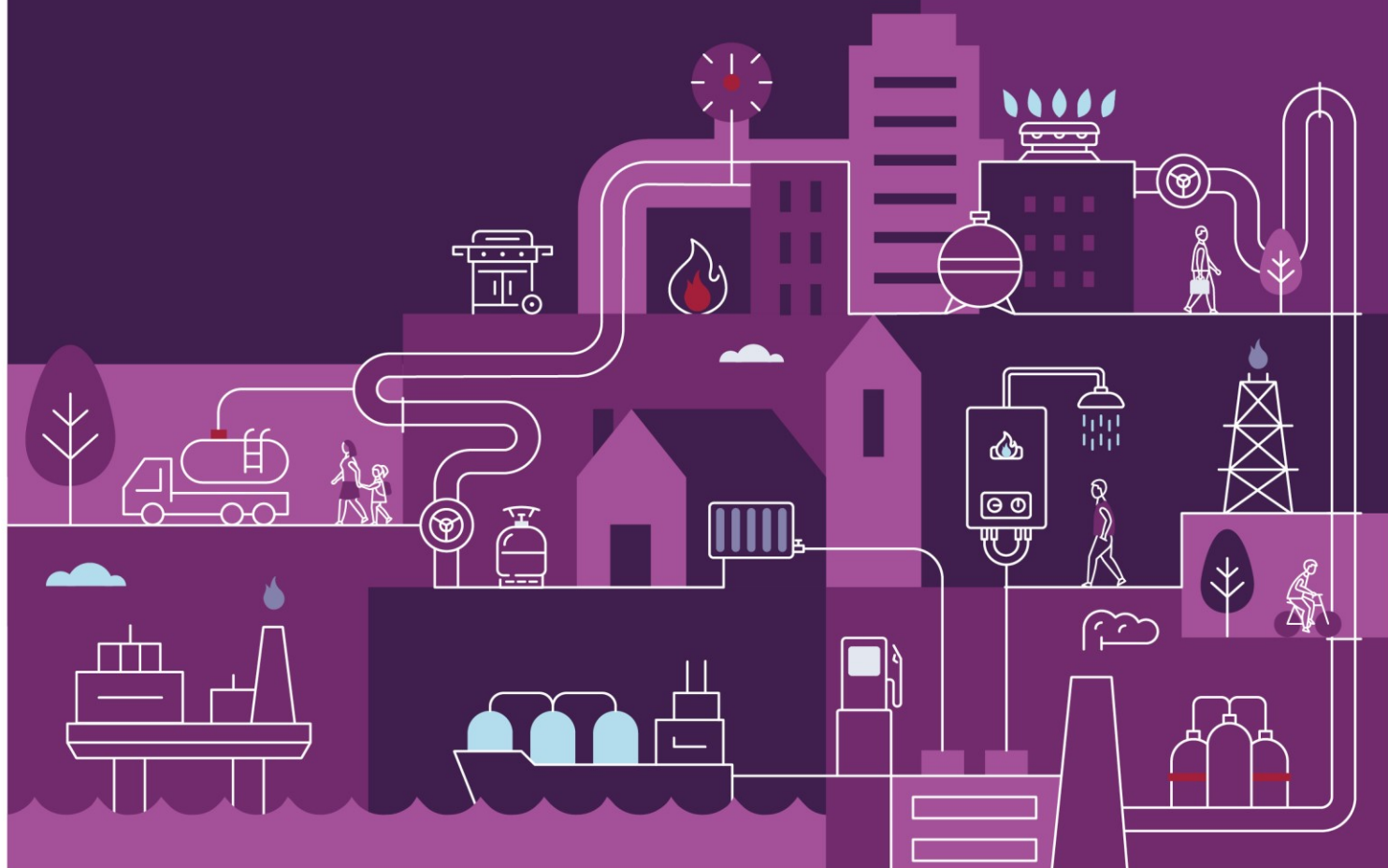


2024 Western Australia Gas Statement of Opportunities

December 2024

For Western Australia's Gas Market





We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.

We acknowledge that, wherever we work, we do so on Aboriginal and Torres Strait Islander lands. We pay respect to the world's oldest continuing culture and First Nations peoples' deep and continuing connection to Country; and hope that our work can benefit both people and Country.

'Journey of unity: AEMO's Reconciliation Path' by Lani Balzan.

AEMO Group is proud to have launched its first [Reconciliation Action Plan](#) in May 2024. 'Journey of unity: AEMO's Reconciliation Path' was created by Wiradjuri artist Lani Balzan to visually narrate our ongoing journey towards reconciliation - a collaborative endeavour that honours First Nations cultures, fosters mutual understanding, and paves the way for a brighter, more inclusive future.

Important notice

Purpose

The purpose of this publication is to provide information about the natural gas industry in Western Australia. AEMO publishes this Western Australia Gas Statement of Opportunities in accordance with rule 103 of the Gas Services Information Rules. This publication is generally based on information available to AEMO as of 30 November 2024 unless otherwise indicated.

Disclaimer

AEMO has made reasonable efforts to ensure the quality of the information in this publication but cannot guarantee that information, forecasts and assumptions are accurate, complete or appropriate for your circumstances.

Modelling work performed as part of preparing this publication inherently requires assumptions about future behaviours and market interactions, which may result in forecasts that deviate from future conditions. There will usually be differences between estimated and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material.

This publication does not include all of the information that an investor, participant or potential participant might require, and does not amount to a recommendation of any investment.

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Notes for 2024 Western Australia Gas Statement of Opportunities

- All data in this report is presented in calendar years (1 January to 31 December) unless otherwise stated.
- All references to \$ in this report refer to Australian dollars.
- This WA GSOO presents potential domestic gas supply, domestic gas consumption and domestic demand forecasts for a 10-year outlook period for three scenarios – *Progressive Change*, *Step Change* and *Green Energy Exports*, aligning with 2024 WEM ESOO scenarios. Chapter 1 defines these scenarios along with scenario parameters.
- The compound annual growth rate was used to calculate the average annual growth rate. AEMO refined the calculation by using the first outlook year (year 1) minus one year (year 0) as the base year instead of year 1 to calculate the 10-year average annual growth rate. AEMO used 2024 and 2029 as year 0 to calculate the five-year average annual growth rates for the first half (2024 to 2029) and second half (2029 to 2034) of the outlook period, respectively.
- This WA GSOO differentiates domestic gas consumption from domestic gas demand. While gas consumption considers gas used over a year, averaged to convert to the unit of TJ/day, gas demand refers to daily gas use.

Executive summary

The 2024 Western Australia *Gas Statement of Opportunities* (WA GSOO) forecasts the adequacy of gas supplies in Western Australia's domestic gas market, based on information from gas industry participants and publicly available sources, for the 10-year outlook period from 2025 to 2034. The information in this WA GSOO helps industry participants and stakeholders make informed decisions about investment in Western Australia's gas market.

During Australia's transition to a net zero emissions future, gas will continue to be used by Western Australian households, businesses, and industry, and support the reliability and security of the electricity sector. This WA GSOO forecasts an improved near-term supply adequacy outlook compared to the 2023 WA GSOO and continues to forecast risks of annual supply gaps that will require new sources of supply from 2030 onwards. Gas consumption by industrial, commercial and residential consumers is forecast to increase while existing gas fields are depleting.

- **The near-term supply position is stronger than last year's outlook**, with supply forecast to exceed consumption through to 2027. Shortfalls projected in the 2023 WA GSOO have been relieved by increased flow from Wheatstone, Karratha Gas Plant and Pluto, and new domestic supply with progress of Scarborough Energy Project and West Erregulla. Near-term forecast consumption is also lower than projected last year, due to the suspension of several nickel mines and curtailment of Kwinana Alumina Refinery operations.
- **From 2030, an increasing supply gap in the gas market is projected**, with potential annual supply gaps of up to 191 terajoules per day (TJ/day) towards the end of the outlook period. This is driven by continuous growth in industrial and minerals processing sectors, and a decline in production due to natural reserve depletion from existing gas fields.
- **Gas usage for gas-powered generation (GPG) in the South West Interconnected System (SWIS) is forecast to become peakier and more seasonal**. Increased variable renewable energy (VRE), supported by batteries and gas, is projected to offset retirements of coal-fired generation. Over time, as more renewable generation is connected and heating load switches from gas to electricity, GPG is forecast to play a more seasonal role. As a proportion of the total SWIS supply mix, GPG is projected to decline over the outlook period, but daily peak gas usage is forecast to increase.
- **Most gas production facilities are running close to, or at, capacity**. This leads to a risk of shortages in the event of supply outages and during peak demand days, requiring corresponding responses from suppliers and/or consumers. A projected risk of supply gap in 2028 would require increased production from domestic gas facilities, or accelerated development of supply sources, to better match the increase in consumption. New supply sources that can flex in response to the increasingly seasonal gas demand will provide even greater utility beyond 2030.

In this 10-year assessment, the period from 2028 is subject to the most uncertainty, with forecast supply gaps depending on evolving factors such as coal-fired generation retirements, commodity prices, project timelines and domestic gas policy. The updated Western Australian Domestic Gas Policy is intended to provide greater incentive for new onshore gas development and enable greater supply flexibility to accommodate this uncertainty by temporarily allowing some offshore export during times of domestic surplus. The state's gas supply adequacy is sensitive to the actions of a handful of key players, who in turn are influenced by external factors such as global commodities pricing, energy policy, decarbonisation targets and availability of affordable lower carbon options.

Key changes since the 2023 WA GSOO

Increased supply across the outlook period

The near-term supply shortfalls projected in the 2023 WA GSOO have been relieved by increased flow from Wheatstone, Karratha Gas Plant and Pluto, and new domestic supply with the progress of the Scarborough Energy Project and West Erregulla gas processing plant.

Softened near-term consumption

Forecast gas consumption is lower in the near term than projected in the 2023 WA GSOO, due to the suspension of several nickel mines and curtailment of Kwinana Alumina Refinery operations. Consumption is expected to not only rebound but increase from 2028.

Aligned scenarios and SWIS GPG input assumptions with Wholesale Electricity Market (WEM) Electricity Statement of Opportunities

To help provide a more holistic view of Western Australia's energy requirements, the scenarios used in this WA GSOO have been aligned with the scenarios presented in the 2024 Wholesale Electricity Market *Electricity Statement of Opportunities* (WEM ESOO)¹. The WEM ESOO supply outlook also informs the SWIS GPG demand assessment.

Included new infrastructure adequacy assessment

For the first time, AEMO has undertaken modelling of Western Australia's gas pipeline network to assess infrastructure adequacy. AEMO's high-level assessment indicates adequate daily pipeline and storage infrastructure nameplate capacity across the outlook period, subject to maintaining sufficient line pack and storage levels to maintain supply through a major production outage. AEMO will continue to refine its approach to infrastructure modelling and expects to consider assessment of intra-day network adequacy in future WA GSOOs.

Implemented GSOO-related recommendations from the Domestic Gas Inquiry

AEMO implemented the GSOO-related recommendations from the Western Australian Economics and Industry Standing Committee's Inquiry into the Western Australian Domestic Gas Policy (DomGas Inquiry) as follows:

- *Include forecast decarbonisation pathways.* This was addressed by aligning the GSOO scenarios with the WEM ESOO scenarios and applying an emissions target to SWIS GPG consumption modelling to achieve net zero emissions by 2050. This improves the alignment of SWIS GPG capacity and generation forecasts with technology mix outcomes from multi-sectoral modelling (MSM) outcomes². Decarbonisation for the components aside from SWIS GPG was considered by modelling sectoral electrification and reduction in gas consumption by large users due to efficiency upgrades or on-site VRE.
- *Allow for integration of, and interdependencies between, Western Australia's gas and electricity markets.* This was addressed by aligning scenarios and using the WEM ESOO supply outlook to inform SWIS GPG consumption.

¹ See https://aemo.com.au/-/media/files/electricity/wem/planning_and_forecasting/esoo/2024/2024-wem-electricity-statement-of-opportunities.pdf. The scenarios are *Progressive Change* (low case), *Step Change* (expected case) and *Green Energy Exports* (high case).

² Commonwealth Scientific and Industrial Research Organisation (CSIRO) and ClimateWorks Centre (CWC), 2022 *Multisector energy modelling*, prepared for AEMO, 2022. See https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/2023-inputs-assumptions-and-scenarios-consultation/supporting-materials-for-2023/csiro-climateworks-centre-2022-multisector-modelling-report.pdf.

- *Extend outlook period to 20 years.* This will be considered for future WA GSOOs.

Accounted for Western Australian Government's updated Domestic Gas Policy

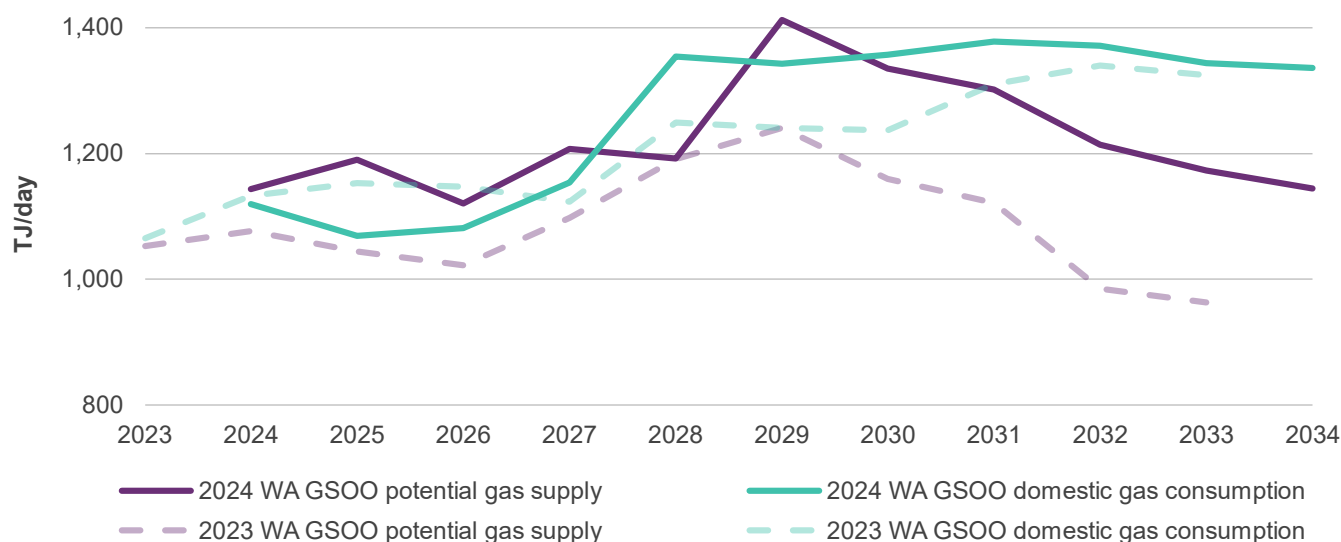
As part of its response to the DomGas Inquiry, in September 2024 the Western Australian Government updated its Domestic Gas Policy³. AEMO has taken this update into account as follows:

- Retained the 15% reservation for Western Australia's offshore liquefied natural gas (LNG) projects for the Western Australia domestic market. As such, LNG projects were assumed to make at least 15% of supply available to the domestic market.
- Permitted export of up to 20% of new onshore projects' gas production until the end of 2030. This was addressed by including an assumption that expected new onshore projects will make 80% of supply available to the domestic market until the end of 2030, and then 100% of supply available after 2030. The impact of this policy on stimulating new projects has not been assessed.

The near-term outlook for Western Australia's domestic gas market has improved compared to the 2023 WA GSOO

In the first half of the outlook period, the Western Australian domestic gas market supply adequacy has improved due to a combination of increased supply and softening consumption. Figure 1 shows that, in the *Step Change* scenario, the Western Australian domestic gas market supply is projected to be in surplus until 2027, to be at risk of a supply gap in 2028, and to move into deficit from 2030⁴. The 2023 WA GSOO outlook (dashed lines) projected a supply deficit throughout the period.

Figure 1 Forecast Western Australian domestic gas supply adequacy, Step Change scenario, 2024 to 2034 (TJ/day)



³ See <https://www.wa.gov.au/government/announcements/domestic-gas-policy-updated-secure-was-energy-future>.

⁴ Prior to 2030, a supply gap in the domestic gas market could materialise if supply projects are delayed or other consumption side risks materialise. Supply-side risks increase after 2030 as production from existing fields declines.

The surplus projected in the near term of the 2024 WA GSOO outlook period is due to a shift in both supply and gas use forecasts since last year, however the forecasts are subject to considerable uncertainty. On the consumption side, the suspension of several nickel mines and the curtailment of Kwinana Alumina Refinery reduce projected gas consumption between 2024 and 2027. On the supply side, higher domestic supply is forecast from:

- Capacity expansion of Wheatstone Project's domestic gas plant, from 2024.
- Pluto Acceleration Project, until the end of 2025.
- Commencement of the offshore Scarborough Energy Project in late 2026 (assuming 15% of resource is reserved for the domestic market), and West Erregulla gas processing facility in 2027.

An increase in gas consumption is forecast from 2027, due to advised restart of curtailed operations as well as projected growth from existing operations. This, in addition to the commencement of the Perdaman Karratha Urea Project, pushes forecast consumption over 1,300 TJ/day from 2028 onwards. The growth in consumption between 2027 and 2030 is partially met by supply from the Scarborough Energy Project (commencing in 2026), the new West Erregulla project (commencing in 2027), and the new Lockyer Gas project (commencing in 2029) and Waitsia Stage 2 (commencing in 2029⁵). However, the currently advised timing of new supply projects lags the projected growth in consumption, leading to a risk of supply gap, forecast in 2028. Addressing this gap will require an increase in supply from existing sources or earlier domestic supply from new supply sources.

This period from 2028 onwards is subject to considerable uncertainty, particularly on the consumption side.

SWIS GPG is forecast to play an increasingly important role in firming renewables (both distributed photovoltaics [PV] and VRE) and maintaining reliable and secure electricity supply. The ability for VRE to connect before 2030 depends on whether sufficient new transmission network capacity is available in time, as well as the effectiveness of enabling external economic and policy factors such as new market reforms⁶ and the Capacity Investment Scheme⁷. Similarly, any shift in the timing of coal-fired generation retirements or new major gas consuming projects will materially impact domestic gas consumption.

For example, there is uncertainty associated with the pressures facing coal-fired generators as the Western Australian economy decarbonises and the operational characteristics of power stations change. Based on SWIS GPG modelling developed for the 2024 WA GSOO, firmed VRE is forecast to replace coal and support growth in electricity consumption, with GPG declining over time as a proportion of the total SWIS supply mix. This results in SWIS GPG annual gas consumption rising slightly for a few years immediately following the coal retirements but returning to current levels of around 190 TJ/day by the end of the decade (while continuing to play an important and increasingly seasonal role in meeting peak demand).

In this WA GSOO, sensitivity analysis has been conducted to understand the impacts on gas supply adequacy if coal supplies to Bluewaters Power Station cannot be secured beyond October 2026, resulting in earlier than expected closure of this plant. Under this sensitivity, annual SWIS GPG gas consumption may increase by up to 27 TJ/day until sufficient replacement VRE and transmission network is built. While forecasts indicate there would

⁵ A delay in commencement of Waitsia Stage 2 was announced in April 2024, see https://yourir.info/resources/0c5a441cf54ff229/announcements/bpt.aspx/2A1516338/BPT_Waitsia_Stage_2_update.pdf. Waitsia Stage 2 joint venture is approved to process LNG for export at North West Shelf LNG facilities to the end of 2028, see <https://www.wa.gov.au/government/publications/implementation-of-the-wa-domestic-gas-policy>.

⁶ Including, but not limited to the Western Australian Government's Wholesale Electricity Market Investment Certainty Review; see <https://www.wa.gov.au/government/document-collections/wholesale-electricity-market-investment-certainty-review>.

⁷ See <https://www.dcceew.gov.au/energy/renewable/capacity-investment-scheme>.

remain sufficient gas supply to meet this increase in consumption in 2027, it would further add to the tightening of the domestic market balance in this period and widen the risk of supply gap identified in 2028.

Notwithstanding the potential uncertainty from 2028, current modelling indicates new gas supply is required from 2030 in all scenarios, consistent with the key findings of the 2023 GSOO. Significant supply gaps arise after 2029 as existing gas fields deplete. Unless new gas supply enters the market from 2030, AEMO forecasts supply deficits of up to 191 TJ/day by 2034 (see Table 1).

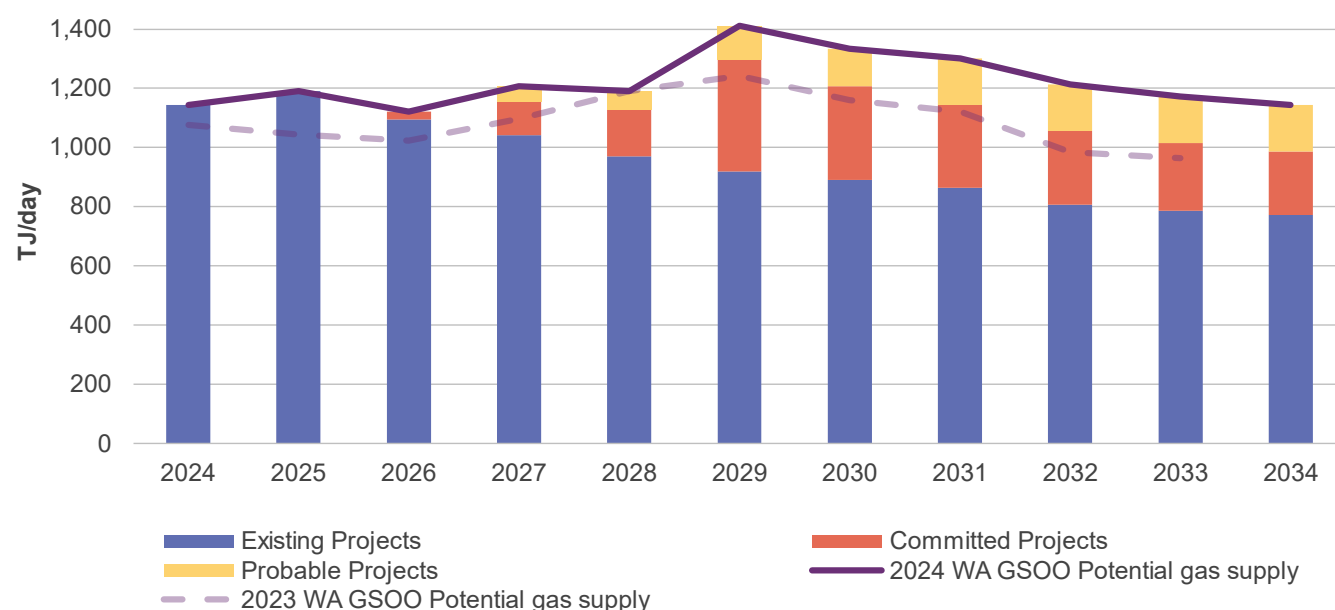
Table 1 Potential annual gas supply and domestic gas consumption forecasts, 2024 to 2034 (TJ/day)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Potential gas supply	1,143	1,190	1,121	1,207	1,192	1,412	1,335	1,301	1,214	1,173	1,144
Domestic gas consumption	1,119	1,069	1,082	1,154	1,354	1,342	1,357	1,378	1,371	1,343	1,336
Difference	24	121	39	54	-162	70	-22	-77	-157	-170	-191
Difference as % of consumption	2.1%	11.3%	3.6%	4.7%	-12.0%	5.2%	-1.6%	-5.6%	-11.5%	-12.7%	-14.3%

Potential gas supply is forecast to grow during the first half of the outlook period and peak in 2029

Figure 2 shows the *Step Change* scenario potential gas supply forecasts by project category across the forecast horizon and compares them to the potential supply forecasts in the 2023 WA GSOO.

Figure 2 Forecast annual potential gas supply by project category, 2023 and 2024 WA GSOOs, *Step Change* scenario, 2024 to 2034 (TJ/day)



Note: The committed projects included here are those which are under construction or have obtained all necessary approvals with a positive Final Investment Decision (FID). The Probable projects included here are all gas field developments which have been publicly announced that would make supply available to the domestic gas market which have not taken positive FID yet but were assumed to come online based on modelling criteria (detailed in Appendix Section A4.3).

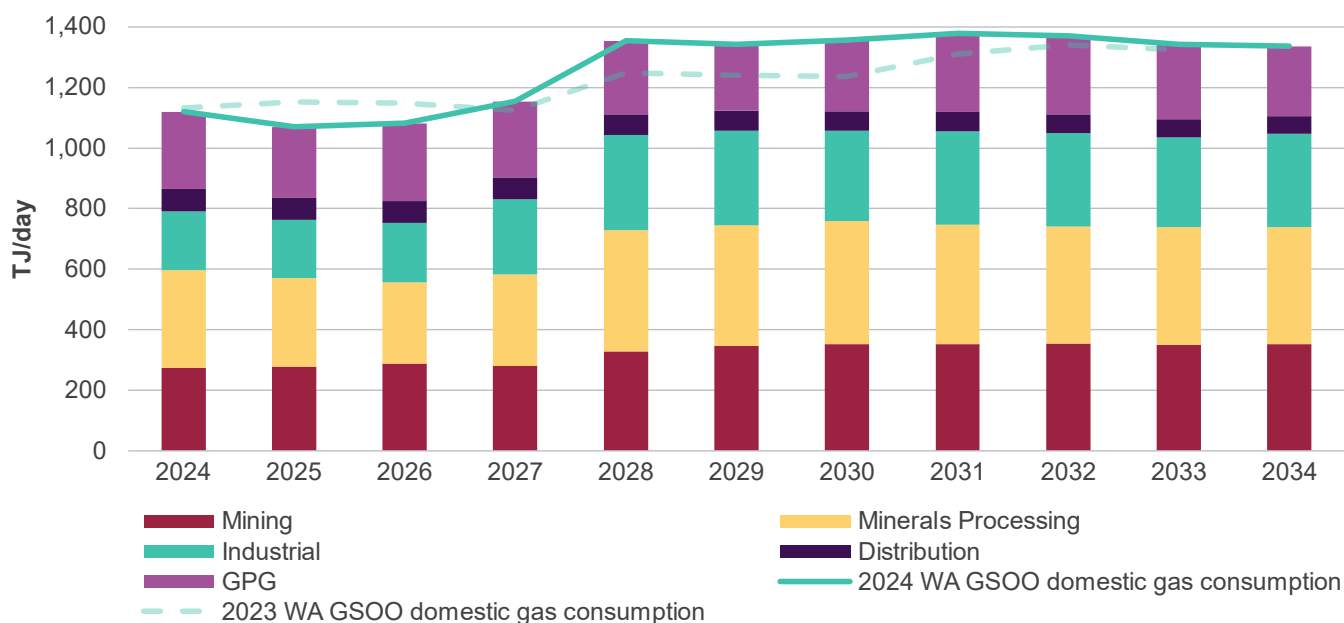
Potential gas supply is forecast to grow at an average of 4.3% annually during the first half of the outlook period, adding 269 TJ/day of gas supply between 2024 and 2029. Based on current assumptions, unless new supply projects come onstream, gas supply is expected to decline after 2030 at an average rate of 4.1% annually, due to natural reserve depletion of existing gas fields.

The gas supply forecast reflects recent increases in supply and/or supply commitments from several existing production facilities following the release of the DomGas Inquiry report. These near-term assumptions include increased nameplate capacity of Wheatstone from 215 TJ/day to 230 TJ/day, and increased flow from the Karratha Gas Plant, Pluto and Gorgon. The forecast also includes assumptions on committed and probable supply from new gas fields including Scarborough Energy Project, West Erregulla, Lockyer Project, and Waitsia Stage 2 reserves, which partially offsets the depletion of gas reserves.

Domestic gas consumption is expected to peak in 2031

Overall domestic gas consumption is forecast to grow at 1.8% per annum, from 1,119 TJ/day in 2024 to 1,336 TJ/day in 2034, with stronger growth between 2027 and 2031, reaching highest daily average consumption of 1,378 TJ/day in 2031. Figure 3 shows the *Step Change* domestic gas consumption forecasts by usage category to 2034 and compares them to the 2023 WA GSOO domestic gas consumption forecasts. The total domestic gas consumption, which includes reductions due to electrification⁸, is shown as a solid green line⁹.

Figure 3 Forecast annual domestic gas consumption by usage category, 2023 and 2024 WA GSOOs, Step Change scenario, 2024 to 2034 (TJ/day)



Note: Figures for each usage category include consumption reduction due to electrification.

⁸ Electrification in this context refers to fuel-switching from gas to electricity drawn from the grid. This differs from the numerous decarbonisation projects captured in the 2024 FIR process, which reduce natural gas consumption by transitioning from on-site gas power generation to behind-the-meter renewable energy source such as wind power and solar farms.

⁹ This is the total of both Tariff V and Tariff D. Tariff V includes volumetrically tariffed customers whose gas use is typically less than 10 TJ/year, while Tariff D includes consumption tariffed customers whose gas use is typically more than 10 TJ/year. Further detail on these two tariff categories is presented in Appendix Section A4.2.

The forecast projects a slight decline in consumption early in the outlook period, due to the suspension of several nickel mines and the curtailment of the Kwinana Alumina Refinery.

A significant increase in gas consumption is projected from 2027 through to 2031, due to growth in the mining, minerals processing, and industrial sectors. The increase in forecast gas consumption is particularly notable with announced commencement of the Perdaman Karratha Urea Project in this period, along with several alumina and nickel processing projects advised to either restart or expand operations.

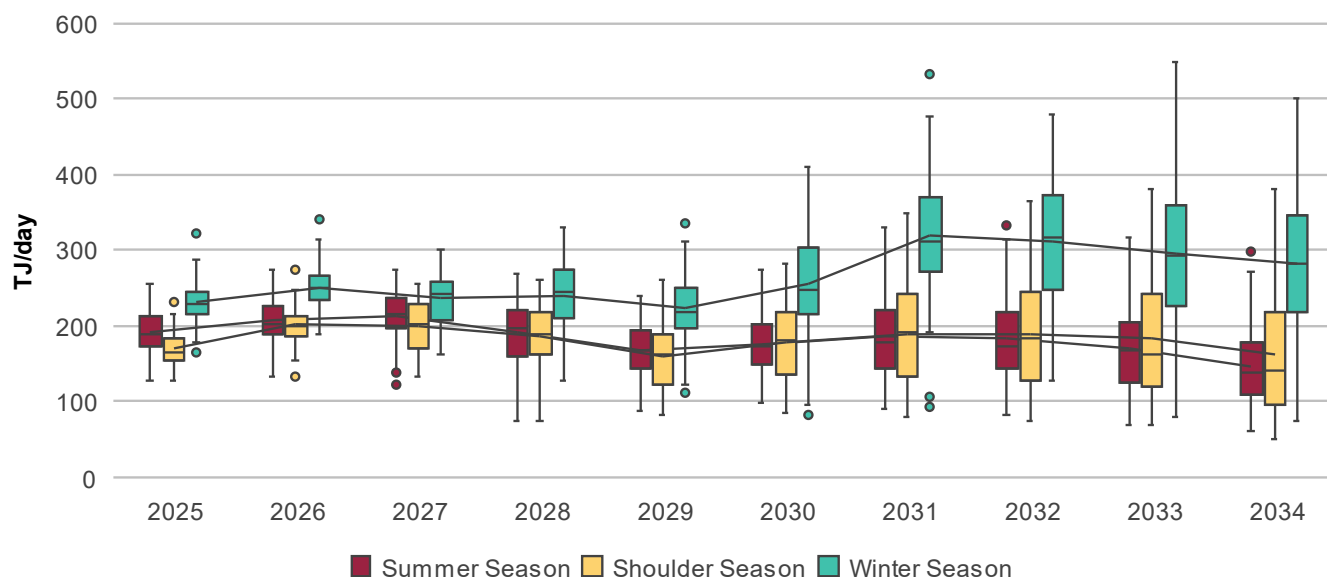
Gas consumption is forecast to decline slightly from 2031, driven by the impacts of electrification and reduced utilisation of SWIS GPG as the electricity sector decarbonises. Increases in large-scale wind and both large-scale and small-scale solar generation, together with battery energy storage systems (BESS) are projected to meet the growth in electricity consumption from electrification.

Significant growth in daily SWIS GPG demand variability is forecast

While SWIS GPG is forecast to decline as a proportion of the total generation supply mix¹⁰, it will continue to play an important role by helping manage extended periods of low VRE generation and providing firming support when other dispatchable sources are unavailable. The role of SWIS GPG may also extend to providing critical power system services to maintain grid security and reliability as the coal-fired generation fleet retires in the SWIS.

Under the *Step Change* scenario, SWIS GPG daily peak demand is projected to increase from around 300 TJ/day in 2025 to more than 500 TJ/day by the end of the outlook period, as illustrated in the box and whisker plot in Figure 4.

Figure 4 Box and whisker plot of SWIS GPG daily gas demand, *Step Change* scenario, 2025 to 2034 (averaged across reference years and iterations^A) for summer, shoulder, and winter seasons^B (TJ/day)



A. For additional details relating to reference years and iterations applied in the SWIS GPG modelling, refer to Ernst & Young (EY), 2024 *South West Interconnected System gas-powered generation forecast methodology report*, prepared for AEMO, 2024, and published alongside this WA GSOO.

B. Three seasons are defined as: (a) summer season (Trading Months December – March), (b) winter season (Trading Months June – August), and (c) shoulder season, which includes all other Trading Months. This is aligned with 2024 WEM ESOO season definitions.

¹⁰ The percentage contribution of GPG to total generation mix for the SWIS is forecast to decline from 32% in 2025 to 18% in 2034.

The variability and seasonality in SWIS GPG daily gas usage¹¹ is also forecast to increase, with greatest usage during the winter months. Consistent with the 2024 WEM ESOO, key insights include:

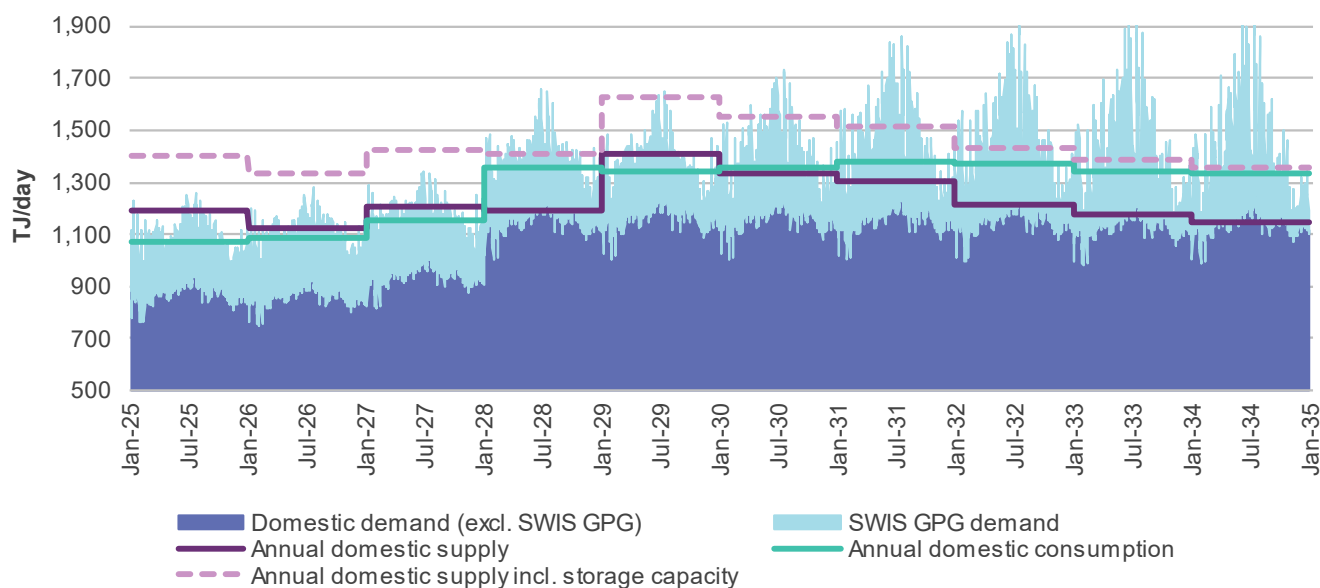
- SWIS GPG demand is forecast to become winter peaking over the period as residential heating load electrifies. Energy efficiency associated with electrification is expected to drive lower gas usage for the same level of heating, which supports emissions abatement.
- Further, days when winter daylight hours are shorter, solar irradiance is lower and wind lulls are observed more frequently compared to other seasons, they place greater reliance on GPG during these times.

Seasonal variability in daily demand could be managed through greater supply flexibility and storage capacity

Peak daily demand is forecast to exceed the forecast 2024 WA GSOO annual average potential gas supply (including storage capacity) from 2028.

This is shown in Figure 5, which presents the forecast Western Australian domestic market supply adequacy to meet the daily gas demand in the *Step Change* scenario.

Figure 5 2024 WA GSOO forecast supply capacity and gas market daily demand, *Step Change* scenario, 2025 to 2034 (TJ/day)



In aggregate, the nameplate capacities of production and storage facilities and pipeline infrastructure are adequate to accommodate these peak demand volumes, but this would require flexibility in supply arrangements. Seasonal supply flexibility, including increased supply capacity from underground storage facilities and potentially supported by line pack¹², spot gas and flexibility in contracting arrangements, would help manage this daily and seasonal demand variability.

¹¹ The seasonality of SWIS GPG daily gas usage has been observed historically particularly from 2022 and onwards. Peak SWIS GPG gas consumption was observed in 2022, 2023, and 2024, winter season as well as 2024 summer season.

¹² Line packing is using gas pipelines to store gas, by increasing pressure to increase the quantity of gas within a pipeline.

With changing GPG patterns and depleting reserves in the second half of the outlook period, new flexible domestic supply sources will be needed, such as new resource development or diversion of LNG exports to domestic supply during winter months.

Western Australia domestic gas market uncertainties

Prior to 2030, a supply gap in the domestic gas market could materialise if supply projects are unable to be accelerated to match consumption, or other consumption side risks materialise. Supply-side risks increase after 2030 as production from existing fields declines. Key uncertainties that could impact the forecast gas supply adequacy include:

- **Market flexibility.** There is limited supply flexibility in the market, with gas production facilities operating at close to maximum capacity. If one of the larger gas plants went offline unexpectedly, there could be an immediate but short-term supply shortfall. Line packing of the 1,500 km Dampier to Bunbury Natural Gas Pipeline (DBNGP), combined with the Mondarra, and Tubridgi storage facilities, may provide some additional flexibility, further explored in AEMO's assessment of pipeline and storage infrastructure.
- **Coal supply.** The domestic gas market could be pushed into deficit if coal supply was restricted or coal-fired power stations were retired earlier than expected, leading to an increase in consumption for SWIS GPG. AEMO continues to monitor the coal supply situation in Western Australia. AEMO has undertaken sensitivity analysis in this WA GSOO to understand the impacts on gas supply adequacy if coal supplies to Bluewaters Power Station cannot be secured beyond October 2026¹³.
- **VRE development.** Consumption for domestic gas could increase if new VRE projects and supporting electricity network infrastructure are delayed. The Clean Energy Link – North Region is expected to pave the way for several VRE projects in the pipeline to progress¹⁴.
- **Changing pattern of gas usage.** As gas is increasingly used for firming VRE, SWIS GPG usage patterns are changing. Close alignment with the WEM ESOO has helped ensure this report continues to reflect the changing pattern of gas consumption, with short-term gas demand peaks during periods of low wind and solar resources and during peak electricity demand events. These changing patterns of SWIS GPG consumption are likely to increase operational impacts on gas infrastructure to meet shorter and sharper consumption needs, explored in AEMO's adequacy assessment of pipeline and storage infrastructure.
- **New gas supply projects.** Probable gas supply projects could be delayed, potentially pushing the market into deficit. Risks remain for Perth basin projects, where the geology is proving complex. AEMO will continue to engage closely with the developers of probable and proposed gas supply projects to ensure its information is up to date. On 19 September 2024, an update to Western Australia's Domestic Gas Policy was released, aimed at encouraging new onshore gas projects prior to 2030 to ensure energy needs are met.
- **New gas consumption projects.** New gas consumption projects could start earlier than forecast, potentially widening supply gaps in the market. For example, the Perdaman Karratha Urea Project is targeting start-up in

¹³ On 1 December 2023, the Western Australian Government announced financial support for Griffin Coal (which supplies Bluewaters Power Station) to June 2026. For the purposes of this sensitivity analysis, AEMO has assumed an early retirement of October 2026 rather than part-way through the 2025-26 Capacity Year. See <https://www.wa.gov.au/government/media-statements/Cook-Labor-Government/Funding-delivers-certainty-for-Collie%2C-WA-electricity-and-workers-20231201>.

¹⁴ See <https://www.westernpower.com.au/resources-education/our-network-the-grid/future-of-the-grid/clean-energy-link-program/clean-energy-link-north/>.

2027 with full gas consumption by 2028. If the project ramps up to full production faster than assumed here, it will further tighten the market in 2027. The Perdaman Karratha Urea Project has achieved several critical project milestones including financial close in April 2023¹⁵ and is now under construction. The project is contracted to take 130 TJ/day¹⁶ of gas primarily from the new Scarborough Energy Project, which is assumed to commence supply from October 2026 with production ramping up to reach 180 TJ/day.

- **Consumption reduction or destruction.** Gas price-sensitive industries could choose to cease operations or take steps to reduce gas consumption if gas is not available at competitive prices. Responses to AEMO's Formal Information Request (FIR) for this WA GSOO indicate that consumption reduction could happen from \$7.93/gigajoule (GJ), although the median price response was from \$10.75/GJ¹⁷.

A combination of solutions is required to reduce or eliminate the medium- to long-term potential supply shortfall

In the medium term, the following actions may reduce or eliminate the risk of a supply shortfall before 2030:

- Accelerated development of proposed projects or development of gas fields that were not included in the gas supply forecasts, such as discoveries made in 2024 in the Perth Basin (Trigg Northwest, Tarantula Deep and Redback). These gas fields could be developed as separate or expansion projects to take advantage of the LNG export incentive under the updated Western Australian Domestic Gas Policy, however developers have not yet indicated a development path.
- Increase in flexibility for reservation of existing gas reserves to domestic market to better match daily peaks and the increasingly seasonal domestic gas demand. In the near term, management of peak days could include a combination of storage and pipeline line pack. In the medium term, flexibility may come in the form of increasing output from the Karratha Gas Plant and production from storage facilities. Increasing output from the Karratha Gas Plant may require a diversion of LNG gas supplies, so is unlikely to be a sustainable solution without changes to State and commercial agreements.
- Large gas users transitioning more rapidly to lower emissions electricity sources. This would require a commercial, regulatory and technological pathway to incentivise an accelerated transition.

The potential supply volumes remain uncertain, as several probable and proposed supply projects in the Perth and Carnarvon basins are at early stages of appraisal.

Over the longer term, new sources of gas supply may include:

- Backfill projects at existing facilities, such as Corvus being developed through Varanus Island, and domestic gas delivery from Equus and Browse being developed via the North West Shelf infrastructure and Karratha Gas Plant.
- Unconstraining and expanding existing facilities, including the domestic gas plants attached to LNG projects.

¹⁵ See <https://perdaman.com.au/2023/04/20/perdaman-urea-project-closes-financing/>.

¹⁶ See <https://www.woodside.com/docs/default-source/media-releases/long-term-domestic-gas-sale-between-woodside-and-perdaman-becomes-unconditional.pdf>.

¹⁷ The average spot gas price on 1 October 2024 was \$8.27/GJ, although the spot market is very small (7 TJ/day in October, less than 1% of the gas market) and this price should be viewed only as indicative. See <https://www.gastrading.com.au/spot-market/historical-prices-and-volume/monthly-volume-history>.


- Undeveloped fields such as standalone development of Corvus, Equus project and Browse area fields.
- New discoveries, such as Trigg Northwest or Tarantula in the Perth Basin, being developed as greenfield projects.
- Further successful exploration, for example, in the Perth and Canning Basins, leading to new development opportunities.

Long-term consumption-side responses could include:

- Build-out rates of VRE and energy storage could be accelerated, leading to lower gas consumption from SWIS GPG in the longer term.
- Industrial decarbonisation could be accelerated, decreasing gas consumption in the long term.

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1 Introduction

During Australia's transition to a net zero emissions future, gas continues to be used by Western Australian households, businesses, and industry, and support the reliability and security of the electricity sector.

This chapter provides a summary of significant events and changes in the Western Australian energy sector since the publication of 2023 Western Australia *Gas Statement of Opportunities* (WA GSOO), particularly those which have influenced the gas consumption and supply forecasts in the 2024 WA GSOO.

One of the most important events during 2024 was the release of the Western Australian Parliament's Economics and Industry Standing Committee's final report on its inquiry into Western Australia's Domestic Gas Policy (the DomGas Inquiry). The inquiry led to a policy response from the Western Australian Government and encouraged an increase in production of domestic gas commitments.

The DomGas Inquiry, and the five-year review of the GSOO, also led to changes in the way AEMO has prepared its WA GSOO forecasts, including:

- Closer alignment with AEMO's electricity forecasts for Western Australia's Wholesale Electricity Market (WEM).
- A more detailed assessment of the capacity of Western Australia's pipeline and storage infrastructure, to better understand potential supply adequacy to meet any instantaneous or seasonal variability in daily peak demand.

1.1 Purpose

The 2024 WA GSOO forecasts the adequacy of gas supply sources in Western Australia's domestic gas market, based on information provided by gas industry participants and publicly available sources. This WA GSOO forecasts potential gas supply sources and domestic gas consumption along with daily gas demand forecasts for a 10-year outlook period from 2025 to 2034. It also includes an assessment of Western Australian gas pipeline and storage infrastructure capacity to better assess Western Australia's domestic market supply adequacy to meet any instantaneous or seasonal variability in daily demand from South West Interconnected System (SWIS) gas-powered generation (GPG) and other domestic demand and consumption.

The information in this publication assists industry participants and stakeholders in making informed decisions about investment in the Western Australia gas market.

1.1.1 Structure of this document

- **Chapter 1** provides a summary of significant events and changes in Western Australia's energy sector since the publication of 2023 WA GSOO. It also summarises the key changes implemented in this WA GSOO, including the scenario descriptions that broadly align with the WEM *Electricity Statement of Opportunities* (ESOO) scenarios to better align AEMO gas and electricity market forecasts.
- **Chapter 2** presents Western Australian domestic gas consumption and demand projections. It also provides an estimate of the total gas consumption; that is, an estimate of gas required to produce liquified natural gas

(LNG) for export, in addition to the domestic consumption, reflecting an overall assessment of the forecast consumption of natural gas in Western Australia.

- **Chapter 3** presents potential gas supply projections. It also presents discussion on Western Australian gas reserves and resources, performance of gas supply and storage facilities.
- **Chapter 4** presents Western Australian domestic gas supply adequacy projections and summarises AEMO's assessment of potential uncertainties to the key drivers in this market and possible solutions in medium to long term.
- The **Appendices** include summary analysis of the Formal Information Request (FIR), detailed discussion on key events since the 2023 WA GSOO publication, Western Australian gas market characteristics, historical domestic prices and cost of production, 2024 WA GSOO input assumptions and forecasts methodologies for economic and commodity forecasts, gas consumption and potential gas supply forecasts, gas pipeline and storage network modelling, and details on SWIS GPG forecasts.

