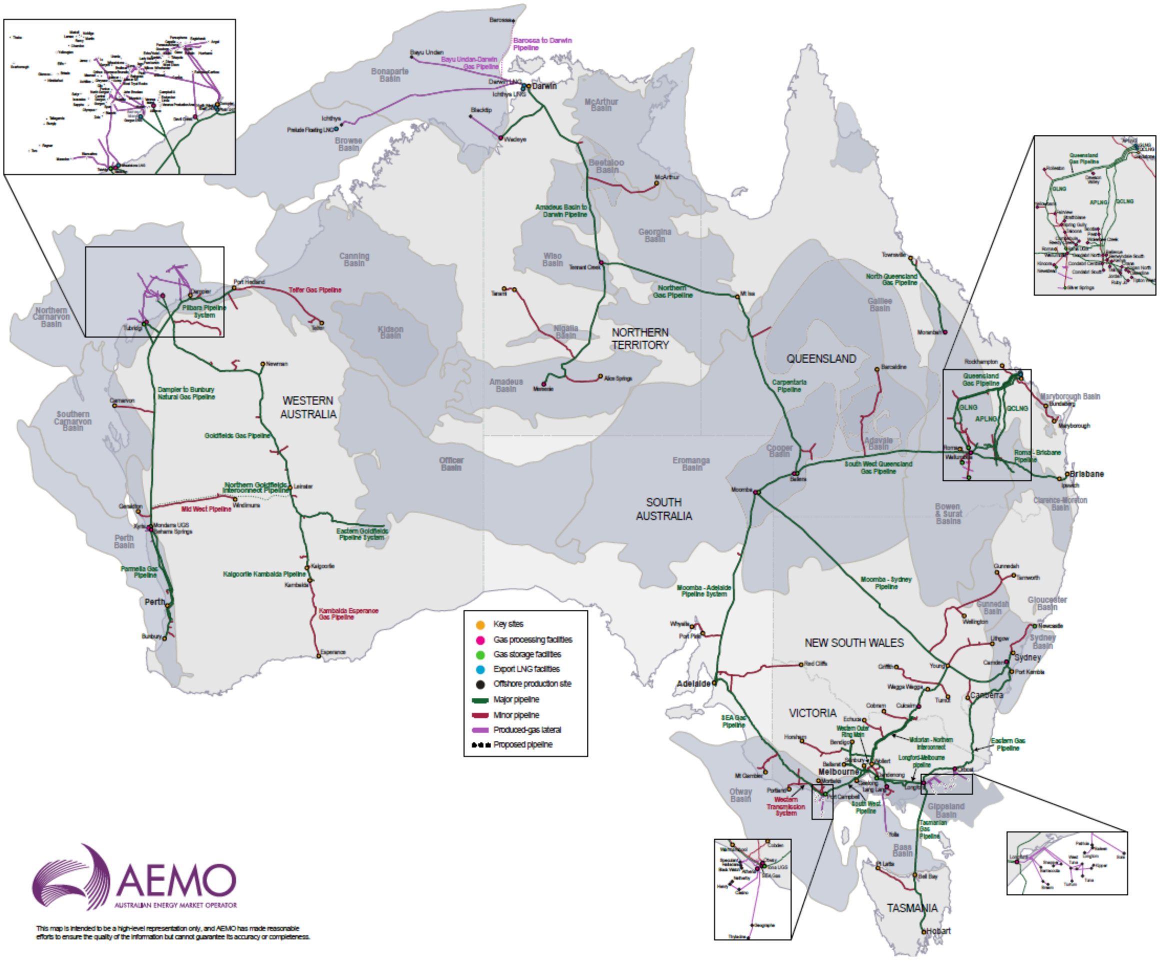

Figure 18: Australian gas pipeline map. From Australian Energy Market Operator Gas Bulletin Board.

The structure of the Australian gas industry means that domestic consumers, whether households firing up winter heaters, manufacturers relying on chemical feedstocks, or grid operators firming renewable energy, are operating at the margins of a system built to service international LNG demand.

Domestic demand under transition pathways

The domestic market is also undergoing a transformation. Driven by emission reduction targets and the broader energy transition, overall domestic gas consumption on the east coast is projected to track steadily downwards over the coming decades.[138]

Figure 19 presents the actual and forecast annual gas consumption for the East Coast Gas Market under the Australian Energy Market Operator's 2026 Gas Statement of Opportunities (GSOO) central 'Step Change' scenario. The figure shows forecast domestic use across the industrial, residential and commercial, and GPG sectors, and removes use related to LNG exports.

Domestic demand is forecast to decline. This is primarily driven by electrification of residential and commercial buildings, with a slight decline in industrial gas use as facilities either re-engineer

[137] ibid.

[138] AEMO (2026). *2026 Gas Statement of Opportunities.* AEMO.

processes or cease operations. GPG is forecast to eventually increase to provide winter firming support as coal-fired power stations retire, but this is not enough to offset the shrinking of the broader domestic market.[139]

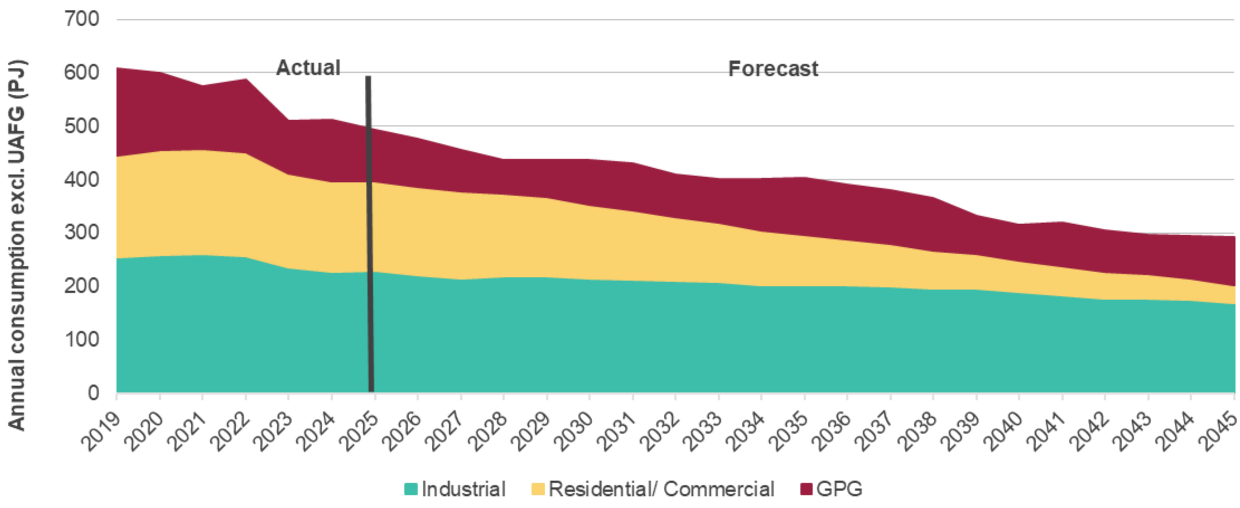

Figure 19: Actual and forecast annual domestic gas consumption, East Coast Gas Market, Step Change scenario. Calculated from the 2026 GSOO data excluding feed gas and own-use gas at LNG facilities.

AEMO's modelling, which reflects a gradual policy-driven decline in local consumption, assumes that large-scale LNG exports will continue to operate and underpin the economics of the broader gas industry.[140] The GSOO does not stress-test the domestic market against a rapid decline in demand for Australian LNG exports.

Domestic considerations in a changing LNG export market

The scenarios explored in this report imply that global LNG markets could become increasingly demand-constrained under climate-aligned pathways. If this occurs, Australian LNG exports may gradually decline as existing contracts expire and competition intensifies. Such changes in export dynamics could have implications for domestic supply conditions and investment decisions.

Link between exports and domestic supply

Australia's domestic gas system is connected to the LNG export industry.[141] Much of the upstream production capacity and pipeline infrastructure developed over two decades has been built to supply LNG export terminals, particularly in Western Australia and Queensland.[142] Domestic users therefore operate within a system whose scale and investment dynamics are influenced by export markets.

If export demand weakens over time, this could change the balance between export and domestic gas markets. In principle, a reduction in export demand may increase the availability of gas for domestic users. At the same time, lower export revenues could reduce incentives for upstream investment. The overall impact on domestic supply and prices would therefore depend on how producers respond and how domestic market arrangements evolve.

[139] ibid.
[140] ibid.
[141] *Future Gas Strategy Analytical Report.*
[142] *Gas Market Review Report.*

Domestic price outcomes are uncertain

A common assumption is that declining LNG exports would lower domestic gas prices. While this is possible, it is not guaranteed. Domestic prices are influenced by a range of factors including production costs, infrastructure constraints, regulatory settings, and investment decisions of producers.[143] For example, if weaker export demand reduces incentives to invest and leads to moth-balling, domestic supply could tighten over time even if international prices fall. However, if production continues while export demand declines, lower-cost gas may be available to domestic markets. The net effect on prices and availability will therefore depend on the interaction between export markets, investment behaviour, and domestic policy settings.