1.1.2 Supplementary information

Supporting key materials, including previous GSOO reports, supplementary forecasts and methodology, 2024 WA GSOO Data Register with figures and data, and 2024 WA GSOO consumption forecasting portal with interactive access to detailed forecasts of annual gas consumption are available on AEMO's website¹⁸ and listed in Table 2.

Table 2 Other relevant reference materials

Information source	Website links
2024 WA GSOO Consumption Forecasting Portal	https://www.aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/wa-gas-statement-of-opportunities-wa-gsoo
2024 WA GSOO Data Register	https://www.aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/wa-gas-statement-of-opportunities-wa-gsoo
Australian Energy Market Operator (AEMO), 2023 Inputs, Assumptions and Scenarios Report	https://aemo.com.au/-/media/files/major-publications/isp/2023/2023-inputs-assumptions-and-scenarios-report.pdf?la=en
AEMO, 2024 Wholesale Electricity Market Electricity Statement of Opportunities, 2024	https://aemo.com.au/-/media/files/electricity/wem/planning_and_forecasting/esoo/2024/2024-wem-electricity-statement-of-opportunities.pdf?la=en&hash=6B9DD8B889C7EE8B280475DEC8F655FA
Commonwealth Scientific and Industrial Research Organisation (CSIRO) and ClimateWorks Centre (CWC), 2022 Multisector energy modelling, prepared for AEMO, 2022	https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/2023-inputs-assumptions-and-scenarios-consultation/supporting-materials-for-2023/csiro-climateworks-centre-2022-multisector-modelling-report.pdf
Deloitte Access Economics, Economic forecasts 2023/24, prepared for AEMO, 2024	https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2024/Deloitte-Access-Economics-2023-24-Economic-forecast-report.pdf
Ernst & Young (EY), 2024 South West Interconnected System gas-powered generation forecast methodology report to 2034, prepared for AEMO, 2024, and published with this WA GSOO	https://www.aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/wa-gas-statement-of-opportunities-wa-gsoo
National Institute of Economic and Industry Research (NIEIR), Critical minerals and other commodity forecasts for WA to 2034, prepared for AEMO, 2024, and published with this WA GSOO	https://www.aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/wa-gas-statement-of-opportunities-wa-gsoo
Western Australia Gas Bulletin Board (WA GBB) – Map and Reports	https://gbbwa.aemo.com.au/#home

¹⁸ See <https://www.aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/wa-gas-statement-of-opportunities-wa-gsoo>.

1.2 The year in review

The following sections summarise some of the key events since the 2023 WA GSOO was published in December 2023 in chronological order¹⁹, including updates to:

- Gas supply and gas consumption projects.
- Battery storage projects, which are monitored for their potential to displace GPG gas consumption and therefore reduce domestic gas consumption.
- Green hydrogen projects, which are monitored for their potential to be used as a gas substitute, and in turn reduce domestic gas consumption.
- Gas pipeline access arrangement decisions, which set the standard services, prices, and terms and conditions for access to the respective pipelines. These decisions are monitored for the potential to impact gas consumption from price-sensitive projects.

Key events since publication of 2023 WA GSOO

February 2024

- DomGas Inquiry interim report released.
- Western Australian Government and Federal Government finalised \$140 million agreement to build hydrogen hub in the Pilbara.
- Emissions reduction considerations factored into the National Gas Rules.

March 2024

- Covalent Lithium commissioned the Mt Holland lithium mine and concentrator.

April 2024

- Woodside agreed to increase domestic gas supply through to December 2025 from the Pluto Acceleration project.
- Beach Energy announced a delay in Waitsia Stage 2 expansion, which is expected to export LNG until 2028 as per approval granted as an exemption under Western Australian Domestic Gas Policy²⁰.

¹⁹ AEMO sourced information on the major events from this period from EnergyQuest and AEMO market research, with references provided where possible. The list in the box is not an exhaustive list of events. It is provided as a guide to some of the material matters that influenced the 2024 WA GSOO gas supply and consumption forecasts. Additional information is provided in Appendix A2.

²⁰ Beach Energy announced Waitsia Stage 2 targeted commencement in early 2025 for LNG export, after a delay due to quality issues at pre-commissioning stage, see https://yourir.info/resources/0c5a441cf54ff229/announcements/bpt.aspx/2A1516338/BPT_Waitsia_Stage_2_update.pdf. The Waitsia Joint Venture was granted as an exemption under the WA Domestic Gas Policy to process 7.5 metric ton (mt) of LNG for export at the North West Shelf facilities until the end of 2028, see <https://www.wa.gov.au/government/publications/implementation-of-the-wa-domestic-gas-policy>.

May 2024

- Australian Renewable Energy Hub granted major project status by the Federal Government.
- Federal Government published its Future Gas Strategy.

July 2024

- BHP announced Nickel West and West Musgrave projects will be suspended from October 2024.
- Western Australian Government and Federal Government entered bilateral Renewable Energy Transformation Agreement.
- Alinta's second battery at Wagerup approved.
- Fortescue announced job cuts and shift away from green hydrogen.
- Economic Regulation Authority (ERA) released its draft decision on regulated tariffs for the Goldfields Gas Pipeline.

August 2024

- DomGas Inquiry final report published.
- Woodside confirmed Scarborough is on track for first liquefied natural gas (LNG) in 2026.
- Alcoa announced plans to fully curtail production at Kwinana Alumina Refinery from Q4 2024.

September 2024

- Western Australian Government issued response to the DomGas Inquiry.
- Western Australia Department of Jobs, Tourism, Science and Innovation (JTISI) published its first annual Western Australia Domestic Gas Statement.

October 2024

- West Erregulla Gas Project received environmental approvals.
- Synergy installed first units of the Collie Battery Energy Storage System.

November 2024

- ERA released its final decision on regulated tariffs for the Mid-West and South-West Gas Distribution System.

1.2.1 Gas supply and consumption in 2024

In 2024, domestic gas supply averaged 1,140 terajoules per day (TJ/day), slightly above the 1,080 TJ/day seen in 2023 and 0.1% above the 2019 peak of 1,139 TJ/day²¹.

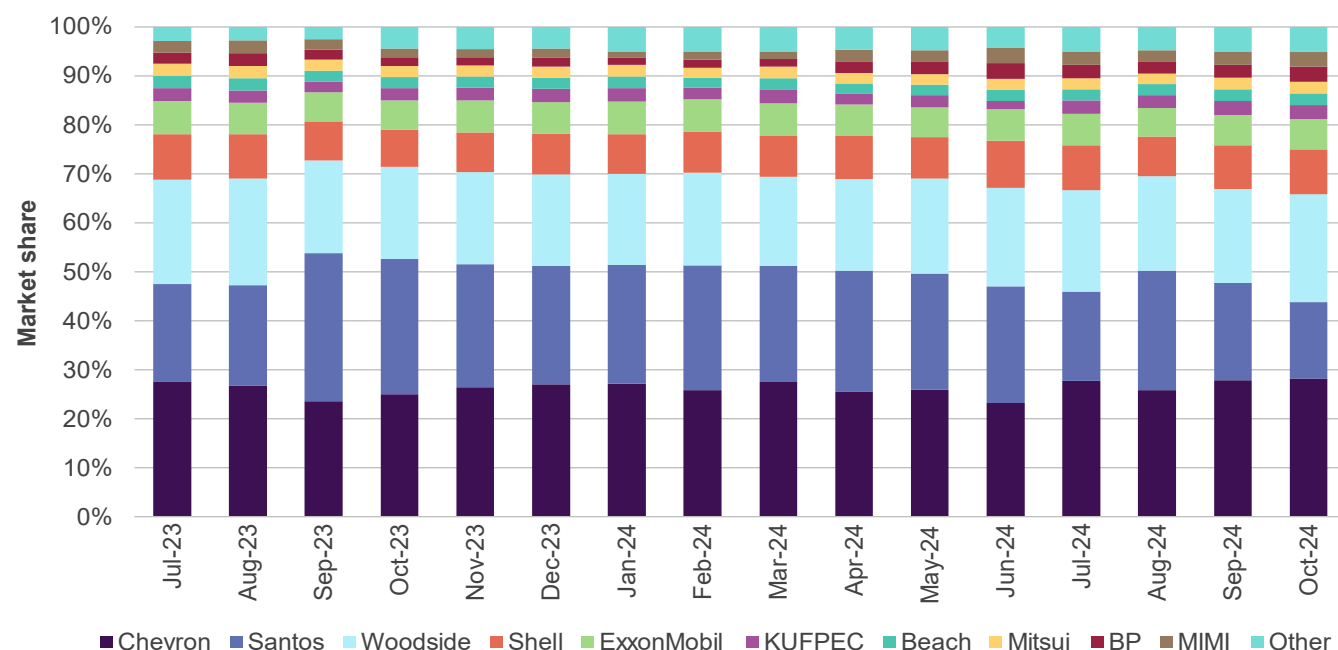
²¹ The actual average supply for 2024 covers a period from 1 Jan to 31 October 2024, while this actual average supply for all previous years covers a period from 1 January to 31 December of the respective years.

The increased gas supply in 2024 is due to increased nameplate capacity of Wheatstone and revised Domestic Market Obligation of Karratha Gas Plant²².

Figure 6 compares the average gas production market share by company during the 2023-24 financial year²³. Chevron was the largest producer (26%), followed by Santos (24%) and Woodside (19%).

Santos' market share in 2023-24 financial year was lower than its average in the previous financial year, and was generally lower in 2024 than 2023, with its lowest share at 16% in October 2024. This followed supply constraints to Santos-operated Varanus Island in the 2023-24 financial year²⁴.

Figure 6 Gas production market share by company, July 2023 to October 2024 (%)



Note: AEMO assumed each company's production is in proportion to its equity share in each project.

Source: WA GBB and company reports.

A negligible increase in consumption is observed from 2023 to 2024, largely as a result of increased consumption from industrial, minerals processing, and GPG, offset by a reduction in mining. Industrial consumption increased by 14%, from 157 TJ/day in 2023 to 179 TJ/day in 2024.

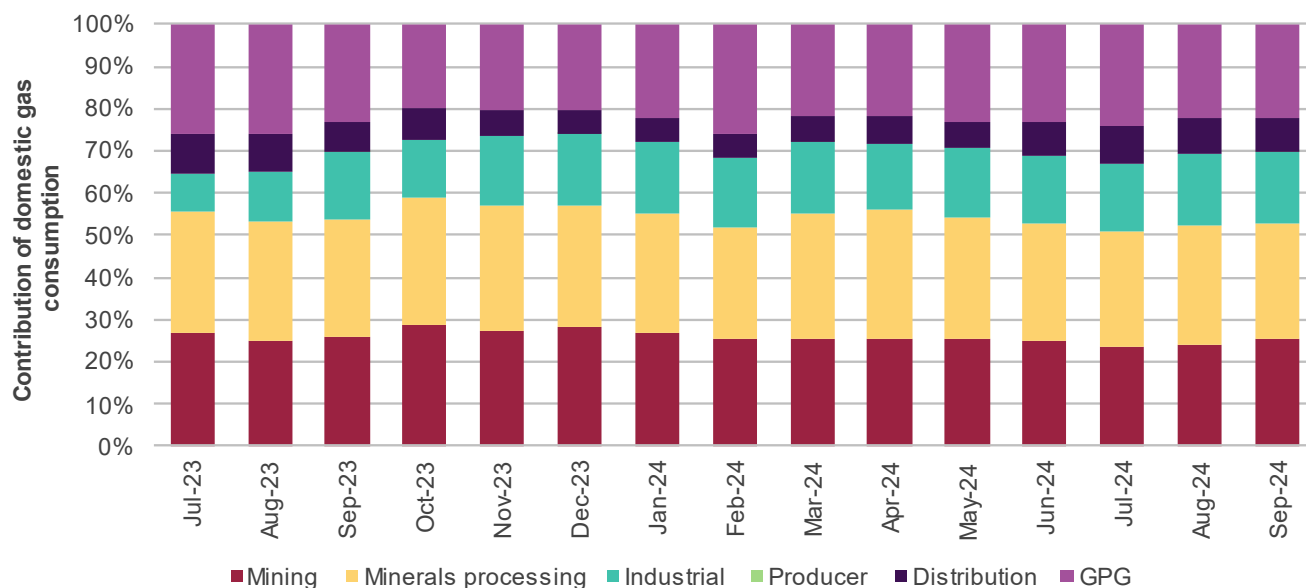
Figure 7 shows monthly domestic gas consumption by sector in Western Australia since July 2023.

The largest sectors were minerals processing with a contribution of 28% to the total domestic gas consumption for 2024, followed by mining at 25% then GPG at 23%. GPG consumption shows some seasonality, with a notable peak (26% of monthly domestic gas consumption) observed in February 2024, during which the last peak electricity demand occurred and, to a lesser extent, in July.

²² Further detail is available in Chapter 3.

²³ The comparison was completed as per the market share on 31 October 2024, AEMO assumes that each company's production is in proportion to its equity share in each project.

²⁴ See <https://gbbwa.aemo.com.au/#flows> and <https://gbbwa.aemo.com.au/#reports/mediumTermCapacity>.

Figure 7 Contribution of monthly domestic gas consumption by sector, July 2023 to September 2024 (%)

Source: WA GBB.

Note: Average gas consumption data is up to 30 September 2024.

1.2.2 Economics and Industry Standing Committee's inquiry into matters relating to the Western Australian Domestic Gas Policy

The final DomGas Inquiry report

In August 2024, the final report of the Parliamentary Inquiry into the Western Australian Domestic Gas Policy was published²⁵. The Inquiry made 30 recommendations, including the following which are of particular relevance to the WA GSOO:

- That AEMO's WA GSOO be expanded to cover a 20-year forecast period.
- That AEMO's WA GSOO includes the forecasting of decarbonisation pathways for gas users.
- That there is a need to increase the integration of gas and electricity planning, forecasting and operation with the WA GSOO.
- That the State Government enact measures to permit and require state government agencies to share relevant information with AEMO to assist it in compiling the annual WA GSOO.
- That, for new LNG projects or gas fields, the reservation amount is set as necessary to mitigate any expected domestic gas shortfall, based on the WA GSOO forecasts.

In response to the Parliamentary inquiry, the Western Australian Government released its updated Western Australian Domestic Gas Policy in September 2024²⁶. This included:

²⁵ Western Australia Parliament, *Inquiry into the WA Domestic Gas Policy: Final Report*, 15 August 2024, at [https://www.parliament.wa.gov.au/Parliament/commit.nsf/\(Report+Lookup+by+Com+ID\)/27F837EAB987BD9548258B790020F885/\\$file/20240814%20-%20RPT%20-%20DOMGAS%20FINAL%20updated%20for%20web.pdf](https://www.parliament.wa.gov.au/Parliament/commit.nsf/(Report+Lookup+by+Com+ID)/27F837EAB987BD9548258B790020F885/$file/20240814%20-%20RPT%20-%20DOMGAS%20FINAL%20updated%20for%20web.pdf).

²⁶ Department of Jobs, Tourism, Science and Innovation, *Government response to the Economics and Industry Standing Committee's 'Inquiry into the WA Domestic Gas Policy'*, September 2024 at https://www.wa.gov.au/system/files/2024-09/0172_domgas_jtsi_submission_to_parliamentary_inquiry.pdf.

- Retaining the 15% reservation for Western Australia's offshore LNG projects for the Western Australian domestic market. As such, LNG projects were assumed to make at least 15% of supply available to the domestic market.
- Permitting export of up to 20% of new onshore projects' gas production until the end of 2030. After this date, 100% of domestic onshore production will be required to be supplied to the domestic market.

The Western Australian Government also included a number of recommendations that will improve the way market information and forecasting data is produced. Table 3 presents the key recommendations from the Inquiry that are of relevance to AEMO GSOOs, the Western Australian Government response, and AEMO's course of action in responding to the recommendations.

The key changes to the 2024 WA GSOO are detailed in Section 1.3.

Table 3 Western Australian Domestic Gas Inquiry Recommendations relevant to the WA GSOO

Inquiry recommendations relevant to the GSOO	Western Australian Government response	AEMO action for WA GSOOs
That the WA GSOO be expanded to cover a 20-year forecast period.	Supported in principle. The Western Australian Government will engage with AEMO to investigate opportunities for longer forecast periods.	To be included in future GSOOs.
That the WA GSOO includes forecasts of the decarbonisation pathways for gas users.	Supported in principle. The Western Australian Government will engage with AEMO to investigate further opportunities to include decarbonisation forecasts.	Actioned in 2024 WA GSOO.
That there is a need to increase the integration of gas and electricity planning, forecasting and operation with the WA GSOO.	Supported. The Western Australian Government will investigate, where appropriate, integration and alignment of the State's gas and electricity markets to support better planning, forecasting and operations of the State's energy system.	Actioned in 2024 WA GSOO.
That the State Government enact measures to permit and require government agencies to share relevant information with AEMO.	Supported. The Western Australian Government is supportive of opportunities for better data sharing and will investigate mechanisms to enable increased transparency with AEMO to help inform more comprehensive and up-to-date market forecasts.	AEMO continues to engage with relevant government agencies as required.
For new LNG projects or gas fields, the reservation amount is set as necessary to mitigate any expected domestic gas shortfall, based on the WA GSOO forecasts.	Not supported. For new offshore LNG projects, the Western Australian Government will continue its policy of a 15 per cent reservation of domestic gas, to ensure market and investment certainty.	In the 2024 WA GSOO, AEMO applied the updated Western Australian Domestic Gas Policy published in September 2024, and assumed only the minimum volume is reserved for the domestic gas market.
That the State Government allow onshore gas projects to export LNG only if the domestic market is adequately supplied and is expected to be well supplied for a period of time.	Supported. To facilitate new project development and additional domestic gas supply, the Western Australian Government will implement an 80% domestic gas reservation policy for onshore gas producers until 31 December 2030. After this date, it will increase to a 100% domestic gas reservation policy for onshore producers.	In the 2024 WA GSOO, AEMO has applied the updated Western Australian Domestic Gas Policy published in September 2024, and conservatively assumed the maximum permissible volume is exported from new onshore gas projects.

1.3 Key changes in 2024 WA GSOO

AEMO is continually seeking to improve the quality and accuracy of the gas services information it provides. AEMO therefore welcomes the feedback provided as part of the October 2023 five-yearly GSOO review²⁷, as well as the subsequent recommendations for improvement in the DomGas Inquiry final report. The key changes implemented in this year's WA GSOO in response to the five-yearly review and DomGas Inquiry, as well as part of AEMO's commitment to ongoing improvement, are summarised below.

1.3.1 A more holistic view of Western Australia's energy requirements

AEMO aligned the 2024 WA GSOO forecasting scenarios with those presented in the 2024 WEM ESOO. The GPG modelling also used the same set of input assumptions as WEM modelling. This improves the integration of GPG planning, forecasting and operation in this WA GSOO. The scenarios are defined as:

- **Progressive Change (Low case)** – explores the task of achieving Australia's Paris Agreement commitment of a 43% emissions reduction compared to 2005 levels by 2030 in a more challenging economic environment. While ongoing energy sector investments are required by national and state policies, the *Progressive Change* scenario reflects reduced consumption for commodities. The slower pace of economic progress in this scenario is primarily due to higher technology costs and supply chain challenges compared to other scenarios. Nonetheless, substantial investments in decarbonisation are still anticipated. The slower technology advancement assumptions may support longer use of gas for power generation, prior to a transition to renewables.
- **Step Change (Expected case)** – is based on achieving a scale of energy transformation that supports Australia's contribution to limiting global temperature rise to below 2°C compared to pre-industrial levels. It features a high level of consumer participation and significant investments in distributed energy resources (DER) to drive the decarbonisation of Australia's economy. This scenario forecasts growth in electrification across the business and residential sectors.
- **Green Energy Exports (High case)** – reflects very strong decarbonisation efforts both domestically and globally to limit temperature increase to 1.5°C. This leads to a rapid transformation of Australia's energy sectors and a strong emphasis on electrification. With increased domestic and international economic growth, there is a global demand for green energy. Enhanced settings for technological development, supply chain management, social license, and domestic and international cooperation enable substantial growth in green energy exports, including the export of green hydrogen through ammonia and energy-intensive manufacturing utilising hydrogen, such as green steel production. The strong decarbonisation assumptions drive less use of gas and more renewable sources to replace the loss of coal-fired electricity generation and meet increased energy consumption.

A complete description of the scenarios, including narratives and key parameters, is in AEMO's 2023 *Inputs, Assumptions and Scenarios Report* (IASR)²⁸. AEMO's gas consumption-related modelling assumptions are further

²⁷ Rule 105 of the Gas Services Information (GSI) Rules requires that AEMO must, at least once in every five-year period, conduct a review of the GSOO, and that this review must be carried out in consultation with Gas Market Participants and gas industry groups.

²⁸ See <https://aemo.com.au/consultations/current-and-closed-consultations/2023-inputs-assumptions-and-scenarios-consultation>.

explored in Section 2.2 and gas supply-related modelling assumptions in Section 3.2. Table 4 summarises key parameters for each scenario.

Table 4 Key parameters by scenario

Parameter	Progressive Change	Step Change	Green Energy Exports
National decarbonisation target	At least 43% emissions reduction by 2030, net zero by 2050.	At least 43% emissions reduction by 2030. Net zero by 2050.	At least 43% emissions reduction by 2030. Net zero by 2050.
Global economic growth and policy coordination	Slow economic growth, lesser coordination.	Moderate economic growth, stronger coordination.	High economic growth, stronger coordination.
Australian economic and demographic drivers	Lower	Moderate	Higher (partly driven by green energy)
Electrification	Low	High	Higher
Energy efficiency across all energy forms	Low	Moderate	Higher
DER uptake	Low	Moderate	High
Retirement^A	BW1_BLUEWATERS_G2 and BW2_BLUEWATERS_G1 retire 1 October 2030.	BW1_BLUEWATERS_G2 and BW2_BLUEWATERS_G1 retire 1 October 2030.	BW1_BLUEWATERS_G2 and BW2_BLUEWATERS_G1 retire 1 October 2027
	<ul style="list-style-type: none"> MUJA_G6 retires 1 April 2025. COLLIE_G1 retires 1 October 2027. MUJA_G7 retires 1 October 2029. MUJA_G8 retires 1 October 2029. 		
Project consideration	<ul style="list-style-type: none"> Existing and committed^B gas consuming projects. Existing and committed^B gas supply sources. 	<ul style="list-style-type: none"> Existing and committed gas consuming projects. Existing, committed and probable^C gas supply sources. 	<ul style="list-style-type: none"> Existing, committed, and probable^C gas consuming projects. Existing, committed, and probable^C gas supply sources.
Equivalent scenario in 2024 WEM ESOO	'Low'	'Expected'	'High'

A. AEMO explored additional sensitivities on the *Step Change* scenario with earlier coal retirement, detailed in Appendix A6.

B. The committed projects included here are those which are under construction or have obtained all necessary approvals with a positive Final Investment Decision (FID) to be implementation ready to commence or already underway (detailed in Section 1.3.2).

C. The Probable projects are those which have not taken positive FID but are assumed to come online based on modelling criteria (detailed in Section 1.3.2). Probable supply sources have been included in both the *Step Change* and *Green Energy Exports* scenarios. Probable gas consumption projects are only included in the *Green Energy Exports* scenario and must meet set criteria (described in Appendix Section A4.2). These include gas consumption projects that may switch from diesel to gas electricity generation.

1.3.2 Recategorisations of new projects to align with 2024 WEM ESOO

AEMO assessed several new projects that can impact its 2024 WA GSOO forecasts. These new projects or known upgrades were further classified into committed, probable and proposed project categories based on available information at the time of developing forecasts. The treatment of each of the three following categories²⁹ was based on this WA GSOO's modelling criteria:

²⁹ AEMO considered Probable and Proposed projects to be "Proposed" projects for the purposes of the Gas Services Information Rules 1 December 2022. See <https://www.wa.gov.au/system/files/2022-11/Gas%20Services%20Information%20Rules%201%20December%202022.pdf>.

- Committed projects – gas supply or consumption projects that are under construction or have obtained all necessary approvals with a positive Final Investment Decision (FID) to be implementation ready to commence or already underway.
- Probable projects – probable gas supply sources or gas users are those which have not taken positive FID but are assumed to come online based on modelling criteria (detailed in Appendix 4).
- Proposed projects – gas field and production projects that are at earlier stages of development or face challenges in terms of commercial viability or approval.

1.3.3 Introduced new infrastructure adequacy assessment

AEMO modelled the Western Australian gas pipeline network to assess infrastructure adequacy (detailed in Chapter 4). High level network adequacy studies indicate adequate daily pipeline and storage infrastructure capacity across the outlook period. That is, any supply gaps forecast is not attributable to insufficient pipeline and storage infrastructure capacity. AEMO will continue to refine its approach to infrastructure modelling in future WA GSOOs.

1.3.4 Implemented relevant recommendations from the Domestic Gas Inquiry

AEMO has implemented the WA GSOO-related recommendations from the Western Australian Economics and Industry Standing Committee's Inquiry into the Western Australian Domestic Gas Policy' (DomGas Inquiry) as follows:

- **Include forecast decarbonisation pathways** – addressed by aligning the GSOO scenarios with the WEM ESOO scenarios and applying an emissions target to GPG consumption modelling to achieve net zero emissions by 2050. This improves the alignment of GPG results with national multi-sectoral modelling (MSM)³⁰ outcomes for technology mix in respect to both capacity and generation.
- **Allow for integration of, and interdependencies between, Western Australia's gas and electricity markets** – addressed by aligning scenarios and using the WEM ESOO supply outlook to inform GPG consumption (detailed in Chapter 2).
- **Extend outlook period to 20 years** – while time and information constraints mean the 2024 WA GSOO maintains a 10-year outlook period, AEMO will adopt a longer outlook period in future WA GSOOs.

1.3.5 Accounted for Western Australian Government's policy response to Domestic Gas Inquiry

The 2024 WA GSOO forecasts took into account in the Western Australian Government's policy responses to the DomGas Inquiry (detailed in Chapter 2) as follows:

- **Retain the 15% reservation for Western Australia's offshore LNG projects** for the Western Australian domestic market – as such, LNG projects were assumed to make at least 15% of supply available to the domestic market.

³⁰ CSIRO and CWC, *2022 Multisector energy modelling*, prepared for AEMO, 2022. See https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/2023-inputs-assumptions-and-scenarios-consultation/supporting-materials-for-2023/csiro-climateworks-centre-2022-multisector-modelling-report.pdf.

- **Permit export of up to 20% of new onshore projects' gas production until the end of 2030** – addressed by conservatively including an assumption that expected new onshore projects will make only 80% of supply available to the domestic market until the end of 2030, and then 100% of supply available after 2030. The impact of this policy on stimulating new projects has not been assessed.

2 Gas demand and consumption

Under the *Step Change* scenario, Western Australian domestic gas consumption is expected to increase from 1,119 TJ/day in 2024 to 1,336 TJ/day in 2034, with an average annual growth rate (AAGR) of 1.8%.

Forecast domestic gas consumption increases after 2027 due to commencement of the Perdaman Karratha Urea Project, resumption of suspended nickel mines and curtailed minerals processing operations, and mining expansions. Consumption is forecast to reach a peak of 1,378 TJ/day in 2031, followed by slight decline until the end of the outlook period.

The decline in gas consumption in the later years is attributed to a reduction in GPG in the SWIS. Although the retirement of coal-fired electricity generation results in increased reliance on GPG through to 2031, this is expected to be offset thereafter as large volumes of renewable generation and batteries enter the market. GPG will, however, continue to play a critical role as firming capacity during peak electricity demand periods and times when large-scale wind and solar generation is unavailable.

2.1 Background

Western Australia's domestic gas consumption is influenced by both the economic environment and commodity outlook. Gas consumption in Western Australia is driven by mining and minerals processing operations located in the southwest, east, and north of the state. Consumption patterns of these operations reflect both commodity prices for key materials and site-specific operating factors.

While gas consumption in Western Australia continues to be closely tied to the production of commodities, gas consumption may be reduced through the installation of variable renewable energy (VRE) capacity augmented with BESS. These options have considerable potential at remotely located sites.

AEMO presents Western Australian domestic and total gas consumption forecasts, defined as:

- Domestic gas consumption forecasts – includes all major mining and minerals processing activities, industrial, commercial, GPG consumption in the SWIS and non-SWIS areas, and small-use customers connected to Western Australia's gas distribution networks.
- Total gas consumption forecasts – includes domestic gas consumption plus an estimate of the total quantity of gas required for LNG exports, reflecting an overall assessment of Western Australian gas consumption.

2.2 Historical Western Australian domestic gas consumption by usage category

Figure 8 presents domestic gas consumption by usage category³¹, based on Western Australia Gas Bulletin Board (WA GBB) data. In an improvement for this year, AEMO presents WA GSOO data in terms of both consumption

³¹ Usage categories are defined in this way because each category is affected by different external and internal influences. Appendix A8 has a complete breakdown of how gas consumers were categorised. The mining and minerals processing sectors include gas generation located at remote mine sites or minerals processing facilities.

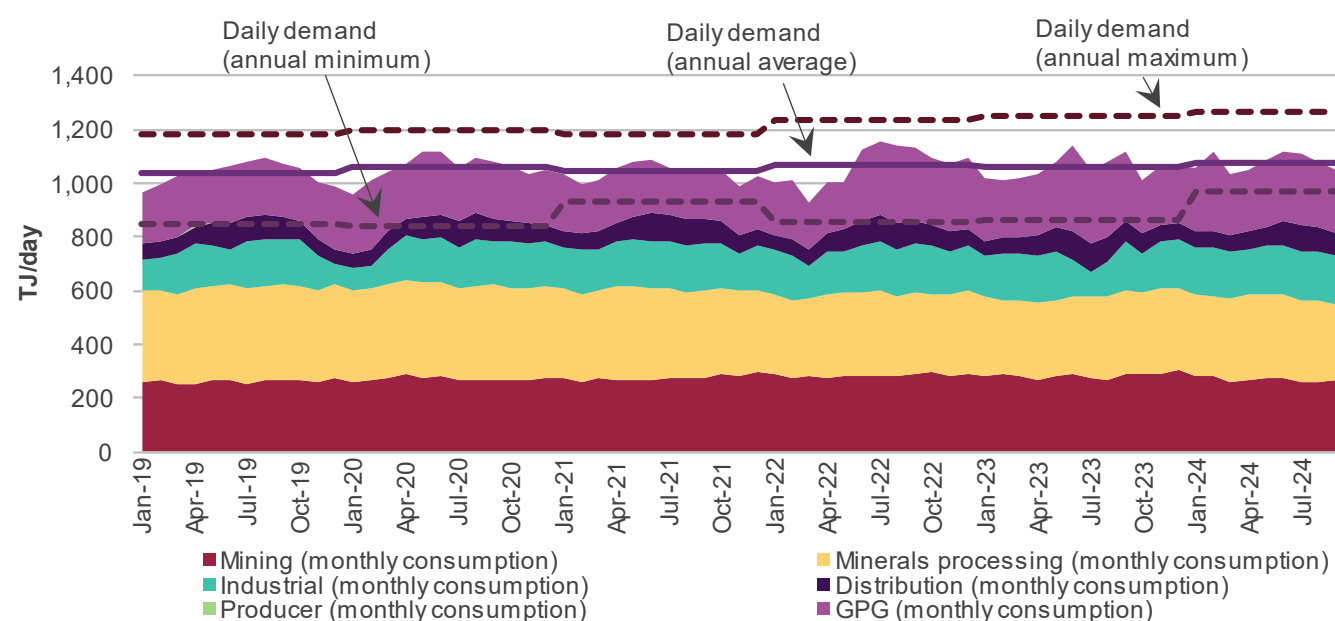
(TJ/day) and peak daily demand (TJ/day). This helps distinguish between the gas demand required at any one time and the ongoing trend of consumption across and between years or months.

Figure 8 also shows the minimum and maximum daily gas demand per annum, which demonstrates the variability in domestic consumption that needs to be matched by supply and pipeline/storage capacity throughout the year.

The past three years have seen a minor increase in total domestic gas consumption, rising from 1,045 TJ/day in 2021 to 1,078 TJ/day in 2024. The highest gas-consuming sector has been minerals processing (~28%), followed by mining (~25%) and then electricity generation (~23%). Most large customers³² have been supplied directly through the gas transmission network; customers supplied through the retail distribution network accounted for only 7% of total domestic gas consumption in 2024.

Monthly domestic gas consumption has been broadly consistent over 2019 to 2024 with minor fluctuations in the industrial sector. Although demand has been steady, the gap between annual minimum and maximum daily demand widened during 2022 and 2023, before narrowing in the first half of 2024³³.

Figure 8 Monthly domestic gas consumption by usage category^{A,B} and annual statistics (average^C, minimum, and maximum) of daily demand, 2019 to 2024 (TJ/day)



A. Post-adjustment made to GBB data to account for ~50% of the gas consumption from Pinjarra Cogeneration (under electricity generation) going towards steam production for Alcoa Pinjarra (captured under the minerals processing). In addition, Port Hedland which is classified as mining in GBB is adjusted to electricity generation. The purpose of these adjustments is to improve alignment with AEMO's sector-based forecasting models.
B. In an improvement for this year's WA GSOO, all connection points have been mapped into categories, meaning there is no longer an 'other' category.
C. Annual average gas consumption for 2024 is based on WA GBB daily demand data until 30 September 2024.

GPG and distribution make a significant contribution to seasonal variation in demand, as gas consumption in these sectors is influenced by weather patterns.

As Figure 9 shows, over the past five years gas consumption by distribution-connected customers has experienced winter peaks and summer troughs, driven mostly by space and water heating.

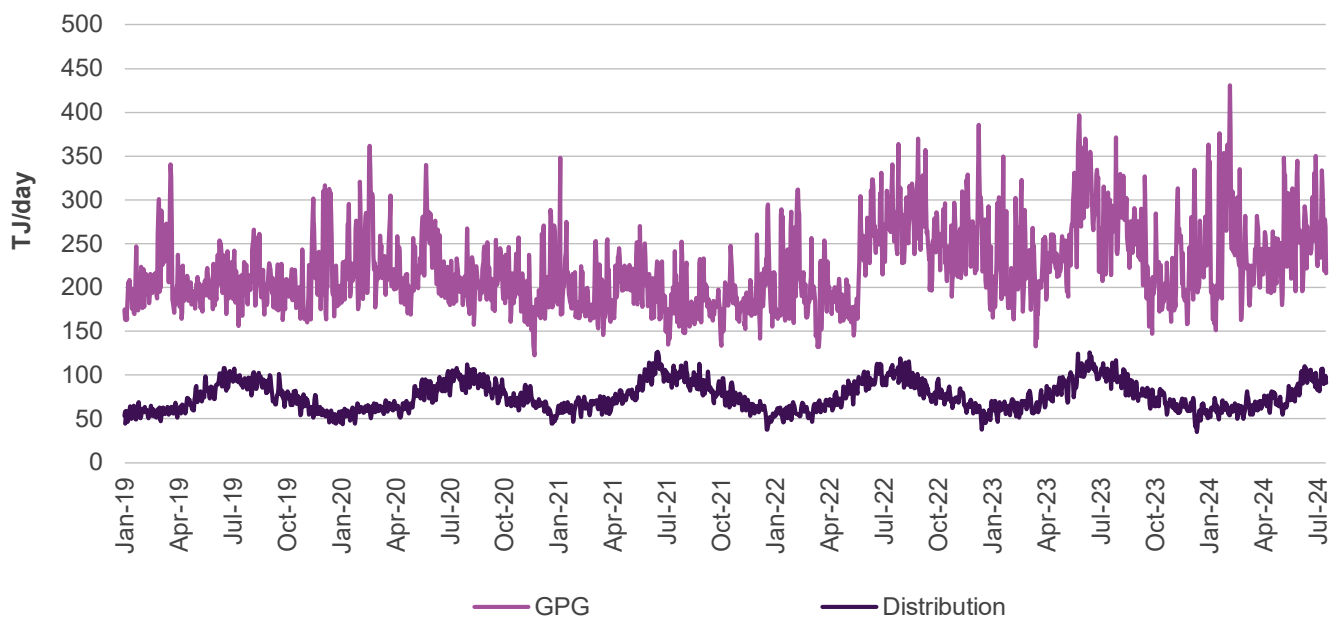
³² Gas consumers using 10 TJ/day or more are classified as large customers. The categories considered to be large customers include minerals processing, mining GPG (SWIS and non-SWIS), industrial, and other Large Users.

³³ The minimum and maximum presented for 2024 may not capture the full variability as data is only available for up to 30 September 2024.

Demand from GPG, although it exhibits less seasonal correlation, shows winter peaks in 2022, 2023 and 2024 as well as a summer peak in 2024. These summer and winter GPG peaks are closely associated with SWIS electricity demand. For example, the highest daily GPG gas demand of 431 TJ/day occurred on Sunday 18 February 2024, which also saw a new SWIS electricity peak demand record of 4,233 MW that same day. Winter peaks in GPG are often driven by heavy cloud cover and adverse weather that reduce generating output of renewable generation in the SWIS, leading to the need for more GPG.

These trends highlight the increasingly close interrelationship between electricity and gas in the areas served by the SWIS. Changing gas consumption patterns for GPG are explored further in Section 2.3.5.

Figure 9 Domestic gas daily demand, GPG and distribution, 2019 to 2024 (TJ/day)



2.3 Western Australia domestic gas consumption forecasts³⁴

AEMO developed Western Australia domestic gas consumption forecasts for the 2024 WA GSOO outlook period for the *Progressive Change*, *Step Change* and *Green Energy Exports* scenarios detailed in Section 1.3.1. While gas consumption forecasts for all three scenarios include committed projects, the *Green Energy Exports* scenario also includes probable projects that may impact consumption of gas over the outlook period.

2.3.1 Committed new gas consumption projects

Committed new gas consumption projects include projects that have a direct impact on Western Australian gas consumption (either by increasing or decreasing consumption) and have taken a final investment decision (FID) or are under construction.

³⁴ This section covers the gas consumption forecast results, in which the data presented for 2024 is estimated based on actual data up to 30 September 2024. For information on the gas consumption forecast methodology, refer to Appendix A4.2.

These projects include approved upcoming projects that will use natural gas as an input feedstock, for power generation, or renewable energy projects which will offset existing gas consumption. Committed project consumption includes expansions to existing minerals processing, mining, and industrial operations.

Gas consumption for each project under this category has been estimated individually, based on publicly available information, consultation with the project proponent, or from gas consumption information provided to AEMO as part of the 2024 FIR process. The estimated quantities and start dates for individual projects may differ among the three 2024 WA GSOO gas forecast scenarios.

Nine³⁵ committed projects included in this WA GSOO gas consumption forecasts. All projects have the same start date among the three scenarios unless otherwise specified:

- Covalent Lithium's Kwinana lithium hydroxide refinery is expected to commence operations with customer - qualified product in the first half of 2026³⁶.
- Iluka's Rare Earths Refinery is expected to enter commissioning in late 2026³⁷.
- De Grey Mining's Hemi Gold is expected to be operational in second half of 2028³⁸.
- Lynas' Kalgoorlie Rare Earths Processing Facility completed commissioning in November 2024 and is expected to be operational in 2025³⁹.
- Liontown Resources' Kathleen Valley Lithium Project responding to market conditions with a lower-volume high-margin mine plan to mid-2028, before reverting to higher throughputs⁴⁰.
- Further growth of Mineral Resources Ken's Bore iron ore operation which delivered initial shipment earlier this year⁴¹.
- The second expansion phase of the Lynas's Mount Weld Mine is expected to be completed in 2027⁴².
- Perdaman Karratha Urea Project is expected to be fully operational by 2029 under the *Progressive Change* scenario, and by 2028 in both *Step Change* and *Green Energy Exports* scenarios⁴³.
- Mineral Resources is pursuing a range of low-cost growth options at the Wodgina lithium mine operation, deferring investments in additional processing trains⁴⁴.

2.3.2 Domestic gas consumption forecasts by scenario

Figure 10 presents the annual domestic gas consumption forecasts under the three scenarios from the 2023 and 2024 WA GSOOs, with actuals from 2019 to 2024.

³⁵ The 2023 WA GSOO included 12 committed projects, of which three were associated with consumption reduction.

³⁶ See https://www.wesfarmers.com.au/docs/default-source/asx-announcements/full-year-results-briefing-presentation.pdf?sfvrsn=64ee5bb_0.

³⁷ See <https://www.iluka.com/media/5tqdzumaz/2024-half-year-results-presentation.pdf>.

³⁸ See <https://app.sharelinktechnologies.com/announcement/asx/c9e59f38d7d516c8720ec38ef594fbc5>.

³⁹ See <https://wcsecure.weblink.com.au/clients/lynascorp/headline.aspx?headlineid=61236820>.

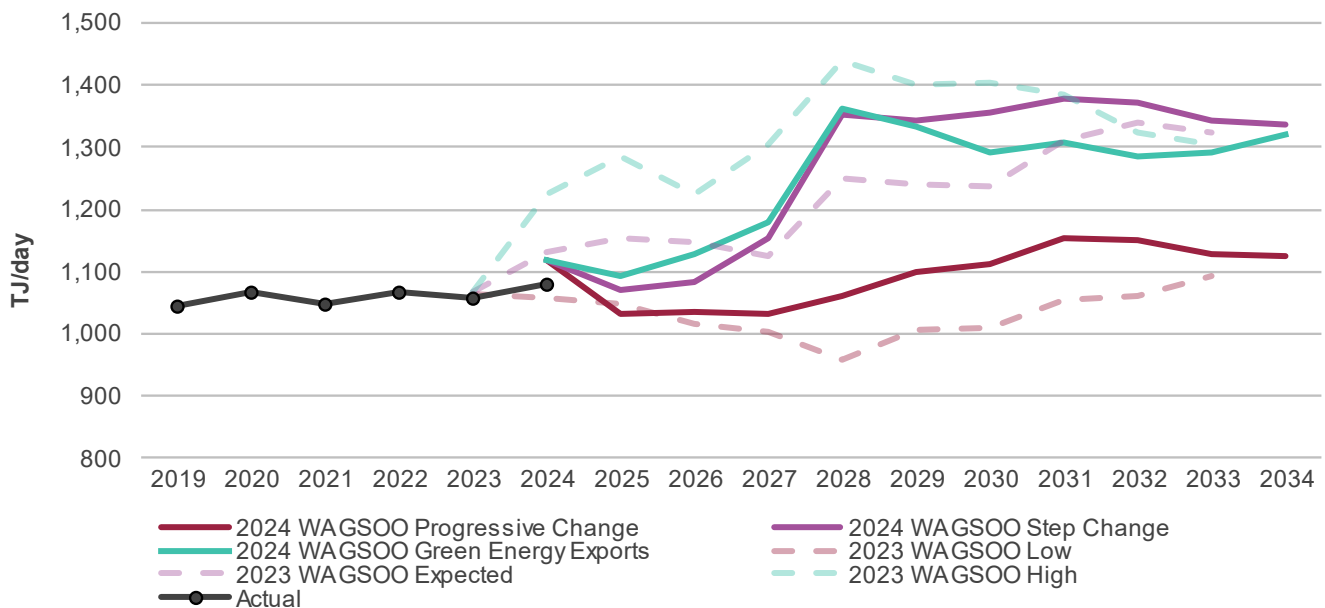
⁴⁰ See <https://www.ltresources.com.au/wp-content/uploads/2024/11/61236906.pdf>.

⁴¹ See <https://clients3.weblink.com.au/clients/mineralresources/v2/headline.aspx?headlineid=61222575>.

⁴² See <https://wcsecure.weblink.com.au/clients/lynascorp/headline.aspx?headlineid=61222341>.

⁴³ See <https://perdaman.com.au/2023/04/20/perdaman-urea-project-closes-financing/#:~:text=Perdaman%20is%20pleased%20to%20announce,north%20of%20Karratha%2C%20Western%20Australia>.

⁴⁴ See <https://clients3.weblink.com.au/clients/mineralresources/v2/headline.aspx?headlineid=61222575>.

Figure 10 Actual and forecast domestic gas consumption, all sectors, 2023 and 2024 WA GSOOs, all scenarios, 2019 to 2034 (TJ/day)

Note: Actual consumption for 2024 is based on WA GBB data until 30 September 2024.

A summary of the key findings on gas consumption in each of the modelled scenarios is provided in Table 5. Existing and new gas consumption projects are considered as per Table 4.

Table 5 Domestic gas consumption forecasts and assumptions, by scenario

	Progressive Change	Step Change	Green Energy Exports
AAGR	0.0%	1.8%	1.7%
Forecast	<ul style="list-style-type: none"> Consumption declines until 2027, due to curtailments across the alumina refining, nickel production and lithium processing sectors. Peak consumption 1,155 TJ/day in 2031 due to restart of some of the curtailed operations and commencement of new projects. Consumption eases off after 2031 due to decline in GPG consumption. 	<ul style="list-style-type: none"> Consumption declines slightly early in the outlook period due to the curtailment of nickel, alumina, and lithium processing operations. Peak consumption 1,378 TJ/day in 2031 due to restart of curtailed operations, commencement of new projects, and expansion of existing projects. Consumption eases off after 2031 due to decline in GPG consumption. 	<ul style="list-style-type: none"> Consumption declines slightly early in the outlook period due to the curtailment of nickel, alumina, and lithium processing operations. Peak consumption 1,363 TJ/day in 2028 due to restart of curtailed operations, commencement of new projects, and expansion of existing projects. Growth in consumption from industry is offset by decline in GPG consumption as companies seek to decarbonise, resulting in negligible change after 2028.
Assumptions	<ul style="list-style-type: none"> The Perdaman Karratha Urea Project reaches full capacity by 2029. Curtailed nickel and lithium operations restart in 2027. Suspended alumina operations do not restart. VRE and battery storage continue to enter the power system after 2031^A. 	<ul style="list-style-type: none"> The Perdaman Karratha Urea Project reaches full capacity by 2028. Curtailed nickel, lithium and alumina operations restart in 2027. VRE and battery storage continue to enter the power system after 2031. 	<ul style="list-style-type: none"> The Perdaman Karratha Urea Project reaches full capacity by 2028. Curtailed nickel, lithium and alumina operations restart in 2027. VRE and battery storage continue to enter the power system after 2031. Include new consumption reduction projects^B, which cover more than half of the new consumption projects in this scenario.

A. Refer to Section 2.2.4 for further detail on GPG and decarbonisation assumptions.

B. Consumption reduction projects reduce the reliance on natural gas by implementing decarbonisation initiatives. All new consumption reduction projects are probable in nature and yet to be committed. These projects were only considered in the *Green Energy Exports* scenario and were omitted from the *Progressive Change* and *Step Change* forecasts.

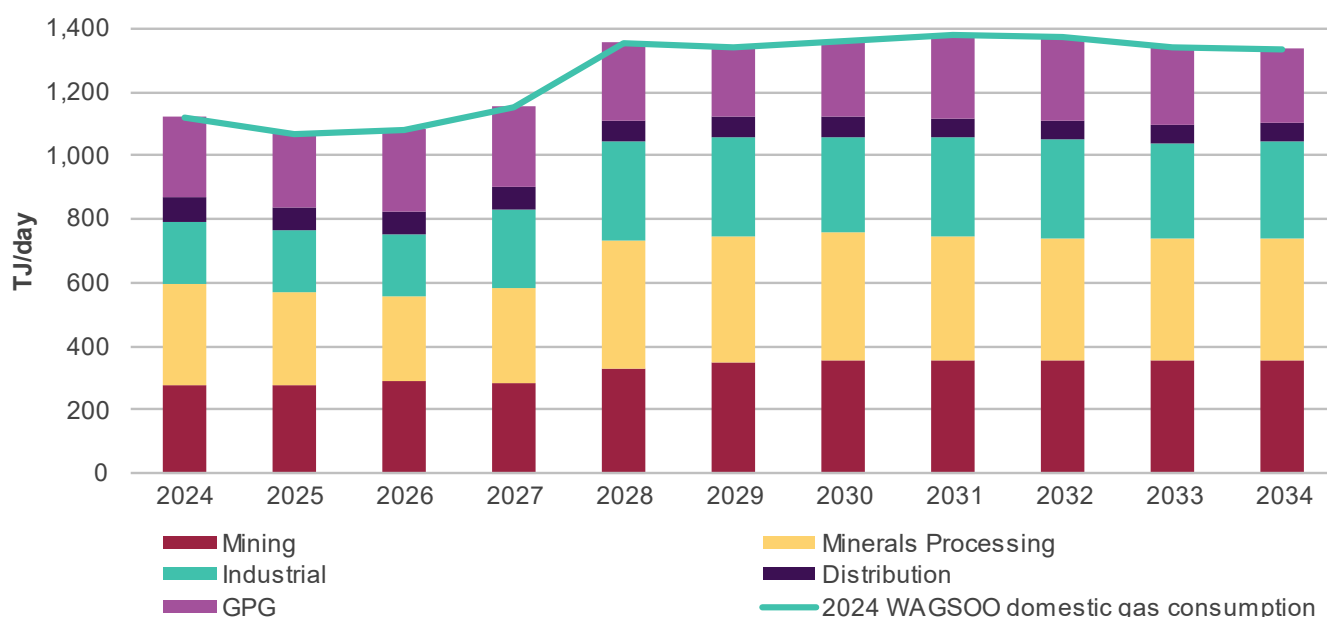
The AAGR is similar to the 2023 WA GSOO for all three scenarios. In comparison with the 2023 WA GSOO forecasts:

- The *Progressive Change* scenario forecasts consumption higher throughout the entire outlook period except for 2025. The overall higher forecast is due to increased gas consumption for both SWIS GPG and the industrial sector.
- The *Step Change* scenario forecasts consumption lower until 2026, due to curtailed nickel and lithium operations and suspended alumina operations. Thereafter, domestic consumption is forecast to increase and peak in 2031 due to production volume growth and fuel-switching in the minerals and industrial sectors, slightly offset by lower SWIS GPG gas consumption. There is additional forecast domestic consumption of up to 120 TJ/day in this period.
- The *Green Energy Exports* scenario forecasts consumption lower throughout the entire outlook period, largely due to lower SWIS GPG and nickel mining gas consumption.

2.3.3 Domestic gas consumption forecasts by usage category

Domestic gas consumption is divided into five usage categories. Figure 11 shows domestic gas consumption broken down by these categories for the *Step Change* scenario. The AAGR by sector quoted in this section excludes the impacts of electrification unless otherwise specified.

Figure 11 Domestic gas consumption forecasts by usage category, *Step Change* scenario, 2024 to 2034 (TJ/day)



Note: Figures for each usage category include consumption reduction due to electrification.

Drivers of trends in the *Step Change* scenario in the different sectors are summarised below. The AAGRs provided are based on results including reduction due to electrification unless otherwise stated:

- **Minerals Processing** – forecast to increase at an AAGR of 1.8% across the outlook period. The curtailment of the Kwinana Alumina Refinery translates to lower gas consumption in the early years of the forecast, compared to recent history. Increased consumption is forecast from 2028 due to the anticipated restart of the refinery,

combined with incremental growth in alumina production at other sites and programs of fuel switching (coal to gas). This is followed by slight decline after 2030 due reduction from electrification. Operational restarts are dependent on prevailing market conditions for key commodities and the relative cost structures of individual operations.

- **GPG** – forecast to decline slightly at an AAGR of -0.9% across the outlook period. This contrasts with the 3.3% growth forecast in the 2023 WA GSOO. The decrease in GPG is due to stronger growth in VRE and BESS in the SWIS, which reduces consumption for gas generation particularly for later years of the outlook period. For more information on SWIS GPG forecasts, refer to Section 2.3.5.
- **Mining** – continues to be a significant consumer of gas with an AAGR of 2.6% across the outlook period, underpinned by production expansion of Pilbara-based iron ore exporters and the execution of large projects such as South Flank (BHP) and Rhodes Ridge (Rio Tinto). Gold mining is forecast to experience a resurgence in exploration and development activities, which may translate to new projects (De Grey Mining Hemi project), substantive expansions of existing operations (Northern Star KCGM mill expansion) and mine life extensions. This will drive high gas consumption in the second half of the outlook period.
- **Industrial** – gas consumption in the industrial sector⁴⁵ is forecast to increase at an AAGR of 4.7% across the outlook period. This is largely attributed to the Perdaman Karratha Urea Project.
- **Distribution** – forecast to decline at an AAGR of -2.4% driven by reduction from electrification.

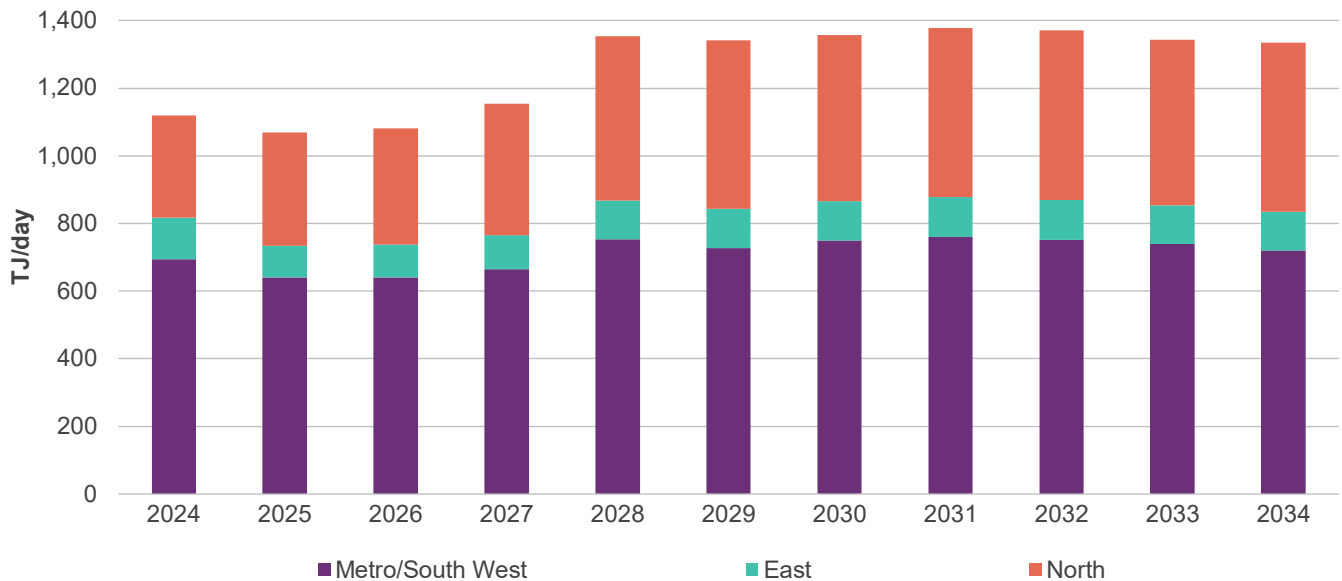
Note that some loads previously classified under Tariff D (Distribution) have been reclassified in the 2024 WA GSOO to their industry sectors (such as Industrial or Minerals Processing). This enables AEMO to leverage self-reported site level forecasts from FIR responses to improve forecasting accuracy. The load reclassification for these sites also provides added transparency for the projected growth of their relevant sectors.

2.3.4 Domestic gas consumption forecasts by region

Western Australian domestic gas consumption forecasts are split into three regions – North, East, and Metro/South West.

Figure 12 presents the domestic gas consumption forecasts by region for the *Step Change* scenario and Table 6 summarises the regional growth rates and observations.

⁴⁵ Comprises all large business use that are not covered under minerals processing, GPG, or mining sectors.

Figure 12 Domestic gas consumption forecasts by region, Step Change scenario, 2024 to 2034 (TJ/day)

Note: Figures for each region do not include any reduction due to Tariff V electrification.

Table 6 Western Australia domestic gas consumption growth rates and observations by region

Region	AAGR	Observations
	5.2%	<ul style="list-style-type: none"> Growth largely due to the Perdaman Karratha Urea Project.
	-0.7%	<ul style="list-style-type: none"> Growth in gas consumption driven by gold mining projects, offset to some extent by development of on-site renewables. Drop-off in consumption at the beginning of the period due to the suspension of nickel mines before the impact of the gold and other mining projects takes effect. Overall, consumption in this region is expected to be largely flat, with a modest decline of -0.7% over the period.
	0.4%	<ul style="list-style-type: none"> Decline in the first three years due to the nickel mine suspension and alumina processing curtailment. General growth later in the period due to minerals and industrial sectors ramping up, coupled with an increase in GPG consumption as the coal retirements take effect.

Source: WA GBB.

2.3.5 SWIS GPG forecasts

This section provides an overview of forecast changes in gas consumption for GPG in the SWIS. Two of the most significant considerations when forecasting the use of gas for electricity generation are the retirement of coal-fired

generation and the volume of VRE connected to the grid. As coal exits the market, the void left behind will need to be filled by alternative generation sources. The assumed emission reduction trajectory to net zero by 2050 drives a preference for VRE where practicable. However, it is likely that gas will continue to play an important role in the SWIS by helping manage extended periods of low VRE generation and providing firming support when other dispatchable sources are unavailable.

When forecasting GPG gas consumption over the outlook period, the following core modelling assumptions have been applied in the *Step Change*⁴⁶ scenario:

- All Synergy-owned coal-fired generation is retired by October 2029.
- Bluewaters coal-fired generation exits the market in October 2030⁴⁷.
- There is sufficient transmission network capacity available after 2030 to enable VRE and BESS to continue to connect and be despatched.
- The current decarbonisation pathway of achieving net zero emissions by 2050 remains in place.

In Figure 13 below, wind generates the majority of electricity in the WEM by 2034. This is forecast to result in SWIS GPG annual gas consumption rising slightly for a few years immediately following the coal retirements but returning to current levels of around 190 TJ/day by the end of the outlook period.

While playing a declining role in supplying generation to meet increasing levels of electricity consumption, SWIS GPG is forecast to play an increasingly important role in firming renewables (both distributed photovoltaics [PV] and VRE) and maintaining reliable and secure electricity supply.

Figure 13 WEM annual generation mix from SWIS GPG forecasts, *Step Change* scenario, 2025 to 2034 (terawatt hours [TWh])

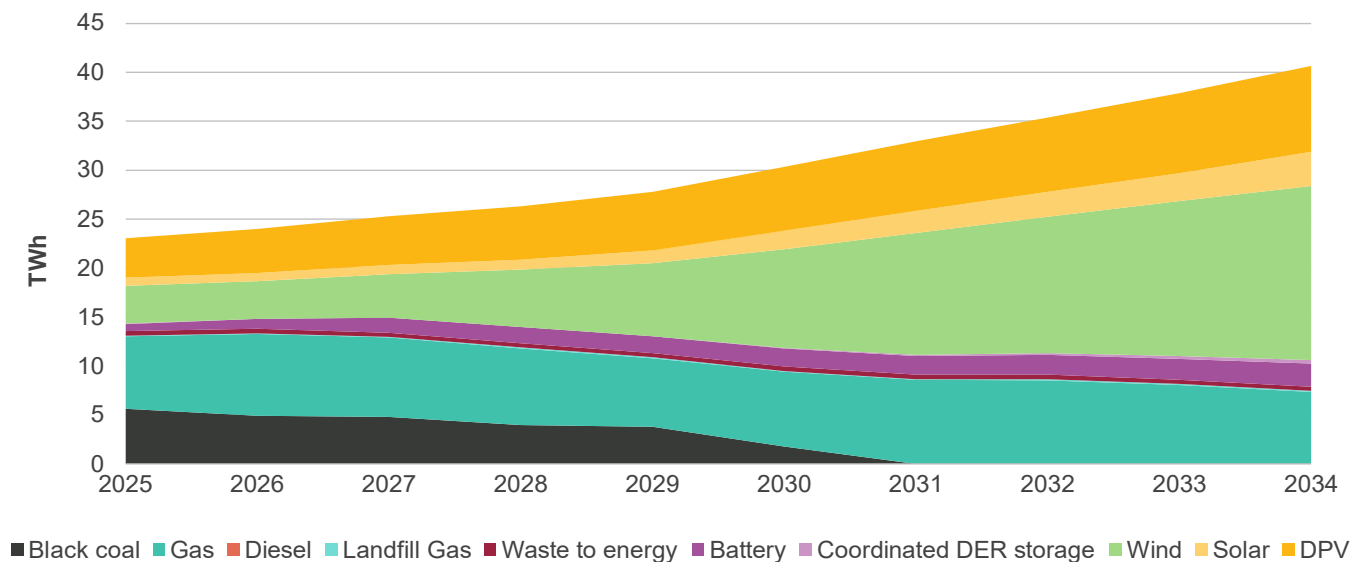
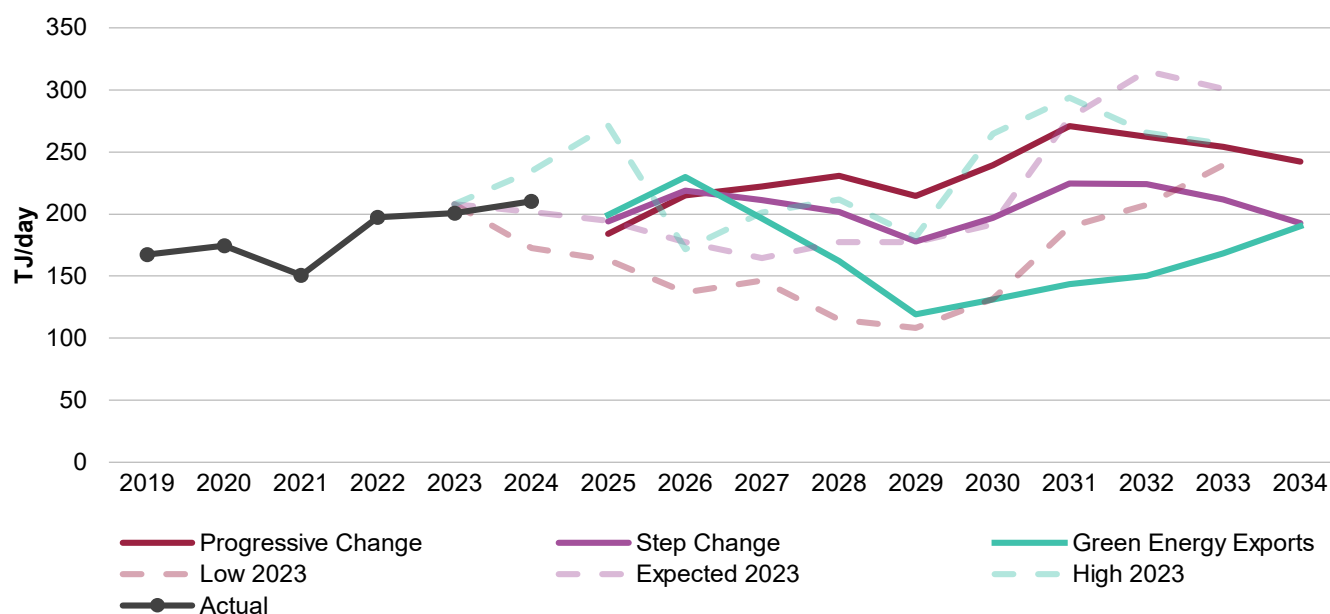


Figure 14 shows the resultant SWIS GPG gas consumption forecasts for the *Progressive Change*, *Step Change*, and *Green Energy Exports* scenarios.

⁴⁶ Refer to Appendix A4 for further information on the specific modelling assumptions for all three scenarios.

⁴⁷ Refer to Appendix A6 for information on the impact of an earlier than expected closure of this power station.

Figure 14 Actual and forecast SWIS GPG gas consumption, 2023 and 2024 WA GSOOs, all scenarios, 2019 to 2034 (TJ/day)



Forecast gas consumption for GPG in the SWIS in each scenario is summarised below:

- Progressive Change scenario** – GPG consumption remains fairly steady through to 2029 as growth in VRE and BESS is slow and coal remains in the capacity mix. This is followed by an uplift as coal exits the market, placing greater reliance on GPG. GPG consumption then declines after 2031 as more VRE and BESS connect to the SWIS. *Progressive Change* is the only scenario that shows an overall increase in GPG. This is due to the assumed slower pace of energy transition.
- Step Change scenario** – GPG consumption declines through to 2029 due to a steady growth in VRE and BESS as Western Australia’s energy transition continues at a moderate pace. GPG consumption then increases as coal exits the market, before declining again after 2031 as more VRE and BESS connects.
- Green Energy Exports scenario** – Western Australia’s energy transition gathers pace and economic growth is strong. This means high volumes of VRE and BESS connect, significantly reducing GPG consumption until coal-fired generation exits the market. As with the other scenarios, gas consumption for GPG increases after 2029 due to the void left by coal-fired generation. Large volumes of VRE and BESS continue to enter the market after 2031, however, this scenario assumes significantly higher electricity consumption due to economic growth and the electrification and development of significant hydrogen production industry in Western Australia. As a result, demand for GPG continues to rise after 2029 until the end of the outlook period, albeit with GPG being a relatively small portion of the electrical energy production mix at 9%.

All three scenarios see an uptick in gas consumption for GPG from 2025 to 2026. This is due to a forecast fall in Western Australia’s domestic gas prices that drives some switching between coal and gas generation⁴⁸.

The trend for GPG thereafter is more directly related to the pace of Western Australia’s energy transition. Assuming coal generators continue to retire as expected, where the energy transition slows and less VRE and

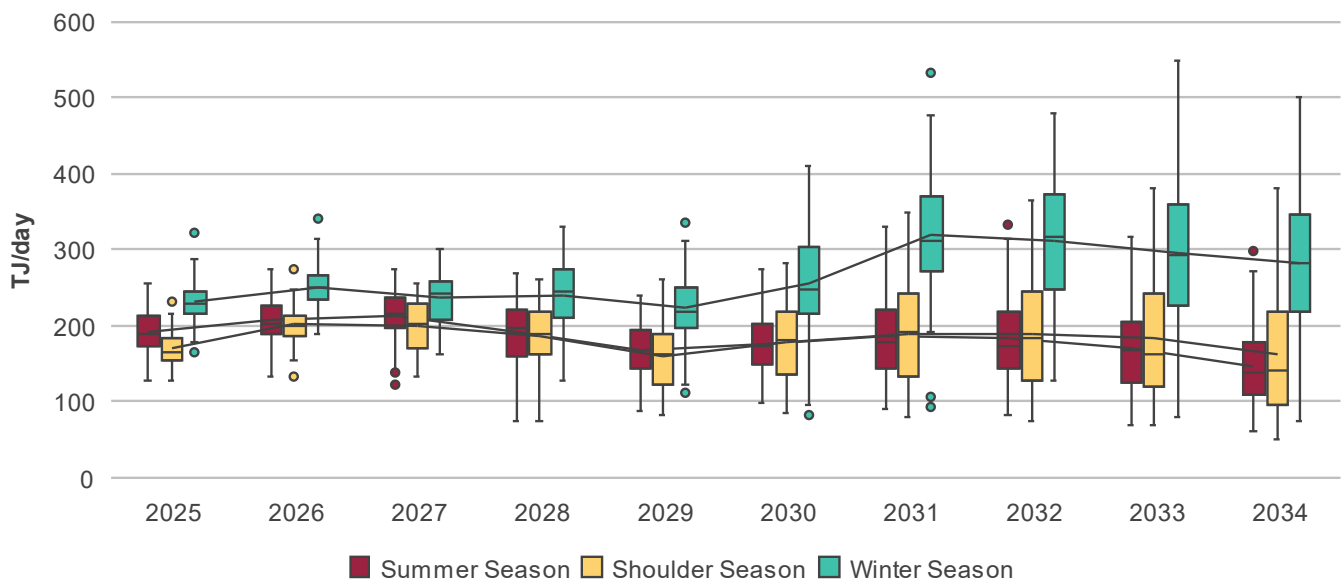
⁴⁸ AEMO engaged external consultant EnergyQuest to develop gas price forecasts for the 2024 WA GSOO.

BESS enter the market, reliance on GPG increases and gas consumption grows. Where the energy transition occurs more quickly, greater volumes of VRE and storage connect, reducing the overall need for GPG to meet electricity consumption.

In all scenarios, GPG continues to play a significant role as firming capacity during times of peak demand, or when VRE is unavailable. Increasing variability in SWIS GPG gas demand is forecast, as shown in Figure 15, with the following key observations:

- High variability in GPG demand particularly during winter months as a result of the emergence of peak demand in winters, decreased output from both large-scale solar and distributed PV, and decreased consistency in wind generation due to higher frequency of wind lulls. This demonstrates the increase in impact of weather conditions on the demand for GPG.
- The increase in GPG demand variability is particularly notable after 2029, following the expected retirement of the Muja D power station⁴⁹. After 2029, the proportion of VRE in the SWIS capacity mix is expected to grow continuously, contributing to the increase in GPG demand variability.

Figure 15 Box and whisker plot of SWIS daily GPG demand, *Step Change* scenario, 2025 to 2034 (averaged across reference years and iterations^A) for summer, shoulder, and winter seasons^B (TJ/day)



A. For additional details relating to reference years and iterations applied in the SWIS GPG modelling, refer to Ernst & Young (EY), 2024 *South West Interconnected System gas-powered generation forecast methodology report*, prepared for AEMO, 2024, and published alongside this WA GSOO.
 B. Three seasons are defined as: (a) summer season (Trading Months December – March), (b) winter season (Trading Months June – August), and (c) shoulder season, which includes all other Trading Months. This is aligned with 2024 WEM ESOO season definitions.

2.4 Total gas consumption forecasts

Total gas consumption is the aggregate of forecasts for domestic gas consumption, LNG export feedstock, and gas used in LNG processing. Figure 16 shows the total annual gas consumption forecasts for the *Progressive*

⁴⁹ See <https://www.wa.gov.au/government/media-statements/McGowan%20Labor%20Government/State-owned-coal-power-stations-to-be-retired-by-2030-20220614>.

Change, Step Change, and Green Energy Exports scenarios for the 2024 WA GSOO, and the Low, Expected, and High scenarios from the 2023 WA GSOO. Assumptions underpinning these forecasts are outlined in Appendix A4.

Figure 16 Forecast total gas consumption, 2023 and 2024 WA GSOOs, all scenarios, 2024 to 2034 (TJ/day)

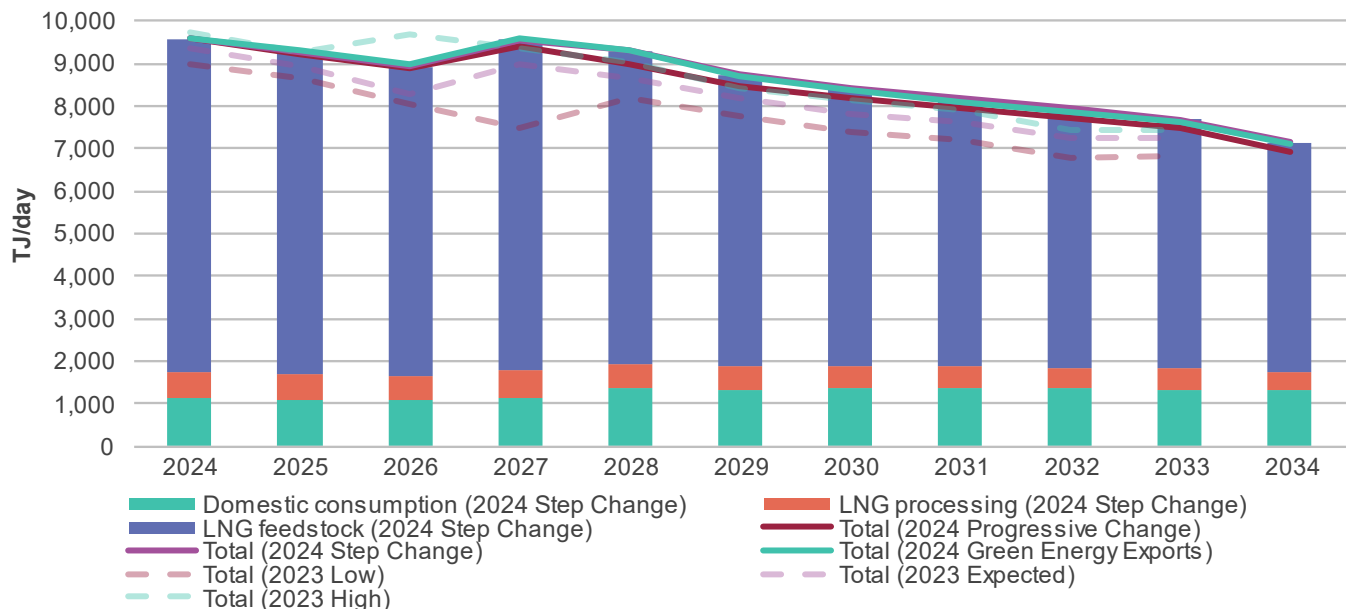


Table 7 summarises the key assumptions specific to each total gas consumption scenario.

Table 7 Total gas consumption forecasts and assumptions, by scenario

	Progressive Change	Step Change	Green Energy Exports
AAGR	-3.2%	-2.9%	-2.9%
Assumptions	<ul style="list-style-type: none"> Scarborough is brought onstream in 2026. Waitsia Stage 2 backfills the Karratha Gas Plant (KGP) from 2025. Assumes existing LNG plants achieve nameplate production rates and that Pluto Train 2 achieves production of 5 million tonnes per annum (Mtpa). 	<ul style="list-style-type: none"> Scarborough is brought onstream in 2026. West Erregulla is brought onstream in 2027 and assumed to export to LNG up to 31 December 2030. Lockyer Deep and North Erregulla Deep are brought onstream in 2029 and assumed to export to LNG up to 31 December 2030. Waitsia Stage 2 backfills the KGP from 2025. Assumes existing LNG plants achieve nameplate production rates and that Pluto Train 2 achieves production of 5 Mtpa. 	<ul style="list-style-type: none"> Scarborough is brought onstream in 2026. West Erregulla is brought onstream in 2026 and assumed to export to LNG up to 31 December 2030. Lockyer Deep and North Erregulla Deep are brought onstream in 2028 and assumed to export to LNG up to 31 December 2030. Waitsia Stage 2 backfills the KGP from 2025. Assumes existing LNG plants achieve nameplate production rates and that Pluto Train 2 achieves production of 5 Mtpa.

Note: Assumptions only include consideration for the LNG processing and feedstock components. Refer to Table 5 for assumptions related to the domestic consumption component.

Overall, the 2024 WA GSOO total gas consumption forecasts are higher than the 2023 WA GSOO forecasts for all three scenarios. This is largely due to higher LNG export feedstock and gas used in LNG processing throughout the outlook period.

3 Gas supply

AEMO forecasts the potential availability of gas to supply the Western Australia domestic market, or “potential gas supply”. Potential gas supply is defined as supply that *could* be made available to the domestic gas market, given forecast prices, production costs and domestic market obligations (DMOs), subject to processing capacity and gas reserves.

Under the *Step Change* scenario, potential gas supply is expected to increase during the first half of the outlook period between 2024 and 2029, reaching a maximum of 1,412 TJ/day annually on average in 2029, before gradually decreasing. The resulting forecast annual average growth in potential gas supply is 0.01% throughout the outlook period.

Decreases in forecast potential gas supply are primarily due to cessation of production from Reindeer gas field (Devil Creek gas plant) and natural reserve depletion, while increases are attributed mainly to new supply from the Scarborough Energy Project and development of Perth basin gas fields.

3.1 Profile of upstream gas production

Potential gas supply relies on information received from market participants through 2024 WA GSOO FIR that includes information such as forecasts for capability and capacity of gas processing plants, and any plans for new, expansions or upgrades of gas facilities that could impact forecast supply along with detail on connected fields for potential supply sources. Additionally, potential gas supply accounts for information on reserves and resources, ongoing explorations and gas discoveries and actual domestic supply from gas production facilities.

3.1.1 Reserves and resources

Gas is categorised into either reserves or resources, based on the level of commercial and technical certainty associated with extraction⁵⁰. These terms are broadly defined below:

- Reserves are quantities of gas anticipated to be commercially recoverable from known accumulations. **Proved and probable (2P) reserves** are considered the best estimate of commercially recoverable reserves⁵¹.
- **Contingent (2C) resources** are considered less commercially viable than reserves. These can be considered roughly the equivalent of reserves with one or more commercial or technical uncertainties impacting the likelihood of development. 2C resources are considered the best estimate of sub-commercial resources⁵².
- Third-party estimates of Western Australian total conventional gas resources⁵³ are summarised in Table 8.

⁵⁰ Uncertainties could include securing finance, obtaining government approvals, negotiating contracts, or overcoming geological challenges.

⁵¹ The 2P reserves categorisation indicates a reasonable probability that 50% or more of the gas is recoverable and economically profitable. This generally accepted industry standard has been used as the best estimate. Proved reserves (1P) indicate that this probability is higher than 90%. For detailed definitions, see the Society of Petroleum Engineers, at <https://www.spe.org/en/industry/petroleum-resources-classification-system-definitions/>.

⁵² The resources are estimated to exist in prospective areas but are not currently commercially viable.

⁵³ ‘Conventional’ refers to formations that are relatively straightforward to extract, and ‘unconventional’ refers to formations that are much more difficult to extract, in some cases requiring specialised techniques. Both conventional and unconventional gas formations may contribute to reserves and resources, depending on the economic viability of extraction.

Table 8 Western Australia conventional gas resources and reserves, June 2024, (PJ)

Type	2023	2024
Conventional 2P gas reserves	71,201	66,338
Conventional 2C gas resources	59,220	51,488

Data source: Department of Jobs, Tourism, Science and Innovation, Western Australia, 2024, at <https://www.wa.gov.au/government/publications/western-australias-economy-and-international-trade>.

In addition to conventional gas, Western Australia has unconventional gas resources (basin centred, shale, and tight gas) mostly located in the Canning Basin. Geoscience Australia estimates 2,429 PJ of unconventional 2C gas could be recoverable from the Canning Basin⁵⁴. There has been no commercial production of unconventional gas in Western Australia to date.

2024 WA GSOO potential gas supply forecasts account for 2P gas reserves information, primarily sourced from the 2024 WA GSOO FIR process and market research as inputs to best reflect supply capability in the forecasts. The 2C gas resources information is also primarily sourced from the FIR process as estimated to exist over the longer term but are not currently commercially viable.

Over time, gas reserves and resources are developed, depleted, or reassessed (particularly against commercial benchmarks). AEMO assesses the Western Australian gas reserves and resources based on the most current market information.

The 2024 WA GSOO assessment criteria for reserve and resources are detailed in Appendix Section A4.3.

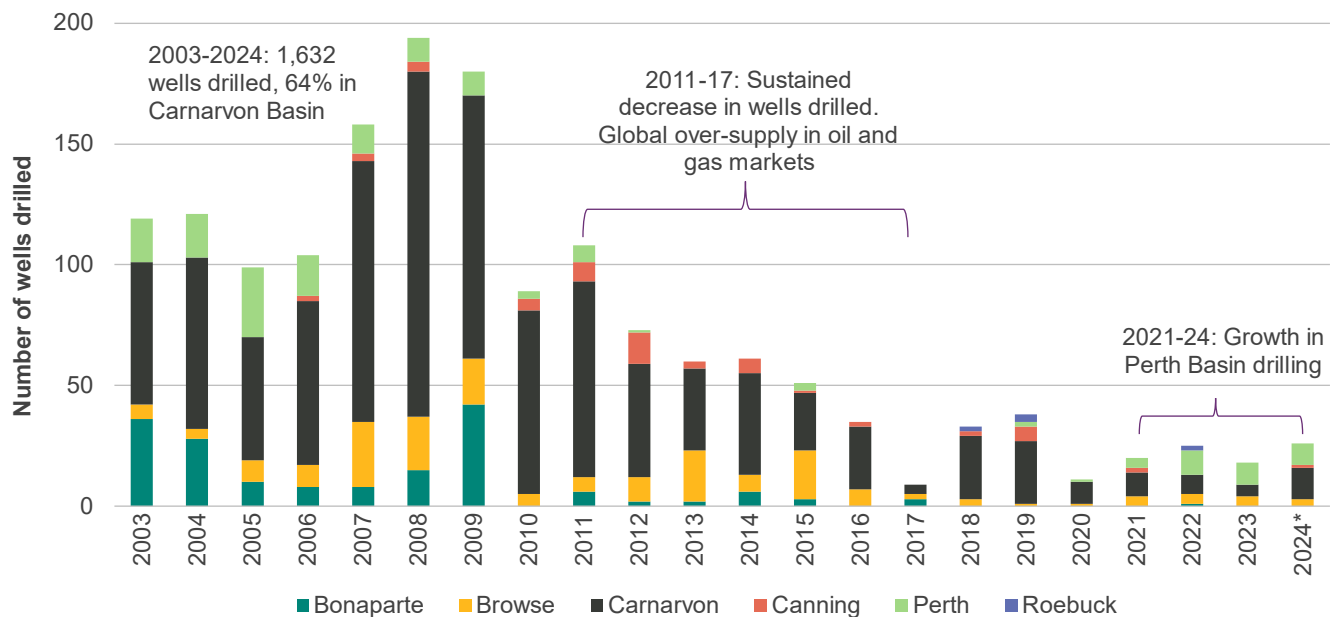
3.1.2 Exploration

Gas supply to the Western Australia domestic market relies on the ongoing development of gas discoveries. While prospectivity remains across all basins, the number of exploration and development wells drilled in Western Australia remains relatively subdued, with only 26 wells drilled so far in 2024 compared to 194 at the peak in 2008. There has been renewed interest in the Perth Basin in recent years, with 32 wells drilled between 2021 and 2024⁵⁵.

Figure 17 shows the geographic distribution of drilled wells by year.

⁵⁴ See <https://www.ga.gov.au/aecr2024/gas>.

⁵⁵ During 2022 and 2023 the Perth Basin overtook the Carnarvon Basin in terms of wells drilled for the first time since at least 1990.

Figure 17 Exploration and development wells drilled, 2003 to 2024

Source: WAPIMS, NOPIMS, and AEMO.

Note: Data until 31 October 2024, sourced from <https://nopims.dmp.wa.gov.au/Nopims/Wells> and <https://wapims.dmp.wa.gov.au/WAPIMS/Wells>.

3.1.3 Domestic gas supply

There are currently 10 gas production facilities supplying the Western Australian domestic gas market⁵⁶, with a total nameplate capacity of approximately 1,836 TJ/day⁵⁷. The Karratha Gas Plant maintains the largest nameplate capacity at 630 TJ/day, albeit with a utilisation of 22% in the financial year 2023-24⁵⁸.

Table 9 shows the average capacity utilisation over the 2023-24 financial year.

⁵⁶ As of 31 October 2024, the average annual domestic supply is 1,140 TJ/day.

⁵⁷ Nameplate capacity as of 31 October 2024. The Dongara gas production facility has not operated since Q3 2017 and has therefore been excluded. The nameplate capacity values, along with gas production facility average production and capacity utilisations are shown in Appendix A4.

⁵⁸ Utilisation was calculated using WA GBB capacity (which may differ from nameplate capacity). See <https://gbbwa.aemo.com.au/#reports/mediumTermCapacity>.

Table 9 Domestic gas production facilities' average production and capacity utilisation, 2023-24 financial year

Facility	Nameplate capacity ^A (TJ/day)	Average production (TJ/day)					Average capacity utilisation ^B				
		1 Jul – 30 Sept 2023 (Q1)	1 Oct – 31 Dec 2023 (Q2)	1 Jan – 31 Mar 2024 (Q3)	1 Apr – 30 Jun 2024 (Q4)	2023-24 financial year	1 Jul – 30 Sept 2023 (Q1)	1 Oct – 31 Dec 2023 (Q2)	1 Jan – 31 Mar 2024 (Q3)	1 Apr – 30 Jun 2024 (Q4)	2023-24 financial year
Beharra Springs	25 ⁵⁹	25	23	21	23	23	99%	92%	82%	92%	91%
Devil Creek	50 ⁶⁰	24	43	11	30	27	48%	86%	22%	59%	54%
Gorgon	300 ⁶¹	279	289	295	297	291	93%	96%	98%	99%	97%
KGP	630 ⁶²	153	119	101	188	141	24%	19%	16%	30%	22%
Macedon	170 ⁶³	178	177	172	173	176	84%	83%	81%	81%	82%
Pluto^C	40 ⁶⁴	23	22	22	19	22	93%	88%	88%	78%	87%
Varanus Island	390 ⁶⁵	183	201	209	206	200	61%	67%	70%	91%	72%
Walyering^D	33 ⁶⁶	1	20	24	25	17	0%	59%	73%	76%	69%
Wheatstone	215 ⁶⁷	196	223	217	190	207	91%	104%	101%	88%	96%
Xyris	30 ⁶⁸	28	29	29	28	29	93%	98%	97%	94%	95%
Total	1,883	1,090	1,146	1,102	1,180	1,132	61%	63%	61%	68%	63%

A. The nameplate capacity values have been taken from company websites and public announcements.

B. Utilisation was calculated using WA GBB capacity (which may differ from nameplate capacity).

C. The Pluto LNG facilities have a nameplate capacity of 40 TJ/day (a 25 TJ/day pipeline gas facility and a 15 TJ/day LNG truck loading facility).

D. Walyering came online in September 2023, with nameplate capacity of 33 TJ/day.

The following trends were observed during the 2023-24 financial year:

- The highest production was from Gorgon (291 TJ/day annual average), followed by Wheatstone (207 TJ/day annual average) and Varanus Island (200 TJ/day annual average). Walyering had the lowest production (17 TJ/day annual average due to production beginning at the end of quarter 1), followed by Pluto (22 TJ/day annual average).
- Production from the KGP has increased in the fourth quarter of the financial year, due to the processing of increased Pluto gas through the Pluto-KGP interconnector⁶⁹.

⁵⁹ See <https://www.mepau.com.au/project/beharra-springs-project/>.

⁶⁰ Nameplate capacity of the plant is 50 TJ/day with expected cessation in late 2024. For detail see <https://www.santos.com/wp-content/uploads/2024/10/2024-Santos-Third-Quarter-Report.pdf> and <https://www.santos.com/wp-content/uploads/2023/11/Santos-Investor-Day-2023.pdf>.

⁶¹ See <https://australia.chevron.com/what-we-do/gorgon-project>.

⁶² See https://www.woodside.com/docs/default-source/sustainability-documents/transparency-documents/2023-government-submissions-reports/submission---woodside_inquiry-into-the-wa-domgas-policy.pdf?sfvrsn=e77567d3_3.

⁶³ See https://www.woodside.com/docs/default-source/sustainability-documents/transparency-documents/2023-government-submissions-reports/submission---woodside_inquiry-into-the-wa-domgas-policy.pdf?sfvrsn=e77567d3_3.

⁶⁴ See https://www.woodside.com/docs/default-source/sustainability-documents/transparency-documents/2023-government-submissions-reports/submission---woodside_inquiry-into-the-wa-domgas-policy.pdf?sfvrsn=e77567d3_3.

⁶⁵ See <https://www.santos.com/wp-content/uploads/2024/08/2024-Half-year-results.pdf>.

⁶⁶ See <https://announcements.asx.com.au/asxpdf/20240103/pdf/05z3v53sxgk1sb.pdf>.

⁶⁷ See <https://australia.chevron.com/news/2024/chevron-australia-further-boosts-wa-domestic-gas-supply>.

⁶⁸ See <https://www.mepau.com.au/project/waitsia-gas-project/>.

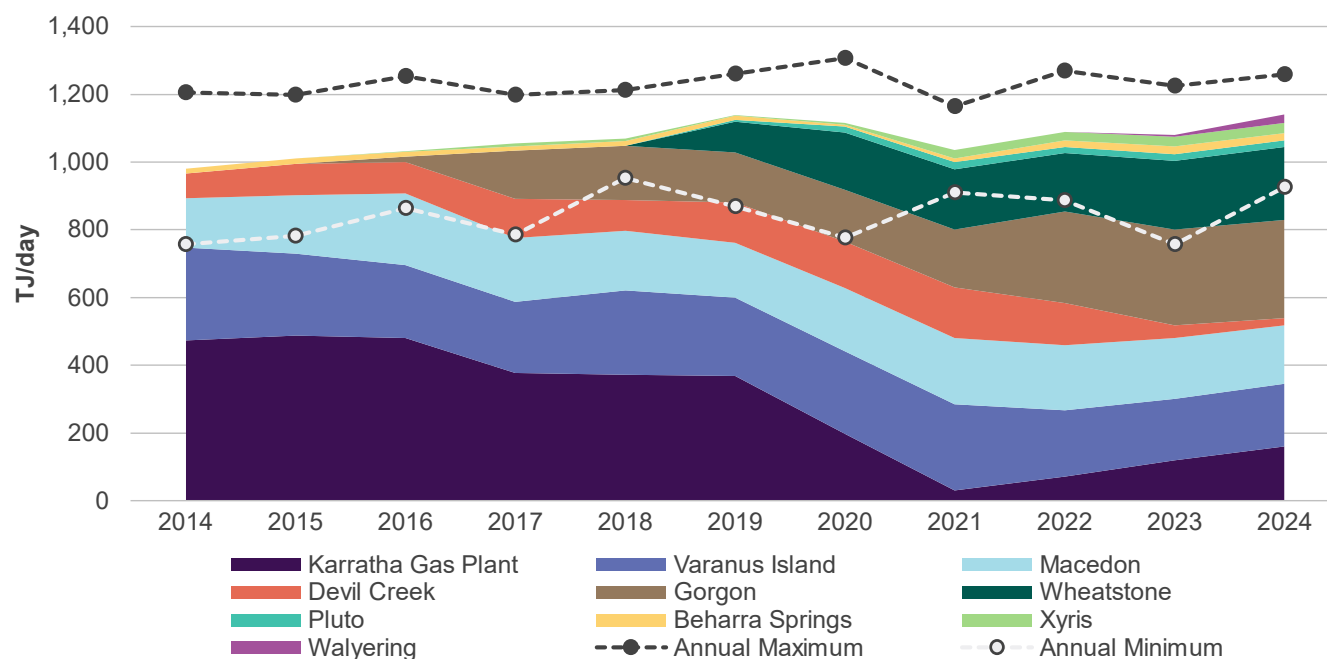
⁶⁹ See <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024> under Pluto Acceleration.

- Production from Devil Creek has been varied, with intermittent production as the Reindeer gas field ceases production by the end of 2024⁷⁰.
- The Gorgon, Wheatstone, Xyris and Beharra Springs facilities had the highest capacity utilisation over the financial year, all operating at over 90%, while the KGP facility had the lowest capacity utilisation at 22%. The remaining facilities have been operating at capacity utilisations ranging from 54% to 87%.
- Overall, the weighted average capacity utilisation was 63% (88% excluding KGP) over this financial year, with the highest utilisation in the last quarter when production from the Pluto-KGP interconnector, Varanus Island and Walyering increased.

Figure 18 presents the historical gas supply in the Western Australian domestic gas market over the last decade. It also shows the minimum and maximum daily gas supply per annum, highlighting the scale of variability in supply to meet demand throughout the year. Key points are:

- All major supply has been sourced from the State's north-west, with only a small fraction of total supply sourced from the Perth Basin.
- Since 2014, gas supply sources in Western Australia have become more diversified with the introduction of Gorgon in 2016 and Wheatstone in 2019, and more recently several smaller Perth Basin supply sources including Beharra Springs, Xyris, and Walyering. Notably, a significant decrease in supply from Karratha Gas Plant (KGP) was observed from 2016 to 2021.
- Natural reserves depletion impacted production from Devil Creek from 2021, decreasing from 150 TJ/day in 2021 to an average of 21 TJ/d in 2024.

Figure 18 Average annual gas supply by facility, and supply statistics, 2014 to 2024 (TJ/day)



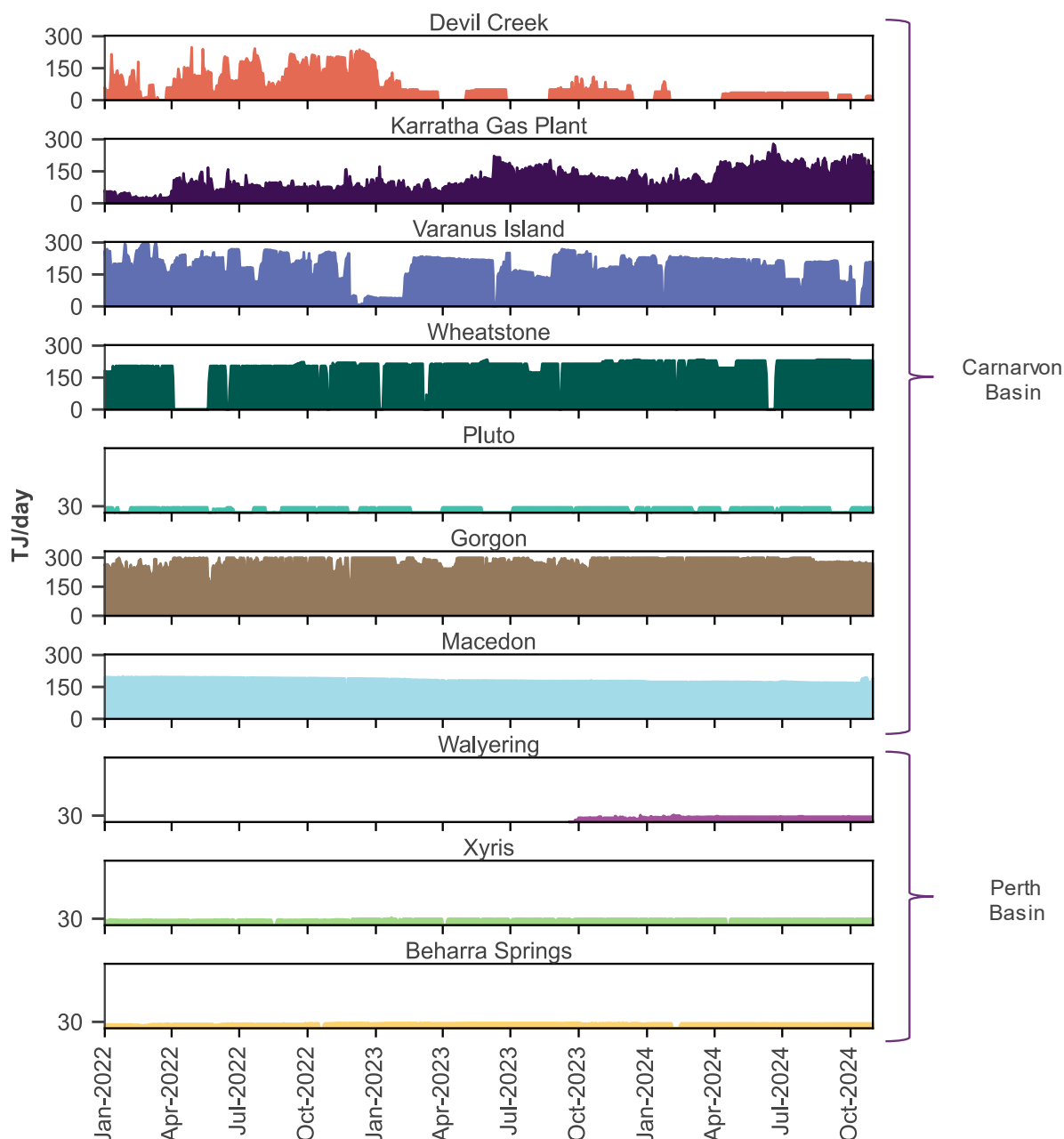
Source: WA GBB.