Policy context for gas-dependent investment

Even if gas becomes more available or prices fall domestically, the broader policy environment may shape the role of gas in Australia's industrial strategy. Large industrial facilities in Australia are subject to the Safeguard Mechanism, which imposes declining emissions baselines over time and requires facilities to reduce emissions or purchase offsets. As Australia moves toward its national emissions targets, these baselines may tighten further.[144]

Some of Australia's major trading partners are also developing carbon border adjustment mechanisms or similar policies that impose carbon-related costs on emissions-intensive imports.[145] If such mechanisms expand in scope, energy-intensive exports produced using fossil fuels may face regulatory or trade pressures in international markets. In this context, lower domestic gas prices alone may not provide a sufficient basis for long-term investment in gas-dependent industrial capacity. Decisions about future investment are likely to depend not only on fuel costs, but also on the evolving trajectory of climate policy and carbon regulation in Australia and globally.

These considerations do not determine how Australia's domestic gas market will evolve, but they highlight the importance of evaluating gas investment decisions within a changing global and policy environment.

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[143] ACCC. (2025). *Gas Inquiry 2017–30: September 2025 interim repor*t; *Gas Market Review Report*; Queensland Treasury. (2025). *Queensland energy roadmap 2025.* Queensland Government.
[144] Australian Government, Department of Industry, Science and Resources. (2024). *Future Gas Strategy Analytical Report;* Treasury. (2025). *Australia's net zero transformation: Treasury modelling and analysis*.
[145] International Institute for Sustainable Development (IISD). (2025). *The state of border carbon adjustments 2025*.

7. Policy considerations for Australia

The analysis explores how Australia's LNG export sector performs under three global warming pathways: 1.6°C, 1.8°C, and 2°C. These scenarios are not predictions of the future, but structured ways to assess risk under different levels of climate ambition.

The most ambitious pathway, 1.6°C, reflects scenarios consistent with limiting warming to 1.5°C with limited overshoot. Achieving this outcome would require further strengthening of global climate policies beyond those currently in place, and therefore represents the most challenging pathway. However, it remains relevant to include because energy scenarios have historically underestimated the pace of technological and policy change.[146] As discussed in Section 2, the global temperature outlook has already shifted over the last decade, from a trajectory above 3°C to a best estimate of 1.8°C to 2°C if countries meet their current targets in full.

In this sense, the 1.8 to 2°C cases represent a reasonable baseline for assessing transition risk.

Across all three scenarios explored in this report, a consistent finding emerges: global LNG markets become increasingly competitive as demand plateaus or declines while large volumes of new liquefaction capacity come online over time. In such an environment, prices are likely to fall toward the short-run marginal cost of the lowest-cost producers needed to meet demand. Cost estimates referenced in Australia's Future Gas Strategy Analytical Report suggest this floor may lie around US$3 to 5/MMBtu in key Asian markets.[147] At these price levels, higher-cost LNG exporters are likely to come under pressure.

For Australia, which sits at the higher end of the global cost curve, this dynamic has potentially significant economic implications. Lower prices and declining demand could substantially reduce export revenues from LNG over time.

Similar structural pressures have been identified in other fossil fuel exports. Previous Climate Resource analysis of Australia's coal outlook found that demand for Australian coal declines substantially under Paris-aligned warming pathways as major importing economies decarbonise their energy systems.[148] If comparable dynamics emerge across both coal and LNG markets, Australia's export profile could shift materially over the coming decades. In these scenarios, traditional fossil fuel exports may play a smaller role in the national economy .

These findings suggest that Australia's existing long-term LNG contracts may represent much of what the country can sell into global markets if demand declines as countries strive to meet their emissions targets, and lower-cost supply expands.

Implications for policymakers

For governments, the results highlight several strategic considerations:

- **Economic diversification**: if fossil fuel export revenues decline over time, strengthening other export sectors and emerging clean-energy industries may become increasingly important for maintaining Australia's trade balance and economic resilience.

[146] Way, R., Ives, M., Mealy, P., & Farmer, J. D. (2022).*Empirically grounded technology forecasts and the energy transition*. Joule, 6(9), 2057–2082.
[147] *Future Gas Strategy Analytical Report.*
[148] Burdon, R., Talberg, A., Spiller, K., Meinshausen, M., & Lewis, J. (2025). *Australia's coal outlook in a warming world: Insights from integrated assessment models*. Climate Resource.

- **Domestic energy system planning:** the relationship between LNG exports and the domestic gas market means that changes in export demand could influence domestic supply dynamics, infrastructure utilisation, and investment decisions.
- **Policy coherence with climate commitments:** domestic climate policies, including the Safeguard Mechanism and potential future tightening of emissions constraints, will interact with global energy market trends and shape the long-term competitiveness of Australian gas projects.

Implications for investors

For investors and project developers, the analysis reinforces the importance of stress-testing LNG investments against demand-constrained market conditions:

- **Exposure to declining demand:** investment decisions based on high-demand outlooks may face downside risk if global gas demand tracks closer to the pathways explored in this report.
- **Cost competitiveness:** in oversupplied markets, higher-cost producers face greater exposure to price pressure and underutilisation of existing assets.
- **Contract exposure:** as legacy contracts expire in the 2030s, the commercial outlook for Australian LNG projects will depend on the availability of uncontracted demand, and alternative sources of supply.

The central message of this analysis is that the global market conditions that supported Australia's rapid LNG expansion over the past decade may not persist beyond the 2030s. If global LNG demand weakens while low-cost supply expands, the commercial space available for higher-cost exporters will narrow. Preparing for this possibility is therefore less about predicting a specific demand outcome and more about managing risk. For Australia, this means recognising that existing LNG contracts may represent the peak of the export opportunity rather than the foundation for further expansion, and ensuring that economic, energy and climate policy are aligned with a world in which global fossil fuel demand gradually declines.

8. Conclusions: is Australia prepared for a demand-constrained LNG world?

Over the past decade, global climate ambition and technological change have altered expectations for future fossil fuel demand. Ten years ago, global emissions trajectories implied warming outcomes exceeding 3°C.[149] Today, strengthened national commitments and rapidly declining clean energy costs have shifted expected outcomes closer to 2°C if countries meet their current targets. Pathways consistent with limiting warming in 2100 to 1.5°C after temporary overshoot are still technically achievable.[150]

This shift changes the strategic outlook for globally traded fuels.

This report has examined what happens to the global LNG market if governments implement their stated climate commitments. Rather than assuming continued demand growth, the analysis adopts a demand-led perspective, asking how much LNG the world requires under warming pathways consistent with 1.6°C, 1.8°C and 2°C peak temperatures.

The most ambitious pathway explored, 1.6 °C, reflects scenarios consistent with limiting warming to 1.5 °C with limited overshoot. Achieving this outcome would require further strengthening of global climate policies beyond those currently in place. The 1.8°C and 2 °C pathways more closely reflect the outcomes if countries fully implement their existing national climate commitments.

Across all scenarios examined, a consistent result emerges: global LNG demand growth is structurally constrained in a decarbonising world, while a large wave of new low-cost supply comes online during the late 2020s or early 2030s. Under a 1.6°C pathway, existing contracted LNG supply alone is sufficient to meet projected global demand. Even under 1.8°C and 2°C outcomes, only limited volumes of additional uncontracted LNG are required.

In such an environment, low-cost producers are positioned to capture the remaining market space.[151] Higher-cost exporters face exposure to declining prices and utilisation.

Australia occupies a vulnerable position within this emerging market. Much of Australia's LNG production sits high on the global cost curve. Long-term contracts that have underpinned the sector progressively expire over the coming decades.[152] As these legacy agreements lapse, Australian exporters are increasingly exposed to spot prices in a market with excess liquefaction capacity.

The analysis also challenges the commonly cited assumption that rising Asian demand will indefinitely underpin Australian LNG exports. Across Japan, South Korea, China, India and the European Union, the scenarios explored show gas demand stabilising or declining. LNG demand tends to fall faster than overall gas demand because importing countries typically prioritise lower-cost domestic production and pipeline supplies, leaving LNG as the marginal balancing source that adjusts most rapidly to market conditions. At the same time, gas demand declines unevenly across sectors: consumption in power generation falls quickly as renewables expand, while industrial

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[149] UNEP. (2025). *Emissions Gap Report 2025: Off target – Continued collective inaction puts global temperature goal at risk* (A. Olhoff, W. Lamb, T. Kuramochi, J. Rogelj, & M. den Elzen, Eds.) United Nations Environment Programme.
[150] Talberg, A., Self, A., Lewis, J., Spiller, K., Meinshausen, M., Pflüger, M., & Burdon, R. (2026). *Behind the curves: Comparing 2100 temperature projections and underlying assumptions*. Climate Resource Pty Ltd.
[151] IEEFA. (2024). *Global LNG Outlook 2024-2028.*
[152] *Future Gas Strategy Analytical Report.*

demand declines more gradually due to fewer immediate alternatives for high-temperature heat and chemical feedstocks.

Declining global LNG demand does not automatically translate into improved outcomes for Australia's domestic gas market. Australia's domestic supply, pricing, and infrastructure arrangements are deeply intertwined with export project economics.[153] Changes in export demand could therefore create complex and uncertain outcomes for the domestic market rather than simply lowering prices.

For policymakers, investors and industry participants, the implication is clear: managing transition risk requires stress-testing economic strategy against current climate commitments. This involves assessing the resilience of new LNG investment under demand-constrained scenarios, preparing for potential shifts in Australia's export profile, and ensuring that domestic energy policy remains robust in a changing global market.