Note: Average annual domestic gas supply data until 31 October 2024. All supply sources except for the three in Perth Basin (namely Beharra Springs, Xyris and Walyering) are in Western Australia's north-west.

⁷⁰ See https://www.santos.com/wp-content/uploads/2024/10/2024_Santos-Third-Quarter-Report.pdf.

Figure 19 shows three-year actual daily gas supply by facility.

Figure 19 Actual daily gas supply by facility, 2022 to 2024 (TJ/day)



Source: WA GBB.

Note: Figure 19 includes domestic gas supply data until 31 October 2024.

Key observations are:

- **Supply variability** – noticeable variation in supply across some of the 10 facilities, partly attributable to facility planned maintenance and forced outages. The facilities of Macedon, Beharra Springs, Xyris, Walyering, Gorgon and Pluto have the smallest contributions to supply variability.
- **Utilisation of supply** – the nature of gas market contracting arrangements, which are not publicly available, are likely to contribute to the supply variability (or lack thereof) associated with each facility. Gas price-sensitive

industries can choose to reduce consumption if gas is not available at competitive prices and can add to the variability of supply. Between January 2022 and September 2024, a maximum of 31 TJ/day gas was transacted in the spot market. This occurred during June 2023 and the average price was \$10.02⁷¹. Responses to AEMO's FIR for the 2024 WA GSOO indicated that consumption reduction could occur from \$7.93/GJ, although the median price at which consumption reduction occurs is \$10.75/GJ.

Table 10 includes statistics from a study of gas supply reliability, which is added to this WA GSOO in response to the recommendations from the 2023 five-yearly WA GSOO review⁷². Insights from this gas supply reliability study have been included in this WA GSOO potential gas supply forecasts, with AEMO assessing historical daily gas supply for the largest contributions to total supply, as well as the largest sources of variation. AEMO continues to assess this historical production data to adjust its potential supply forecast assumptions to reflect actual operating patterns. This includes adjustments of capacity utilisation to best reflect historical behaviour.

For the period 2022 to 2024, Table 10 highlights the supply source contribution to variance within the system, as well as historical contributions to total supply for each facility, showing that Gorgon, Karratha Gas Plant, Varanus Island and Wheatstone were the largest supply sources. Variation at most facilities has reduced over the past three years.

Table 10 Supply source contributions to Western Australia total domestic gas supply, 2022 to 2024 (%)

Year		Western Australia domestic gas supply sources									
		Beharra Springs	Devil Creek	Gorgon	Karratha Gas Plant	Macedon	Pluto	Varanus Island	Walyering	Wheatstone	Xyris
% of total Western Australia domestic gas supply	2022	2%	11%	25%	7%	18%	2%	18%	N/A	16%	2%
	2023	2%	3%	26%	11%	17%	2%	17%	0%	19%	3%
	2024 ^B	2%	2%	25%	14%	15%	2%	16%	2%	19%	3%
% variation of total supply ^A	2022	0%	6%	3%	3%	1%	1%	6%	N/A	7%	0%
	2023	0%	3%	2%	4%	1%	1%	6%	1%	4%	1%
	2024 ^B	0%	2%	1%	4%	1%	1%	5%	0%	4%	0%

A. Total variation calculated for each source is the standard deviation of daily supplied volumes divided by the annual daily average total of all domestic gas sources.

B. 2024 numbers are based on domestic gas supply data until 31 October 2024.

3.2 Potential gas supply model assumptions

AEMO's supply model does not project how much gas *will* be produced, but rather how much *could* be produced. The model distinguishes between existing, committed, and probable projects⁷³.

⁷¹ See <https://www.gastrading.com.au/spot-market/historical-prices-and-volume/daily-volume-history> for actual daily volume and price in the spot market.

⁷² See https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/wa_gsoo/2023/wa-gsoo-five-year-review.pdf?la=en

⁷³ New projects or expansions to production capacity that have achieved FID are considered as committed. New projects that have not yet achieved FID and have not been excluded from the modelling for one of the reasons listed in Section 3.2.3 are considered as probable.

Probable projects are included if the forecast price (Western Australian domestic gas price or Asian LNG price) exceeds production costs.

For more information about the model features and methodology, see Appendix Section A4.3.

3.2.1 Input sources

Inputs used in developing potential gas supply forecasts for the *Progressive Change*, *Step Change*, and *Green Energy Exports* scenarios were derived from the following sources of information:

- AEMO engaged external consultant EnergyQuest to develop forecasts for domestic gas prices, Asian LNG netback⁷⁴ prices, and production cost estimates for this WA GSOO.
- Gas reserves and contracted volumes were sourced from the 2024 WA GSOO FIR process.
- Existing Domestic Market Obligation (DMO) volumes were sourced from the Western Australia Department of Jobs, Tourism, Science and Innovation (JTSI)⁷⁵. DMO volumes and gas reserves for all three scenarios were applied to all projects as applicable.
- Market intelligence was gathered via informal and formal gas stakeholder interviews, and publicly available information in relation to projects.
- AEMO has projected that hydrogen will have only a minimal impact on potential domestic supply towards the end of this outlook period⁷⁶. This forecast is driven by the lack of hydrogen committed for domestic usage (most projects are focusing on exports), along with uncertainty around the progress of hydrogen projects. AEMO will continue to assess the possible impact of hydrogen on potential domestic gas supply, with a view to including hydrogen supply in future WA GSOOs.

3.2.2 Key modelling assumptions

AEMO's supply-related modelling assumptions for the three scenarios can be summarised as follows:

- The ***Progressive Change*** scenario included only existing and committed gas production capacity.
- The ***Step Change*** scenario included all projects in the *Progressive Change* scenario, plus probable supply sources that are expected to commence operation in the outlook period based on forecast prices and production costs.
- The ***Green Energy Exports*** scenario included all projects in the *Step Change* scenario, with an accelerated commencement of probable supply sources.

Consistent production costs, DMO volumes, and gas reserves were assumed for all three scenarios. Table 11 and Table 12 present further information on AEMO's assumptions by production facility and gas field across all three scenarios. More detail on inputs and assumptions is provided in Appendix Section A4.3.

⁷⁴ Netback price is the export parity price for a domestic producer. It is calculated as the LNG destination sale price less the liquefaction and transport costs.

⁷⁵ See <https://www.wa.gov.au/government/publications/implementation-of-the-wa-domestic-gas-policy#>.

⁷⁶ This is in line with the input assumptions for hydrogen projects considered in the 2024 WEM ESOO Expected scenario.

Following analysis of historical production, AEMO adjusted the daily delivery rates⁷⁷ associated with the LNG-linked supply sources that are operating at capacity (Gorgon and Wheatstone). Specifically, 96% and 93% of the respective nameplate capacity of Gorgon and Wheatstone domestic plants was assumed to be available to the Western Australia domestic gas market on an annual basis. The modelling also assumed the maximum potential gas supply from domestic-gas only projects is available to the market, subject to remaining gas reserves.

AEMO accounted for the updated Domestic Gas Policy in its potential gas supply forecasts and assumed 20% of gas exports to LNG from probable and proposed onshore gas projects until 31 December 2030. These onshore gas projects are detailed in Section 3.2.3.

Table 11 Potential gas supply modelling assumptions for existing projects

Production facility	Category	Assumption in all three scenarios
Beharra Springs	Existing domestic gas only	28 TJ/day throughout the outlook period ^A .
Devil Creek	Existing domestic gas only	Ceasing continuous production by Q4 2024, intermittent production limited by with depleting reserves ^B .
Gorgon	Existing LNG-linked with DMO	288 TJ/day throughout the outlook period ^C .
Karratha Gas Plant	Existing LNG-linked with DMO	151 TJ/day in 2025 reflecting revised DMO and with production limited by remaining reserves through the outlook period.
Macedon	Existing domestic gas only	~165 TJ/day in 2025, with production limited by remaining reserves through the outlook period.
Pluto	Existing LNG-linked with DMO	28 TJ/day: 3 TJ/d via LNG truck-loading ^D and 25 TJ/d via pipeline.
Pluto acceleration	Existing LNG-linked with DMO	48 TJ/day between April-2024 and end-2025, and an additional 25 TJ/day starting from 2024 (Pluto gas to be delivered via the KGP) ^E .
Varanus Island (John Brookes, Spar-Halyard and Spartan)	Existing domestic gas only	~200 TJ/day from 2025 with production limited by remaining reserves through the outlook period.
Xyris (Waitsia stage 1)	Existing LNG-linked with DMO	20 TJ/day from 2025 delivered via Xyris ^F .
Walyering	Existing domestic gas only	25 TJ/day from 2025, with production limited by remaining reserves.
Wheatstone	Existing LNG-linked with DMO	214 TJ/day throughout the outlook period ^G .

A. The nameplate capacity is to increase from 25 TJ/day to 28 TJ/day in from 2025. See <https://gbbwa.aemo.com.au/#capacities>.

B. The capacity of Devil Creek was decreased from 220 TJ/day to 50 TJ/day in March 2023, primarily due to water breakthrough at the Reindeer field. The field has ceased continuous production in 2024, with only intermittent production due to implementation of well cycling. See https://www.santos.com/wp-content/uploads/2024/10/2024_Santos-Third-Quarter-Report.pdf.

C. The 96% capacity utilisation assumed based on historical flow analysis. See <https://gbbwa.aemo.com.au/#reports/actualFlow>.

D. AEMO has included “Non-connection-point consumption” (off-grid gas consumption) that is equal to the Pluto LNG truck loading production.

E. See <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024> for updated Pluto Acceleration agreement.

F. Domestic gas supply from Xyris is expected to end from 2028 in line with the Waitsia Joint Venture Domestic Gas Commitment Agreement. See <https://www.wa.gov.au/government/publications/waitsia-joint-venture-domestic-gas-commitment-agreement>.

G. The capacity of Wheatstone was increased from 215 TJ/day to 230 TJ/day in August 2024, see <https://australia.chevron.com/news/2024/chevron-australia-further-boosts-wa-domestic-gas-supply>. The 93% capacity utilisation is assumed based on historical flow analysis, see: <https://gbbwa.aemo.com.au/#reports/actualFlow>.

⁷⁷ Full details of the domestic market obligations in force, including gas produced and outstanding commitments, are available on JTSI's website. See <https://www.wa.gov.au/government/publications/implementation-of-the-wa-domestic-gas-policy>.

Table 12 Potential gas supply modelling assumptions for new projects, by committed and probable projects category

Gas field	Category	Progressive Change	Step Change	Green Energy Exports
Scarborough^A	New LNG-linked with DMO. Committed project	Production ramps up from Q4-2026 to reach 180 TJ/day by 2029.	Production ramps up from Q4-2026 to reach 180 TJ/day by 2029.	Production ramps up from Q4-2026 to reach 180 TJ/day by 2029.
Waitsia Stage 2	New domestic gas only (from 2029) ^B . Committed project	~200 TJ/day in 2029, with production limited by remaining reserves through the outlook period.	~200 TJ/day in 2029, with production limited by remaining reserves through the outlook period.	~200 TJ/day in 2029, with production limited by remaining reserves through the outlook period.
West Erregulla	New domestic gas only. Probable project	Not developed.	Production ramps up from start-2027 to reach 78 TJ/day by 2031. 20% of gas to LNG assumed until 2030 ^C .	Production ramps up from Q4-2026 to reach 78 TJ/day by 2031. 20% of gas to LNG assumed until 2030 ^C .
Lockyer Gas Project^D	New domestic gas only. Probable project	Not developed.	Production ramps up from start-2029 to reach 80 TJ/day by 2031. 20% of gas to LNG assumed until 2030 ^C .	Production ramps up from start-2028 to reach 80 TJ/day by 2031. 20% of gas to LNG assumed until 2030 ^C .

Note: Ramp-up rates have been applied in the modelling of committed and probable projects of Scarborough, West Erregulla and the Lockyer Gas Project based on available information. This has been done to reflect a more realistic production forecast particularly in the starting years of production. Actual ramp-up rates could vary from what has been assumed.

A. Scarborough is being developed as an LNG supply source to Pluto Train 2 and a domestic gas facility with a nameplate capacity of 225 TJ/day.

B. Developed as an LNG supply source through North West Shelf (NWS) up until 2028 and then to supply domestic market from 2029 onwards.

C. Assumed as per the updated Western Australia domestic gas policy. See <https://www.wa.gov.au/government/announcements/domestic-gas-policy-updated-secure-was-energy-future>.

D. Lockyer Deep and North Erregulla Deep fields supply the Lockyer Gas Project. See <https://clients3.weblink.com.au/pdf/MIN/02852782.pdf>.

3.2.3 Detail on probable and proposed supply sources

For each scenario, probable and proposed supply sources and backfill for existing production facilities are assumed to commence if:

- Forecast Western Australian domestic gas prices assumed in the scenario exceeded the cost of production for domestic gas projects.
- Forecast Asian LNG prices assumed in the scenario exceeded the cost of production, for LNG-linked projects. If the project is assumed to commence, an associated DMO is also assumed to be offered to the domestic gas market.

Using these criteria, AEMO included three undeveloped fields – Lockyer Deep, North Erregulla Deep and West Erregulla – in the *Step Change* scenario. There are no additional undeveloped fields in the *Green Energy Exports* scenario supply forecast (see Appendix Section A4.3 for further information about the selection criteria for these projects). While there is a large volume of undeveloped gas that could supply the Western Australian domestic market during the outlook period, these resources are currently too speculative to be included in the potential supply forecasts. These proposed resources include, but are not limited to, Corvus, Tarantula Deep and Redback Deep, Trigg Northwest, Dorado, Equus, and Browse⁷⁸. AEMO will continue to monitor these projects for potential inclusion in future WA GSOOs.

⁷⁸ This is not an exhaustive list of resources. AEMO will continue to monitor the inclusion of any applicable projects in future WA GSOOs.

Lockyer Gas Project – Lockyer Deep and North Erregulla Deep

The Lockyer Gas Project is to be supplied by both Lockyer and North Erregulla gas pools, with 2C reserve estimate of 435 PJ⁷⁹.

Lockyer Deep-1 was discovered in September 2021⁸⁰. It lies 10 km north of the West Erregulla project and 15 km east of the Waitsia project. The field is owned by Energy Resources Limited (subsidiary of Mineral Resources Limited, 80% owner and operator), and Norwest Energy NL (20%). The Lockyer Deep 2 appraisal well, drilled in March 2023, came in dry⁸¹. Two further appraisal wells were drilled – Lockyer Deep 3 in July 2023 and Lockyer-5 in early 2024 – both seeing high flows⁸².

North Erregulla Deep-1 (NED-1) was discovered in June 2023⁸³. It is situated 8.3 km south-east of the Lockyer Deep-1 well. NED-1 drilling began in April 2023⁸⁴ and a well test occurring in August 2023.

In the *Step Change* scenario, AEMO assumed that the Lockyer Gas Project will be available from 2029 as a domestic gas supply project, based on project progress⁸⁵.

West Erregulla

The West Erregulla field was discovered in 2019 and is located onshore in the Perth Basin, approximately 350 km north of Perth⁸⁶. The field is owned by Strike Energy (50%, operator) and Warrego Energy (50%, now part of Hancock Energy)⁸⁷. The 2P reserve estimate is 422 PJ⁸⁸ and the project owner has received primary environmental approvals to develop the West Erregulla gas field⁸⁹. Erregulla Deep -1 well drilling occurred in 2024 seeing strong flow rates and pressure under flow⁹⁰.

In the *Step Change* scenario, it is assumed that West Erregulla will be available from 2027 based on project progress, after having production licence granted in August 2024⁹¹.

3.3 Potential gas supply forecasts

AEMO's potential gas supply forecasts for the three scenarios are shown in Table 13 and Figure 20.

⁷⁹ See <https://clients3.weblink.com.au/pdf/MIN/02852782.pdf>.

⁸⁰ See <https://clients3.weblink.com.au/pdf/MIN/02419018.pdf>.

⁸¹ See <https://clients3.weblink.com.au/pdf/MIN/02653457.pdf>.

⁸² See <https://clients3.weblink.com.au/pdf/MIN/02868774.pdf> and <https://clients3.weblink.com.au/pdf/MIN/02788656.pdf>.

⁸³ See <https://www.mineralresources.com.au/our-business/energy/exploration/>.

⁸⁴ See <https://clients3.weblink.com.au/pdf/MIN/02676930.pdf>.

⁸⁵ See <https://www.epa.wa.gov.au/proposals/lockyer-conventional-gas-project>.

⁸⁶ See <https://strikeenergy.au/west-erregulla-2/>.

⁸⁷ See <https://app.sharelinktechnologies.com/announcement/asx/c133b54227a195cb83d8276049426106>.

⁸⁸ See <https://app.sharelinktechnologies.com/announcement/asx/18e7bc225c88e77f5e9920d04a1296f8>.

⁸⁹ See <https://www.epa.wa.gov.au/proposals/west-erregulla-processing-plant-and-pipeline/> 31 October 2024 and <https://app.sharelinktechnologies.com/announcement/asx/8258b04fbae187bbb18c79545757d577>.

⁹⁰ See <https://app.sharelinktechnologies.com/announcement/asx/7df56b2d24fc1db0e59fb0f8a40664a0> and <https://app.sharelinktechnologies.com/announcement/asx/57c3febea6bed77539e66d8901bd7a03>.

⁹¹ See <https://app.sharelinktechnologies.com/announcement/asx/82946100dc223382ae953b069254a713>.

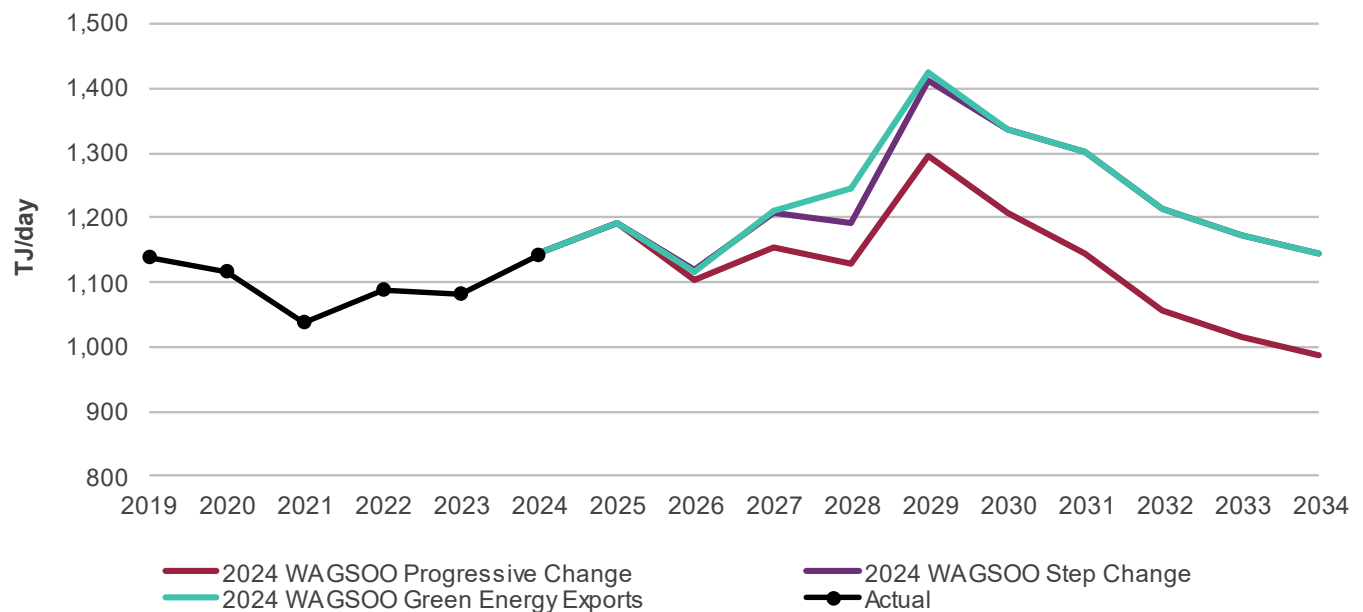
Potential gas supply is forecast to increase at an average of 4.3% annually during the first half of the outlook period, adding 269 TJ/day of gas supply between 2024 and 2029. The forecast then decreases at an average rate of 4.1% annually during the second half of the outlook period due to projected depletion of natural reserves.

Table 13 Potential gas supply forecasts, 2024 to 2034 (TJ/day)

Scenario	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	First 5-year average growth rate	Second 5-year average growth rate
Progressive Change	1,143	1,190	1,102	1,155	1,129	1,297	1,208	1,143	1,055	1,015	986	2.6%	-5.3%
Step Change	1,143	1,190	1,121	1,207	1,192	1,412	1,335	1,301	1,214	1,173	1,144	4.3%	-4.1%
Green Energy Exports	1,143	1,190	1,115	1,210	1,245	1,423	1,335	1,301	1,214	1,173	1,144	4.5%	-4.3%

Note: 2024 captures actual production between 1 January to 31 October 2024 and estimated production between 1 November to 31 December 2024. For the average annual growth rate calculations, 2024 is the base year (year 0) and 2034 is the final year (year 10).

Figure 20 Actual and potential gas supply forecasts, 2024 WA GSOO, all scenarios, 2019 to 2034 (TJ/day)



Note: Actual supply for 2024 is based on WA GBB data until 31 October 2024.

Across the three scenarios, increases in potential supplies are predominantly due to:

- Scarborough being brought onstream from 2026 in all three scenarios.
- Additional domestic supplies from Waitsia Stage 2 from 2029⁹².
- Wheatstone nameplate capacity increased from 215 TJ/day to 230 TJ/day in August 2024.

⁹² 2029 is the assumed commencement year for the additional Waitsia domestic supply in all three scenarios.

- Increased domestic production from the Pluto Acceleration Project from April 2024 to end of 2025 (an increase of up to 30 TJ/d compared to the previous agreement)⁹³.
- LNG-linked supplies from Gorgon and Wheatstone assumed to produce at 96% and 93% of their capacity, respectively⁹⁴.

This increase in potential supply is offset by:

- The Reindeer gas field, which supplies the Devil Creek production facility, ceasing continuous production by the end of 2024⁹⁵.
- Macedon, Varanus Island and Waitsia natural reserve depletion.

Table 14 summarises the key observations for forecast potential gas supply in each scenario.

Table 14 Key observations for forecast potential gas supply between 2024 and 2034, by scenario

	<i>Progressive Change</i>	<i>Step Change</i>	<i>Green Energy Exports</i>
AAGR	-1.5%	0.0%	0.0%
Supply assumptions	<ul style="list-style-type: none"> • Sustained supply with Scarborough coming on-line from 2026. • Peak supply in 2029 with the introduction of Waitsia Stage 2 domestic gas supply in that year. • Natural field decline from Macedon, Varanus Island and Waitsia. • LNG-linked supplies from Gorgon and Wheatstone which continue to produce at 96% and 93% of their capacity, respectively. 	<ul style="list-style-type: none"> • Sustained supply with Scarborough coming on-line from 2026. • Peak supply in 2029 is supported by Waitsia Stage 2 and the following developments in the Perth Basin: <ul style="list-style-type: none"> – Lockyer Gas Project from 2029. – West Erregulla from 2027. • Natural field decline from Macedon, Varanus Island and Waitsia. • LNG-linked supplies from Gorgon and Wheatstone which continue to produce at 96% and 93% of their capacity, respectively. 	<ul style="list-style-type: none"> • Sustained supply with Scarborough coming on-line from 2026. • Peak supply in 2029 is supported by Waitsia Stage 2 and assumed earlier start-up of Perth Basin Projects: <ul style="list-style-type: none"> – Lockyer Gas Project from 2028. – West Erregulla from 2026. • Natural field decline from Macedon, Varanus Island and Waitsia. • LNG-linked supplies from Gorgon and Wheatstone which continue to produce at 96% and 93% of their capacity, respectively.

Figure 21 captures the location for each of the potential domestic gas supply facilities in Western Australia. This includes the existing, committed, and probable supply projects included in this WA GSOO's three scenarios as mentioned in Section 3.2.2.

⁹³ See <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024>.

⁹⁴ The capacity utilisation assumptions for Gorgon and Wheatstone have been assumed based on historical flow analysis. See <https://gbbwa.aemo.com.au/#reports/actualFlow>.

⁹⁵ See https://www.santos.com/wp-content/uploads/2024/10/2024_Santos-Third-Quarter-Report.pdf.

Figure 21 Potential domestic gas supply locations in Western Australia

Note: The colour code of the existing, committed, and probable projects aligns with that used in Figure 22 in Section 3.4.

3.4 Comparison of 2023 and 2024 potential gas supply forecasts

Several events have impacted Western Australia's domestic gas supply since the 2023 WA GSOO⁹⁶ are presented in Chapter 1. Amongst them, some key events have crucially impacted the 2024 WA GSOO potential supply forecast modelling assumption, including:

- The Western Australian Government announced policy changes in response to the Western Australia Parliamentary Inquiry into the Western Australian Domestic Gas Policy (DomGas Inquiry) Final Report⁹⁷ recommendations.

⁹⁶ The events are further detailed in Appendix Section A2.1.

⁹⁷ See [https://www.parliament.wa.gov.au/Parliament/commit.nsf/\(Report+Lookup+by+Com+ID\)/27F837EAB987BD9548258B790020F885/\\$file/20240814%20-%20RPT%20-%20DOMGAS%20FINAL%20updated%20for%20web.pdf](https://www.parliament.wa.gov.au/Parliament/commit.nsf/(Report+Lookup+by+Com+ID)/27F837EAB987BD9548258B790020F885/$file/20240814%20-%20RPT%20-%20DOMGAS%20FINAL%20updated%20for%20web.pdf).

- To stimulate new onshore gas developments, the Western Australian Government's updated policy permits new onshore projects to export up to 20% of their gas production until the end of 2030, from which time the policy will revert to a ban on exports from onshore projects⁹⁸. This has been reflected by adjusting the available domestic gas supply for the period 2027 to 2030 from probable West Erregulla and Lockyer Projects.
- Some gas producers committed to making additional gas available in the near term by bringing forward delivery on their commitments under their respective domestic gas agreements.

Other events that have impacted actual and potential gas supply forecasts are summarised below:

- The nameplate capacity of the Wheatstone domestic gas facility was increased by 7% in August 2024⁹⁹, increasing capacity from 215 TJ/day to 230 TJ/day. A period of testing higher flow rates led to an increased supply to the domestic market.
- From 10-24 June 2024, Wheatstone operations were interrupted due to offshore platform fuel system repairs, which impacted domestic gas production¹⁰⁰. During this time, gas in storage was used to partially offset the production loss at Wheatstone¹⁰¹.
- Varanus Island nameplate capacity reduced by 25% in early 2024, from 300 TJ/day in 2023 to 225 TJ/day due to a well constraint¹⁰². This nameplate capacity was increased back to 300 TJ/day in late-October 2024. Processing constraints also impacted Varanus Island production in 2024, seeing production temporarily drop to zero for around six days in early October¹⁰³.
- From April 2024, there has been increased domestic gas supply flows through the Pluto-Karratha Gas Plant interconnector as part of agreements to increase domestic gas production from the Pluto Acceleration Project (covering the period of April 2024 to end-2025)¹⁰⁴.

Potential gas supply forecast methodology presented in Appendix Section A4.3 details the treatment of these events in to the 2024 WA GSOO potential gas supply model.

Figure 22 compares the resulting potential gas supply forecasts in the 2024 WA GSOO *Step Change* scenario by project categories over the whole outlook period. The figure also shows that compared to the 2023 WA GSOO Expected scenario, supply is forecast to be 138 TJ/day higher between 2024 and 2033, on average.

⁹⁸ This revised policy has been considered in AEMO's potential gas supply forecast, as detailed in Section 3.2. For updated policy, see <https://www.wa.gov.au/government/announcements/domestic-gas-policy-updated-secure-was-energy-future>.

⁹⁹ See <https://australia.chevron.com/news/2024/chevron-australia-further-boosts-wa-domestic-gas-supply>.

¹⁰⁰ See https://www.woodside.com/docs/default-source/lse-announcements/second-quarter-2024-report-lse.pdf?sfvrsn=3d0956b5_1

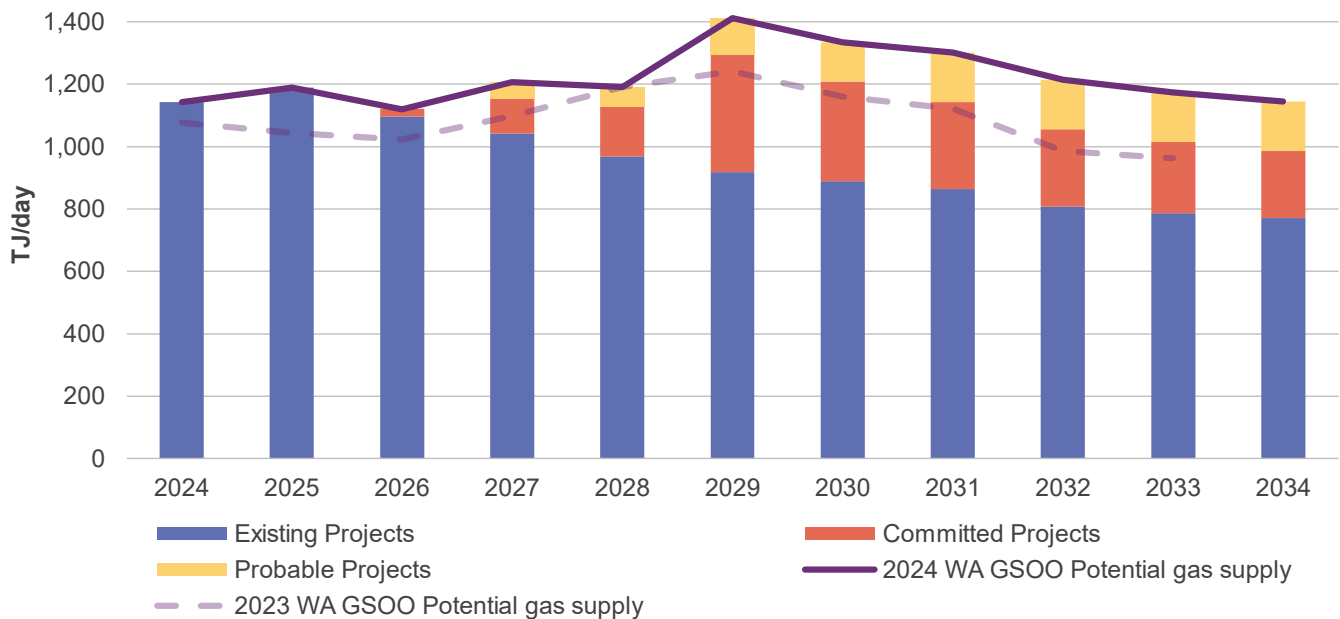
¹⁰¹ From analysis of GBB data. See <https://gbbwa.aemo.com.au/#reports/actualFlow>. Also see Section 3.5 for monthly net storage flows.

¹⁰² As per GBB, at <https://gbbwa.aemo.com.au/#reports/mediumTermCapacity>.

¹⁰³ See <https://gbbwa.aemo.com.au/#reports/actualFlow> and https://www.santos.com/wp-content/uploads/2024/10/2024_Santos-Third-Quarter-Report.pdf.

¹⁰⁴ See <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024> and <https://gbbwa.aemo.com.au/#flows>.

Figure 22 Forecast annual potential gas supply by project category, 2023 and 2024 WA GSOOs, *Step Change* scenario, 2024 to 2034 (TJ/day)



Note: The committed and probable projects included here are as detailed in Section 3.2.2.

For this 2024 WA GSOO, AEMO made the following key changes in potential gas supply assumptions in the *Step Change* scenario:

- Aligned the forecast with the additional gas being made available from some gas producers in the near term, and the updated policy from the Western Australian Government in response to the DomGas Inquiry, as discussed earlier in this section.
- Removed South Erregulla, owned and operated by Strike Energy. South Erregulla, previously included in the 2023 WA GSOO as a 40 TJ/d domestic gas facility to start mid-2026, has taken FID to be developed as a peaking gas power station and not connected to the Western Australian domestic pipeline network¹⁰⁵.
- Added Mineral Resources' North Erregulla Deep field, because this, together with the Lockyer Deep field, will supply the Lockyer Gas Project¹⁰⁶.
- Added the West Erregulla gas field, a joint venture between Strike Energy and Hancock Prospecting¹⁰⁷. In July 2024¹⁰⁸, it was announced that the Ministerial Statement issued under the *Environmental Protection Act 1986* had been received for both upstream development and the plant and pipeline, which was a step towards FID for the project.
- Updated its DMO production assumptions for Gorgon, Wheatstone, NWS and Pluto, based on the domestic gas agreements and historical production, which increased the supply forecast by an average of 54 TJ/day between 2024 and 2033 (see Table 29 in Appendix Section A4.3.2).

¹⁰⁵ See <https://app.sharelinktechnologies.com/announcement/asx/2c454d11bdd51b913cac9535c37e811d> and <https://app.sharelinktechnologies.com/announcement/asx/bfaf5bfb7ee91209d998162ab9a945e4>.

¹⁰⁶ See <https://clients3.weblink.com.au/pdf/MIN/02852782.pdf>.

¹⁰⁷ See <https://strikeenergy.au/west-erregulla-2/>.

¹⁰⁸ See <https://app.sharelinktechnologies.com/announcement/asx/3cf0673dc8941617e7f557d78bcb3a5e>.

- Following the Domestic Gas Policy update, accounted for this updated Domestic Gas Policy in its potential gas supply forecasts and assumed 20% of gas exports to LNG from probable and proposed onshore gas projects until 31 December 2030.
- Updated its assumptions about reserve depletion rates and final production dates, based on responses from the 2024 FIR on production from domestic-only supply sources, which decreased the supply forecast by an average of 2 TJ/day.
- Updated forecasts for gas reserves and resources, production costs, domestic gas prices and Asian LNG prices.

3.5 Multi-user gas storage facilities

Western Australia has two multi-user gas storage facilities in operation. These are shown in Table 15.

Table 15 Western Australian multi-user gas storage facilities, 2024

Facility	Operator	Commenced operation	Gas storage capacity (PJ)	Injection/withdrawal capacity (TJ/day)
Mondarra	APA Group	2013	18	70/150
Tubridgi	Australian Gas Infrastructure Group	2017	60	90/65
Total			78	160/215

Source: WA GBB.

Tubridgi typically provides long-term storage, as it has low injection/withdrawal capacity relative to its storage capacity. It is also located remotely from the major gas markets of the South West and Metropolitan area.

Mondarra is much closer to the Perth Metropolitan area and is connected to the Dampier to Bunbury Natural Gas Pipeline (DBNGP) and Parmelia pipelines. It has high injection/withdrawal capacity relative to its storage capacity and is typically used for short-term storage and daily balancing.

Figure 23 shows the estimated amount of gas stored in Mondarra and Tubridgi since 2014. Total storage capacity across the two facilities is 78 PJ. In October 2024, it is estimated that the facilities contained 39 PJ of gas, down from 42 PJ in October 2023.

Figure 24 indicates that Tubridgi and Mondarra tend to be used for long (multi-year) storage, with gas being withdrawn at times of tight supply or production facility outages.

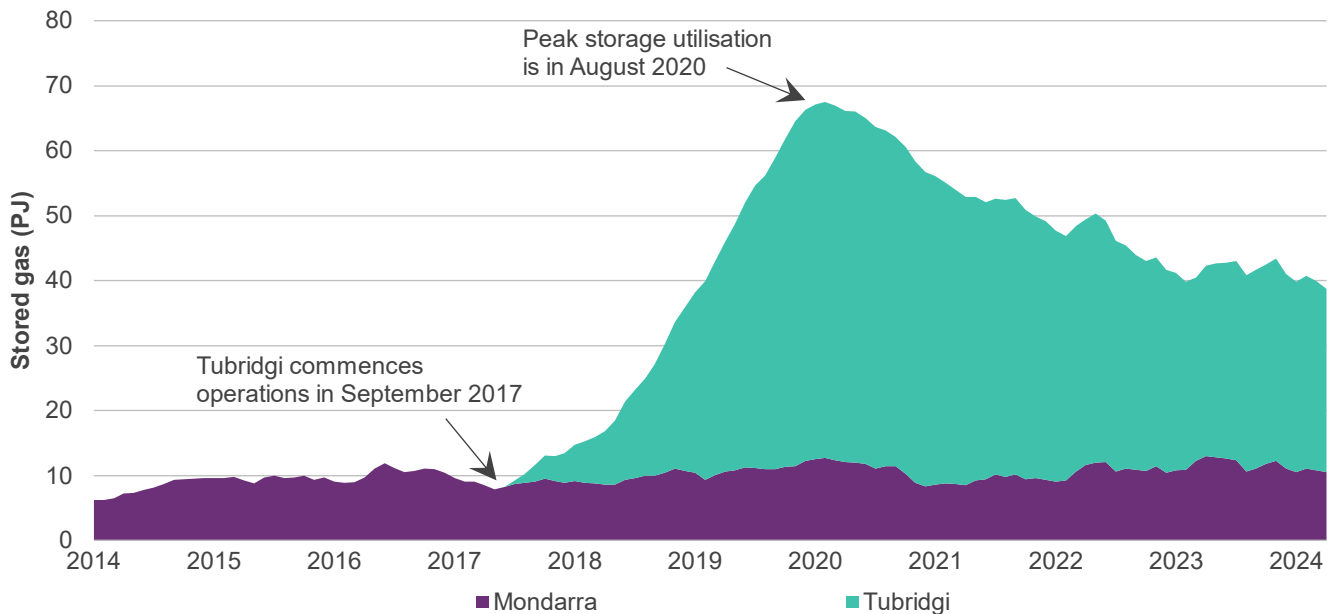
Stored gas peaked in August 2020 and declined between September 2020 and October 2023 as withdrawals outpaced injections. Declines in stored gas since 2020 have coincided with rising prices in the domestic gas spot market¹⁰⁹ and indicate tight market conditions for gas supply across this period.

Between 2023 and 2024, stored gas has been declining more slowly, with duration of withdrawals reducing and injections increasing, as shown in Figure 24. From 2022 to 2024, maximum net withdrawal from storage occurred

¹⁰⁹ See <https://www.gastrading.com.au/spot-market/historical-prices-and-volume/forecast-vs-actual>.

during the gas supply outage in January 2023¹¹⁰, with a monthly net total of 3.02 PJ withdrawn. This was followed by the Wheatstone outage in June 2024, which saw a monthly net total withdrawal of 2.34 PJ.

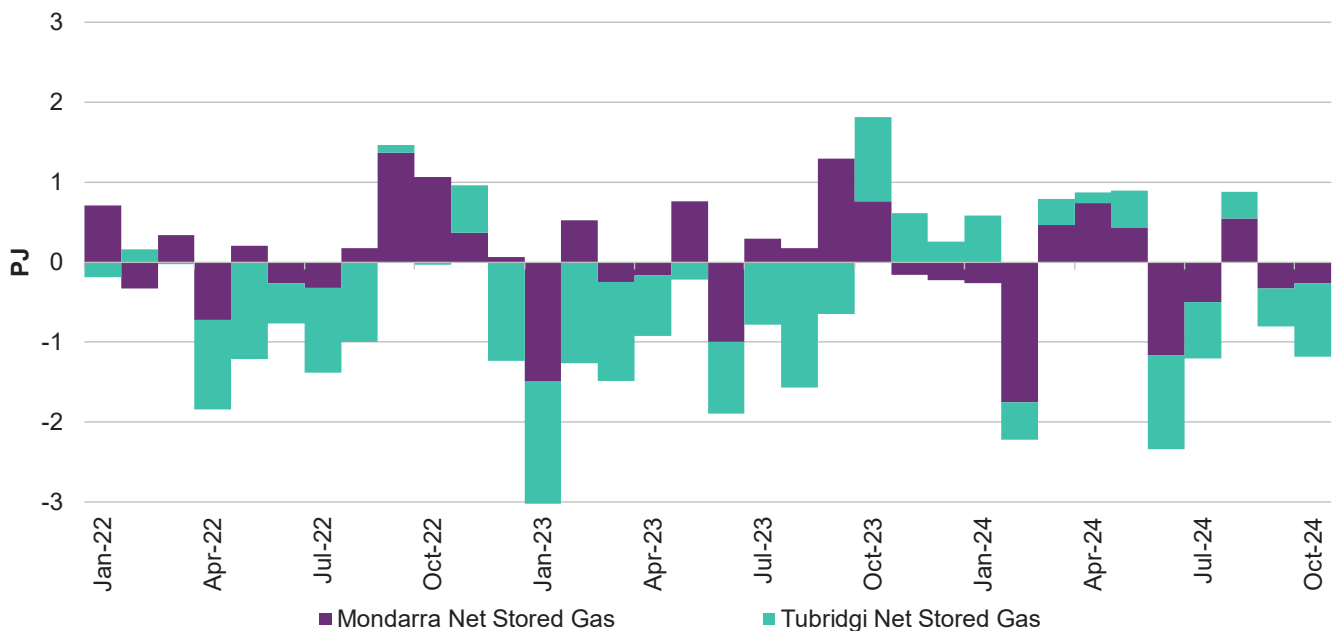
Figure 23 Cumulative stored gas, 2014 to October 2024 (PJ)



Source: WA GBB.

Note: The cumulative stored gas data is up to 31 October 2024.

Figure 24 Monthly net stored gas, January 2022 to October 2024 (PJ)



Note: Monthly net stored gas refers to the total amount of gas into storage net of the gas taken out of storage in that month. A positive net stored gas value is a net increase in stored gas, while a negative value presents the reverse.

¹¹⁰ This event is detailed in Section 1.2.3 in the 2023 WA GSOO, at https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/wa_gsoo/2023/2023-wa-gas-statement-of-opportunities-wa-gsoo.pdf?la=en.

4 Western Australian domestic gas supply adequacy

Potential gas supply is forecast to be in surplus¹¹¹ in the near term across all three scenarios, before falling into deficit later in the outlook period. In the *Step Change* scenario, the Western Australian domestic gas market supply is projected to be in surplus until 2027, is at risk of a supply gap in 2028 and moves into a deficit from 2030.

The 2024 WA GSOO domestic gas supply adequacy forecasts are subject to considerable uncertainty. The near-term surplus is contingent on new gas supply from 2026 across all three scenarios. Connection of more firmed renewables for electricity generation in the SWIS, or changes in assumptions regarding export quantities for new domestic supply, would improve domestic gas supply adequacy. Conversely, any delays or downgrades of major gas supply projects or advances in timing of new gas consuming projects would adversely impact the domestic gas supply adequacy in Western Australia.

Longer-term supply gaps could not be mitigated from the probable sources of supply identified within the scope of the 2024 WA GSOO, but could possibly be partially mitigated by development of proposed offshore resources (such as Browse and Equus), and proposed future onshore gas discoveries from the Perth and Canning basins¹¹².

4.1 Step Change scenario

Based on forecasts of consumption and potential gas supply discussed in previous chapter, Table 16 and Figure 25 show that, in the *Step Change* scenario forecast:

- The Western Australian domestic gas market is in surplus through to 2027, is at risk of a supply gap in 2028, and moves into deficit from 2030.
- Between 2024 and 2027, potential domestic supply is forecast to exceed consumption by up to 121 TJ/day (in 2025).
- In 2028, the risk of a supply gap is forecast due to new gas consuming projects increasing consumption one year in advance of the expected development of new gas supply sources. In 2029, with the inclusion of new supply projects, this supply gap is temporarily eliminated. From 2030 onwards, however, supply gaps re-emerge and increase, ranging from a deficit of 1.6% of consumption in 2030 to a peak deficit of 14.3% in 2034.
- Domestic consumption exceeds supply by up to 191 TJ/day towards the end of the outlook period.

The forecast surplus through to 2027 is due to:

¹¹¹ Gas consumption presented in this chapter is gas consumed over a year, averaged to convert to the unit of TJ/day.

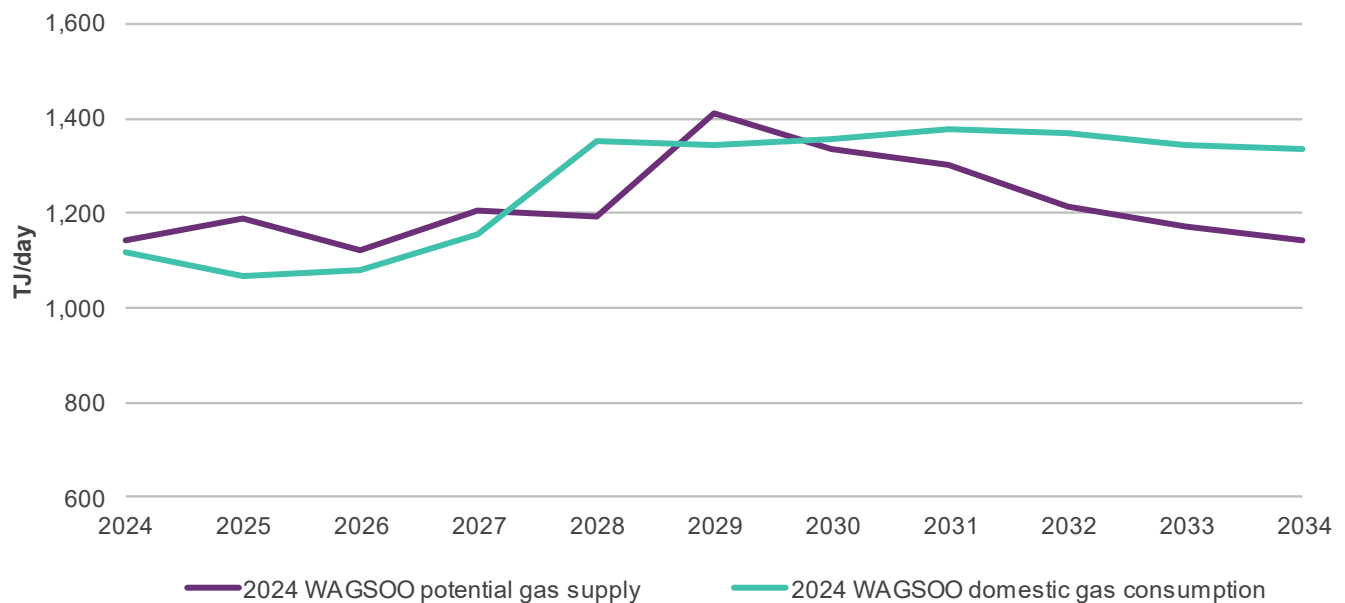
¹¹² Detailed discussion on 2024 WA GSOO domestic gas consumption forecasts is in Chapter 2 and potential supply forecasts for the *Step Change*, *Progressive Change* and *Green Energy Exports* scenarios are in Chapter 3.

- Increased domestic production from Wheatstone from 2024.
- The Pluto Acceleration Project until 2025.
- Commencement of supply from Scarborough in late 2026 and West Erregulla in 2027.
- A slight decline in consumption due to curtailment of nickel, alumina, and lithium processing operations.

Table 16 Forecast Western Australian domestic gas supply adequacy, Step Change scenario, 2024 to 2034 (TJ/day)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Potential gas supply	1,143	1,190	1,121	1,207	1,192	1,412	1,335	1,301	1,214	1,173	1,144
Domestic gas consumption	1,119	1,069	1,082	1,154	1,354	1,342	1,357	1,378	1,371	1,343	1,336
Difference	24	121	39	54	-162	70	-22	-77	-157	-170	-191
Difference as % of consumption	2.1%	11.3%	3.6%	4.7%	-12.0%	5.2%	-1.6%	-5.6%	-11.5%	-12.7%	-14.3%

Figure 25 Forecast Western Australian domestic gas supply adequacy, Step Change scenario, 2024 to 2034 (TJ/day)



In the *Step Change* scenario, domestic consumption is forecast to increase from 2027 and peak in 2031. The advised restart of curtailed operations, combined with higher consumption from existing projects in the minerals and industrials sectors, contributes to significant growth during this period. This, in addition to the commencement of the Perdaman Karratha Urea Project, pushes forecast consumption over 1,300 TJ/day from 2028.

This growth in consumption between 2027 and 2030 is partially fulfilled by supply from the Scarborough Energy Project (expected to commence in 2026), the new West Erregulla (expected to commence in 2027), and the Lockyer Gas Project and Waitsia Stage 2 (both commencing in 2029). However, the currently advised timing of

new supply projects lags the growth in consumption, leading to a forecast supply gap risk in 2028. Addressing this gap will require an increase in supply from existing sources or earlier domestic supply from new supply sources.

From 2030, under all scenarios, current modelling indicates new gas supply is required. Supply deficits are forecast to emerge, increasing to up to 191 TJ/day by 2034, due to depletion of existing gas fields.

4.2 Progressive Change scenario

The *Progressive Change* scenario includes only existing and committed gas supply and gas use sources, and therefore represents a conservative forecast¹¹³. Potential supply and domestic consumption forecasts are both lower than in the *Step Change* and *Green Energy Exports* scenarios.

Table 17 and Figure 26 present the 2024 WA GSOO Western Australian domestic gas supply adequacy assessment in the *Progressive Change* scenario.

In the *Progressive Change* scenario, the Western Australian domestic gas market is in surplus until 2030. The forecast surplus through to 2030 is due to:

- Increased domestic production from Wheatstone from 2024.
- The Pluto Acceleration Project until 2025.
- Commencement of supply from Scarborough in 2026 and Waitsia Stage 2 in 2029.
- Decline in consumption until 2027 due to curtailment of alumina refinery, nickel production, and lithium processing operations, before rising after 2027 with advised restart of nickel and lithium operations along with commencement of the Perdaman Karratha Urea Project.

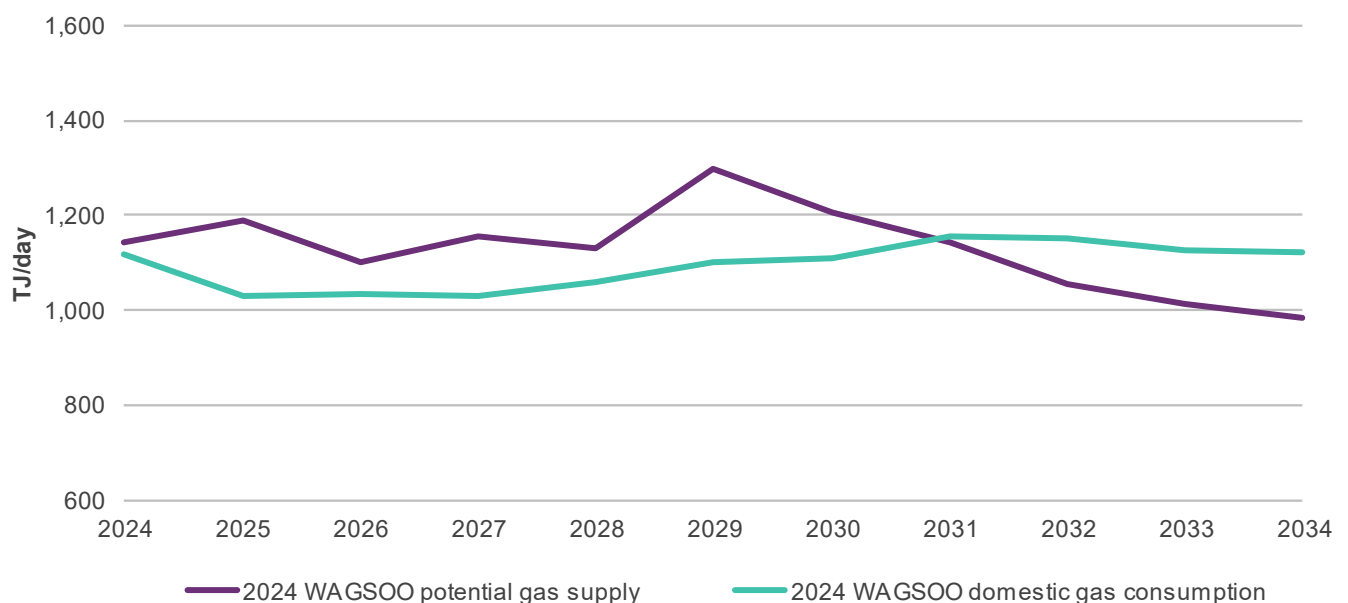
Between 2024 and 2030 in this forecast:

- Potential gas supply exceeds consumption by up to 196 TJ/day in 2029 with commencement of domestic supply from Waitsia Stage 2.
- The Western Australian domestic market tightens in 2031 when consumption is forecast to peak.
- The market is forecast to move into an increasing supply gap from 2031, ranging from a deficit of 1.0% of consumption in 2031 to a peak deficit of 12.3% in 2034, with consumption exceeding domestic supply by up to 138 TJ/day towards the end of this outlook period.
- Potential gas supply declines strongly over the second half of the outlook period, at an average annual rate of 5.3%, in line with reserve depletion at existing production facilities (see Table 17 and Figure 28).
- This decline in supply, combined with the increased gas consumption discussed above, contributes to a projected supply gap towards the end of the outlook period. The supply gap would have been wider if there was no decline in SWIS GPG consumption forecast after 2031 in this scenario.

¹¹³ The main assumption difference between this scenario and the *Step Change* scenario is this scenario does not include any probable gas projects. Over the outlook period, *Progressive Change* scenario forecasts for potential gas supply and domestic consumption are on average 92 TJ/day and 169 TJ/day lower than the *Step Change* scenario forecasts, respectively.

Table 17 Forecast Western Australian domestic gas supply adequacy, *Progressive Change* scenario, 2024 to 2034 (TJ/day)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Potential gas supply	1,143	1,190	1,102	1,155	1,129	1,297	1,208	1,143	1,055	1,015	986
Domestic gas consumption	1,119	1,032	1,035	1,031	1,061	1,100	1,111	1,155	1,150	1,127	1,124
Difference	24	158	67	124	68	196	97	-12	-95	-112	-138
Difference as % of consumption	2.2%	15.3%	6.5%	12.1%	6.4%	17.8%	8.7%	-1.0%	-8.2%	-9.9%	-12.3%

Figure 26 Forecast Western Australian domestic gas supply adequacy, *Progressive Change* scenario, 2024 to 2034 (TJ/day)

4.3 Green Energy Exports scenario

The *Green Energy Exports* scenario includes all existing and committed gas projects in the *Step Change* scenario. The same probable supply sources are included as in the *Step Change* scenario although commencing earlier.

Domestic gas consumption forecasts in this scenario are close to the *Step Change* scenario in the first half of the outlook period, and lower in the second half when the majority of gas consumers were assumed to reduce gas usage to meet decarbonisation objectives, and there was assumed to be an influx of large-scale renewables and battery storage entering the power system.

Potential gas supply forecasts are close to the *Step Change* scenario throughout the outlook period, but in the middle years there is an improved outlook due to assumed earlier commencement of probable supply sources.

In the *Green Energy Exports* scenario, the Western Australian domestic gas market is in overall surplus through to 2030 except in 2026 and 2028, as shown in Table 18 and Figure 27.

The forecast between 2024 and 2030 is due to:

- Increased domestic production from Wheatstone from 2024.
- The Pluto Acceleration Project until 2025.
- Commencement of supply from Scarborough in 2026, new supply from West Erregulla from 2026 and Lockyer Project from 2028 along with domestic supply from Waitsia Stage 2 from 2029.
- A slight decline in consumption early in the outlook period due to curtailment of alumina refinery, nickel production, and lithium processing operations, rising from 2027 with advised restart of curtailed operations along with commencement of the Perdaman Karratha Urea Project and expansion of existing projects.

The coordinated timing of both domestic gas consumption and supply developments is crucial if domestic gas supply adequacy is to be maintained during the period to 2030. While forecast potential gas supply finely balances forecast domestic consumption during 2026 and 2027 with projected supply from Scarborough Energy Project and West Erregulla, the market is projected to face a supply gap risk in 2028 when consumption peaks, primarily with the Perdaman Karratha Urea Project ramping up to full operations along with restart and expansions of other gas users mentioned earlier. Further growth in consumption from industry is forecast to be offset by a decline in GPG consumption, resulting in negligible change after 2028.

The market is projected to be in surplus from 2029 with commencement of supply from Lockyer Project and Waitsia Stage 2, to tighten in 2031, then move into increasing deficit from 2032. Supply gaps progressively widen from 2032 onwards, ranging from 5.5% of consumption in 2032 to 13.3% in 2034, with consumption exceeding supply by up to 176 TJ/day by the end of the outlook period.

The *Green Energy Exports* scenario assumed Bluewaters Power Station closes in late 2027¹¹⁴, but the gap in generation supply is forecast to be more than offset by assumed VRE and battery storage entering the power system, especially after 2031. More than half of the new consumption projects in this scenario are considering options to reduce their reliance on natural gas.

Table 18 Forecast Western Australian domestic gas supply adequacy, *Green Energy Exports* scenario, 2024 to 2034 (TJ/day)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Potential gas supply	1,143	1,190	1,115	1,210	1,245	1,423	1,335	1,301	1,214	1,173	1,144
Domestic gas consumption	1,120	1,091	1,127	1,179	1,363	1,333	1,292	1,308	1,284	1,291	1,320
Difference	23	99	-12	31	-118	90	42	-7	-70	-118	-176
Difference as % of consumption	2.1%	9.1%	-1.1%	2.6%	-8.7%	6.8%	3.3%	-0.5%	-5.5%	-9.2%	-13.3%

¹¹⁴ This is one year later than forecast in the 2023 WA GSOO High scenario to reflect the assignment of Capacity Credits for the 2026-27 Capacity Year.

Figure 27 Forecast Western Australian domestic gas supply adequacy, *Green Energy Exports* scenario, 2024 to 2034 (TJ/day)

4.4 Capability analysis of Western Australian gas pipeline and storage network to ensure security of the domestic gas market

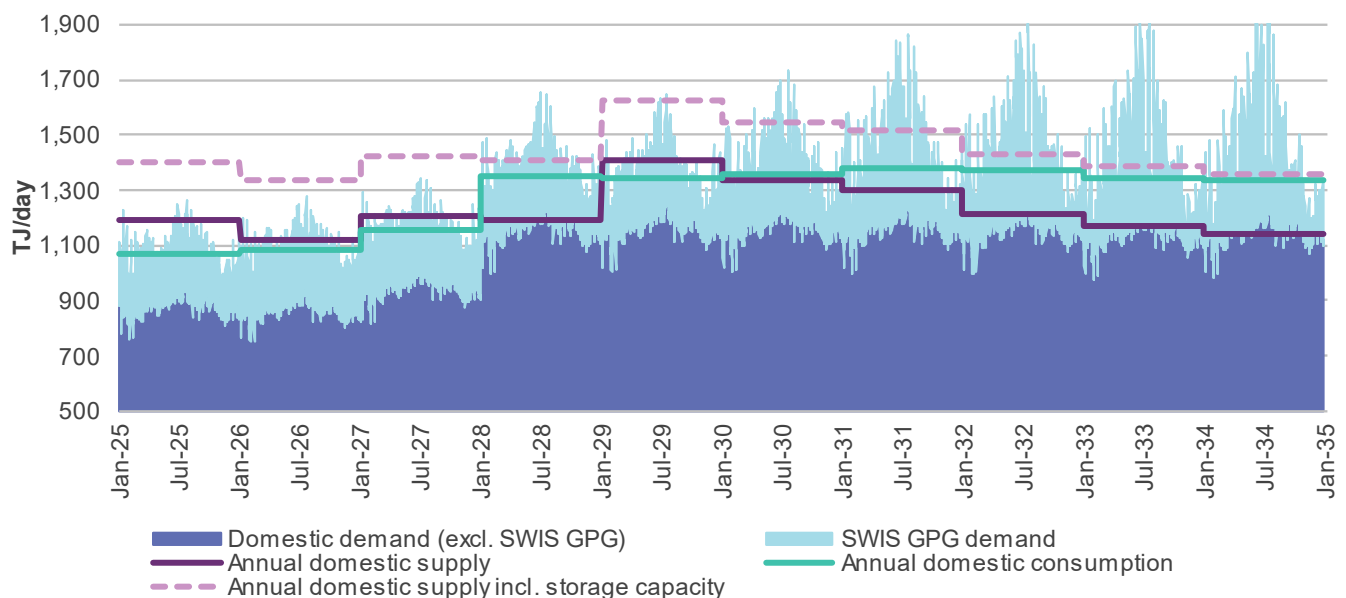
AEMO evaluates the capability of Western Australia's gas pipeline and storage network from 1 January 2025 to 31 December 2034 using a time-sequential energy supply model (Appendix Section A4.4 presents more details on methodology). The model was designed to identify any potential congestion in the pipeline network and/or shortfalls in gas storage capacity based on the *Step Change* scenario. This section presents a brief on modelling considerations and outcomes for the 2024 WA GSOO *Step Change* scenario, unless otherwise stated. Table 19 summarises the modelling cases and outcomes.

Table 19 Infrastructure adequacy

Modelling case	Outcomes
Unconstrained production from 1 January 2025 to 31 December 2034. This case investigated the forecast adequacy of the gas pipeline and storage network under the assumption that there is sufficient gas supply available (that is, limitations on gas production or production outages were not considered).	<ul style="list-style-type: none"> Simulations indicate the Western Australian gas pipeline and storage network has adequate capacity for the forecast gas demand in the <i>Step Change</i> scenario.
Near-term constrained production from 1 January 2025 to 31 December 2029. This case investigated the adequacy of the gas pipeline and storage network over the first five years, assessing the impact of forecast production capacity, production outages and seasonal fluctuations in gas demand.	<ul style="list-style-type: none"> When production facility capacity limits are included, a supply gap emerges in 2028, which is alleviated once in 2028 the Lockyer and Waitsia Stage 2 projects commence production (expected in 2029). The domestic market balance remains tight over the next five years in the <i>Step Change</i> scenario. Unplanned production outages may lead to risk of unserved gas demand. Impacts of unplanned long-duration major production or compressor station outages have not been modelled.

Figure 28 presents Western Australian gas infrastructure adequacy to meet daily demand with increasing reliance on the SWIS GPG fleet in the *Step Change* scenario. Estimated daily supply capability is plotted in Figure 28 with and without inclusion of storage capacity to illustrate the scope available to potentially fulfill this demand.

Figure 28 2024 WA GSOO forecast supply capacity and gas market daily demand, *Step Change* scenario, 2025 to 2034 (TJ/day)



The estimated daily supply capability assumes that most gas production facilities are operating at close to maximum capacity every day (notably, with the exception of the Karratha Gas Plant). That is supported by recent observed performance where supply variability has been diminishing over the past three years (see Table 10). In the first three years of the forecast, daily demand in excess of production capacity can be met through utilisation of existing storage capacity. Over time however, greater supply flexibility will be required to meet an increasingly seasonal and peaky domestic gas demand.

Seasonal variability in daily demand could be managed through greater supply flexibility and storage capacity. Development of seasonal supply flexibility may include increased supply capacity from underground storage facilities potentially supported by line packing¹¹⁵, spot gas and flexibility in contracting arrangements.

The development and reservation of resources of proposed offshore resources such as Browse and Equus and proposed future onshore gas discoveries from the Perth and Canning basins, may help in the longer term.

4.5 Western Australia domestic gas market uncertainties

The period from 2028 onwards is subject to considerable uncertainty, particularly on the consumption side.

Prior to 2030, a supply gap in the domestic gas market could materialise if supply projects are unable to be accelerated to match consumption, or consumption is greater than forecast. Supply-side uncertainties increase

¹¹⁵ Line packing is using gas pipelines to store gas, by increasing pressure to increase the quantity of gas within a pipeline.

after 2030 as production from existing fields declines. Key uncertainties that could impact forecast gas supply adequacy include:

- **Market flexibility.** There is limited supply flexibility in the market, with gas production facilities operating at close to maximum capacity. If one of the larger gas plants went offline unexpectedly, there could be an immediate but short-term supply shortfall. Line packing of the 1,500 km DBNGP, combined with the Mondarra and Tubridgi storage facilities, may provide some additional flexibility, as was further explored in AEMO's assessment of pipeline and storage infrastructure in Section 4.4.
- **Coal supply.** The domestic gas market could be pushed into deficit if coal supply was restricted or coal-fired power stations were retired earlier than expected, leading to an increase in consumption for SWIS GPG. AEMO continues to monitor the coal supply situation in Western Australia. AEMO has undertaken sensitivity analysis in this WA GSOO to understand the impacts on gas supply adequacy if coal supplies to Bluewaters Power Station cannot be secured beyond October 2026¹¹⁶. Further detail of this sensitivity analysis is presented in Appendix A6.
- **VRE development.** Domestic gas consumption could also increase if new VRE projects and supporting electricity network infrastructure are delayed (projects connecting to the Western Power network and new network augmentations such as the Clean Energy Links). Annual weather conditions can also contribute to reduced VRE contribution and consequently increased GPG demand.
- **Changing pattern of gas usage.** As gas is increasingly used for firming VRE, SWIS GPG usage patterns are changing. Close alignment with the WEM ESOO has helped ensure this report continues to reflect the changing pattern of gas consumption, with short-term gas demand peaks during periods of low wind and solar resources and during peak electricity demand events. These changing patterns of SWIS GPG consumption are likely to increase operational impacts on gas infrastructure to meet shorter and sharper consumption needs, as highlighted in Section 4.4.
- **New gas supply projects.** Probable gas supply projects could be delayed, potentially pushing the market into deficit. Risks remain for Perth basin projects, where the geology is proving complex. AEMO will continue to engage closely with the developers of probable and proposed gas supply projects to ensure its information is up to date. On 19 September 2024, an update to Western Australia's Domestic Gas Policy was released aimed at encouraging new onshore gas projects prior to 2030 to ensure energy needs are met.
- **New gas consumption projects.** New gas consumption projects could start earlier than forecast, potentially widening supply gaps in the market. For example, in the *Step Change* scenario, the Perdaman Karratha Urea Project is targeting start-up in 2027 with full gas consumption by 2028. If the project ramped up to full production faster than assumed in this 2024 WA GSOO, it would further tighten the domestic market in 2027. The Perdaman Karratha Urea Project has achieved several critical project milestones including financial close in April 2023¹¹⁷ and is now under construction. The project is contracted to take 130 TJ/day¹¹⁸ of gas primarily

¹¹⁶ On 1 December 2023, the Western Australian Government announced financial support for Griffin Coal (which supplies Bluewaters Power Station) to June 2026. For the purposes of this sensitivity analysis, AEMO has assumed an early retirement of October 2026 rather than part-way through the 2025-26 Capacity Year. See <https://www.wa.gov.au/government/media-statements/Cook-Labor-Government/Funding-delivers-certainty-for-Collie%2C-WA-electricity-and-workers-20231201>.

¹¹⁷ See <https://perdaman.com.au/2023/04/20/perdaman-urea-project-closes-financing/>.

¹¹⁸ See <https://www.woodside.com/docs/default-source/media-releases/long-term-domestic-gas-sale-between-woodside-and-perdaman-becomes-unconditional.pdf>.

from the new Scarborough Energy Project, which is assumed to commence supply from October 2026 with production ramping up to reach 180 TJ/day.

- **Consumption reduction.** Gas price-sensitive industries could choose to cease operations or take steps to reduce gas consumption if gas is not available at competitive prices. Responses to AEMO's FIR for this WA GSOO indicate that consumption reduction could happen from \$7.93/gigajoule (GJ), although the median price response was from \$10.75/GJ¹¹⁹.
- **Western Australia pipeline and storage constraint.** There is currently adequate capacity in Western Australia's pipeline and storage network, but maintaining sufficient line pack and storage levels is still necessary to see through a major production outage, for example, considering the transport lag for gas to flow from North West Western Australia to Perth. Overtime, expansion of capability for both may be required to meet future annual consumption and daily demand needs efficiently.

Western Australia's gas market depends on a small number of large resource projects, while consumption is dominated by large gas consuming projects. This implies that domestic gas supply adequacy is sensitive to the actions of a handful of key players, who in turn are influenced by external factors such as global commodities pricing, energy policy and decarbonisation targets.

In this WA GSOO, sensitivity analysis has been conducted to test the impact that variations in these uncertain assumptions may have on gas supply adequacy. In particular, on GPG demand. Appendix A6 presents further detail on the impact of an earlier than expected coal closure and Appendix A9 details flexibility of capacity from large gas supply sources.

4.6 Actions and events that could reduce or eliminate the medium- to long-term potential supply shortfall

In the medium term, the following actions may reduce or eliminate the risk of a supply shortfall before 2030:

- Accelerated development of proposed projects or development of gas fields that are not currently included in the gas supply forecasts, such as discoveries made in 2024 in the Perth Basin (Trigg Northwest, Tarantula Deep and Redback). It is possible that these gas fields could be developed as separate or expansion projects to take advantage of the LNG export incentive under the Western Australian Domestic Gas Policy updated in September 2024, however the developers have not yet indicated a development path.
- Increase in flexibility for reservation of existing gas reserves to domestic market to better match daily peaks and the increasingly seasonal domestic gas demand. In the near term, management of peak days could include a combination of storage and pipeline line pack. In the medium term, flexibility may come in the form of increasing output from the Karratha Gas Plant and production from storage facilities. Increasing output from the Karratha Gas Plant would require a diversion of LNG gas supplies and so is unlikely to be a sustainable solution without changes to state and commercial agreements.

¹¹⁹ The average spot gas price on 1 October 2024 was \$8.27/GJ, although the spot market is very small (7 TJ/d in October, less than 1% of the gas market) and this price should be viewed only as indicative. See <https://www.gastrading.com.au/spot-market/historical-prices-and-volume/monthly-volume-history>.

- Large gas users transitioning more rapidly to lower emissions electricity sources. This would require a commercial, regulatory and technological pathway to incentivise an accelerated transition.

The potential supply volumes remain uncertain as several proposed supply projects in the Perth and Carnarvon basins are at early stages of appraisal.

Over the longer term, new sources of gas supply may include:

- Backfill projects at existing facilities, such as Corvus being developed through Varanus Island, and domestic gas delivery from Equus and Browse being developed via the North West Shelf infrastructure and Karratha Gas Plant.
- Debottlenecking and expansion of existing facilities, including the domestic gas plants attached to LNG projects.
- Undeveloped fields such as standalone development of Corvus, Equus project and Browse area fields.
- New discoveries, such as Trigg Northwest or Tarantula in the Perth Basin being developed as greenfield projects.
- Further successful exploration, for example, in the Perth and Canning Basins, leading to new development opportunities.

Long-term demand-side responses could include:

- Build-out rates of VRE and BESS being accelerated, leading to lower gas demand from SWIS GPG in the longer term.
- Industrial decarbonisation being accelerated, decreasing gas demand in the long term.

A1. Formal information request data analysis

This section presents aggregate data submitted by Gas Market Participants (GMPs) through the 2024 Formal Information Request (FIR) process and provides a comparison with data previously received in FIRs for the 2021, 2022 and 2023 WA GSOOs.

In line with the Gas Services Information (GSI) Rules, AEMO conducts a confidential FIR process to collect data and information from GMPs¹²⁰ for the purposes of the WA GSOO. The data presented in this section includes:

- Gas consumption and supply estimates.
- Contracted volumes.
- Gas reserves.
- Domestic gas prices that may cause gas consumers to reduce or increase gas consumption.

Data is aggregated to protect confidentiality of the individual respondents. Some information submitted as part of the FIR process is not presented¹²¹.

AEMO has used the FIR data as an input into developing 2024 WA GSOO gas consumption and potential gas supply forecasts, along with additional market research based on publicly available sources. The data reported here is from the 2024 FIR process, unless otherwise specified. All data presented is the latest available as of 31 July 2024 and any subsequent update from GMPs and should be considered indicative only. It is important to note the data presented here does not represent AEMO's forecasts.

A1.1 Gas Market Participant profile

Table 20 presents an overview of the response rate from the 2024 and 2023 FIR processes.

Of the 74 surveyed participants, 65 responded to the 2024 FIR. Compared to the 2023 FIR, the total response rate increased by two percentage points. Fewer non-Registered GSI participants were issued with FIRs in 2024 compared to 2023, with 85% responding.

¹²⁰ Under rule 106 of the GSI Rules, AEMO may require GMPs to provide information for the purposes of preparation of a WA GSOO. This does not cover all participants in the WA domestic gas market. AEMO has collected this FIR data annually since 2017.

¹²¹ Including gas consuming facility names, their capacities and development status, and consumption by pipeline and storage facilities.

Table 20 FIR response rate overview, 2023 to 2024

Year	2023			2024		
	Number of requests issued	Number of responses received	Response rate (rounded)	Number of requests issued	Number of responses received	Response rate (rounded)
Registered GMPs	54	49	91%	61	54	89%
Non-registered GMPs (optional)	16	11	69%	13	11	85%
Total	70	60	86%	74	65	88%

For the purposes of analysis, respondents were categorised as either consumer¹²², supplier¹²³ or infrastructure operator (includes pipelines and storage facilities), with responses as presented in Table 21 below.

Table 21 Distribution of responses, 2024

	Consumers	Suppliers	Infrastructure	Total
Registered GMPs	43	8	3	54
Non-registered GMPs (optional)	4	7	0	11
Total	47	15	3	65

A1.2 Gas consumption and supply data

For the outlook period, AEMO asked GMPs to provide the following data for each facility:

- For gas consumers – total gas consumption and maximum contracted gas consumption estimates.
- For gas suppliers – total nameplate capacity¹²⁴ and committed gas supply estimates.

The following sections provide indicative insights of the Western Australian gas market over the next 10 years.

A1.2.1 Gas consumption

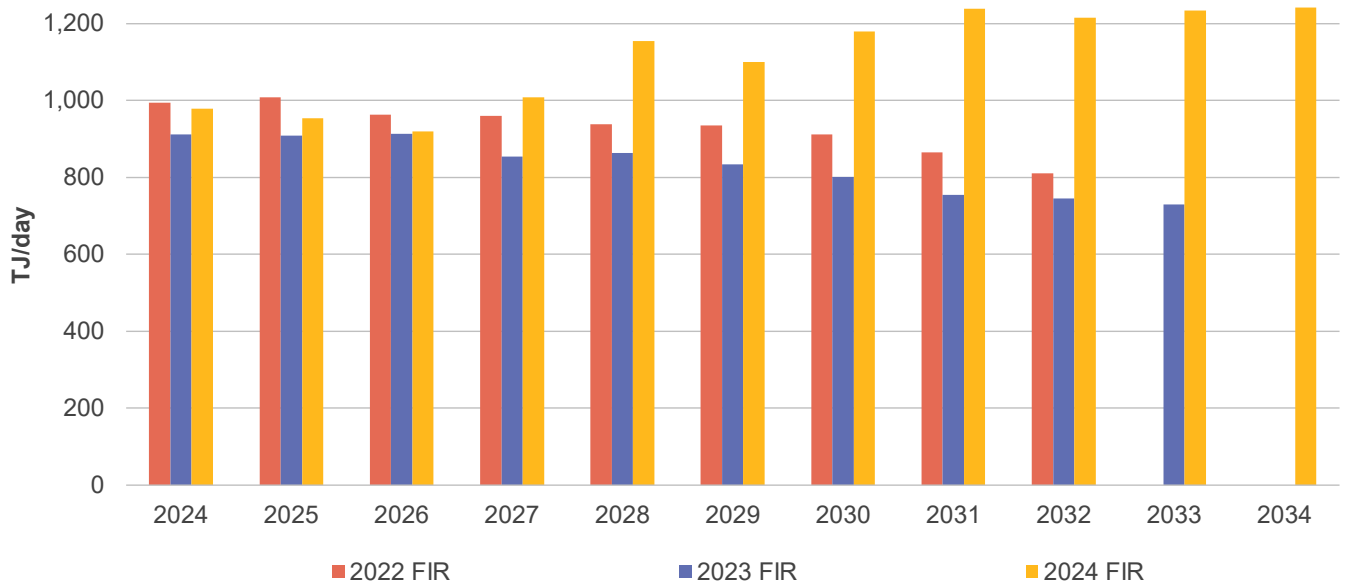
Expected gas consumption¹²⁵ as per 2024 FIR data lies between the 2023 and 2022 FIR values until 2026, then is generally higher than 2023 and 2022 FIR data throughout the rest of the outlook period (see Figure 29). This is due to an increase in projections by GPG and major industry.

¹²² Includes gas consuming facility names, their capacities and development status, and consumption by pipeline and storage facilities.

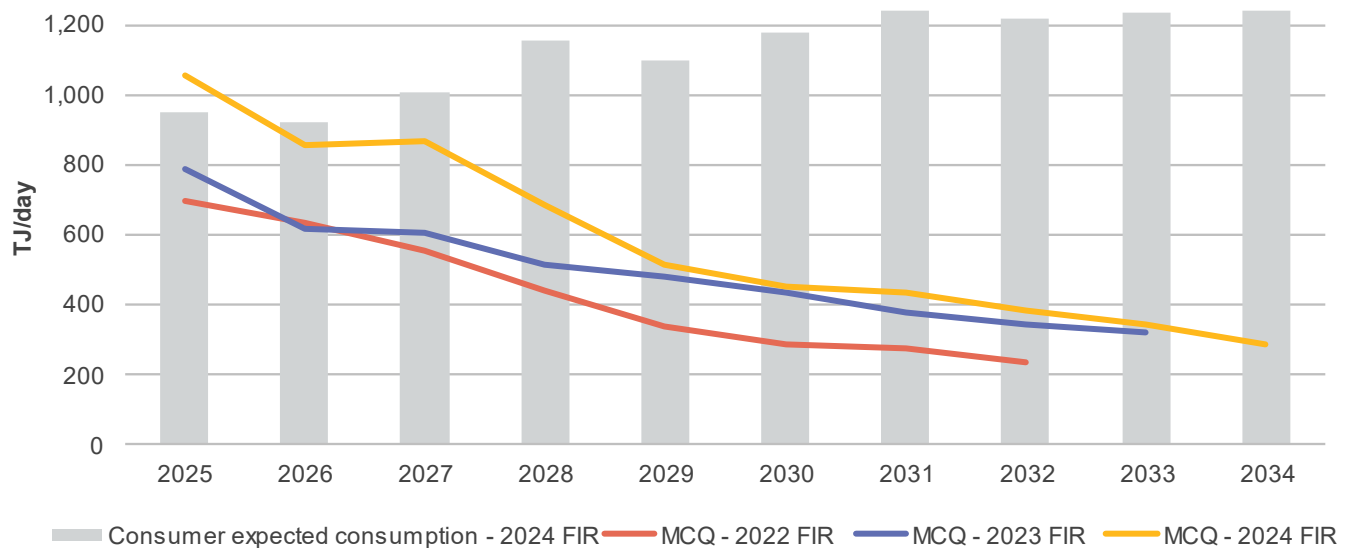
¹²³ Excludes gas resellers and facilities with gas consumption less than 10 TJ/day.

¹²⁴ The FIR requested "Total known nameplate capacity (in TJ/day) that is available to the WA domestic gas market".

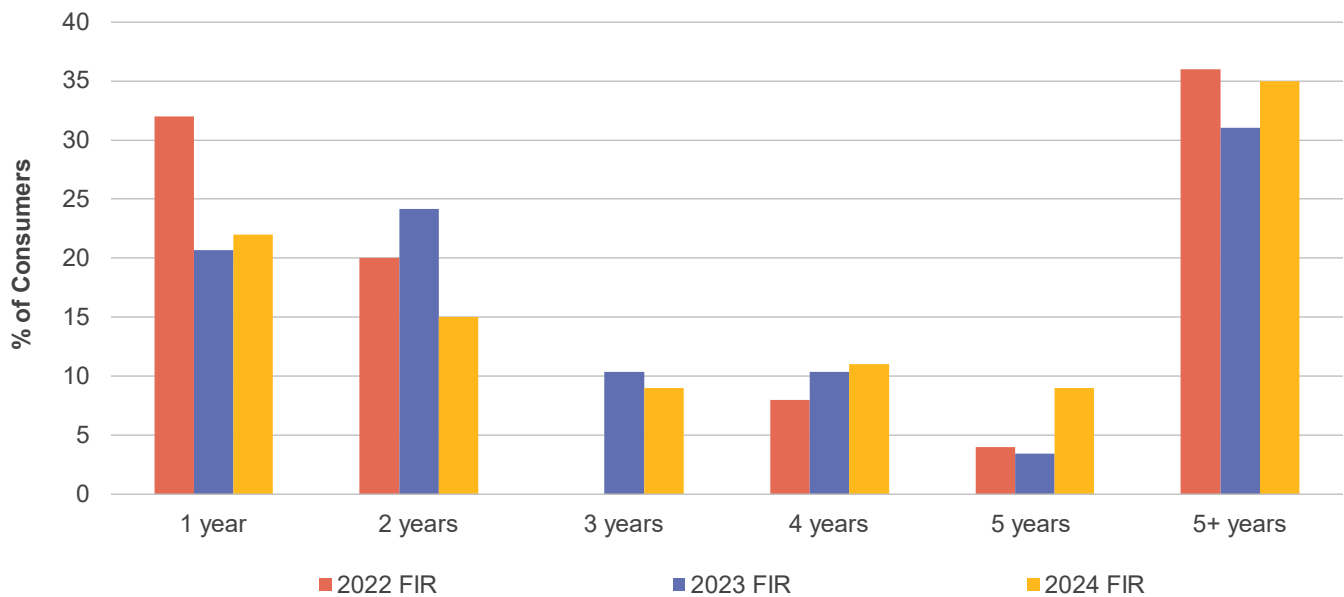
¹²⁵ Expected gas consumption includes all committed projects that have attained FID and are expected to commence during the outlook period.

Figure 29 Comparison of consumer expected consumption, 2022, 2023 and 2024 FIRs (TJ/day)

Consumer maximum contracted quantity (MCQ) is lower than expected consumption over the whole outlook period after 2025 (see Figure 30). This indicates consumers have not fully contracted their gas consumption from 2026, even though the contracted position looks stronger than previous years (the proportion of gas contracted is higher relative to total expected demand).

Figure 30 Comparison of consumer maximum contracted levels (MCQ), 2022 to 2024 FIRs (TJ/day)

The 2024 FIR responses show a similar range of contract durations as the 2023 and 2022 responses (see Figure 31).

Figure 31 Comparison of consumer maximum contract duration, 2022 to 2024 FIRs (%)

The responses show an increase in long-term contracts (longer than five years) compared to the 2023 FIR data. Compared to the 2022 FIR, the number of consumers with single-year contracts is much lower in the 2023 and 2024 FIRs. The proportion of two and three-year contracts has fallen in 2024 compared with the 2023 FIR figures. However, the increase in four and five-year contracts in the 2024 FIR data is likely to leave fewer gas buyers needing to recontract in the short term. Similarly, the proportion of long-term contracts (six-year and longer) has also increased.

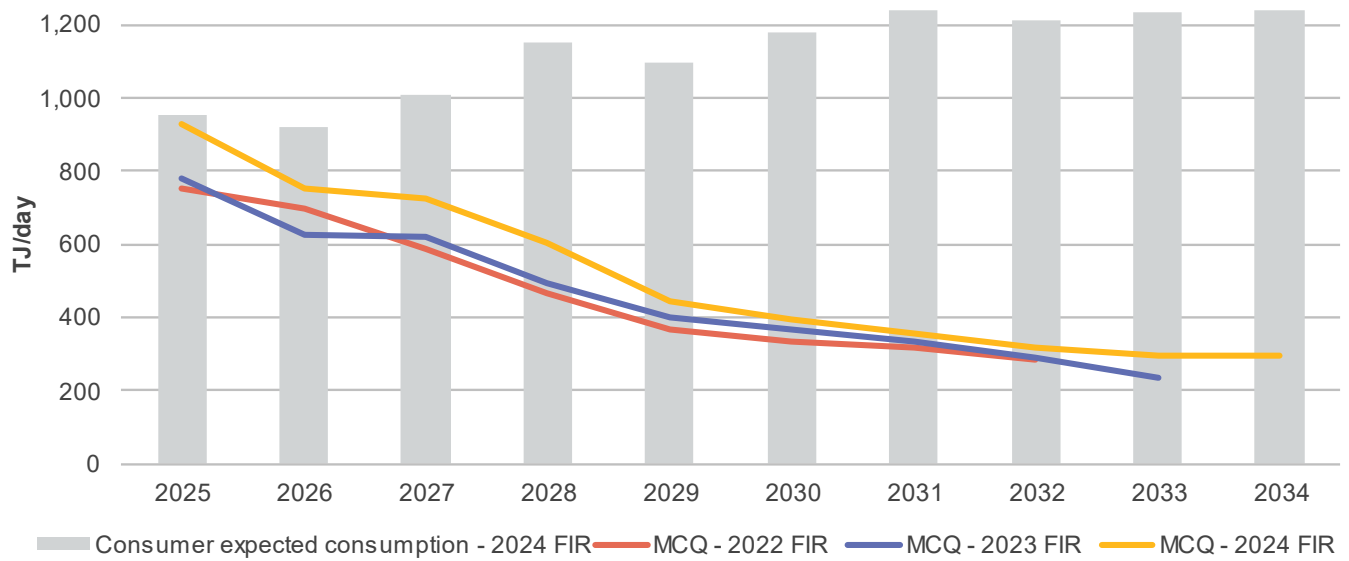
Around 35% of consumers have contracted their gas consumption for two years or less. Some are planning to meet any additional energy requirements through spot gas supplies or fuel switching from gas to renewables.

A1.2.2 Gas supply

Supplier MCQ has increased in the 2024 FIR data compared with the last two years (see Figure 32). The rate of decline in quantities (13.4% annually¹²⁶) over time is similar to the 2023 FIR (13.9% annually¹²⁷), suggesting that suppliers' contracting strategies in 2024 are similar to those in 2023.

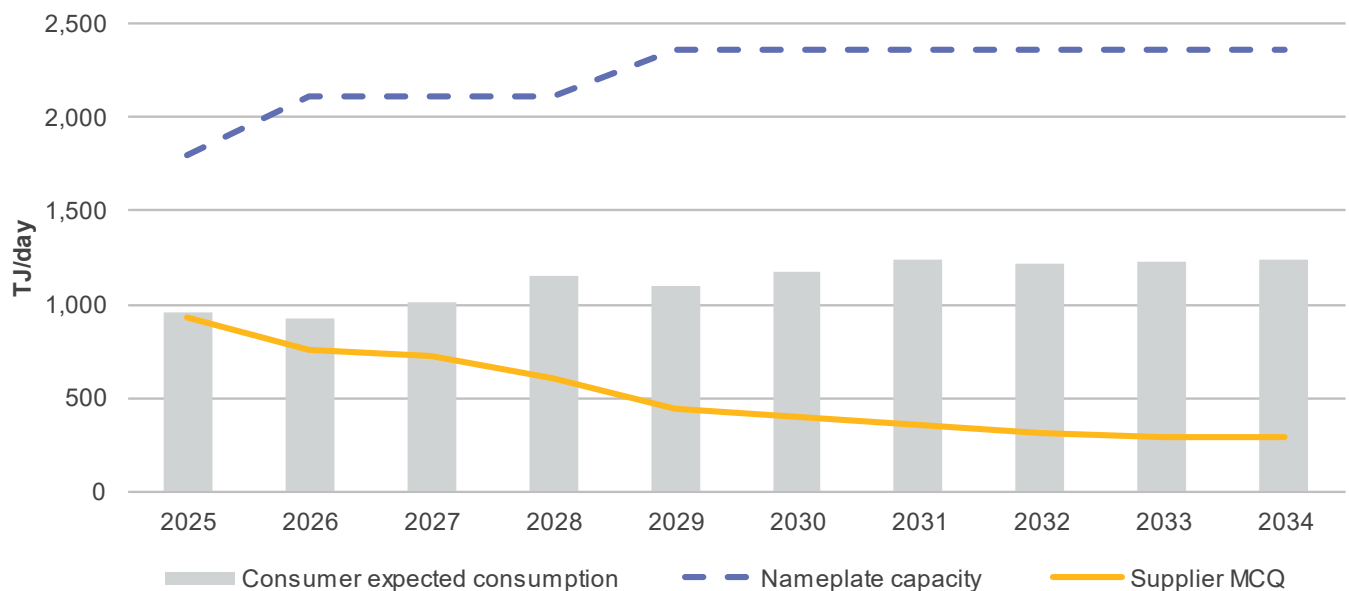
¹²⁶ Measured 2025 to 2033.

¹²⁷ Measured 2025 to 2033. Note that for quality assurance this figure and the 2023 supplier MCQ trajectory in Figure 34 have been reappraised since the publication of 2023 WA GSOO.

Figure 32 Comparison of supplier maximum contracted levels (MCQ), 2022 to 2024 FIRs (TJ/day)

A1.2.3 Reported gas consumption and committed gas supply

Based on the reported MCQ, supply commitment is expected to be 52% of the supply facilities' nameplate capacity in 2025, dropping to 13% by 2034 (see Figure 33).

Figure 33 Consumer expected gas consumption compared to supplier contracted levels (MCQ) and nameplate capacity, 2025 to 2034 (TJ/day)

A1.3 Gas reserves

Domestic gas production facility operators and joint venture partners reported the volumes of 2P gas reserves associated with all their Western Australian petroleum production licences, as well as 2P gas reserves that are

physically connected to each existing domestic gas production facility. This data is an input into AEMO’s potential gas supply model.

Table 22 compares the 2P gas reserves connected to domestic gas production facilities with the figures received as part of previous FIRs¹²⁸. Connected 2P reserves (developed and undeveloped) have decreased relative to the 2022 and 2023 WA GSOO estimates.

Table 22 Total 2P gas reserves, 2020 to 2024 FIRs (PJ)

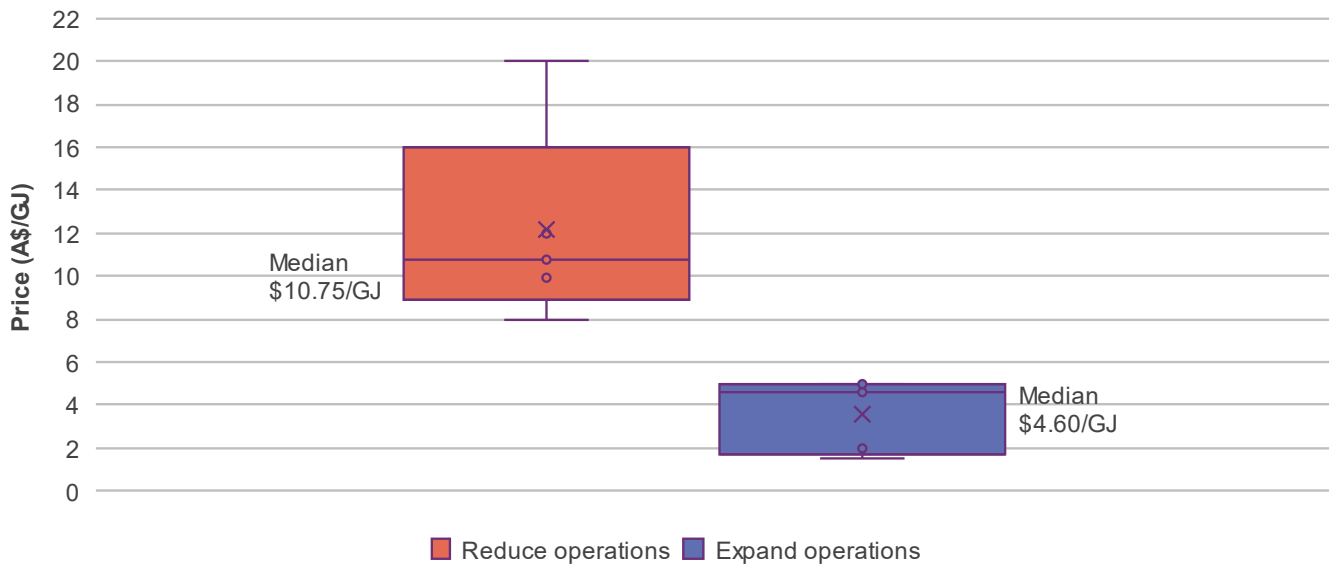
Gas reserves and resources	2020	2021	2022	2023	2024
Total 2P reserves connected to domestic gas production facilities	47,337	42,607	39,813	36,553 ^A	33,533

A. For quality assurance, this figure has been reappraised since the publication of 2023 WA GSOO.

A1.4 Domestic gas prices that would influence consumption

Several consumers submitted gas prices that would either encourage expansion (new or existing facilities) or encourage reduction of their gas consumption (closure or curtailment)¹²⁹. Figure 34 presents that the median gas price at which respondents would reduce operations is \$10.75/GJ (was \$12.00/GJ in the 2023 WA GSOO FIR), while they may expand operations if it falls to \$4.60/GJ (was \$2.00/GJ in the 2023 WA GSOO FIR).

Figure 34 Median gas price estimates that could result in changes in gas consumption (A\$/GJ)



Consumers noted that, in addition to gas prices, other factors such as availability of alternative fuel, commodity prices, transportation cost and approval of project proposals would also impact the scale of their operation.

¹²⁸ Volumes reported at standard conditions (60°C and 1 atmosphere [101.325 kilopascal (kPa)] pressure).