Recent geopolitical tensions in major producing regions highlight an important qualification. Prolonged or widespread disruptions to LNG supply could tighten markets and have material short-term effects on prices and trade flows. However, disruptions that primarily affect the timing of new supply rather than the total volume expected to come online by the mid-2030s do not alter the structural imbalance identified in this analysis, between constrained demand and a large wave of new liquefaction capacity, in the scenarios explored.

The crisis in the Middle East clearly demonstrates the risks to global supply chains and the impact of temporary tightening of gas markets. Yet such episodes also demonstrate why long-term planning is essential: investment decisions in infrastructure that operates for decades must ultimately be guided by structural demand trends rather than short-term market disruptions. The current disruptions will heighten the focus on energy security and may serve to hasten the transition to locally available sources and renewables in many markets.

The question facing Australia is no longer whether demand for its LNG exports will eventually peak, but whether economic and energy policy are prepared for a rapid decline in demand in the 2030s.

[153] *Gas Market Review Report.*

Appendices

A1 - Detailed methodology: a demand-led LNG analysis

To assess the impact of the global energy transition on Australian LNG exports, this study employs a demand-led model. Rather than forecasting supply-side capacity additions, we construct a 'bottom-up' view of global LNG demand under warming pathways and assess how existing supply capacity and contract positions interact with a shrinking market. The analysis is conducted across nine analytical steps, detailed below.

Deriving scenario-based gas demand (NGFS5)

Step 1

To estimate future gas demand for LNG-importing nations, we draw on the NGFS Phase 5 scenario database.[154] We isolate the variable for 'Primary Energy - Gas' demand, focusing our analysis on the top 19 LNG importing countries, which collectively account for approximately 90% of global LNG imports.

Rather than relying on a single NGFS5 scenario, we employ a rolling-quantile regression to capture the non-linear relationship between peak warming and gas demand in each region. This method maximises the use of available scenario data, allowing us to estimate gas demand under three distinct peak warming levels: 1.6°C, 1.8°C, and 2.0°C. We derive a distribution of demand pathways (specifically the 13th, 33rd, 50th (median), 66th, and 87th percentiles) for each country at five-year intervals from 2020 to 2050, interpolating to obtain annual values.

Projections for the 1.6°C pathways are informed by a smaller number of scenarios, reflecting the increasingly limited and narrowing window to achieve this ambitious temperature goal without significant overshoot.

Isolating the LNG import requirement: The supply merit order

To determine how much of a country's total gas demand must be met by LNG, we apply a supply merit order, subtracting domestic production and pipeline imports from total primary gas demand.

Step 2 (domestic supply)

We first subtract domestic gas supply from each of the 19 countries' total demand profiles, assuming that domestic production is consumed preferentially over imports.[155] This assumption is grounded in the fundamental economics of gas markets and energy security. Domestic gas generally sits lower on the cost curve as it avoids the capital-intensive processes of liquefaction, shipping, and regasification.[156] Nations typically prioritise domestic extraction to ensure sovereign energy security and insulate their economies from international price volatility and geopolitical supply shocks.[157]

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[154] NGFS Climate Scenarios for central banks and supervisors - Phase V.

[155] Production data from various publicly available sources including the IEA, GECF, and the UK North Sea Transition Authority.

[156] *Future Gas Strategy.*

[157] Casagrande, S., & Dallago, B. (2025). *The economic and geostrategic role of LNG in EU energy transition.* Structural Change and Economic Dynamics, 74, 387–404.

While conceptually sound and appropriate for this analysis, this assumption has practical limitations. It does not account for intra-country infrastructure bottlenecks, such as when a country may lack pipeline capacity to move inland domestic gas to coastal demand centres, forcing those centres to rely on imported LNG.

Step 3 (pipeline imports)

We next subtract pipeline imports for each of the 19 countries. Pipeline gas is assumed to have priority over LNG imports because it is generally lower cost on a delivered basis and is typically supplied through long-term bilateral infrastructure arrangements with limited destination flexibility. These characteristics tend to anchor pipeline flows between specific counterparties and reduce the ability to redirect volumes in response to changing market conditions.[158] Projections are based on historical trend data, adjusted to reflect documented national plans for infrastructure expansion or a reduction in imported volumes. These projections are informed by data from ENTSOG's Transparency Platform, the Energy Institute's Statistical Review of World Energy, and the IEA's Gas 2025 report.[159]

Step 4 (calculating the remainder)

The residual volume remaining after domestic supply and pipeline imports are subtracted from total gas demand represents the theoretical 'LNG import requirement' for each of the 19 countries.