¹²⁹ These prices have not been used in the potential gas supply modelling, which requires domestic gas price forecasts.

A2. Detailed discussion on year in review

This section presents a detailed discussion of the events that have occurred since the publication of the 2023 WA GSOO along with the sources of information.

A2.1 Supply projects – announced or updated

Since the publication of the 2023 WA GSOO, the Western Australian market has seen no new gas supply projects come onstream. There has, however, been an uplift in production at Woodside’s Pluto operations, as well as progress in several major projects currently under development.

Updates to **existing** gas supply projects

- In April 2024, Woodside agreed to increase domestic gas supply from April 2024 through to December 2025¹³⁰. The additional gas supply is from the Pluto Acceleration Domestic Gas Agreement, with an associated domestic gas commitment of 49.2 PJ (an increase from the previous 20.5 PJ).
- In June 2024:
 - Beach Energy’s strategic review¹³¹ indicated a reduction in reserves of approximately 58 petajoules (PJ) for the Beharra Springs development. Development timing was not specified in the strategic review. The timing of the Stage 2 expansion of the Waitsia project is indicated for the first quarter of 2025 in this report (developed as an LNG supply source up until 2028 and then to supply domestic market).
- Santos’ Devil Creek Gas Plant continued to produce in the third quarter of 2024 with successful implementation of Reindeer Fields’ well cycling production strategy. End of field life is now expected by the end of 2024.

Progress on **upcoming** supply projects

- In February 2024, Strike Energy announced the results of two appraisal wells at South Erregulla, with both wells failing to flow gas, leading to the conclusion that the western fault block was not gas-filled¹³². In November 2024, Strike took FID on South Erregulla as an 85 megawatts (MW) peaking gas power station with operations planned to commence by October 2026¹³³.

¹³⁰ Western Australian Government, *WA Domestic Gas Statement September 2024*, 19 September 2024, at <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024>.

¹³¹ Beach Energy, *Strategic Review Outcomes*, 18 June 2024, at https://yourir.info/resources/0c5a441cf54ff229/announcements/bpt.aspx/2A1529505/BPT_Strategic_Review_Outcomes_Presentation.pdf.

¹³² Strike Energy, *Half Year Report 1H FY24*, 25 February 2024, at <https://app.sharelinktechnologies.com/announcement/asx/3ef1566c8a82337ce957d310bbb02b2d>.

¹³³ Strike Energy, *South Erregulla Peaking Gas Power Station Final Investment Decision*, 28 November 2024, at <https://app.sharelinktechnologies.com/announcement/asx/2c454d11bdd51b913cac9535c37e811d>.

- In the first quarter of 2024, the Lockyer 5 development well was drilled. The well required a sidetrack and flowed high gas rates from a short test. Mineral Resources also announced an oil discovery at North Erregulla 2¹³⁴.
- In May 2024, Strike Energy drilled the Walyering 7 well into a separate compartment. Testing conducted into the production facility in June 2024 reportedly flowed gas. The announcement did not specify results or flow rates¹³⁵.
- In August 2024:
 - Woodside and the Australian Conservation Foundation (ACF) agreed to dismiss the ACF's challenge to a primary environmental approval for the Scarborough Energy Project¹³⁶. The Scarborough Energy Project was 73% complete at the end of the third quarter 2024. Woodside said the project is on track for first LNG in 2026¹³⁷. The Western Australian Domestic Gas Statement indicates domestic gas supply will also commence in 2026¹³⁸.
 - Strike Energy announced it had been granted a production licence for West Erregulla¹³⁹. Strike is working to update the Field Development Plan for the proposed 87 TJ/d development, with a view to include the Erregulla Deep discovery¹⁴⁰.
- In September 2024, Strike Energy reported a significant gas discovery at the Erregulla Deep-1 exploration well¹⁴¹.
- In October 2024, the West Erregulla Gas Project received approval under the *Environment Protection and Biodiversity Conservation Act 1999*. The approval represents the last in a series of environmental approvals required by the Joint Venture and Australian Gas Infrastructure Group (the midstream gas plant provider) to progress the development of the West Erregulla gas field¹⁴².
- The pre-Front End Engineering and Design (FEED) process for Dorado continued through 2024, towards the goal of being FID-ready by 2025¹⁴³.

¹³⁵ Strike Energy, *Walyering 7 test update*, 27 June 2024, at <https://app.sharelinktechnologies.com/announcement/asx/7b1c44b361e85d6c47639a5117519427>.

¹³⁶ Woodside, *Scarborough Primary Approval challenge to be dismissed*, 19 August 2024, at https://www.woodside.com/docs/default-source/asx-announcements/2024/scarborough-primary-approval-challenge-to-be-dismissed.pdf?sfvrsn=5cdd22ef_6.

¹³⁷ Woodside, *Third Quarter Report for period ended 30 September 2024*, 16 October 2024, at https://www.woodside.com/docs/default-source/asx-announcements/2024/third-quarter-2024-report.pdf?sfvrsn=ca416b56_1.

¹³⁸ Western Australia Government, *WA Domestic Gas Statement September 2024*, 19 September 2024, at <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024>.

¹³⁹ Strike Energy, *West Erregulla Production Licence Granted*, 15 August 2024, at <https://app.sharelinktechnologies.com/announcement/asx/82946100dc223382ae953b069254a713>.

¹⁴⁰ Strike Energy, *Q1 FY25 Quarterly Report*, 24 October 2024, at <https://app.sharelinktechnologies.com/announcement/asx/968cb440af3fc9e36d844ecc313f29ba>.

¹⁴¹ Strike Energy, *Highly significant gas discoveries at Erregulla Deep-1*, 3 September 2024, at <https://announcements.asx.com.au/asxpdf/20240903/pdf/067ft3zg06qj26.pdf>.

¹⁴² Strike Energy, *West Erregulla Gas Project Receives EPBC Approval*, 28 October 2024, at <https://app.sharelinktechnologies.com/announcement/asx/8258b04fbae187bbb18c79545757d577>.

¹⁴³ Santos, *Third Quarter Report*, 17 October 2024, at https://www.santos.com/wp-content/uploads/2024/10/2024_Santos-Third-Quarter-Report.pdf.

Notable acquisitions that may impact future gas supply

- In May 2024, Wesfarmers Chemicals, Energy & Fertilisers (WesCEF) announced it had agreed to sell its liquefied petroleum gas (LPG) distribution and LNG distribution businesses to Supagas and Clean Energy Fuels Australia respectively¹⁴⁴.
- In October 2024:
 - Mineral Resources reached agreement with Hancock Prospecting on gas and oil assets in the onshore Perth and Carnarvon basins. The binding agreement will see Hancock acquire 100% ownership of Exploration Permits 368 and 426 in the Perth Basin, covering the Lockyer and North Erregulla fields among others¹⁴⁵.
 - Woodside completed its sale of a 15.1% non-operating interest in the Scarborough Joint Venture to JERA¹⁴⁶.

A2.2 Gas consumption projects – announced or updated

Several projects that may impact gas use have been announced since the publication of the 2023 WA GSOO, including power generation, renewables, and minerals processing projects. The majority of those that could increase gas use are non-SWIS power generation in the mining sector.

Updates to **existing** consumption projects

- In March 2024, Covalent Lithium officially commissioned the Mt Holland lithium mine and concentrator. Construction of the Covalent refinery in Kwinana is continuing and expected to be complete by the end of 2024¹⁴⁷.
- In April 2024, Yara Pilbara announced it would collaborate with the Angel Carbon Capture and Storage (CCS) Joint Venture to study the feasibility of using carbon capture and storage to decarbonise Yara Pilbara's existing operations near Karratha in Western Australia¹⁴⁸.
- In July 2024, BHP announced that the Nickel West operations and West Musgrave project would be suspended from October 2024. BHP said it would review the decision by February 2027, noting that the decision followed oversupply in the global nickel market¹⁴⁹.

¹⁴⁴ Wesfarmers, *WesCEF sells LPG and LNG distribution businesses*, 30 May 2024, at <https://www.wesfarmers.com.au/util/news-media/article/2024/05/30/wescef-sells-lpg-and-lng-distribution-businesses>.

¹⁴⁵ Mineral Resources, *MinRes announces \$1.1 billion gas deal with Hancock*, 31 October 2024, at <https://www.mineralresources.com.au/news/minres-announces-dollar11-billion-gas-deal-with-hancock/>.

¹⁴⁶ Woodside, *Woodside completes sale to JERA of 15.1% in Scarborough*, October 2024, at https://www.woodside.com/docs/default-source/asx-announcements/2024/woodside-completes-sale-to-jera-of-15-1-in-scarborough.pdf?sfvrsn=bff3e5d3_7.

¹⁴⁷ WesCEF, *Covalent Lithium opens Mt Holland lithium mine and concentrator*, March 2024, at <https://wescef.com.au/2024/03/07/covalent-lithium-opens-mt-holland-lithium-mine-and-concentrator/>.

¹⁴⁸ Woodside, *Angel CCS Joint Venture and Yara collaborate on carbon capture and storage*, April 2024, at https://www.woodside.com/docs/default-source/media-releases/angel-ccs-jv-and-yara-collaborate-on-carbon-capture-and-storage.pdf?sfvrsn=6465c43b_17.

¹⁴⁹ BHP, *Western Australia Nickel to temporarily suspend operations*, July 2024, at <https://www.bhp.com/news/media-centre/releases/2024/07/western-australia-nickel-to-temporarily-suspend-operations>.

- In August 2024, Alcoa announced plans to fully curtail production in 2024 at its Kwinana Alumina Refinery with the process beginning in Q2 2024¹⁵⁰.
- In FY24, South32 completed conversion of two coal-fired boilers to natural gas at the Worsley Alumina Refinery¹⁵¹.

Progress on **upcoming** consumption projects

- In March 2024, Ratch Australia applied for environmental approval to increase operating hours for the gas-fired Kemerton Power Station, from 2,000 hours per annum to 13,800 hours per annum, to provide additional generation capacity for the SWIS¹⁵². In November 2024, the Environmental Protection Agency (EPA) recommended that the proposal may be implemented, subject to conditions outlined in its report¹⁵³.
- In April 2024, BHP applied for approval to increase firm GPG capacity at the Yarnima GPG in the Pilbara to 239 MW by installing an additional 120 MW of firm GPG¹⁵⁴. In December 2024, the EPA recommended that the proposal may be implemented, subject to conditions outlined in its report¹⁵⁵.
- In August 2024, the Perdaman Karratha Urea Project closed the financing of its Vesta Project, a circa \$122 million housing project that will see 100 new homes built in Karratha¹⁵⁶. The Vesta Project will provide housing for the Perdaman Karratha Urea Project. Construction of the Vesta Project is planned to commence in the fourth quarter of 2024.

Progress on renewable projects that may reduce gas consumption

- In April 2024, the Australian Government announced Glencore's Murrin Murrin cobalt and nickel project would be allocated \$35.7 million from the Powering the Regions Fund for a hybrid renewable energy project to supplement existing fossil fuel power sources with renewables and batteries¹⁵⁷.
- In May 2024, Rio Tinto and BHP announced they would collaborate on the testing of large battery-electric haul truck technology in the Pilbara, Western Australia, to accelerate the potential for its future deployment. These trials represent the first stage of battery-electric haul truck testing at BHP and Rio Tinto's Pilbara operations¹⁵⁸.
- In June 2024:

¹⁵⁰ Alcoa, *Alcoa announces curtailment of Kwinana Alumina Refinery in Western Australia*, August 2024, at <https://news.alcoa.com/press-releases/press-release-details/2024/Alcoa-announces-curtailment-of-Kwinana-Alumina-Refinery-in-Western-Australia/default.aspx>.

¹⁵¹ South32, *Sustainable Development Report*, August 2024, at https://www.south32.net/docs/default-source/annual-reporting-suite/2024/sustainable-development-report-2024.pdf?sfvrsn=ddc11e46_1.

¹⁵² Western Australian Government, *Kemerton Power Station Increased Operation Hours*, May 2024, at <https://www.epa.wa.gov.au/proposals/kemerton-power-station-increased-operation-hours>.

¹⁵³ Environmental Protection Authority, *Kemerton Power Station Increased Operation Hour*, 11 November 2024, at https://www.epa.wa.gov.au/sites/default/files/EPA_Report/EPA%20Report%201772%20Kemerton%20Power%20Station%20Increased%20Operation%20Hours.pdf

¹⁵⁴ Western Australian Government, *Yarnima Power Station Stage 4 (Gas Reciprocating Engines)*, 29 April 2024, at <https://www.epa.wa.gov.au/proposals/yarnima-power-station-stage-4-gas-reciprocating-engines>.

¹⁵⁵ Environmental Protection Authority, *Yarnima Power Station Stage 4 (Gas Reciprocating Engines)*, 29 November 2024, at https://www.epa.wa.gov.au/sites/default/files/EPA_Report/EPA%20Report%201776%20Yarnima%20Power%20Station%20Stage%204_0.pdf

¹⁵⁶ Perdaman, *Perdaman set to build over 100 new homes in Karratha for Project Ceres's operational workforce and State social housing*, 12 August 2024, at <https://perdaman.com.au/2024/>

¹⁵⁷ Australian Government, *\$330m investment in Australian heavy industry future*, 24 April 2024, at <https://minister.dcceew.gov.au/bowen/media-releases/330m-investment-australian-heavy-industry-future>.

¹⁵⁸ Rio Tinto, *Rio Tinto and BHP collaborate on battery-electric haul truck trials in the Pilbara*, 27 May 2024, at <https://www.riotinto.com/en/news/releases/2024/rio-tinto-and-bhp-collaborate-on-battery-electric-haul-truck-trials-in-the-pilbara>.

- The Yindjibarndi Energy Corporation – in partnership with ACEN Australia – received environmental approval from the Western Australian Government for its first solar project of up to 150 MW located within a 13,000 square kilometre area in the Pilbara covered by the Yindjibarndi Native Title Determination Area¹⁵⁹.
- Liontown announced the Kathleen Valley 95 MW hybrid power station was partially commissioned. A 16 MW solar farm, 18 MW BESS and the first three of the five 6 MW wind turbines were commissioned and are collectively powering an accommodation village and process plant, in addition to diesel and gas generation brought online earlier in 2024¹⁶⁰.
- In July 2024:
 - The Australian Government and Western Australian Government entered into a bilateral Renewable Energy Transformation Agreement. Through the agreement, the Australian Government commits to support developers in Western Australia to build a minimum of 6.5 terawatt hours (TWh) of new wind and solar projects in Western Australia, and 1.1 gigawatts (GW) of new storage capacity¹⁶¹.
 - Bids opened for dispatchable capacity projects in the WEM under the Australian Government's Capacity Investment Scheme. The tender aims to deliver 500 MW of 4-hour equivalent (or 2,000 megawatt hours [MWh]) of clean dispatchable capacity. Announcement of successful bids is expected in early 2025¹⁶².
 - Rio Tinto and Ngarluma Aboriginal Corporation agreed to pursue the development of an 80 MW solar farm on Ngarluma Country, near Karratha. The project is expected to be located next to Rio Tinto's existing Yurralyi Maya Power Station near Karratha and has the potential to displace up to 11% of natural gas currently used for generation across Rio Tinto's integrated mining operations in the Pilbara¹⁶³.
 - Fortescue began commissioning of its 100 MW solar farm at North Star Junction. The solar farm, part of the Pilbara Generation Project, complements the Pilbara Transmission Project, which consists of 275 kilometres of high voltage transmission lines connecting Fortescue mine sites¹⁶⁴.
- Construction continued on AngloGold Ashanti's Tropicana renewable energy plant. The renewable energy plant will be integrated into the existing 54 MW GPG system and is estimated by AngloGold to reduce natural gas consumption by 50%¹⁶⁵.
- Over the course of 2024, a number of VRE and BESS projects came online, made progress, or were announced:

¹⁵⁹ WA Government, *First project approved through Green Energy Approvals Initiative*, 20 June 2024, at <https://www.wa.gov.au/government/announcements/first-project-approved-through-green-energy-approvals-initiative>.

¹⁶⁰ Liontown, *Renewables power up Kathleen Valley*, 5 June 2024, at <https://www.ltresources.com.au/latest-news/renewables-power-up-kathleen-valley/>.

¹⁶¹ Australian Government, *Boosting renewables in Western Australia and South Australia*, 29 July 2024, at <https://www.dcccew.gov.au/about/news/boosting-renewables-western-australia-south-australia>.

¹⁶² Australian Government, *Open now: Capacity Investment Scheme Tender 2 – WEM Dispatchable Capacity*, 22 July 2024, at <https://www.dcccew.gov.au/about/news/open-now-capacity-investment-scheme-tender-2-wem-dispatchable-capacity>.

¹⁶³ Rio Tinto, *Ngarluma and Rio Tinto to progress renewable energy project*, 15 July 2024, at <https://www.riotinto.com/en/news/releases/2024/ngarluma-and-rio-tinto-to-progress-renewable-energy-project>.

¹⁶⁴ Fortescue, *2024 Annual Report*, 28 August 2024, at <https://cdn.fortescue.com/docs/default-source/uncategorised/fy24-annual-report.pdf>.

¹⁶⁵ AngloGold Ashanti, *Tropicana, Australia*, 1 October 2024, at <https://www.anglogoldashanti.com/portfolio/australia/tropicana/>.

- The new existing or committed projects include those that received Capacity Credits for 2024-25, 2025-26, or 2026-27 Capacity Year¹⁶⁶, contracted for Reliability Services for 2024-25 and 2025-26 (2024-26 Peak Demand NCESS) and/or for 2025-26 and 2026-27 (2025-27 Peak Demand NCESS). Key projects include:
 - Synergy's Collie BESS (500 MW of power with 2,000 MWh of energy storage) of which its first units completed installation in October 2024¹⁶⁷.
 - Synergy's Kwinana BESS 2 (KBESS2) (200 MW of power and 800 MWh of additional energy storage capacity), which was commissioned in late 2024¹⁶⁸.
 - Neoen's Collie Battery Stage 1 (219 MW/877 MWh) began operating in October 2024, with Collie Battery Stage 2 (341 MW/1,363 MWh) under construction, with an expected commencement on Q4 2025¹⁶⁹.
- Announced projects include:
 - Alinta's second battery at Wagerup, a 300 MW project, located in the Shire of Waroona, will support the introduction of more solar and other intermittent renewable energy sources into Western Australia's existing network and help maintain system security and stability. The project is expected to be completed by October 2027¹⁷⁰.
 - King Rocks Wind Farm (KRWF) received development approval, with construction expected to begin in 2025. The KRWF is expected to generate up to 150 MW of electricity from 2026, using up to 30 wind turbines¹⁷¹.

A2.3 Hydrogen

The hydrogen industry in Western Australia is still emerging as a viable energy source, and most proposed projects remain focused on producing hydrogen for the transport, mining, and export sectors. The 2024 WEM ESOO forecast that hydrogen could require 2.0 TWh of electricity generation by 2034. SWIS GPG modelling in this 2024 WA GSOO applies the same set of demand profiles derived for 2024 WEM ESOO, which includes the consideration of hydrogen load.

AEMO has assessed that there will be limited direct impact on the Western Australian domestic gas market over the outlook period¹⁷². AEMO has therefore not incorporated hydrogen into the 2024 WA GSOO domestic consumption and supply modelling, presented in Chapter 2 and 3 respectively.

¹⁶⁶ For the list of Facilities, see <https://wa.aemo.com.au/energy-systems/electricity/wholesale-electricity-market-wem/wa-reserve-capacity-mechanism/assignment-of-capacity-credits#:~:text=Capacity%20Credits%20are%20assigned%20to,historical%20information%20on%20Capacity%20Credits>.

¹⁶⁷ Synergy, *Major milestone as first units installed at Collie battery*, 8 October 2024, at <https://www.synergy.net.au/About-us/News-and-announcements/Media-releases/Collie-battery-milestone>.

¹⁶⁸ Synergy, *Kwinana Battery Energy Storage System 2*, accessed 27 October 2024, at <https://www.synergy.net.au/Our-energy/SynergyRED/Large-Scale-Battery-Energy-Storage-Systems/Kwinana-Battery-Energy-Storage-System-2>.

¹⁶⁹ Neoen, *Neoen's Collie Battery Stage 1 begins operating and delivering grid reliability services in Western Australia*, 29 October 2024, at <https://neoen.com/en/news/2024/neoens-collie-battery-stage-1-begins-operating-and-delivering-grid-reliability-services-in-western-australia/>.

¹⁷⁰ Alinta, *Second Wagerup battery project approved*, 18 July 2024, at <https://www.alintaenergy.com.au/about-us/news-hub/second-wagerup-battery-project-approved>.

¹⁷¹ Synergy, *King Rocks Wind Farm (KRWF)*, 1 October 2024, at <https://www.synergy.net.au/Our-energy/SynergyRED/King-Rocks-Wind-Farm>.

¹⁷² This is in line with the input assumptions for hydrogen projects considered in the 2024 WEM ESOO Expected (*Step Change*) scenario.

AEMO will continue to monitor the progress of hydrogen initiatives in Western Australia and will report on new developments in future GSOOs and at relevant industry forums.

New hydrogen initiatives announced in 2024

- In February 2024, the Western Australian Government announced it had finalised a \$140 million agreement to build a hydrogen hub in the Pilbara. The combined \$140 million investment (\$70 million each from the Australian Government and Western Australian Government) will help build infrastructure to support hydrogen exports and renewable energy production, as well as fund activities for a Clean Energy Training and Research Institute¹⁷³.
- In May 2024, the Australian Government announced in the 2024-25 Federal Budget that it was allocating an additional \$2 billion for Round 2 of the Hydrogen Headstart program, bringing total funding under the program to \$4 billion¹⁷⁴.
- In September 2024, the Australian Government released its 2024 National Hydrogen Strategy, which provides the framework to guide Australia's production, use and export of hydrogen¹⁷⁵.

Hydrogen projects progressed since the 2023 WA GSOO

- In December 2023:
 - Province Resources applied for environmental approval for the HyEnergy Green Hydrogen and Ammonia Project. The proposal involves up to 945 hectares (6.8 GW) of wind turbines and up to 10,000 hectares (5.2 GW) of solar arrays, a new multiuser port facility with a material offloading facility and export terminal, a BESS, and a hydrogen and ammonia production facility¹⁷⁶.
 - The Federal Government announced BP's H2Kwinana project and the Murchison Hydrogen Renewables Project had been shortlisted and invited to submit a full application under the \$2 billion Hydrogen Headstart Program. H2Kwinana is currently at the FEED stage, and production scenarios range from 44 tonnes/day H2 using 101-111 MW of renewable generation, to 429 tonnes/day H2 using 1,030-1,133 MW.¹⁷⁷
 - The Australian Renewable Energy Agency (ARENA) announced an award of A\$1.67 million to support Stage 1 of a feasibility study for the East Kimberly Clean Energy Project¹⁷⁸.

¹⁷³ Australian Government, *Joint media release: Pilbara Hydrogen Hub to boost Australia's hydrogen industry*, 19 February 2024, at <https://minister.dcceew.gov.au/bowen/media-releases/joint-media-release-pilbara-hydrogen-hub-boost-australias-hydrogen-industry>.

¹⁷⁴ Australian Government, *Hydrogen Headstart Round 2*, accessed 27 October 2024, at <https://arena.gov.au/funding/hydrogen-headstart-round2/>.

¹⁷⁵ Australian Government, *National Hydrogen Strategy 2024*, September 2024, at <https://www.dcceew.gov.au/energy/publications/australias-national-hydrogen-strategy>.

¹⁷⁶ WA Government, *HyEnergy® Green Hydrogen and Ammonia Project*, 5 February 2024, at <https://www.epa.wa.gov.au/proposals/hyenergy%C2%AE-green-hydrogen-and-ammonia-project>.

¹⁷⁷ Australian Government, *Six shortlisted for \$2 billion Hydrogen Headstart funding*, 21 December 2023, at <https://arena.gov.au/news/six-shortlisted-for-2-billion-hydrogen-headstart-funding/>.

¹⁷⁸ Australian Government, *East Kimberley Clean Energy Project – Stage 1, Feasibility Study*, accessed 27 October 2024, at <https://arena.gov.au/projects/east-kimberley-clean-energy-project/>.

- In February 2024, operational handover for the Denham Hydrogen Demonstration Plant occurred. To date, the plant has produced more than 4,000 kg of hydrogen, and generated 40 MWh of electricity from hydrogen and 1,800 MWh from the solar farm¹⁷⁹.
- In March 2024, Woodside said it had awarded the major services contract for its Hydrogen Refueller @H2Perth project¹⁸⁰.
- In April 2024, the Murchison Hydrogen Renewables Project was granted Major Project Status by the Australian Government¹⁸¹.
- In May 2024, the Australian Renewable Energy Hub was granted Major Project Status by the Australian Government¹⁸².
- In June 2024, the Mid West Clean Energy Project received a Declaration of Greenhouse Gas Storage Formation for the Cliff Head CO2 Storage Project Pilot, which is part of the project¹⁸³.
- In July 2024, Fortescue announced it would cut 700 jobs and shift its focus away from green hydrogen towards renewable energy. Fortescue also abandoned its target to produce 15 million tonnes of green hydrogen annually by 2030¹⁸⁴.
- In August 2024:
 - A prototype hydrogen-powered haul truck commenced site-based testing at Fortescue's Christmas Creek mine¹⁸⁵.
 - The Western Australian Government announced that construction had begun on key Pilbara Hydrogen Hub road upgrades at Port Hedland¹⁸⁶.
 - The Christmas Creek Renewable Hydrogen Mobility Project was officially announced as operational¹⁸⁷.
 - Works began on site at the Christmas Creek Green Iron Trial Commercial Plant¹⁸⁸.

¹⁷⁹ CSIRO, *Denham Hydrogen Demonstration Plant*, 18 October 2024, at <https://research.csiro.au/hyresource/denham-hydrogen-demonstration-plant/>.

¹⁸⁰ CSIRO, *Hydrogen Refueller @H2Perth*, 10 July 2024, at <https://research.csiro.au/hyresource/hydrogen-refueller-h2perth-2/>.

¹⁸¹ CSIRO, *Murchison Hydrogen Renewables Project*, 15 August 2024, at <https://research.csiro.au/hyresource/murchison-hydrogen-renewables-project/>.

¹⁸² CSIRO, *Australian Renewable Energy Hub*, 15 August 2024, at <https://research.csiro.au/hyresource/australian-renewable-energy-hub/>.

¹⁸³ Pilot Energy, *MWCEP receives Declaration of Greenhouse Gas Storage Formation for Cliff Head CO2 Storage Project*, 14 June 2024, at <https://www.pilotenergy.com.au/sites/default/files/asx-announcements/61211519.pdf>.

¹⁸⁴ AFR, *Labor's hydrogen dream stalls as Fortescue slims down H2 vision*, 17 July 2024, at <https://www.afr.com/companies/mining/fortescue-puts-hydrogen-on-backburner-with-700-jobs-cut-20240717-p5jufj>.

¹⁸⁵ Fortescue, *Fortescue's hydrogen-powered haul truck prototype arrives in the Pilbara*, 12 August 2024, at <https://www.fortescue.com/en/articles/fortescue-s-hydrogen-powered-haul-truck-prototype-arrives-in-the-pilbara>.

¹⁸⁶ CSIRO, *Pilbara Hub*, 14 August 2024, at <https://research.csiro.au/hyresource/hubs/pilbara/>.

¹⁸⁷ CSIRO, *Christmas Creek Renewable Hydrogen Mobility Project*, 20 August 2024, at <https://research.csiro.au/hyresource/christmas-creek-renewable-hydrogen-mobility-project/>.

¹⁸⁸ CSIRO, *Christmas Creek Green Iron Trial Commercial Plant*, 20 August 2024, at <https://research.csiro.au/hyresource/christmas-creek-green-iron-trial-commercial-plant/>.

A2.4 Regulatory update

- In February 2024, the Australian Energy Market Commission (AEMC) officially incorporated emissions reduction considerations into the National Gas Rules¹⁸⁹.
- In May 2024, the Australian Government published its Future Gas Strategy¹⁹⁰. The strategy adopts six principles that will guide policy actions to achieve the strategy's aims:
 - Australia is committed to supporting global emissions reductions to reduce the impacts of climate change and will reach net zero emissions by 2050.
 - Gas must remain affordable for Australian users throughout the transition to net zero.
 - New sources of gas supply are needed to meet demand during the economy-wide transition.
 - Reliable gas supply will gradually and inevitably support a shift towards higher-value and non-substitutable gas uses.
 - Gas and electricity markets must adapt to remain fit for purpose throughout the energy transformation.
 - Australia is, and will remain, a reliable trading partner for energy, including LNG and low emission gases.
- In June 2024:
 - The AEMC published versions 79 and 80 of the National Gas Rules¹⁹¹.
 - The Australian Government finalised new offshore exploration permits including permits for Chevron, INPEX, Melbana, and Woodside on Australia's west coast¹⁹².
- In July 2024:
 - The ERA released its draft decision on Goldfields Gas Transmission's proposed five-year plan for the Goldfields Gas Pipeline. The draft decision reduces the proposed increase in tariffs from 54% down to 34% in 2025, rising at the rate of inflation for the remaining four years¹⁹³. The plan will cover the period from 1 January 2025 to 31 December 2029¹⁹⁴.
 - The ERA released its decision on the DBNGP reference service proposal. The proposal will apply from January 2026 to December 2030¹⁹⁵.
- In November 2024, the Economic Regulation Authority (ERA) published its final decision for the access arrangement for ATCO's Mid-West and South-West Gas Distribution System. Under the ERA's final decision,

¹⁸⁹ AEMC, *Transformative changes as emissions reduction included in national energy rules*, 1 February 2024, at <https://www.aemc.gov.au/news-centre/media-releases/transformative-changes-emissions-reduction-included-national-energy-rules>.

¹⁹⁰ Australian Government, *Future Gas Strategy*, 25 June 2024, at <https://www.industry.gov.au/publications/future-gas-strategy>.

¹⁹¹ AEMC, *New Versions 79 and 80 of the National Gas Rules*, 3 June 2024, at <https://www.aemc.gov.au/news-centre/media-releases/new-versions-79-and-80-national-gas-rules>.

¹⁹² Australian Government, *Finalisation of offshore exploration rounds*, 23 July 2024, at <https://www.minister.industry.gov.au/ministers/king/media-releases/finalisation-offshore-exploration-rounds>.

¹⁹³ ERA, *Draft decision for regulated Goldfields Gas Pipeline*, 25 July 2024, at <https://www.erawa.com.au/cproot/24215/2/GGP-GGT-AA5-Draft-Decision-Media-Statement.PDF>.

¹⁹⁴ ERA, *Draft decision on revisions to the access arrangement for the Goldfields Gas Pipeline*, 25 July 2024, at <https://www.erawa.com.au/cproot/24216/2/GGP-GGT-AA5-Draft-Decision-Overview-final.PDF>.

¹⁹⁵ ERA, *Reference service proposal decision*, 1 July 2024, at <https://www.erawa.com.au/cproot/24155/2/DBNGP-DBP-AA6-Decision-Reference-service-proposal.PDF>.

the forecast increase in the gas network bill for the average residential customer is 7% above inflation on 1 January 2025, with 7.8% per year above inflation for subsequent years¹⁹⁶.

A2.5 Supply projects – sources

- Beach Energy, *Strategic Review Outcomes*, 18 June 2024, at https://yourir.info/resources/0c5a441cf54ff229/announcements/bpt.aspx/2A1529505/BPT_Strategic_Review_Outcomes_Presentation.pdf.
- Mineral Resources, *MinRes announces \$1.1 billion gas deal with Hancock*, 31 October 2024, at <https://www.mineralresources.com.au/news/minres-announces-dollar11-billion-gas-deal-with-hancock/>.
- Mineral Resources, *MinRes maiden gas and oil resource statements*, 16 September 2024, at <https://clients3.weblink.com.au/pdf/MIN/02852782.pdf>.
- Santos, *Third Quarter Report*, 17 October 2024, at https://www.santos.com/wp-content/uploads/2024/10/2024_Santos-Third-Quarter-Report.pdf.
- Strike Energy, *Half Year Report 1H FY24*, 25 February 2024, at <https://app.sharelinktechnologies.com/announcement/asx/3ef1566c8a82337ce957d310bbb02b2d>.
- Strike Energy, *Highly significant gas discoveries at Erregulla Deep-1*, 3 September 2024, at <https://announcements.asx.com.au/asxpdf/20240903/pdf/067ft3zg06qj26.pdf>.
- Strike Energy, *Q1 FY25 Quarterly Report*, 24 October 2024, at <https://app.sharelinktechnologies.com/announcement/asx/968cb440af3fc9e36d844ecc313f29ba>.
- Strike Energy, *South Erregulla Peaking Gas Power Station Final Investment Decision*, 28 November 2024, at <https://app.sharelinktechnologies.com/announcement/asx/2c454d11bdd51b913cac9535c37e811d>.
- Strike Energy, *Walpyring-7 Flow Test Update*, 27 June 2024, at <https://app.sharelinktechnologies.com/announcement/asx/7b1c44b361e85d6c47639a5117519427>.
- Strike Energy, *West Erregulla Gas Project Receives EPBC Approval*, 28 October 2024, at <https://app.sharelinktechnologies.com/announcement/asx/8258b04fbae187bbb18c79545757d577>.
- Strike Energy, *West Erregulla Production Licence Granted*, 15 August 2024, at <https://app.sharelinktechnologies.com/announcement/asx/82946100dc223382ae953b069254a713>.
- Western Australian Government, *The WA Domestic Gas Statement September 2024*, 19 September 2024, at <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024>.
- Wesfarmers, *WesCEF sells LPG and LNG distribution businesses*, 30 May 2024, at <https://www.wesfarmers.com.au/util/news-media/article/2024/05/30/wescef-sells-lpg-and-lng-distribution-businesses>.
- Woodside, *Woodside completes sale to JERA of 15.1% in Scarborough*, 31 October 2024, at https://www.woodside.com/docs/default-source/asx-announcements/2024/woodside-completes-sale-to-jera-of-15-1-in-scarborough.pdf?sfvrsn=bff3e5d3_7.

¹⁹⁶ ERA, *Final decision on access arrangement for the Mid-West and South-West Gas Distribution Systems (2025 to 2029)*, 8 November 2024, at <https://www.erawa.com.au/cproot/24355/2/Final-Decision-Overview.PDF>.

- Woodside, *Scarborough Primary Approval challenge to be dismissed*, 19 August 2024, at https://www.woodside.com/docs/default-source/asx-announcements/2024/scarborough-primary-approval-challenge-to-be-dismissed.pdf?sfvrsn=5cdd22ef_6.
- Woodside, *Third Quarter Report for period ended 30 September 2024*, 16 October 2024, at https://www.woodside.com/docs/default-source/asx-announcements/2024/third-quarter-2024-report.pdf?sfvrsn=ca416b56_1.

A2.6 Consumption projects – sources

- Alcoa, *Alcoa announces curtailment of Kwinana Alumina Refinery in Western Australia*, 1 August 2024, at <https://news.alcoa.com/press-releases/press-release-details/2024/Alcoa-announces-curtailment-of-Kwinana-Alumina-Refinery-in-Western-Australia/default.aspx>.
- Alinta, *Second Wagerup battery project approved*, 18 July 2024, at <https://www.alintaenergy.com.au/about-us/news-hub/second-wagerup-battery-project-approved>.
- AngloGold Ashanti, *Tropicana, Australia*, 1 October 2024, at <https://www.anglogoldashanti.com/portfolio/australia/tropicana/>.
- Australian Government, *\$330m investment in Australian heavy industry future*, 24 April 2024, at <https://minister.dcceew.gov.au/bowen/media-releases/330m-investment-australian-heavy-industry-future>.
- Australian Government, *Boosting renewables in Western Australia and South Australia*, 29 July 2024, at <https://www.dcceew.gov.au/about/news/boosting-renewables-western-australia-south-australia>.
- Australian Government, *Open now: Capacity Investment Scheme Tender 2 – WEM Dispatchable Capacity*, 22 July 2024, at <https://www.dcceew.gov.au/about/news/open-now-capacity-investment-scheme-tender-2-wem-dispatchable-capacity>.
- BHP, *Western Australia Nickel to temporarily suspend operations*, 11 July 2024, at <https://www.bhp.com/news/media-centre/releases/2024/07/western-australia-nickel-to-temporarily-suspend-operations>.
- Fortescue, *2024 Annual Report*, 28 August 2024, at <https://cdn.fortescue.com/docs/default-source/uncategorised/fy24-annual-report.pdf>.
- Lontown, *Renewables power up Kathleen Valley*, 5 June 2024, at <https://www.ltresources.com.au/latest-news/renewables-power-up-kathleen-valley/>.
- Neoen, *Neoen's Collie Battery Stage 1 begins operating and delivering grid reliability services in Western Australia*, 29 October 2024, at <https://neoen.com/en/news/2024/neoens-collie-battery-stage-1-begins-operating-and-delivering-grid-reliability-services-in-western-australia/>.
- Rio Tinto, *Ngarluma and Rio Tinto to progress renewable energy project*, 15 July 2024, at <https://www.riotinto.com/en/news/releases/2024/ngarluma-and-rio-tinto-to-progress-renewable-energy-project>.
- Rio Tinto, *Rio Tinto and BHP collaborate on battery-electric haul truck trials in the Pilbara*, 27 May 2024, at <https://www.riotinto.com/en/news/releases/2024/rio-tinto-and-bhp-collaborate-on-battery-electric-haul-truck-trials-in-the-pilbara>.

- South32, *Sustainable Development Report*, 28 August 2024, at https://www.south32.net/docs/default-source/annual-reporting-suite/2024/sustainable-development-report-2024.pdf?sfvrsn=ddc11e46_1.
- Synergy, *King Rocks Wind Farm (KRWF)*, 1 October 2024, at <https://www.synergy.net.au/Our-energy/SynergyRED/King-Rocks-Wind-Farm>.
- Synergy, *Kwinana Battery Energy Storage System 2*, 27 October 2024, at <https://www.synergy.net.au/Our-energy/SynergyRED/Large-Scale-Battery-Energy-Storage-Systems/Kwinana-Battery-Energy-Storage-System-2>.
- Synergy, *Major milestone as first units installed at Collie battery*, 8 October 2024, at <https://www.synergy.net.au/About-us/News-and-announcements/Media-releases/Collie-battery-milestone>.
- WA Government, *First project approved through Green Energy Approvals Initiative*, 20 June 2024, at <https://www.wa.gov.au/government/announcements/first-project-approved-through-green-energy-approvals-initiative>.
- WA Government, *Kemerton Power Station Increased Operation Hours*, 13 May 2024, at <https://www.epa.wa.gov.au/proposals/kemerton-power-station-increased-operation-hours>.
- WA Government, *Yarnima Power Station Stage 4 (Gas Reciprocating Engines)*, 29 April 2024, at <https://www.epa.wa.gov.au/proposals/yarnima-power-station-stage-4-gas-reciprocating-engines>.
- WesCEF, *Covalent Lithium opens Mt Holland lithium mine and concentrator*, 7 March 2024, at <https://wescef.com.au/2024/03/07/covalent-lithium-opens-mt-holland-lithium-mine-and-concentrator/>.
- Woodside, *Angel CCS Joint Venture and Yara collaborate on carbon capture and storage*, 5 April 2024, at https://www.woodside.com/docs/default-source/media-releases/angel-ccs-jv-and-yara-collaborate-on-carbon-capture-and-storage.pdf?sfvrsn=6465c43b_17.

A2.7 Hydrogen – sources

- AFR, *Labor's hydrogen dream stalls as Fortescue slims down H2 vision*, 17 July 2024, at <https://www.afr.com/companies/mining/fortescue-puts-hydrogen-on-backburner-with-700-jobs-cut-20240717-p5jufj>.
- Australian Government, *East Kimberley Clean Energy Project – Stage 1, Feasibility Study*, 27 October 2024, at <https://arena.gov.au/projects/east-kimberley-clean-energy-project/>.
- Australian Government, *Hydrogen Headstart Round 2*, 27 October 2024, at <https://arena.gov.au/funding/hydrogen-headstart-round2/>.
- Australian Government, *Joint media release: Pilbara Hydrogen Hub to boost Australia's hydrogen industry*, 19 February 2024, at <https://minister.dcceew.gov.au/bowen/media-releases/joint-media-release-pilbara-hydrogen-hub-boost-australias-hydrogen-industry>.
- Australian Government, *National Hydrogen Strategy 2024*, September 2024, at <https://www.dcceew.gov.au/energy/publications/australias-national-hydrogen-strategy>.
- Australian Government, *Six shortlisted for \$2 billion Hydrogen Headstart funding*, 21 December 2023, at <https://arena.gov.au/news/six-shortlisted-for-2-billion-hydrogen-headstart-funding/>.

- CSIRO, *Australian Renewable Energy Hub*, 15 August 2024, at <https://research.csiro.au/hyresource/australian-renewable-energy-hub/>.
- CSIRO, *Christmas Creek Green Iron Trial Commercial Plant*, 20 August 2024, at <https://research.csiro.au/hyresource/christmas-creek-green-iron-trial-commercial-plant/>.
- CSIRO, *Christmas Creek Renewable Hydrogen Mobility Project*, 20 August 2024, at <https://research.csiro.au/hyresource/christmas-creek-renewable-hydrogen-mobility-project/>.
- CSIRO, *Denham Hydrogen Demonstration Plant*, 18 October 2024, at <https://research.csiro.au/hyresource/denham-hydrogen-demonstration-plant/>.
- CSIRO, *Hydrogen Refueller @H2Perth*, 10 July 2024, at <https://research.csiro.au/hyresource/hydrogen-refueller-h2perth-2/>.
- CSIRO, *Murchison Hydrogen Renewables Project*, 15 August 2024, at <https://research.csiro.au/hyresource/murchison-hydrogen-renewables-project/>.
- CSIRO, *Pilbara Hub*, 14 August 2024, at <https://research.csiro.au/hyresource/hubs/pilbara/>.
- Fortescue, *Fortescue's hydrogen-powered haul truck prototype arrives in the Pilbara*, 12 August 2024, at <https://www.fortescue.com/en/articles/fortescue-s-hydrogen-powered-haul-truck-prototype-arrives-in-the-pilbara>.
- Pilot Energy, *MWCEP receives Declaration of Greenhouse Gas Storage Formation for Cliff Head CO2 Storage Project*, 14 June 2024, at <https://www.pilotenergy.com.au/sites/default/files/asx-announcements/61211519.pdf>
- Western Australian Government, *HyEnergy® Green Hydrogen and Ammonia Project*, 5 February 2024, at <https://www.epa.wa.gov.au/proposals/hyenergy%C2%AE-green-hydrogen-and-ammonia-project>.
- Western Australian Government, *Renewable hydrogen: strategy refresh consultation*, 12 September 2024, at <https://www.wa.gov.au/government/publications/renewable-hydrogen-strategy-refresh-consultation>.

A2.8 Regulatory update – sources

- AEMC, *New Versions 79 and 80 of the National Gas Rules*, 3 June 2024, at <https://www.aemc.gov.au/news-centre/media-releases/new-versions-79-and-80-national-gas-rules>.
- AEMC, *Transformative changes as emissions reduction included in national energy rules*, 1 February 2024, at <https://www.aemc.gov.au/news-centre/media-releases/transformative-changes-emissions-reduction-included-national-energy-rules>.
- Australian Government, *Finalisation of offshore exploration rounds*, 23 July 2024, at <https://www.minister.industry.gov.au/ministers/king/media-releases/finalisation-offshore-exploration-rounds>.
- Australian Government, *Future Gas Strategy*, 25 June 2024, at <https://www.industry.gov.au/publications/future-gas-strategy>.
- ERA, *Draft decision for regulated Goldfields Gas Pipeline*, 25 July 2024, at <https://www.erawa.com.au/cproot/24215/2/GGP-GGT-AA5-Draft-Decision-Media-Statement.PDF>.

- ERA, *Draft decision on revisions to the access arrangement for the Goldfields Gas Pipeline*, 25 July 2024, at <https://www.erawa.com.au/cproot/24216/2/GGP-GGT-AA5-Draft-Decision-Overview-final.PDF>.
- ERA, *Final decision on access arrangement for the Mid-West and South-West Gas Distribution Systems (2025 to 2029)*, 8 November 2024, at <https://www.erawa.com.au/cproot/24355/2/Final-Decision-Overview.PDF>.
- ERA, *Reference service proposal decision*, 1 July 2024, at <https://www.erawa.com.au/cproot/24155/2/DBNGP-DBP-AA6-Decision-Reference-service-proposal.PDF>.

A2.9 Western Australian Domestic Gas Policy – sources

- Parliament of Western Australia, *Inquiry into the WA Domestic Gas Policy: Final Report*, 15 August 2024, at [https://www.parliament.wa.gov.au/Parliament/commit.nsf/\(Report+Lookup+by+Com+ID\)/27F837EAB987BD9548258B790020F885/\\$file/20240814%20-%20RPT%20-%20DOMGAS%20FINAL%20updated%20for%20web.pdf](https://www.parliament.wa.gov.au/Parliament/commit.nsf/(Report+Lookup+by+Com+ID)/27F837EAB987BD9548258B790020F885/$file/20240814%20-%20RPT%20-%20DOMGAS%20FINAL%20updated%20for%20web.pdf).
- Western Australian Government, *Government response to the Economics and Industry Standing Committee's "Inquiry into the WA Domestic Gas Policy"*, 19 September 2024, at https://www.wa.gov.au/system/files/2024-09/0172_domgas_jtsi_submission_to_parliamentary_inquiry.pdf.
- Western Australian Government, *WA Domestic Gas Statement September 2024*, 19 September 2024, at <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024>.

A3. Gas market characteristics, historical domestic prices, and cost of production

This section presents discussion on Western Australian historical domestic gas contract prices, spot prices and production cost of onshore gas.

A3.1 Western Australia gas market characteristics

Western Australia's unique combination of geographic isolation and very large gas resources has led to a history of large LNG developments in the region. Western Australian Government policy promoted the development of gas fields in the NWS area during the 1980s. Subsequently, the State Energy Commission of Western Australia signed a large gas supply contract with the NWS partners in 1980 and completed construction of the DBNGP in 1984.

The Western Australia domestic gas market has several key characteristics:

- Large, typically offshore, gas reserves, developed primarily to supply the global LNG market.
- A limited number of large suppliers and consumers.
- Bilateral, commercial, and long-term take-or-pay gas sales contracts, with small volumes of short-term and spot gas sales.
- Limited information about supply that is available to be contracted, potential buyers, and gas contract pricing.
- A small number of pipelines and interconnectors, with limited surplus pipeline capacity.
- Total gas storage capacity of 78 PJ, which can receive up to 160 TJ/day and supply up to 215 TJ/day.

A3.2 Historical domestic gas prices

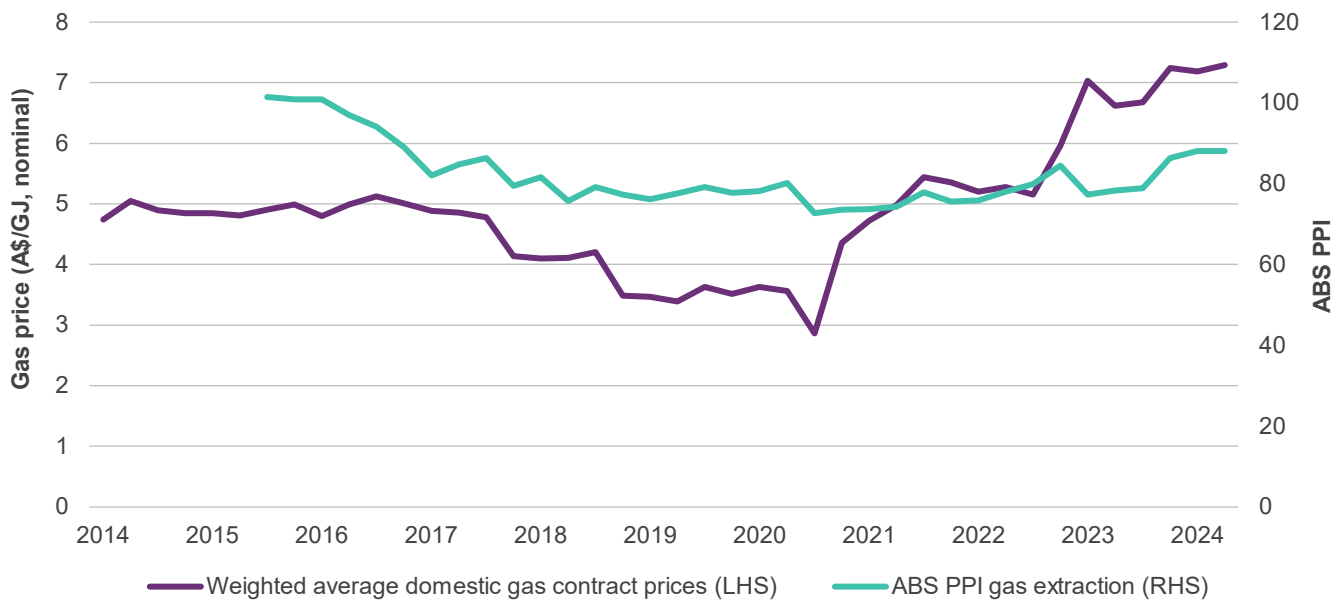
Figure 35 compares the quarterly historical domestic gas contract price¹⁹⁷ with the Australian Bureau of Statistics (ABS) producer price index (PPI)¹⁹⁸ for gas extraction. It shows that:

- The average gas contract price increased to \$7.29 in Q2 2024 after a decline to \$6.62/GJ in Q2 2023.
- The price is 154% above its low point of \$2.87/GJ, recorded in Q3 2020.
- The ABS PPI (gas extraction) also shows an upward trajectory since its low in Q3 2020.

¹⁹⁷ Prior to 2016, the average domestic gas price was derived from all domestic gas sales into WA. However, beginning with the March quarter 2016, the average domestic gas price has been derived only from domestic gas sales reported to the State Government in relation to the administration of royalties. Therefore, the domestic gas price represents only a subset of all domestic gas sales. For more details, see <http://www.dmp.wa.gov.au/About-Us-Careers/Latest-Statistics-Release-4081.aspx>.

¹⁹⁸ The base for the index is the 2015-16 financial year. See <https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/producer-price-indexes-australia/latest-release>.

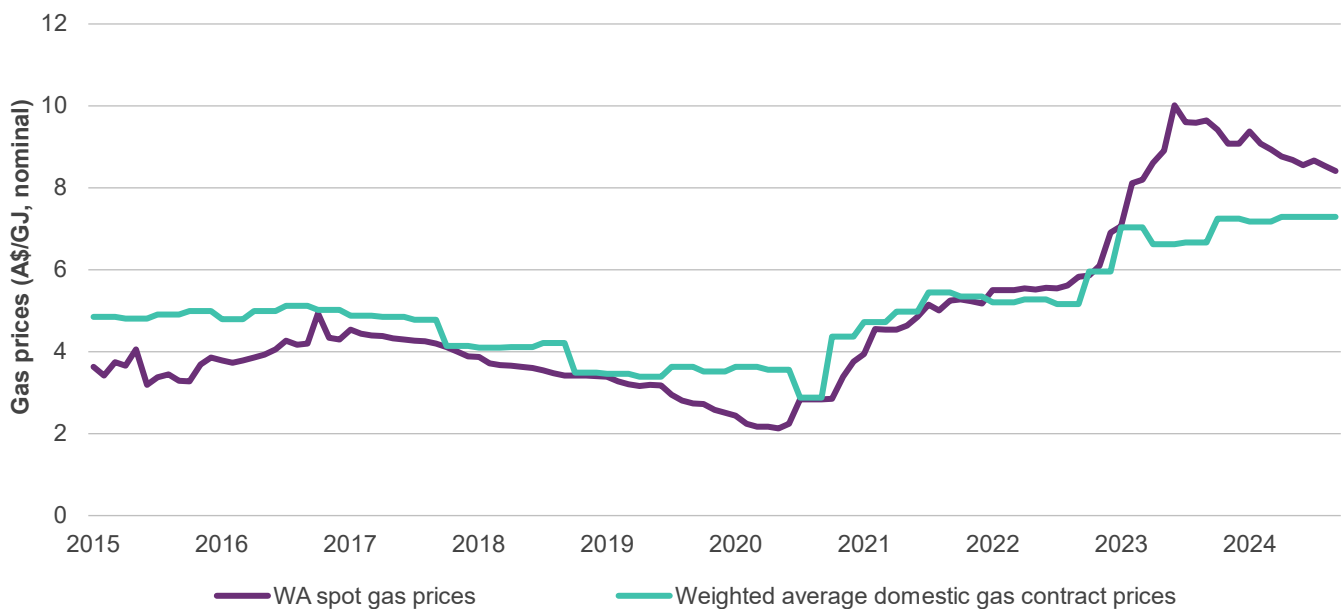
Figure 35 Historical domestic gas contract prices and Australian Bureau of Statistics producer price index – Western Australia (gas extraction, index), Q1 2014 to Q2 2024



Source: ABS and Department of Energy, Mines, Industry, Regulation and Safety.

Figure 36 shows average monthly nominal spot prices (for gas traded via Gas Trading Australia Pty Ltd [gasTrading]¹⁹⁹) since early 2015.

Figure 36 Western Australian spot gas prices from gasTrading, January 2015 to September 2024 (A\$/GJ)



Source: Gas Trading Australia Pty Ltd – gasTrading Spot Market™ and Department of Energy, Mines, Industry Regulation and Safety.

The figure highlights that:

¹⁹⁹ See <http://www.gastrading.com.au/spot-market/historical-prices-and-volume/13-historical-prices-and-volume/27-price-history-table>.

- Spot prices were on an upward trend until June 2023, rising from \$2.13/GJ in May 2020 to \$10.02 in June 2023, after which it started to decline, reaching \$8.41/GJ in September 2024.
- The current spot price (\$8.41/GJ in September 2024) is nearly four times higher than the lowest price in May 2020.
- Spot prices are more volatile than the weighted average domestic gas contract prices²⁰⁰.

A3.3 Spot and short-term trading

AEMO does not operate a spot or short-term trading market in Western Australia. Instead, most short-term demand is met by confidential contracts settled between parties. Short-term gas may also be procured through two independent and non-aligned mechanisms:

- gasTrading operates a spot market where sellers advise the operator of any surplus gas for the coming month, which is broadcast to the market and subsequently allocated depending on the ranking of the purchasers' offers and availability. The exact volumes available are confirmed by the seller one day ahead. Trade data is published on gasTrading's website at the end of each month.
- Energy Access Services Pty Ltd operates a real-time energy trading platform where members enter gas trade agreements with a focus on supply durations of up to 90 days. Trades can encompass firm and interruptible gas arrangements, as well as imbalances, and trade data is published monthly on the Energy Access website.

AEMO estimates that approximately 1-2%²⁰¹ of total gas consumption in Western Australia is traded on a short-term basis. Information in the public domain regarding the quantity and associated prices of spot or short-term gas is provided by gasTrading and Energy Access Services.

A3.4 Production costs for Western Australia onshore gas

AEMO has estimated the weighted average cost of gas production for each year in the 10-year outlook period. These costs range from \$1.80/GJ in 2024 to \$2.19/GJ in 2034. These production costs were used to develop the forecast domestic gas prices applied in the potential gas supply, GPG and consumption model (see Appendix A4).

Table 23 Production costs, 2024 to 2034

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Weighted average costs of production (A\$/GJ, \$ real, 2024)	1.80	2.00	2.11	2.16	2.19	2.18	2.16	2.16	2.18	2.19	2.19

Weighted average production costs were calculated using the following assumptions:

- The short-run marginal cost (SRMC) was used for onstream projects.
- Whole of project costs were used for probable and proposed projects.

²⁰⁰ See <http://www.dmp.wa.gov.au/About-Us-Careers/Latest-Statistics-Release-4081.aspx>.

²⁰¹ Calculated using WA Gas Spot Market data and WA GBB. See <https://www.gastrading.com.au/spot-market/historical-prices-and-volume/daily-volume-history> and <https://gbbwa.aemo.com.au/>.

- New projects were introduced to the market according to assumptions based on the timeframes publicly announced by project developers (see Appendix Section A4.3 for further information about these dates).
- A 10% discount rate was used.
- Costs were weighted by gas production by field and the cost (either SRMC or whole-of-project costs) of that field, for both existing gas production facilities and new supply sources²⁰².

²⁰² For existing facilities, AEMO used the nameplate production capacity. For probable supply sources, the DMO quantity or the expected production capacity were used as applicable. See Chapter 3 for further details of production capacity.

A4. Input assumptions and forecast methodologies

This appendix provides details of input assumptions and methodologies used to forecast potential gas supply, domestic gas consumption and demand, and total gas consumption.

A4.1 Economic and commodity forecasts

A4.1.1 Economic outlook

To maintain consistency between long-term electricity and gas forecasting, AEMO has used economic forecasts prepared by Deloitte Access Economics as a key input for both the 2024 WEM ESOO and Western Australian domestic gas consumption forecasts for this WA GSOO.

Refer to Deloitte Access Economics' report²⁰³ for more information on the methodology and assumptions for the Western Australia Gross State Product (GSP) forecasts.

A4.1.2 Commodity outlook

AEMO engaged the National Institute of Economic and Industry Research (NIEIR) to provide commodity forecasts²⁰⁴ as inputs for the development of the Western Australian domestic gas consumption forecasts. NIEIR has compiled information on new projects and existing operations (including expansions and closures) across each key commodity.

NIEIR provides the following projections across key commodities:

- **Iron ore** – the outlook beyond 2024 remains robust for the key iron ore producers, with volume growth from core Pilbara operations.
- **Alumina** – production has declined in-line with the curtailment of the Kwinana Alumina Refinery earlier this year. Production is forecast to recover in the medium term, in part due to the development of emerging high-purity alumina businesses. Beyond 2027, volumes stabilise.
- **Gold** – production is expected to grow as a response to favourable gold prices and the execution of new development and expansion plans across different sites. Nickel production has been impacted by several high-profile suspensions of operations, including the Ravenswood and Savannah mines, the operations of Wyloo

²⁰³ See Deloitte Access Economics, Economic forecasts 2023/24 Prepared for the Australia Energy Market Operator Limited, 2024, at https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2024/Deloitte-Access-Economics-2023-24-Economic-forecast-report.pdf.

²⁰⁴ NIEIR prepared forecasts for the following commodities – iron ore, alumina, gold, nickel, zinc, copper, lithium, lead, cobalt, and mineral sands, published along this 2024 WA GSOO. See NIEIR - *Critical minerals and other commodity forecasts for Western Australia to 2034*, August 2024, prepared for AEMO and published alongside the 2024 WA GSOO. See <https://www.aemo.com.au/energy-systems/gas/gas-forecasting-and-planning/wa-gas-statement-of-opportunities-wa-gsoo>.

Metals and those of BHP Nickel West in July 2024. Western Australian nickel production is projected to remain weak to at least up to 2028 and is heavily dependent on the future nickel market conditions.

- **Zinc** – a stronger outlook for the zinc market would support the growth of Western Australian operations and potential new developments.
- **Copper** – a strong outlook is linked to copper’s role in future decarbonisation efforts. Western Australian production declined in 2023 in line with the cessation of the DeGrussa mine. Several promising projects could be advanced in the medium term, including a re-start of the Whim Creek mine.
- **Lithium** – Western Australia capitalised on its natural resource endowment and robust market conditions to advance the development of a wide range of new mines and minerals processing facilities. Forecasts for the outlook period indicates continued growth, underpinned by demand for lithium-battery raw materials in consumer electronics and electric vehicles. A recent pull-back of market conditions has tempered the growth of this industry.
- **Lead** – lead production in Western Australia is confined to a few operating sites. Growth is limited by a limited number of available projects and the complexities of mine permitting.
- **Cobalt** – the outlook for this metal is tied closely to the prospects of nickel as it occurs as a co-product of nickel mining and processing operations.
- **Mineral sands** – mineral sand production is expected to steadily increase as new projects are brought online.

Further information about the commodity forecasts can be found in NIEIR’s report²⁰⁵.

A4.2 Gas consumption forecast methodology

A4.2.1 Domestic gas consumption

Domestic gas consumption includes all major mining and minerals processing activities, industrial, commercial, GPG consumption in the SWIS and non-SWIS area, and small-use customers connected to Western Australia’s gas distribution networks.

AEMO forecasts domestic gas consumption by separately modelling each of the following sectors:

- **Tariff V** – volumetrically tariffed customers, which includes residential and commercial **distribution** network customers. These consumers typically use less than 10 TJ/year. Distribution networks include the Mid-West and South-West, along with Kalgoorlie and Leonora, but exclude Albany, which distributes liquefied petroleum gas (LPG).
- **Tariff D** – demand tariffed customers that typically use more than 10 TJ/year. This includes industrial customers that are located within the distribution network, and the following transmission-connected consumers:
 - **Mining** – primary extraction.
 - **Minerals processing** – secondary processing of raw materials.

²⁰⁵ NIEIR - *Critical minerals and other commodity forecasts for Western Australia to 2034*, August 2024, prepared for AEMO and published alongside the 2024 WA GSOO.

- **Industrial** – including LPG and LNG producers as well as urea plants.
- Other industrial customers that are located within the distribution network.
- **GPG** (including SWIS²⁰⁶ and non-SWIS).

For the 2024 WA GSOO, AEMO incorporated several improvements to the domestic gas consumption forecasts:

- Enhanced modelling of the gold sector, capturing the price sensitivity of gold extraction. Gold processing capacity can be adjusted up and down in response to gold price conditions, cost profile and production capacity at a mine site level.
- Consideration of potential future reactivations of recently suspended large mines and processing facilities – in response to a forecasted recovery of commodity prices.
- Enhanced analysis of electricity power generation and operations of mine sites in and around the Pilbara's North-West Interconnected System.
- Improved categorisation of loads through clarifications with network operator.

The methodology applied in forecasting each sector is summarised in the following sections:

Residential and commercial distribution customers (Tariff V)

The distribution network includes the low-pressure pipelines used to supply small-use residential and non-residential retail customers. These customers account for less than 10% of Western Australia's domestic gas consumption. Tariff V total consumption is projected by applying different assumptions based on the customer type (residential or non-residential), and the consumption per connection.

The average per-connection Tariff V consumption is estimated, consisting of heating²⁰⁷ and baseload components. This is used as the base for forecasting Tariff V annual consumption, with growth driven by the following factors:

- Connection numbers.
- Energy efficiency.
- Weather and climate change effects.
- Gas price impacts.

Further information about the Tariff V forecasting methodology can be found in Chapter 5 of AEMO's *Gas Demand Forecasting Methodology Information Paper*²⁰⁸.

Large users (Tariff D)

Tariff D consumers account for more than 75% of Western Australia's total domestic gas demand, and consist of:

²⁰⁶ Ernst & Young (EY), *2024 South West Interconnected System gas-powered generation forecast methodology report*, prepared for AEMO, 2024, and published alongside this WA GSOO. See <https://aemo.com.au/en/energy-systems/gas/gas-forecasting-and-planning/wa-gas-statement-of-opportunities-wa-gsoo>.

²⁰⁷ Heating load is largely dependent on future weather projections, specifically the frequency and severity of cold days. This is referred to as HDDs (heating degree days).

²⁰⁸ See https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/gsoo/2024/gas-demand-forecasting-methodology-2024.pdf?la=en.

- Mining consumers such as:
 - Iron ore producers – BHP, Rio Tinto, Hancock Mining, CITIC Pacific and Fortescue.
 - Gold producers – Large international companies such as Newmont and key local producers such as Northern Star Resources.
 - Nickel producers – BHP NickelWest and Glencore.
 - Lithium producers – Existing and emerging miners.
 - Base metals producers – Cyprium Metals, IGO.
- Minerals processing consumers such as Alcoa, Albemarle, and Tianqi Lithium.
- Industrial consumers such as CSBP and Yara Pilbara.
- Construction materials producers such as Midland Brick and Cockburn Cement.
- Domestic LNG producers such as EDL and Wesfarmers.
- Other industrial customers that are connected to the distribution network.

Tariff D gas consumers are associated with natural gas intensive processes, such as minerals processing calcination facilities, equipment used to mine specific minerals, and specific finished products. The growth or decline in future gas consumption has been linked to the quantity of minerals processed, mined, or produced. NIEIR's commodity forecasts have been used as an input into the Tariff D consumption forecasts. The mining, minerals processing, and industrial forecasts are largely driven by:

- Projected mining activity.
- Commodity prices.
- Expected mine production and outages.
- Production costs.
- Exchange rate forecasts.

AEMO used information received from gas consumers as part of the 2024 FIR for developing the gas consumption forecasts for these sectors. Where FIR information was unavailable, AEMO applied NIEIR's commodity production forecasts.

Minerals processing, mining, and industrial sectors

AEMO's forecasts of the mining, minerals processing, and industrial sectors are based on data gathered using the following sequence:

- Tier 1 (preferred method) – obtain forecast data from the facility operator, usually through the FIR, with data quality checks performed against historical consumption along with any public announcements about the facility's operations.
- Tier 2 (if no site-specific forecast was available) – use secondary information such as commodity forecasts. Historical usage data was analysed to calculate either a commodity specific regression-based energy coefficient or an energy intensity factor.

- Tier 3 (where data for the first two approaches was unavailable) – historical pattern matching across multiple years of consumption data (sourced from the WA GBB) determined whether the forecast was based on a trend or a median level of usage.

Tariff D – distribution consumption

AEMO forecasts distribution connected industrial consumers using an econometric approach. This forecast is developed separately from transmission connected Tariff D consumers. The econometric approach features:

- A short-term model (driven by historical metering data provided by CGI Logica and heating degree days as the main explanatory component).
- A long-term annual data model, incorporating gross state product (GSP) forecasts, natural gas price forecasts, and natural gas intensity trends.

The short-term and long-term models are blended together, whereby the short-term model has less influence for each new year of the forecast. Conversely, the GSP-driven long-term model becomes more influential, and is the sole driver of distribution connected consumption by the fifth year of the forecast.

Note that AEMO's forecasts for distribution connected industrial consumers do not include all industrial customers connected to ATCO's network. AEMO has allocated some facilities directly into sectors such as the minerals processing, mining, and industrial sectors to better reflect survey responses received through the FIR (as per the Tier 1 above). As a result, AEMO's distribution connected Tariff D forecast is lower than would otherwise be the case.

SWIS GPG

The forecast of SWIS GPG in this 2024 WA GSOO has been prepared by EY using its in-house 24C[®] software suite. The software suite consists of a co-optimised energy market and Essential System Service (ESS) dispatch engine, and several software tools that are used to develop input data and analyse output data.

The GPG forecasts have been developed based on the electricity demand forecasts and modelling undertaken for the reliability assessment that underpinned the 2024 WEM ESOO for the 2024 Long Term Projected Assessment of System Adequacy (PASA).

Given the extent of new supply capacity needed for each scenario, assumptions were made about the long-term development of the transmission network required to support this build out. The constraint equations used for this GPG modelling are based on the equations derived for the 2024 reliability assessment and assume a network augmentation plan developed to meet the *Step Change* scenario ('Expected' in the 2024 WEM ESOO).

The same constraint set is used for the *Progressive Change* scenario, as electricity demand is lower, and the network development was sufficient for this scenario. For the *Green Energy Exports* scenario, the new generator plants that are additional to those needed for the *Step Change* scenario are modelled as 'unconstrained', based on the assumption that further network developments required to connect these generators and maintain system security will occur. Please refer to AEMO's 2024 WEM ESOO documentation and EY's accompanying methodology report for further detail on the WEM ESOO modelling framework, inputs and assumptions. The scenarios used by EY for the SWIS GPG modelling are shown in Table 24.

Table 24 Scenario mapping for GPG modelling

Scenario	Progressive Change	Step Change	Green Energy Exports
Operational consumption ^A	Low	Expected	High
Peak demand ^A	Low case 10% probability of exceedance (POE)	Expected case 10% POE	High case 10% POE
Gas price ^B	Low	Expected	High
Distributed energy resources (DER) ^A	Low	Expected	High
Generation retirements ^C	Refer to Table 4.		
Generation new builds/upgrades ^D	<ul style="list-style-type: none"> ALINTA_WGP_ESR1 (50 MW / 4hr) COLLIE_ESR1 (200 MW / 4h) ALINTA_WGP_GT and ALINTA_WGP_U2 (11 MW upgrade to each unit) ENELX_DSP_01 (120 MW) 		
	N/A – no additional Facilities included in the Progressive Scenario further to Existing Facilities, or those with 2024-26 Peak Demand NCESS contracts (as started 1 October 2024 so considered Existing)	<ul style="list-style-type: none"> ARROWSMITH_EAST_G1 (85 MW)^E COLLIE_ESR4 (250 MW / 4hr) COLLIE_BESS2 (300 MW / 4hr) COLLIE_ESR5 (250 MW / 4hr) ERRRR_WTE_G1 (29 MW) KWINANA_ESR2 (225 MW / 4hr) MERREDIN_ESR1 (100 MW / 4hr) PHOENIX_KWINANA_WTE_G1 (36 MW) 	
		Other ^F : <ul style="list-style-type: none"> DSP (125 MW in 2025-26, 15 MW longer term)^G Storage (112MW) Solar (110 MW) 	Other ^F : <ul style="list-style-type: none"> Storage (205 MW) Diesel (20 MW) Wind (476 MW)
Capital costs and operating parameters for new build capacity ^H	CSIRO GenCost NZE by 2050	CSIRO GenCost NZE post 2050	CSIRO GenCost Current Policies
Transmission network development	<ul style="list-style-type: none"> 2025-26: Ratings upgrade associated with the East Enhancement Project 2026-27: A portion of the full Clean Energy Link - North Region project. 2027-28: Clean Energy Link – North Region project Post 2030: Network augmentation modelled to represent potential for improved transfer capability throughout the SWIS, including^I: <ul style="list-style-type: none"> South West 330 kV bulk expansion Intra-nodal 132 kV augmentations within the Perth metropolitan region Kwinana 132 kV network reinforcement South-West 132 kV network reinforcement 		

A. Sourced from the 2024 WEM ESOO. The SWIS GPG forecasts were developed based on operational demand profiles derived from reference years across 2017 to 2022, as well as a set of 10 random forced outage profiles per reference year.

B. AEMO engaged external consultant EnergyQuest to develop gas price forecasts for the 2024 WA GSOO.

C. Note MUJA_G6 has had its operation extended to 1 April 2025, in 'standby mode' (see <https://www.wa.gov.au/government/media-statements/Cook-Labor-Government/Muja-C-Unit-6-in-reserve-mode-and-online-for-summer-2024-25-20230817>). However, this only impacts the first 3 months of the modelling horizon and is expected to impact a small number of intervals for modelling, it was assumed to exit 1 October 2024.

D. In addition to existing/committed facilities, the GPG modelling adds new capacity to the SWIS which includes new GPG capacity under all scenarios. Refer to EY's 2024 SWIS GPG forecast methodology report for more details on the approach to developing the forecast capacity mix.

E. ARROWSMITH_EAST_G1 is modelled in GPG forecasts to support in meeting electricity demand but its gas consumption is not included in the domestic gas consumption forecasts as its gas usage is assumed to be self-delivered.

F. Refers to generation either less than 10 MW or identified based on information from 2024 Expressions of Interest for Reserve Capacity or 2024 WEM ESOO FIR. Projects are not listed individually due to confidentiality but are presented as an aggregate by technology type.

G. This category includes some categorised as 'DSP/ESR' reflecting VPP schemes in NCESS 2025-27 contracts – as it has the same impact in the modelling (whether modelled as DSP or ESR as the requirement is the same for each) they are modelled together as DSP.

H. Based on information published in AEMO's 2024 *Integrated System Plan* (ISP) Inputs and Assumptions Workbook (see <https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp>).

I. The drivers of these augmentations are discussed in Table 18 and Table 24 of the WEM ESOO.

The modelling also includes inputs and assumptions on:

- Generator technical data, including capacity, outage rates, ramp rates, heat rates, minimum stable levels, utility-scale intermittent profiles, and cost information.
- Information about network transfer limits and constraints, based on the assumptions and network constraint equations developed for the 2024 WEM ESOO and documented in the same ESOO document.
- Requirements for Contingency Reserve Raise, Contingency Reserve Lower, Regulation Raise, and Regulation Lower.

Further information on the modelling inputs and assumptions is provided in EY's SWIS GPG forecast methodology report, published alongside this WA GSOO.

Non-SWIS GPG

Non-SWIS GPG includes the electricity distribution networks operated by Horizon Power and accounts for less than 5% of total domestic gas consumption. To forecast this gas consumption, AEMO used information received from gas consumers as part of the 2024 FIR²⁰⁹. Where FIR information was unavailable, AEMO applied a linear trend model consistent with the *Gas Demand Forecasting Methodology Information Paper*²¹⁰.

Criteria for inclusion of Probable gas consumption projects

Projects included in the probable consumption forecasts were required to meet **at least two** of the following criteria:

- The project is located within 20 kilometres of a gas transmission pipeline that is under construction, has spare shipping capacity, or is a new pipeline that has attained FID.
- The project proponent has submitted a request for environmental approval to the Western Australian Government or Australian Government.
- The project proponent has a commercial arrangement with a gas pipeline or gas storage company to expand and/or connect physical infrastructure to withdraw gas.
- The project may consume gas from existing domestic gas or LNG facilities.
- The project proponent has publicly announced its intention to build a renewable energy generation project or any other projects that specifically offset the use of gas as an input or energy source.

For each scenario, the shortlisted projects were assessed to determine the likelihood that they would consume gas over the outlook period. The finalised list included projects submitted by Registered GMPs and some non-Registered GMPs as part of the 2024 FIR process.

²⁰⁹ AEMO recognises that in some cases mine sites have commercial offtake agreements with gas power generators. AEMO has worked closely with both parties to ensure that no double counting of FIRs has occurred.

²¹⁰ See https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/gsoo/2024/gas-demand-forecasting-methodology-2024.pdf?la=en.

Consumption reduction projects

Consumption reduction projects are those associated with decarbonisation and are expected to reduce gas consumption. Examples include on-site renewable generation or efficiency upgrades. Consumption reduction projects are modelled by considering them independently from their core projects. In this process, only committed consumption reduction projects²¹¹ are included in the *Step Change* and *Progressive Change* scenarios. More speculative consumption reduction projects are only included in the *Green Energy Exports* scenario.

Electrification and multi-sector energy modelling

Electrification derived from outcomes of multi-sector modelling is applied to the gas consumption forecasts, consistent with methodology employed in the 2024 WEM ES00. The electrification forecasts are developed for both Tariff D and Tariff V.

Hydrogen and biomethane forecasts

AEMO has identified the potential for hydrogen and biomethane to offset future natural gas consumption, based on the outcomes of multi-sector modelling. However, these forecasts are not incorporated into the domestic market balance for the 2024 WA GS00²¹².

For more details on the multi-sector energy modelling, refer to *Multi-sector energy modelling 2022: Methodology and results* final report prepared by Commonwealth Scientific and Industrial Research Organisation (CSIRO) and ClimateWorks Centre (CWC)²¹³. For more details on the methodology to forecast gas reduction from electrification as well as hydrogen and biomethane supply, refer to the *Gas Demand Forecasting Methodology Information Paper*²¹⁴.

A4.2.2 Total gas consumption

To develop Western Australian total gas consumption forecasts, AEMO estimated the amount of gas required for Western Australia's LNG industry and added it to the domestic gas consumption forecasts, as shown in Figure 37. The total gas consumption forecasts are tabulated in Appendix A7.

Figure 37 Total gas consumption equation



²¹¹ AEMO assesses project development likelihood based on whether it has achieved Final Investment Decision, progress of environmental approvals and any relevant market releases.

²¹² While the hydrogen and biomethane forecasts are not incorporated in the 2024 WA GS00 supply adequacy forecasts, natural gas consumed by the GPG required to manufacture hydrogen for export or use in industries such as transport is considered in the consumption forecasts.

²¹³ See https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2022/2023-inputs-assumptions-and-scenarios-consultation/supporting-materials-for-2023/csiro-climateworks-centre-2022-multisector-modelling-report.pdf.

²¹⁴ See https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/gsoo/2024/gas-demand-forecasting-methodology-2024.pdf?la=en.

AEMO developed total gas consumption forecasts for all three scenarios (*Progressive Change*, *Step Change*, and *Green Energy Exports*).

LNG forecasts were developed using historical production utilisation data for existing LNG facilities, and publicly available information on the proposed production capacity and commencement dates of new LNG facilities.

The assumptions applied in each total gas consumption forecast scenario are summarised in Table 25.

Table 25 LNG export assumptions by scenario

Scenario		Progressive Change	Step Change	Green Energy Exports
Gas feedstock for LNG exports	Project	Quantity of LNG		
	North West Shelf (Karratha Gas Plant - KGP)	10.1 Mtpa (million tonnes per annum) in 2024, decreasing at approximately 18% per annum from 2024.		
	NWS production maintained via backfill from Waitsia Stage 2	1.5 Mtpa from early 2025 to 2028		
	Gorgon LNG	14.8 Mtpa		
	Pluto LNG	4.9 Mtpa, decreasing at approximately 22% per annum from 2025		
	Wheatstone LNG	8.9 Mtpa, decreasing at approximately 15% per annum from mid-2026		
	Prelude FLNG	3.2 Mtpa ^C		
	Ichthys LNG	8.5 Mtpa		
	NWS production maintained via backfill through the interconnector from Pluto	1.1 Mtpa from 2022 to end 2025		
	Pluto train one supported by backfill from Scarborough	3.0 Mtpa from Q4 2026		
	Pluto train two expansion from Scarborough gas	5.0 Mtpa, commences Q4 2026		
	Lockyer Gas Project	Approximately 0.1 Mtpa from 2029 to end-2030 ^B		
	West Erregulla	Approximately 0.1 Mtpa from 2027 to end-2030 ^B		
	Gas used for processing LNG ^A	8%		

A. Processing estimates were taken from processing companies' reports and presentations.

B. AEMO has assumed 20% of gas exports to LNG from probable and proposed onshore gas projects until 31 December 2030.

C. Based on weighted moving average of 2023 and 2024 utilisation of nameplate 3.6 Mtpa.

A4.2.3 Reconciliation of previous WA GSOO domestic gas consumption forecasts

Table 26 reconciles WA GSOO domestic gas consumption forecasts from the last three years against actual gas demand data sourced from the WA GBB. Forecasting methodology improvements, changes in assumptions, access to FIR data and improved data availability from the GBB have contributed to the accuracy of the forecasts over time.

The reconciliation of actual gas demand against previous WA GSOO domestic gas consumption forecasts indicates:

- Across the three years of forecasts considered, the percentage difference between the forecasts and actual gas demand varies between 0.3% to 6.3%, showing a tendency to over-forecast.
- The greatest variance from 2024 actuals are forecasts from the 2023 WA GSOO (5%).

Table 26 Reconciliation of previous WA GSOO domestic gas consumption forecasts (% deviance of forecast from actual)^A, 2022 to 2024

	2022	2023	2024 ^B	Average absolute % deviance
December 2021 GSOO forecast deviance (%)	0.3	6.3	4.1	3.6
December 2022 GSOO forecast deviance (%)		3.8	2.2	3.0
December 2023 GSOO forecast deviance (%)			5.0	5.0

A. Percentage difference is calculated as (forecast demand – actual demand)/actual demand. A negative figure denotes an under-forecast while a positive figure denotes an over-forecast.

B. Using data from 1 January 2024 to 30 September 2024.

A4.3 Potential gas supply forecasting methodology

A4.3.1 Reserves and resources

AEMO uses estimates made under the Society of Petroleum Engineers (SPE) system of reserves classification²¹⁵, which is a standard metric across the gas industry. Gas accumulations are categorised into either reserves or resources, based on the level of commercial and technical uncertainty associated with extraction²¹⁶.

Table 27 has a summary of the terms.

Table 27 Classification of reserves and resources

Classification	Definition
1P	A measure of gas reserves that includes proven (developed and undeveloped) reserves with a reasonable certainty (normally at least 90% confidence) of being recoverable.
2P	A measure of gas reserves that includes proven (1P) and probable reserves (normally at least 50% confidence of being recoverable).
2C	A measure of gas resources that are considered less commercially viable than reserves. 2C resources are considered the best estimate of sub-commercial resources.

Source: SPE.

Over time, gas reserves and resources are developed, depleted, or reassessed (particularly against commercial benchmarks), so the forecasts of gas reserves and resources change.

A4.3.2 Potential gas supply forecast methodology

Instead of forecasting how much gas is expected to be supplied over the outlook period, AEMO's forecasts of potential gas supply reflect how much gas could be produced if there was market requirement for it at the forecast price. This approach is useful to assess supply adequacy and identify potential supply gaps²¹⁷.

To determine these potential gas supply sources, AEMO sources information from external consultants, JTSI, interviews with stakeholders and information in the public domain. AEMO uses both physical and commercial characteristics sourced from Energy Quest when assessing probable supply sources, as summarised in Table 28.

²¹⁵ See <https://www.spe.org/en/industry/reserves/>.

²¹⁶ These uncertainties could include securing finance, obtaining government approvals, negotiating contracts, or overcoming geological challenges. The terms resources and reserves are not interchangeable: reserves constitute a subset of resources.

²¹⁷ Transmission pipeline capacity constraints are not considered in the model.

Table 28 Criteria for assessing probable gas supply sources

Physical characteristics
<ul style="list-style-type: none"> • Location of reserves, • Water depth, • Volume of reserves, • Reservoir characteristic, • DMO for sources that are primarily being developed to supply the global LNG market.
Commercial characteristics
<ul style="list-style-type: none"> • Ownership structure (joint venture or sole owner), • Proponent or operator experience, • Primary development driver (global LNG market or domestic gas market), • Likely development path (for example, tie-back to an existing facility, or new production facility), • Estimated development costs, based on the likely development path, • Commercial arrangements (for example, any tolling requirements), • Gas sales contracts, • Environmental approvals, • Infrastructure access.

AEMO's potential gas supply model was redeveloped by ACIL Allen in 2018 following the recommendations of the 2018 five-yearly WA GSOO review²¹⁸. The model tracks the gas reserves remaining for each domestic-only production facility on an annual basis by incorporating assumptions about the following inputs:

- Initial gas reserves and resources.
- Modelled annual gas sales (contracted and uncontracted).
- Fuel gas requirements.
- Incremental reserves additions and backfill.
- Where possible, AEMO sourced model input data from Registered GMPs and non-Registered GMPs through the 2024 FIR and made assumptions based on publicly available information where FIR data was unavailable. For the 2024 WA GSOO, AEMO updated the input assumptions used in the model.

With the aim of improving forecast accuracy, in this WA GSOO, AEMO incorporated a ramp-up consideration in its forecast of new supply projects²¹⁹, based on analysis of the ramp-up profile of similar projects. This was done to reflect a more realistic and accurate production forecast particularly in the starting years of production.

AEMO assessed several new supply sources. Some of these candidates for supply or backfill/infill of existing gas production facilities were excluded for at least one of the following reasons:

- Insufficient appraisal of the field had been completed to evaluate the size and characteristics of the resource.
- The development timeframe was likely to extend beyond the end of the outlook period.
- Developing the resource was considered to be uneconomic under current and expected near-term LNG and domestic market conditions.

²¹⁸ See https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/wa_gsoo/2018/five-yearly-review-of-the-wa-gsoo.pdf?la=en

²¹⁹ This includes committed and probable projects, as per Section 3.2.2.

- The project proponent or operator had not selected a preferred development option.

AEMO will continue to monitor these fields as potential future supply sources.

Based on the existing and new gas supply sources that have been included in the gas supply model, Table 29 summarises the selection criteria and basis of assessment.

Table 29 Potential gas supply model operation

	Domestic only		LNG-linked with DMO	
	Existing/committed	Probable	Existing/committed	Probable
Development timing and duration	<ul style="list-style-type: none"> • As indicated by GMP. 	Developed when indicated by GMP & considering: <ul style="list-style-type: none"> • Approvals Status. • Construction – 2 years. 	<ul style="list-style-type: none"> • As indicated by GMP. 	Developed when indicated by GMP & considering: <ul style="list-style-type: none"> • Approvals Status. • Construction – 5 years.
Production forecast method	Either: <ul style="list-style-type: none"> • GMP supplied production forecast (FIR). or • A plateau rate of nameplate capacity less utilisation %, followed by a decline rate^D from the end of plateau. 	<ul style="list-style-type: none"> • A ramp-up to a plateau rate of 90% of nameplate capacity, followed by a decline rate^D from the end of plateau. • 20% of resulting production allocated to LNG exports until end 2030. 	For existing projects, either: <ul style="list-style-type: none"> • GMP supplied production forecast (FIR). or • JTSI Western Australia Domestic Gas Statement. or • A plateau rate of nameplate capacity less utilisation %^A. For committed projects: <ul style="list-style-type: none"> • A ramp-up to a plateau rate of 90% of nameplate capacity. 	<ul style="list-style-type: none"> • A ramp-up to a plateau rate of 90% of nameplate capacity, followed by a decline rate^D from the end of plateau.
Projects included in the model	<ul style="list-style-type: none"> • Beharra Springs^B • Macedon^B • Varanus Island^B • Walyering^B 	<ul style="list-style-type: none"> • Lockyer Gas Project^C, • West Erregulla^C 	<ul style="list-style-type: none"> • Gorgon^B • KGP^B • Pluto^B • Scarborough^B • Waitsia^E Stage 2^B <ul style="list-style-type: none"> – LNG Export to 2028 – Domestic gas from 2029 • Wheatstone^B • Xyris^B (Waitsia^E Stage 1) 	<ul style="list-style-type: none"> • None

A. Recent analysis of Gorgon and Wheatstone domestic gas production rates (sourced from WA GBB) has shown that historical availability is around 96% and 93% over a calendar year, respectively.

B. Included in the *Progressive Change*, *Step Change*, and *Green Energy Exports* scenarios.

C. Included in the *Step Change* and *Green Energy Exports* scenarios.

D. Advised by GMP, where remaining reserves are insufficient to maintain production for the outlook period.

E. Waitsia is special case domestic gas project with a 7.5 mt LNG export license.

Table 30 summarises the key changes to assumptions for potential gas supply sources between the 2023 WA GSOO and the 2024 WA GSOO.

Table 30 Key assumptions of potential gas supply model, *Step Change* scenario, 2023 and 2024 WA GSOOs

Project	Operator	2024 scenario	Assumption in 2023 WA GSOO	Assumption in 2024 WA GSOO
Beharra Springs	Beach Energy	<i>Step Change</i>	Following FID, available at 28 TJ/day between 2024 and 2033.	To commence from end-2024 at 28 TJ/day, throughout the outlook period.
Corvus	Santos	None	Available at 50 TJ/day from mid-2031, reflecting available reserves.	Not included.
Devil Creek	Santos	<i>Step Change</i>	Cessation of the Reindeer gas field and Devil Creek production facility occurs from the start of the outlook period (Q1 2024).	Cessation of the Reindeer gas field and Devil Creek production facility occurs from Q4 2024.
Gorgon	Chevron	<i>Step Change</i>	Available at 270 TJ/day.	Available at 288 TJ/day, reflecting historical supply.
Gynatrix	Mitsui E&P	None	Available with limited reserves from 2027.	Not included.
KGP	Woodside	<i>Step Change</i>	Available at 90 TJ/day, reflecting increased historical supply, revised DMO and remaining reserves.	Available at 151 TJ/day in 2025, reflecting revised DMO and with production limited by remaining reserves through the outlook period.
Lockyer Gas Project	Mineral Resources	<i>Step Change</i>	Lockyer Deep - Available at 50 TJ/day from 2028.	Lockyer Deep & North Erregulla Deep both supplying the Lockyer Gas Project – production ramps up from start-2029 to reach 80 TJ/day. 20% of gas to LNG assumed until 2030 ^A .
Macedon	Woodside	<i>Step Change</i>	Available at 167 TJ/day, with declining production limited by remaining reserves for the rest of the outlook period.	Available at ~165 TJ/day with production limited by remaining reserves through the outlook period.
Pluto	Woodside	<i>Step Change</i>	28 TJ/day: 3 TJ/day via LNG truck-loading and 25 TJ/day via pipeline.	28 TJ/day: 3 TJ/day via LNG truck-loading and 25 TJ/day via pipeline.
Pluto Acceleration	Woodside	<i>Step Change</i>	18 TJ/day between 2024 and 2025, with an additional 25 TJ/day from 2025 (Pluto gas to be delivered via the KGP).	48 TJ/day between April 2024 and end-2025, with an additional 25 TJ/day from 2025 (Pluto gas to be delivered via the KGP).
Scarborough	Woodside	<i>Step Change</i>	180 TJ/day from mid-2027.	Production ramps up from Q4-2026 to reach 180 TJ/day.
South Erregulla	Strike Energy	None	Available at 40 TJ/day from mid-2026.	Not included.
Trigg Northwest	Beach Energy	None	Availability with limited reserves from 2027.	Not included.
Varanus Island	Santos	<i>Step Change</i>	Limited supply to reflect reserves downgrades at Spar Halyard.	~200 TJ/day from 2025 with production limited by remaining reserves through the outlook period.
Waitsia (Stage 1 and 2)	Mitsui E&P	<i>Step Change</i>	Waitsia stage 1 available at 20 TJ/day from 2024, with LNG supply of 250 TJ/day from stage 2 available between mid-2024 and 2028. Domestic supply of 100 TJ/day from 2029.	Waitsia stage 1 (Xyris) available at 20 TJ/day from 2025, with LNG supply of ~250 TJ/day from stage available between 2025 and 2028. Domestic supply of ~200 TJ/day in 2029 from Waitsia stage two, with production limited by remaining reserves through the outlook period.
Walyering production facility	Strike Energy	<i>Step Change</i>	Available at 25 TJ/day from 2024 after being online from late 2023.	25 TJ/day from 2025, with production limited by remaining reserves.

Project	Operator	2024 scenario	Assumption in 2023 WA GSOO	Assumption in 2024 WA GSOO
West Erregulla	Strike Energy	<i>Step Change</i>	Moved to High scenario following delay, development plan change and partner change. Available at 80 TJ/day from mid-2027.	Moved to <i>Step Change</i> scenario following production licence being granted, and primary environmental approvals. Production ramps up from start-2027 to reach 78 TJ/day. 20% of gas to LNG assumed until 2030 ^A .
Wheatstone	Chevron	<i>Step Change</i>	Available at 194 TJ/day reflecting historical supply and increase in nameplate capacity to 215 TJ/day in August 2023.	Available at 214 TJ/day reflecting historical supply and increase in nameplate capacity to 230 TJ/day in August 2024.

A. Assumed as per the updated Western Australian domestic gas policy. See <https://www.wa.gov.au/government/announcements/domestic-gas-policy-updated-secure-was-energy-future>.

A4.3.3 Reconciliation of previous WA GSOO domestic gas supply forecasts

Table 31 reconciles WA GSOO domestic gas supply forecasts from the last three years against actual gas supply data sourced from the WA GBB. Forecasting methodology improvements, changes in assumptions, access to FIR data and improved data availability from the GBB have contributed to the accuracy of the forecasts over time.

The reconciliation of actual gas supply against previous WA GSOO domestic gas supply forecasts indicates that:

- Across the three years of forecasts considered, the percentage difference between the forecasts and actual gas supply varies between -7.6% to 11.5%.

For existing projects, historical production data has informed capacity utilisation and operational behaviour, further refining each year's forecast. Improvements have been made in recent GSOO's so that forecasts are informed by historical production data available at the time.

For committed, probable and proposed projects, latest announcements along with FIR data are used to inform forecast assumptions each year. Delays and changes in this information can result in varying forecasts in each GSOO related to new projects.

Table 31 Reconciliation of previous WA GSOO domestic gas supply forecasts (% deviance of forecast from actual)^A, 2022 to 2024^B

	2022	2023	2024 ^B	Average absolute % deviance
December 2021 GSOO forecast deviance (%)	11.3	11.5	0.4	7.7
December 2022 GSOO forecast deviance (%)		0.4	-7.6	4.0
December 2023 GSOO forecast deviance (%)			-5.5	5.5

A. Percentage difference is calculated as (forecast supply – actual supply)/actual supply. A negative figure denotes an under-forecast while a positive figure denotes an over-forecast.

B. 2024 uses data from 1 January 2024 to 31 October 2024.

A4.4 Western Australian gas pipeline and storage network modelling

Gas pipeline and storage network adequacy modelling in the 2024 WA GSOO was conducted using a time-sequential energy supply model developed by AEMO to simulate the daily supply and demand balance of the Western Australian gas system, including gas production, storage, transportation (via gas pipelines) and end-use consumption.

The Western Australian gas system is modelled as a simplified network of nodes connected by gas pipelines, with gas injection or withdrawal at each node by producers, storage and consumers (both SWIS GPG and domestic consumers [excluding SWIS GPG]). The modelling is performed time-sequentially over the complete study horizon (for example, 10 years) at a daily resolution.

The model uses linear programming techniques to schedule daily production, net storage withdrawals and pipeline line pack to satisfy gas demand at each node, subject to constraints such as:

- The capacity of the pipelines to deliver gas to consumers, including line pack requirements.
- The capacity of gas producers to deliver sufficient gas into the pipeline network.
- The capacity of storage facilities to store excess gas and later inject gas when it is needed.
- Annual production limitations from each gas producer.

Gas production or transportation costs are not considered in the model. The model does not explicitly model supply contracts, pipeline gas transportation agreements, or intra-day flows of gas.

The analysis takes into account the probabilistic nature of gas demand and production outages by incorporating multiple daily gas demand reference years (based on historical demand) and randomly generated production outages (with parameters based on historical outage statistics). The probabilistic model parameters are described in Table 32.

Table 32 Probabilistic model parameters

Model Parameter	Description
Study horizon	10 years from 1 January 2025 to 31 December 2034.
Gas demand profiles	Total annual gas demand forecasts are based on the <i>Step Change</i> scenario. Daily gas demand profiles at each node are modelled at a daily resolution based on reference years that are uniformly scaled such that the annual gas demand is equal to the forecast demand.
Demand reference years	Different reference years exhibit different levels of daily variability based on the specific conditions that materialised in those reference years. Historical references years 2019-20, 2020-21 and 2021-22 are used in this analysis.
Random production outages	For each reference year, 10 Monte Carlo production outage iterations are modelled to simulate the impacts of unplanned outages on the capability of the system to supply gas to consumers.