Scaling to a global LNG requirement

Step 5

Because our detailed country-level analysis covers the top 19 importers only, representing around 90% of global LNG trade, we scale up LNG demand by dividing by 0.9. This accounts for the remaining 10% of demand from smaller or emerging LNG importers, providing a 100% global LNG import requirement for each warming pathway through to 2050.

Contractual rigidity and destination flexibility

Step 6

To assess how this demand interacts with locked-in supply, we compare the global LNG import requirement against existing contracted LNG supply. Contract data (annual contract quantities and term lengths) was sourced and aggregated from the International Group of Liquefied Natural Gas Importers (GIIGNL) annual reports up to and including the 2025 edition.[160] A limitation of this dataset is that it does not capture contracts concluded in 2025 or 2026 that are not yet reflected in published reports, resulting in an understatement of contracted supply.

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[158] Molnar, G. (2022). *Economics of Gas Transportation by Pipeline and LNG*. In The Palgrave Handbook of International Energy Economics (pp. 23–57). Springer.

[159] ENTSOG. (2025). *Transparency Platform*. Energy Institute. (2025). *Statistical Review of World Energy*. IEA. (2025) *Gas 2025*.

[160] International Group of Liquefied Natural Gas Importers (GIIGNL). *GIIGNL Annual Report 2023.; GIIGNL Annual Report 2024; GIIGNL Annual Report 2025.*

Step 7

Not all LNG contracts offer the same operational flexibility. The ability to redirect LNG cargoes depends on specific contractual provisions, such as destination clauses, diversion rights, and consent requirements. Because such contract-level detail is not publicly available, delivery terms, Free on Board (FOB) versus Delivered Ex-Ship (DES), are used as a proxy measure of flexibility. We apply assumptions based on established industry literature:

- **FOB contracts:** Assumed to be 90% destination flexible, as the buyer takes ownership at the loading port and controls the shipping.
- **DES contracts (signed from 2017 onwards)**: Assumed to be 40% flexible, reflecting the recent industry push for the relaxation of strict destination clauses.
- **DES contracts (signed before 2017)**: Assumed to be 10% flexible, reflecting legacy market practices where sellers strictly controlled the final destination of the gas.

The choice of 2017 does not represent a hard legal or other milestone. Rather it is an inflection point approximately marking the period before widespread relaxation of destination clauses following the emergence of US LNG and increased antitrust enforcement in Europe.[161]

Applying these likelihood assumptions to contracted volumes at the country level yields an estimated split between flexible and non-flexible contracted supply for each country and year.

Sensitivity testing indicates that the results are not affected by the assumed flexibility shares. As shown in Figures 8–10, varying these parameters does not materially alter the overall balance between contracted supply and projected LNG demand.

Market clearing: uncontracted demand vs. surplus

Step 8

We apply this country-level flexibility percentage to any calculated 'surplus' contracts. If a country's contracted LNG volume exceeds its modelled LNG import requirement, this flexibility metric determines exactly how much of that surplus can be redirected to third-party countries whose demand is not yet satisfied by existing contracts.

Step 9

By netting out the redirectable surplus against global demand, the model calculates the final market balance for each warming pathway (1.6°C, 1.8°C, and 2.0°C). This final step identifies the volume of uncontracted demand (the theoretical space for spot cargoes or future contracts) and the volume of surplus contracted supply (the overhang of locked-in gas that exceeds structural demand). It also quantifies uncontracted LNG supply capacity, indicating export capacity that is neither contractually committed nor required to meet modelled demand.

[161] Allens. (2016). *LNG destination clauses under scrutiny by Japanese competition authorities.* Allens; European Commission. (2018). *Antitrust: Commission opens formal investigation into restrictive clauses in LNG supply agreements (IP/18/4239).*; Wright, B., & Côté, M. (2023). *Destination flexibility in LNG contracts: Market evolution and competition policy.* Journal of World Energy Law & Business, 16(6), 492–515

A2 - Methodological limitations and caveats

As with all long-term energy transition modelling, this demand-led analysis relies on specific parameters and assumptions to simulate complex global markets. While the NGFS pathways provide a robust framework for assessing climate-aligned futures, the results should be interpreted with the following methodological limitations in mind:

- **Smoothing and cost-optimised pathways:** The NGFS scenarios used to derive global gas demand are generated by IAMs, which are least-cost optimisation models designed to find the most economically efficient route to a climate target over decades. They inherently produce smooth, rational, and orderly transition pathways. In reality, energy transitions are rarely linear; they are characterised by messy boom-and-bust cycles, technological changes, volatile price spikes, periods of stranded assets or underinvestment, and geopolitical shocks. By relying on these smoothed, cost-optimised IAM pathways, this analysis establishes a structural baseline for demand but does not capture the short-term volatility, nonlinear shocks, and cyclical imbalances that frequently disrupt real-world LNG markets.[162]
- **Perfect foresight and investor behaviour:** Building on the cost-optimised nature of IAMs, some models (REMIND and MESSAGE) effectively assume that market participants act with perfect foresight regarding the long-term climate pathway and adjust their capital allocation accordingly.[163] It does not account for the reality of investor behaviour during a transition, where capital allocation, lagging reactions to sudden policy shifts, or corporate bets against the transition can lead to periods of severe market mismatch and overcapacity.[164]
- **Technological assumptions and blind spots in IAMs**: IAMs also rely on assumptions about the future availability and scaling of specific technologies. Some climate scenarios permit higher levels of continued use of fossil fuels by assuming the large, commercial-scale deployment of carbon capture and storage and extensive land-use changes (carbon sinks) to remove emissions later in the century. IAMs also have a history of underestimating the cost declines and rapid deployment rates of commercially available renewable energy, particularly solar.
- **Absence of geopolitical shocks:** The NGFS pathways do not simulate unpredictable geopolitical disruptions, trade wars, shipping chokepoint crises (such as the Strait of Hormuz or Panama Canal), or deliberate supply withholding by major state actors, all of which can override fundamental supply-demand economics.
- **Simplified infrastructure constraints:** When subtracting domestic supply and pipeline imports to find the LNG requirement, the model assumes perfect intra-regional distribution. It simplifies or ignores domestic infrastructure bottlenecks which can force countries to import LNG even when their aggregate domestic supply appears sufficient.
- **Contract data completeness:** Contract datasets are based on publicly available reporting and do not capture LNG supply agreements concluded in 2025 or 2026 that are not yet reflected

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[162] de Coninck, H., et al. (2016). *A review of criticisms of integrated assessment models and proposed approaches to address these, through the lens of BECCS.* Energies, 12(9), 1747; Berg, T., et al. (2023). *Climate-change scenarios require volatility effects to imply substantial credit losses: shocks drive credit risk not changes in economic trends.* Frontiers in Climate, 5:1127479.

[163] Baumstark, L., Bauer, N., Benke, F., et al. (2021). *REMIND2.1: Transformation and innovation dynamics of the energy-economic system within climate and sustainability limits*. Geoscientific Model Development, 14, 6571–6603.; International Institute for Applied Systems Analysis (IIASA) & IAMC. (2025). *NGFS Climate Scenarios Technical Documentation*. NGFS.

[164] Wilson, C., Guivarch, C., Kriegler, E. et al. (2021) *Evaluating process-based integrated assessment models of climate change mitigation.* Climatic Change 166, 3.

in published sources. As a result, recently signed contracts are underrepresented, leading to an understatement of contracted supply.

- **Contractual generalisations:** Determining the redirectable surplus relies on applying flat flexibility probabilities to delivery contracts: assuming 90% flexibility for FOB and 40% for modern DES contracts. While grounded in industry literature, this generalisation cannot capture the bespoke legal nuances of individual SPAs, including specific Downward Quantity Tolerances (DQT) or the outcomes of private, undisclosed contract renegotiations.
- **Price elasticity of demand:** The model calculates the global LNG requirement top-down from NGFS primary energy data, therefore it may under-represent short-term price elasticity. If the projected overhang of global LNG capacity causes prices to crash, it could theoretically stimulate temporary 'latent' demand or coal-to-gas switching in highly price-sensitive markets, which might slightly soften the pace of demand destruction compared to the rigid IAM trajectory.
- **Static LNG export capacity post-2035**: The baseline LNG export capacity for each producing nation in our model is derived from IEA asset-level data, which captures facilities that are currently in operation or actively under construction. This dataset only projects firm capacity additions out to 2035. Therefore, our analysis assumes a static continuation of these capacity levels from 2035 through to 2050. As a caveat, this static assumption does not dynamically account for the end-of-life decommissioning of legacy LNG trains, the natural depletion of feedgas at older facilities, or any hypothetical greenfield projects that have not yet reached a final investment decision but could theoretically be sanctioned from today and come online by the late 2030s.

Table A1 captures how each limitation or caveat affects the analysis. The limitations of the methodological approach generally skew towards underestimating the severity of the supply glut.