The outputs from the model include the gas produced by each producer, pipeline flows, storage levels and any unserved gas to consumers.

The model provides high-level insights on the adequacy of Western Australia’s pipeline and storage network to supply gas to end consumers over the forecast study horizon, but has the following limitations:

- The physics of the gas transport system are not captured. For example, compressor stations and the transport lag for gas to flow through pipelines are ignored in the model.
- Demand curtailment decisions in the event of gas supply shortfalls are simplified in the model (based on relative shortfall penalties). However, in practice, curtailment decision making is contextual, collaborative and follows an informal escalation process that is not captured by the model.

A5. SWIS GPG forecasts

The section provides detailed outcomes from the SWIS GPG forecasts prepared by EY.

Figure 38 to Figure 40 show the WEM annual generation mix and Figure 41 to Figure 43 show the WEM annual capacity for the three scenarios. Figure 44 shows annual combustion emissions in the WEM from SWIS GPG forecasts for the three scenarios.

Figure 38 WEM annual generation mix from SWIS GPG forecasts, *Progressive Change* scenario, 2025 to 2034 (TWh)

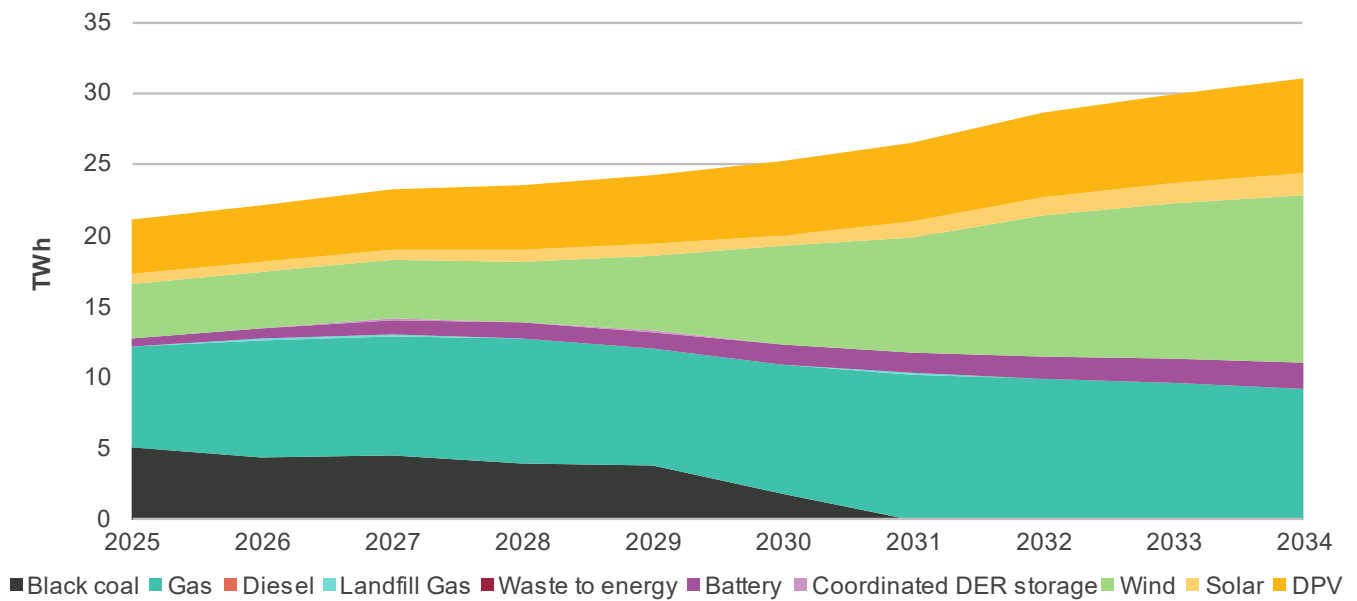


Figure 39 WEM annual generation mix from SWIS GPG forecasts, *Step Change* scenario, 2025 to 2034 (TWh)

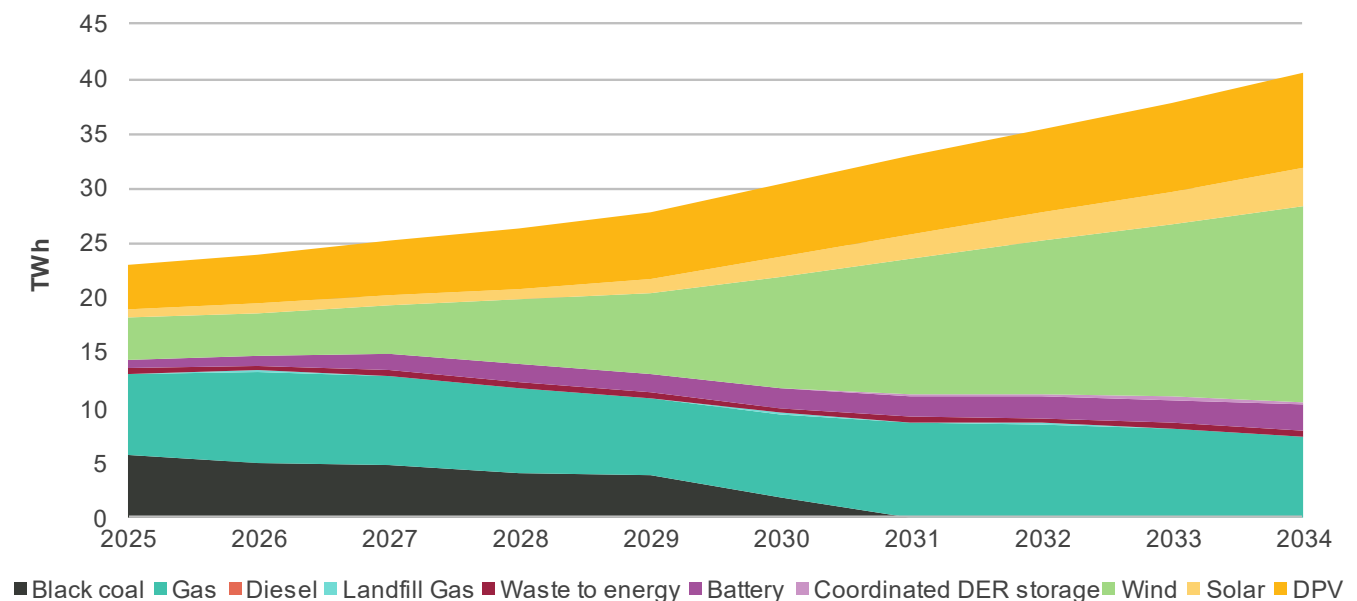


Figure 40 WEM annual generation mix from SWIS GPG forecasts, *Green Energy Exports* scenario, 2025 to 2034 (TWh)

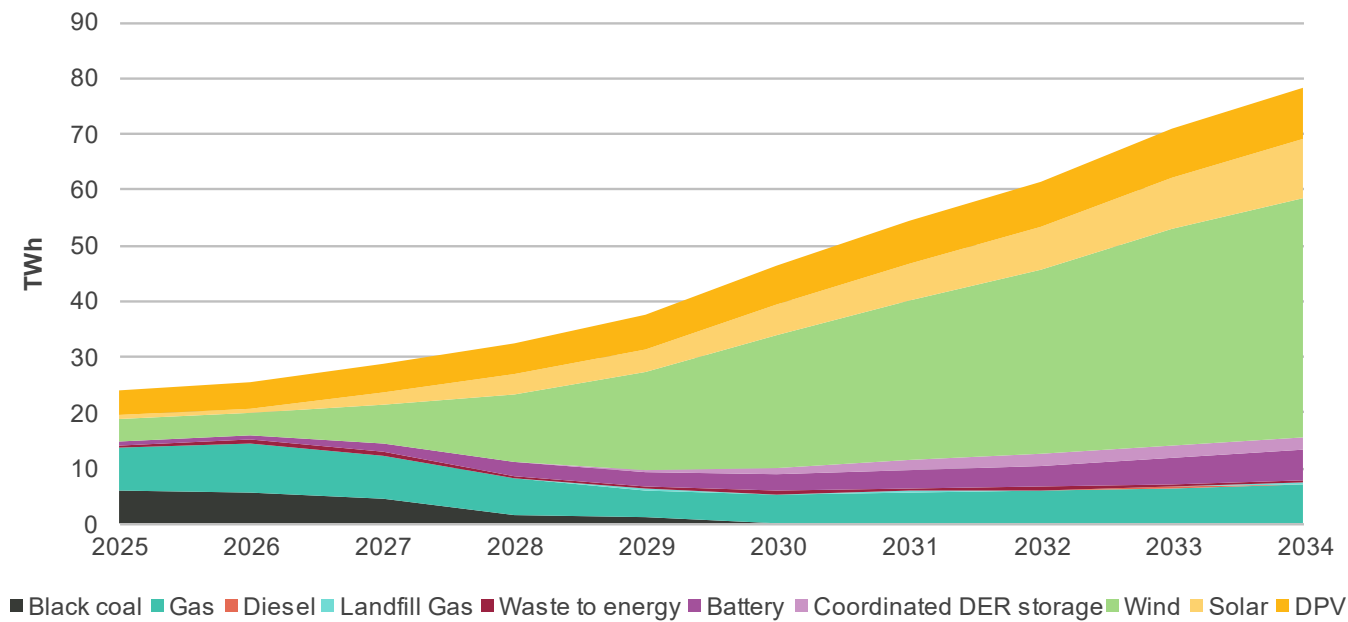


Figure 41 WEM annual capacity mix from SWIS GPG forecasts, *Progressive Change* scenario, 2025 to 2034 (GW)

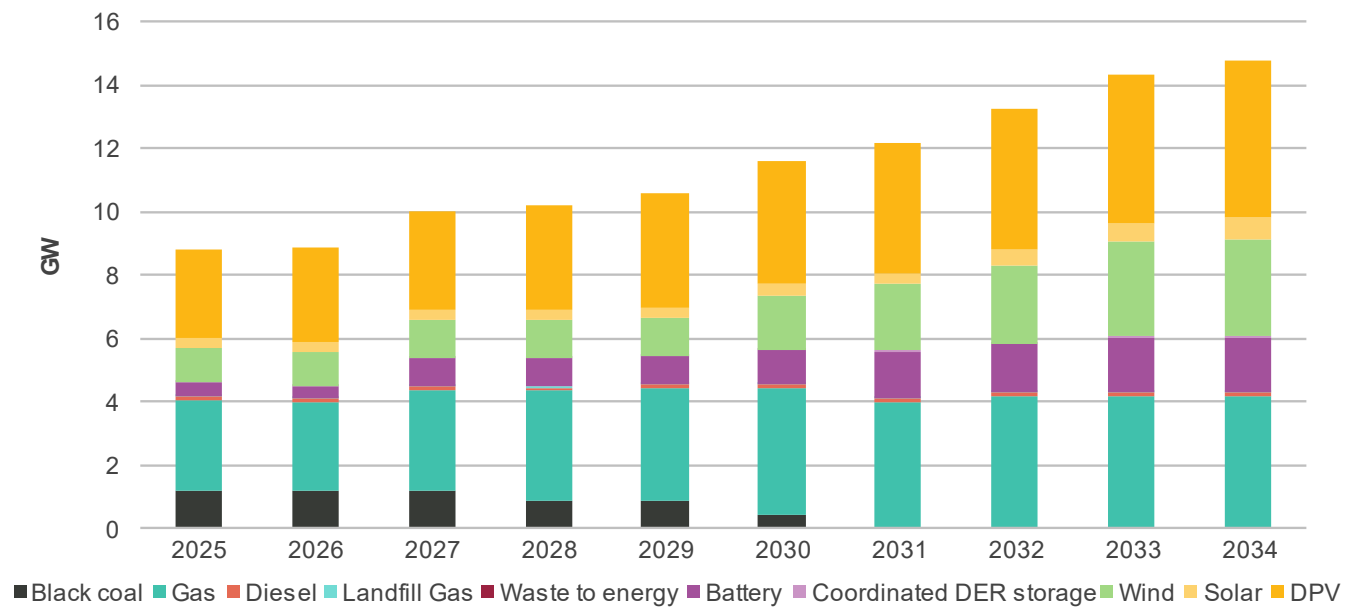




Figure 42 WEM annual capacity mix from SWIS GPG forecasts, Step Change scenario, 2025 to 2034 (GW)

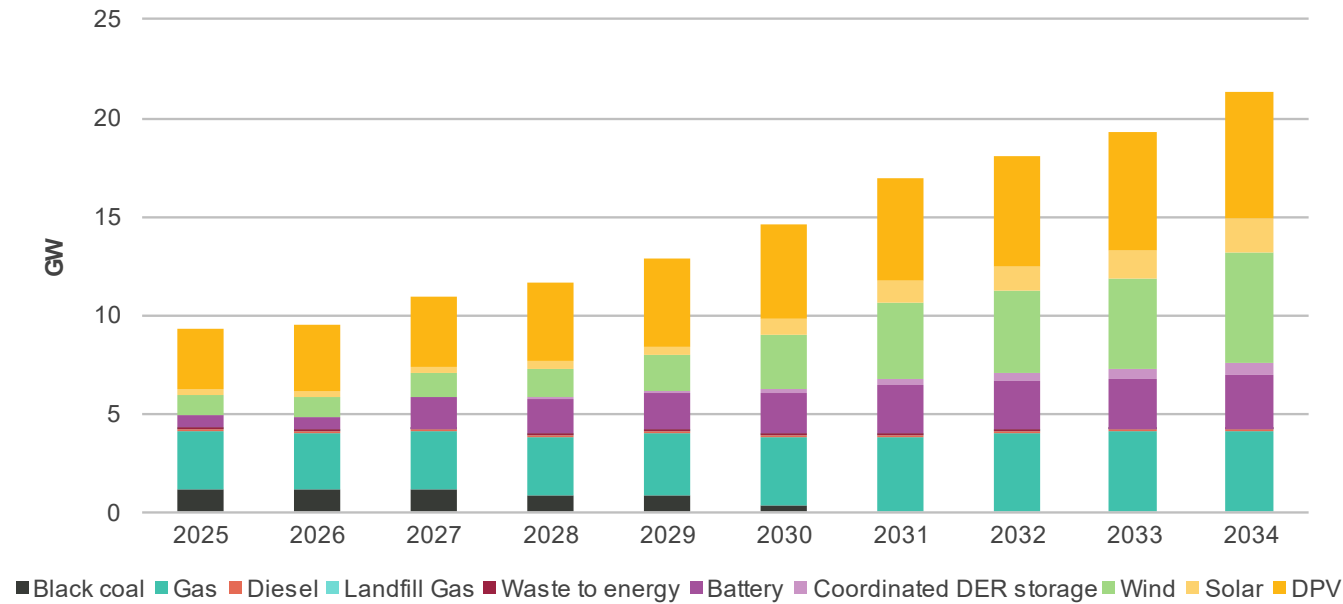


Figure 43 WEM annual capacity mix from SWIS GPG forecasts, Green Energy Exports scenario, 2025 to 2034 (GW)

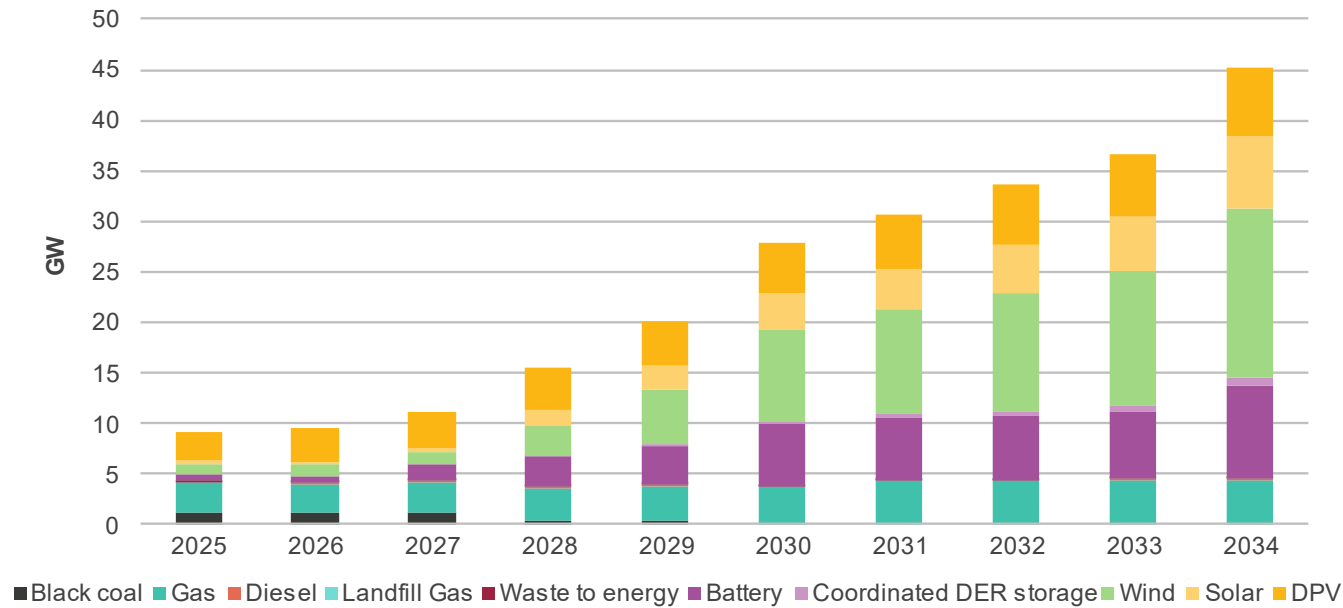
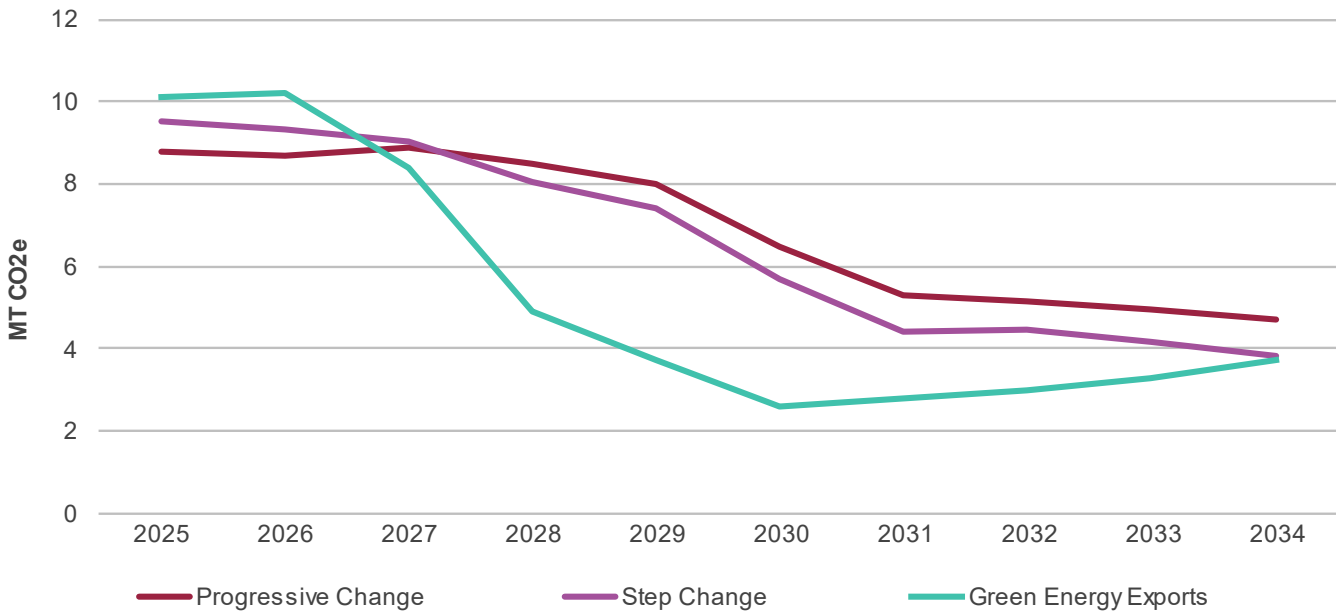


Figure 44 Annual combustion emissions in the WEM from SWIS GPG modelling, all scenarios, 2025 to 2034 (MT CO2e)



A6. Sensitivity analysis

If coal supplies to Bluewaters Power Station cannot be secured beyond October 2026, annual SWIS GPG gas consumption under the *Step Change* scenario may increase by up to 27 TJ/day until sufficient replacement VRE and transmission network is built.

There is uncertainty associated with the pressures facing coal-fired generators as the Western Australian economy decarbonises and the operational characteristics of power stations change.

Bluewaters Power Station is one of the largest coal-fired power stations in the SWIS, sourcing its coal supply primarily from the Griffin Coal mine which is under receivership. In December 2023, the Western Australian State Government announced financial support for continued operations at Griffin Coal mine to June 2026²²⁰. Furthermore, in May 2024 the Western Australian Government agreed to extend the term for Griffin's mining leases to June 2026.²²¹

AEMO has undertaken sensitivity analysis in this WA GSOO (Early Coal Closure sensitivity) to understand the impacts on gas supply adequacy if coal supplies to Bluewaters Power Station cannot be secured beyond October 2026.

Similar order of magnitude impacts on gas consumption could reasonably be expected if, instead, one of the other coal-fired generators closed earlier than expected, or was unavailable for an extended period of time due to extended coal supply disruption or catastrophic plant failure.

Under this Early Coal Closure sensitivity, annual SWIS GPG gas consumption may increase by up to 27 TJ/day until sufficient replacement VRE and transmission network is built. While forecasts indicate sufficient gas supply would remain to meet this increase in consumption in 2027, it would further add to the tightening of the domestic market balance in this period and widen the risk of supply gap identified in 2028.

Figure 45 presents outcomes from the SWIS GPG forecasts prepared by EY with this Early Coal Closure sensitivity, showing annual SWIS GPG gas consumption is projected to increase until sufficient replacement VRE and enabling transmission network is built.

Figure 46 presents the forecast Western Australian domestic gas supply adequacy in the *Step Change* scenario, compared to the Bluewaters Power Station early retirement sensitivity. This sensitivity shows highest impact in 2026 to 2027 with increase in gas consumption of 27 TJ/day in 2027 and 23 TJ/day in 2028. This leads to a reduction of the projected supply surplus in 2027 from 54 TJ/day to 26 TJ/day and an increase in the projected supply gap in 2028 from 162 TJ/day to 185 TJ/day. Negligible difference to the *Step Change* scenario forecasts is expected for this sensitivity towards the end of the outlook period because all coal-fired generation is assumed to have retired by October 2030.

²²⁰ On 1 December 2023, the Western Australian Government announced financial support for Griffin Coal (which supplies Bluewaters Power Station) to June 2026. For the purposes of this sensitivity analysis, AEMO has assumed an early retirement of October 2026 rather than partway through the 2025-26 Capacity Year. See <https://www.wa.gov.au/government/media-statements/Cook-Labor-Government/Funding-delivers-certainty-for-Collie-WA-electricity-and-workers-20231201> and <https://www.abc.net.au/news/2023-12-01/griffin-coal-mine-set-to-have-wa-government-lifeline-extended/103175824>.

²²¹ See Schedule 3 of the *Collie Coal (Griffin) Agreement Act 1979* (WA), at [https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_47736.pdf/\\$FILE/Collie%20Coal%20\(Griffin\)%20Agreement%20Act%201979%20-%20%5B01-e0-00%5D.pdf?OpenElement](https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_47736.pdf/$FILE/Collie%20Coal%20(Griffin)%20Agreement%20Act%201979%20-%20%5B01-e0-00%5D.pdf?OpenElement).

Figure 45 Forecast gas consumption, SWIS GPG, Bluewaters Power Station early retirement sensitivity, *Step Change* scenario, 2025 to 2034 (TJ/day)

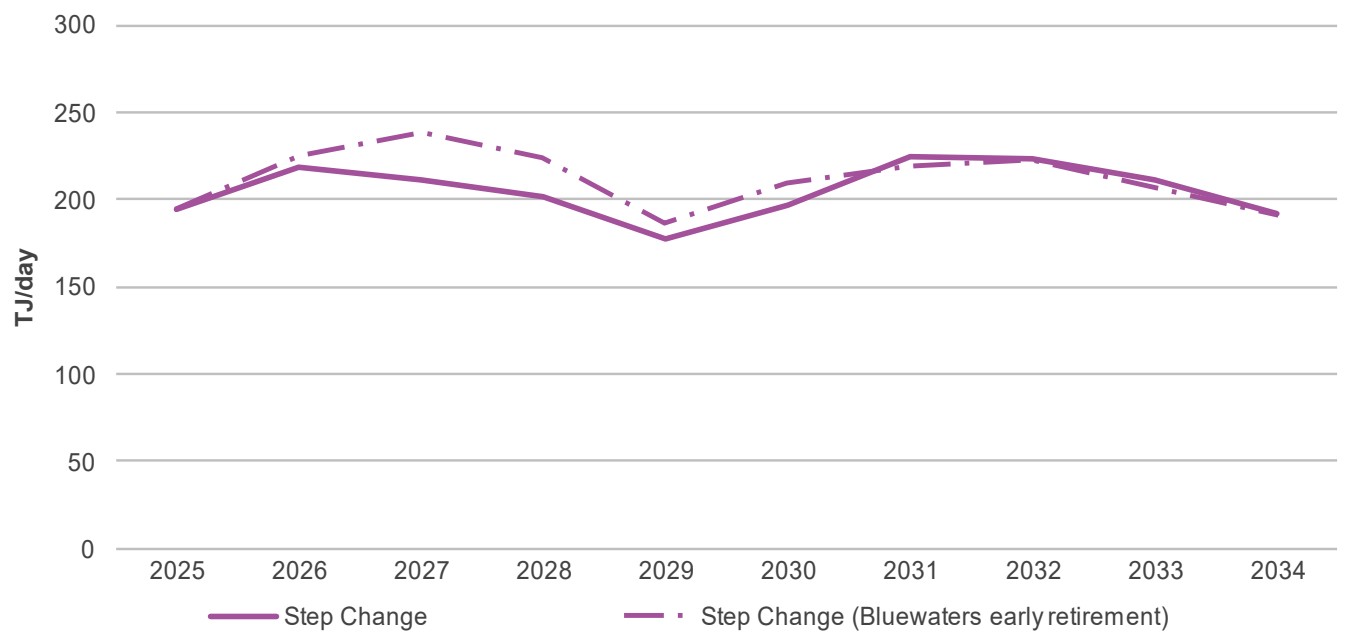
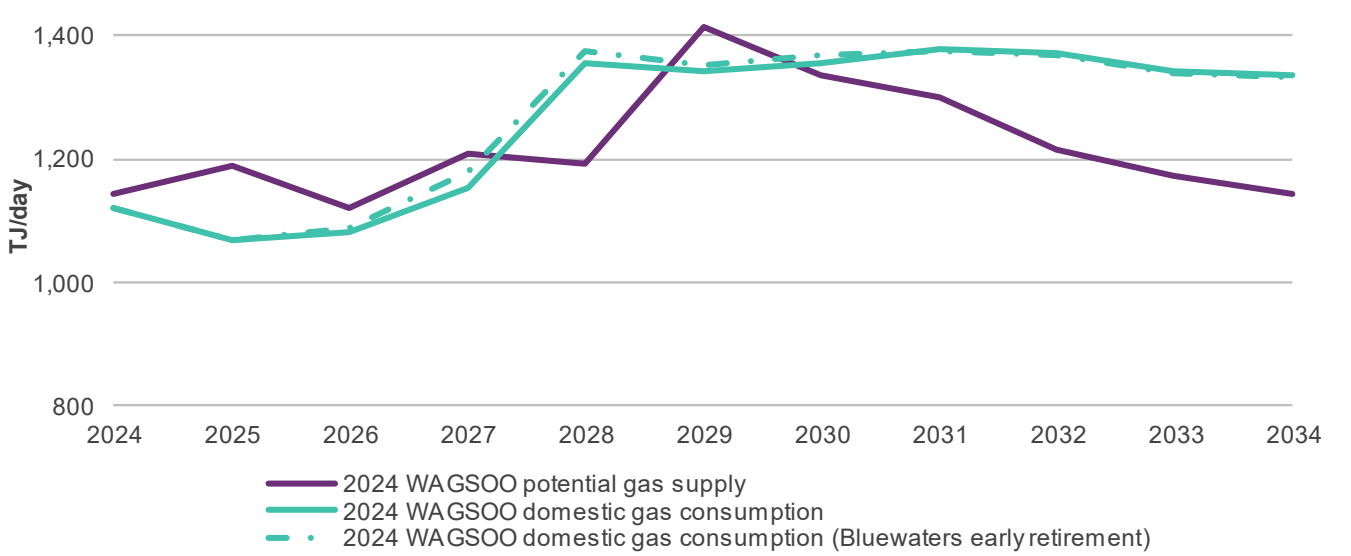


Figure 46 Forecast domestic gas supply adequacy, *Step Change* scenario, compared to Bluewaters Power Station early retirement sensitivity, 2024 to 2034 (TJ/day)



A7. Total gas consumption forecasts

Table 33 Domestic gas consumption forecasts, 2025 to 2034 (PJ/year)

Year	Progressive Change	Step Change	Green Energy Exports
2025	377	390	398
2026	378	395	411
2027	376	421	430
2028	388	496	499
2029	402	490	486
2030	406	495	472
2031	422	503	477
2032	421	502	470
2033	411	490	471
2034	410	487	482

Table 34 LNG feedstock forecasts, 2025 to 2034 (PJ/year)

Year	Progressive Change	Step Change	Green Energy Exports
2025	2,773	2,773	2,773
2026	2,650	2,650	2,651
2027	2,838	2,843	2,843
2028	2,689	2,694	2,699
2029	2,487	2,497	2,498
2030	2,385	2,396	2,396
2031	2,301	2,301	2,301
2032	2,232	2,232	2,232
2033	2,145	2,145	2,145
2034	1,960	1,960	1,960

Table 35 LNG processing forecasts (8% of feedstock), 2025 to 2034 (PJ/year)

Year	Progressive Change	Step Change	Green Energy Exports
2025	222	222	222
2026	212	212	212
2027	227	227	227
2028	215	216	216
2029	199	200	200
2030	191	192	192
2031	184	184	184
2032	179	179	179

Year	Progressive Change	Step Change	Green Energy Exports
2033	172	172	172
2034	157	157	157

Table 36 Total gas consumption forecasts, 2025 to 2034 (PJ/year)

Year	Progressive Change	Step Change	Green Energy Exports
2025	3,372	3,385	3,394
2026	3,240	3,257	3,275
2027	3,441	3,491	3,501
2028	3,292	3,405	3,414
2029	3,087	3,187	3,184
2030	2,981	3,083	3,060
2031	2,907	2,988	2,963
2032	2,831	2,912	2,880
2033	2,728	2,807	2,788
2034	2,528	2,605	2,599

A8. Sector classifications

Table 37 Classification of gas consumers into sectors (GBB delivery points)

Sector	Gas consumers		
Minerals processing	<ul style="list-style-type: none"> Alcoa Kwinana Alcoa Pinjarra^A Alcoa Wagerup 	<ul style="list-style-type: none"> Beyondie BHP Kwinana nickel refinery BP Refinery Hismelt Kwinana 	<ul style="list-style-type: none"> Tiwest Chandala Tiwest Kwinana Worsley alumina^B
Mining	<ul style="list-style-type: none"> Agnew Birla Nifty Boonamichi Well Camel Soak Chichester (Diesel to gas) Cosmos Granny Smith goldmine Gruyere goldmine^C Gwalia Hill 60^C Iron Bridge magnetite project Jaguar 	<ul style="list-style-type: none"> Karlawinda mine Leinster Mount Keith power station Mt Morgans Murrin Newman power station Paraburdoo power station Parkeston power station Pinga Creek Meter Station Plutonic Robe River Saracen Savory Creek 	<ul style="list-style-type: none"> Sino Iron project power station Solomon power station Southern System Power Station Sunrise Dam Tarmoola Meter Telfer gold mine Tropicana Wellesley MS Wiluna Gold Wiluna Jundee Yarnima power station Yurrali Maya power station
Industrial	<ul style="list-style-type: none"> Australian Gold Reagents Cockburn Cement CSBP ammonia Fero industries 	<ul style="list-style-type: none"> Maitland LNG Plant Mid-west LNG hub ROC Oil Rocla 	<ul style="list-style-type: none"> Tip Top Canning Vale Wesfarmers^D Whiteman Brick Yara fertilisers
SWIS GPG	<ul style="list-style-type: none"> Kemerton power station Kwinana power station Mungarra power station 	<ul style="list-style-type: none"> NewGen Kwinana & Cockburn power station NewGen Neerabup power station Perth Energy Kwinana 	<ul style="list-style-type: none"> Pinjar power station Pinjarra power station Wagerup power station Tiwest cogeneration
Non-SWIS GPG	<ul style="list-style-type: none"> Carnarvon power station Exmouth power station 	<ul style="list-style-type: none"> Karratha power station Onslow power station 	<ul style="list-style-type: none"> Port Hedland power station South Hedland power station

A. Includes one delivery point on the DBP and one on the Parmelia pipeline.

B. Includes two delivery points on the DBP.

C. Includes the mine site and power station (two delivery points).

D. Including Wesfarmers gas and LNG facilities.

A9. Western Australian gas infrastructure

Western Australian gas infrastructure includes multi-user gas storage facilities, domestic gas transmission pipelines, and LNG export production facilities. Information on multi-user gas storage facilities and domestic gas production facilities is included in Chapter 3 and Appendix Section A4.3.

A9.1 Gas transmission pipelines

Western Australia’s gas transmission network is shown in Figure 47.

Figure 47 Gas transmission pipelines in Western Australia



Source: WA GBB and AEMC.

A9.2 LNG export production facilities

Western Australia's LNG nameplate production capacity totals 46.3 million tonnes per annum (Mtpa) and consists of four production facilities:

- NWS (KGP) – 16.9 Mtpa²²².
- Pluto – 4.9 Mtpa²²³.
- Gorgon – 15.6 Mtpa²²⁴.
- Wheatstone – 8.9 Mtpa²²⁵.

All the LNG projects in Western Australia have historically used only equity gas – that is where the ownership of gas does not change from wellhead to export. However, in March 2022, third-party use of the NWS liquefaction facility began.

On 31 March 2022, Woodside announced that the Pluto joint venture had begun piping gas into the KGP, via the Pluto-KGP Interconnector²²⁶. Approximately 2.5 million tonnes of LNG were planned to be produced from Pluto gas piped into the KGP facilities between 2022 and 2025. This had an associated 20.5 PJ of Pluto gas to also be supplied into the domestic market via the KGP in the same period, which commenced in April 2022²²⁷. In April 2024, approvals were made for Woodside to extend Pluto gas flows through the Pluto-KGP Interconnector, supporting 4.1 million tonnes of LNG to be produced to end-2025. This has an updated associated domestic gas commitment of 49.2 PJ²²⁸.

On 6 June 2023, Gorgon joint venture partners announced the start-up of production from Gorgon Stage two, connecting 11 additional wells in the Gorgon and Jansz-Io fields, accompanying offshore production pipelines and subsea infrastructure to support gas processing facilities on Barrow Island²²⁹.

Additionally, the Waitsia joint venture has been given permission to export 7.5 million tonnes of LNG (416 PJ) from its stage two reserves via the NWS infrastructure²³⁰. This export deal will be the first time onshore gas has been exported as LNG, and the first time gas will be supplied into the southern end of the DBNGP, but where the customer is at the northern end. The forecast additional supply and demand created by Waitsia LNG export is shown in Figure 48.

AEMO excluded the Waitsia export volumes from the 2024 WA GSOO domestic supply adequacy projections until 2029, as it is not considered available for true domestic consumption. However, the produced gas will be recorded on the GBB and will flow through Western Australian infrastructure.

²²² See <https://www.woodside.com/what-we-do/operations/north-west-shelf>.

²²³ See <https://www.woodside.com/what-we-do/australian-operations/pluto-lng>.

²²⁴ See <https://australia.chevron.com/our-businesses/gorgon-project>.

²²⁵ See <https://www.woodside.com/what-we-do/australian-operations/wheatstone-project>.

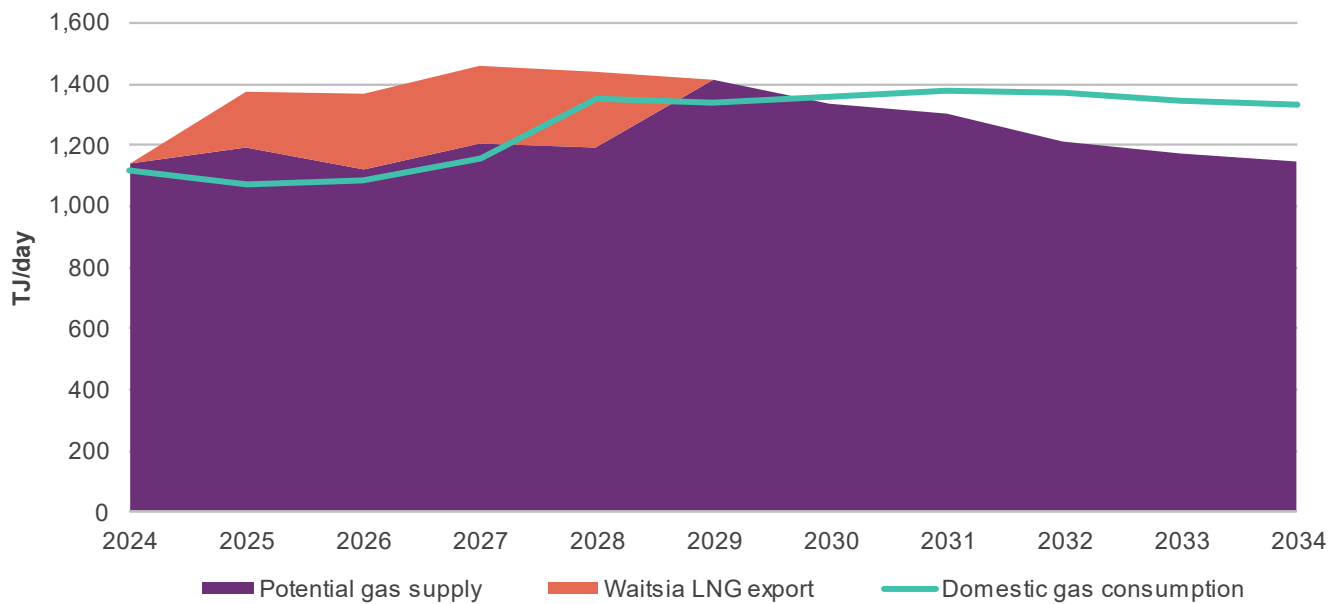
²²⁶ See <https://www.woodside.com/docs/default-source/asx-announcements/2022/processing-of-pluto-gas-starts-at-north-west-shelf.pdf>.

²²⁷ See <https://www.wa.gov.au/government/publications/implementation-of-the-wa-domestic-gas-policy>.

²²⁸ See <https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-gas-domestic-statement-sep-2024>.

²²⁹ See <https://australia.chevron.com/news/2023/gorgon-stage-two-starts-production-supporting-long-term-energy-supply>.

²³⁰ See <https://www.wa.gov.au/government/media-statements/McGowan%20Labor%20Government/WA-Government-reaches-agreement-on-job-creating-domestic-gas-project-20201224>.

Figure 48 Domestic gas consumption and potential gas supply plus Waitsia-to-KGP LNG export gas, 2024 to 2034 (TJ/day)

Two additional facilities source gas from Commonwealth waters off the north-west coast of Western Australia, but the liquefaction either occurs offshore or in the Northern Territory and, therefore, they do not contribute to Western Australia's overall LNG production capacity:

- Prelude Floating Liquefied Natural Gas (FLNG) – a 3.6 Mtpa²³¹ floating LNG facility operated by Shell, which exports directly from the offshore facility.
- Ichthys LNG – a 8.9 Mtpa²³² LNG project operated by INPEX Corporation, which has an onshore liquefaction plant located in Darwin.

²³¹ See <https://www.shell.com.au/media/2019-media-releases/first-lng-cargo-shipped-from-prelude-flng.html>.

²³² See <https://www.inpex.com.au/projects/ichthys-lng/> and <https://www.inpex.co.jp/english/ichthys/>.

A10. Conversion factors

The following conversion factors have been applied in preparing figures for all this 2024 WA GSOO.

Conversion factors

From	To						
	Billion cubic meters NG	Billion cubic feet NG	Million tonnes of oil equivalent	Million tonnes LNG	Trillion British thermal units	Million barrels of oil equivalent	Petajoule
	Multiply by						
Billion cubic meters NG	1	35.3	0.9	0.74	35.7	6.6	37.45
Billion cubic feet NG	0.028	1	0.025	0.0216	1.01	0.19	1.06
Million tonnes of oil equivalent	1.11	39.2	1	0.82	39.7	7.33	-
Million tonnes LNG	1.36	48	1.22	1	48.6	8.97	55.43
Trillion British thermal units	0.028	0.99	0.025	0.021	1	0.18	1.06
Million barrels of oil equivalent	0.15	5.35	0.14	0.11	5.41	1	5.82
Petajoule	0.027	0.943	-	0.018	0.943	0.172	1

Glossary, measures, and abbreviations

This document uses terms that have meanings defined in the GSI Rules. The GSI meanings are adopted unless otherwise specified. Additional terms used in this document have the following meanings:

Glossary

Term	Definition
1P	A measure of gas reserves that includes proven (developed and undeveloped) reserves.
2C	A measure of gas resources that are considered less commercially viable than reserves. 2C resources are considered the best estimate of sub-commercial reserves.
2P	A measure of gas reserves that includes proven (developed and undeveloped) and probable reserves.
Backfill	Connecting additional gas fields or reserves to an existing domestic gas production facility, instead of building new processing infrastructure (sometimes referred to as a tie-back).
Committed projects	Gas supply or consumption projects that are under construction or have obtained all necessary approvals with a positive Final Investment Decision (FID) to be implementation ready to commence or already underway.
Domestic gas consumption	The ongoing trend of consumption across and between years. Includes all major industrial and commercial loads, electricity generators, and small-use customers connected to Western Australia's gas transmission and distribution networks.
Distribution network	The low-pressure networks operated by ATCO and used to supply residential and non-residential customers in the Perth metropolitan area and regional centres of Albany, Bunbury, Geraldton, and Kalgoorlie.
Domestic gas demand	The gas demand required at any one time. Includes all major industrial and commercial loads, electricity generators, and small-use customers connected to Western Australia's gas transmission and distribution networks.
Existing projects	Gas supply and gas consumption projects that are already operating.
Formal Information Request	In line with the Gas Services Information (GSI) Rules, AEMO conducts a confidential Formal Information Request (FIR) process to collect data and information from GMPs for the purposes of the WA GSOO.
Large customers	Gas customers using 10 TJ/day or more (GBB Large Users).
Line pack	The pressurised volume of gas stored in the pipeline system. Line pack is essential for gas transportation through the pipeline network each day, and as a buffer for within-day balancing.
LNG feedstock	Natural gas that enters an LNG production train for removal of impurities and liquefaction.
New projects	New projects are those projects or upgrades not currently online. This includes committed, probable and proposed projects.
Potential gas supply	Instead of forecasting how much gas is expected to be supplied over the outlook period, AEMO's forecasts of potential gas supply reflect how much gas could be produced if there was market demand for it at the forecast price. This approach is useful in assessing supply adequacy and identifying potential supply shortfalls.
Probable projects	The Probable projects are those which have not taken positive FID but are assumed to come online based on modelling criteria (detailed in Section 1.3.2). Probable gas supply sources have been included in both the <i>Step Change</i> and <i>Green Energy Exports</i> scenarios. Probable gas consumption projects are only included in the <i>Green Energy Exports</i> scenario and must meet set criteria (described in Appendix Section A4.2). These include gas consumption projects that may switch from diesel to gas electricity generation.
Proposed projects	Proposed projects are those undeveloped gas field and production projects that are at earlier stages of development or face challenges in terms of commercial viability or approval. These projects are too speculative and thereby not included in the scenarios for potential gas supply model.
Ramping requirements	The difference between minimum and peak demand in the SWIS is widening with increasing uptake of behind the meter PV and large-scale solar. This, combined with increased intermittent wind generation, requires generation (usually using gas) that is capable of rapidly increasing output ("ramping") over a short period of time to meet evening peak demand.
Total gas consumption	Domestic gas consumption plus an estimate of the gas required to produce LNG for export, reflecting an overall assessment of the demand for natural gas in Western Australia.

Term	Definition
Transmission network	The high-pressure pipelines used to transport large volumes of gas from the production facilities to customers. Large customers can connect directly to the transmission network, while smaller customers are supplied through the distribution network connected to the transmission network.
Western Australian Gas Bulletin Board (WA GBB)	A public website (gbb.aemo.com.au), formally established in 2013 under Western Australia's Gas Services Information (GSI) Rules and managed by AEMO, that provides information of forecast and historical data on the domestic production, transmission, storage, and usage of natural gas in Western Australia.

Units of measure

Abbreviation	Unit of measure
A\$	Australian dollar
GJ	gigajoule/s
GW	gigawatt/s
Mtpa	million tonnes per annum
MW	megawatt/s
MWh	megawatt hour/s
PJ	petajoule/s
Q	quarter
tcf	trillion cubic feet
TJ	terajoule/s
TJ/day	terajoules per day
TWh	terawatt hour/s

Abbreviations

Abbreviation	Expanded name
1P	proved reserves
2C	contingent resources
2P	proved and probable reserves
AAGR	average annual growth rate
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
CDD	cooling degree day/s
CEFA	Clean Energy Fuels Australia
CSBP	Cuming Smith British Petroleum and Farmers Limited
DBP	DBNGP (Western Australia) Transmission Pty Ltd
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DER	distributed energy resources
DEMIRS	Western Australia Department of Energy, Mines, Industry, Regulation, and Safety

Abbreviation	Expanded name
DMO	domestic market obligation
EDL	Energy Developments Limited
EPA	Environmental Protection Agency
ERA	Economic Regulation Authority
ESOO	Electricity Statement of Opportunities
FID	final investment decision
FIR	formal information request
FMG	Fortescue Metals Group
GBB	Gas Bulletin Board
GMP	Gas Market Participant
GPG	gas-powered generation
GSA	Gas Sale Agreement
GSI Rules	Gas Services Information Rules
GSOO	Gas Statement of Opportunities
HDD	heating degree day/s
JTSI	Western Australia Department of Jobs, Tourism, Science, and Innovation
KGP	Karratha Gas Plant
LNG	liquified natural gas
LPG	liquified petroleum gas
MCQ	Maximum contracted quantity
NIEIR	National Institute of Economic and Industry Research
NWIS	North West Interconnected System
NWS	North West Shelf
PPA	Power Purchase Agreement
PPI	Purchasing Power Index
PV	photovoltaic/s
SOP	Sulphate of potash
SPE	Society of Petroleum Engineers
SWIS	South West Interconnected System
VRE	variable renewable energy
WA	Western Australia
WEM	Wholesale Electricity Market

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