Table A1 - Directional impact of methodological choices on analytical results

Limitation / caveat	Directional impact on results	Effect on supply overhang
Smoothing and cost-optimised pathways	**Neutral / variable.** The model underestimates short-term volatility and peak demand spikes, but establishes a structurally sound long-term baseline. The overall volume effect over decades is largely neutral.	—
Perfect foresight and investor behaviour	**Underestimates supply overhang.** By assuming rational, climate-aligned investment, the model underestimates the amount of excess capacity that will actually be built, meaning the real-world supply glut could be even larger than modelled.	↓
Technological assumptions and blind spots in IAMs	**Overestimates LNG demand.** The models historically overestimate the commercial viability of carbon capture and storage while systematically underestimating the rapid rollout of cheap solar. Consequently, the actual decline in global LNG demand will likely be steeper and faster than projected.	↓
Absence of geopolitical shocks	**Directional impact uncertain (but Australian share likely to increase)** Geopolitical developments can influence LNG demand in opposing ways. Supply disruptions can trigger price spikes that accelerate demand destruction, as seen following Russia's invasion of Ukraine, while prolonged oversupply and lower prices could stimulate temporary demand through coal-to-gas switching or increased consumption in price-sensitive markets.	?
Simplified infrastructure constraints	**Underestimates LNG demand.** By assuming perfect domestic distribution, the model ignores instances where domestic pipeline bottlenecks force a country or region to rely on imported LNG despite having sufficient aggregate domestic reserves.	↑
Contract data completeness	**Underestimates contracted supply, overstates uncontracted demand.** LNG supply agreements concluded in 2025 or 2026 that are not yet reflected in published sources are excluded. This overestimates uncontracted demand.	↓
Contractual generalisations	**Overestimates uncontracted demand.** The analysis applies simplified assumptions about LNG contract flexibility. In practice, many contracts include diversion rights, tolerance bands or renegotiation clauses, allowing cargoes to be redirected between markets. This makes the LNG system more flexible than in the model and may reduce the need for additional uncontracted supply.	↓
Price-demand feedback	**Neutral.** Price–demand feedback is primarily a market behaviour. In this analysis, however, demand trajectories are determined by climate-aligned IAM scenarios rather than market price responses. As a result, while price changes could influence short-term consumption in real markets, they do not materially alter the structural demand pathways used in the model.	—
Static LNG export capacity post-2035	**Neutral.** Assuming a static continuation of LNG capacity after 2035 could either overstate long-term global supply if the natural depletion and decommissioning of legacy facilities outpaces any unmodelled future project approvals; or it could slightly understate capacity if a new wave of late-2030s greenfield projects is sanctioned.	—

A3 - NGFS Phase 5 scenarios

The NGFS Phase 5 scenarios used in this report provide a structured framework for exploring how global energy systems may evolve under different climate outcomes. In interpreting the results presented in this analysis, several characteristics of the NGFS scenario dataset should be considered.

Purpose of the underlying IAM scenarios

The NGFS scenarios were developed to assist policymakers, regulators and financial institutions in assessing potential climate transition risks and opportunities. They are published annually and widely used across the scientific, policy and investment communities. The scenarios are generated using IAMs, which simulate interactions between the global economy, energy systems and climate policies.

As noted in the previous section, IAMs are optimisation models that identify the least-cost pathway for meeting energy demand under specified policy constraints, including emissions limits consistent with different warming outcomes. The resulting outputs describe internally consistent energy system pathways, including emissions trajectories and demand for different energy sources. These outputs should therefore be interpreted as scenarios rather than forecasts of future energy demand.

Each model contributing to the NGFS Phase 5 database reports several scenarios representing different assumptions about policy ambition and technology development. These include a current-policies scenario as well as multiple pathways reflecting stronger climate mitigation efforts consistent with limiting warming to well below 2°C.

Models included in the NGFS5 dataset

The NGFS Phase 5 database includes scenarios produced by three widely used IAM frameworks developed by leading international research institutions:

- **GCAM**, developed by the Joint Global Change Research Institute (JGCRI), a partnership between the Pacific Northwest National Laboratory and the University of Maryland.
- **MESSAGE-GLOBIOM**, developed and maintained by the International Institute for Applied Systems Analysis (IIASA).
- **REMIND-MAgPIE**, developed by the Potsdam Institute for Climate Impact Research (PIK).

Together these models provide a set of 28 scenarios covering a range of climate policy assumptions and transition pathways.

Scenario availability and model resolution

Not all models report results at the same country-level resolution. In some cases, countries are represented as part of broader regional groupings. Where country-specific data are not available, regional results may be used where the country of interest represents a large share of the region’s demand.

The number of scenarios available also differs across peak warming levels. In particular, the number of scenarios consistent with limiting peak warming to around 1.6°C is relatively small compared with those consistent with 1.8°C or 2°C. This means the statistical distribution of outcomes for the most ambitious scenarios is based on fewer model runs and should be interpreted with appropriate caution.

Despite these limitations, the NGFS scenario dataset provides a useful basis for assessing the direction and scale of changes in global gas demand under different climate transition pathways.