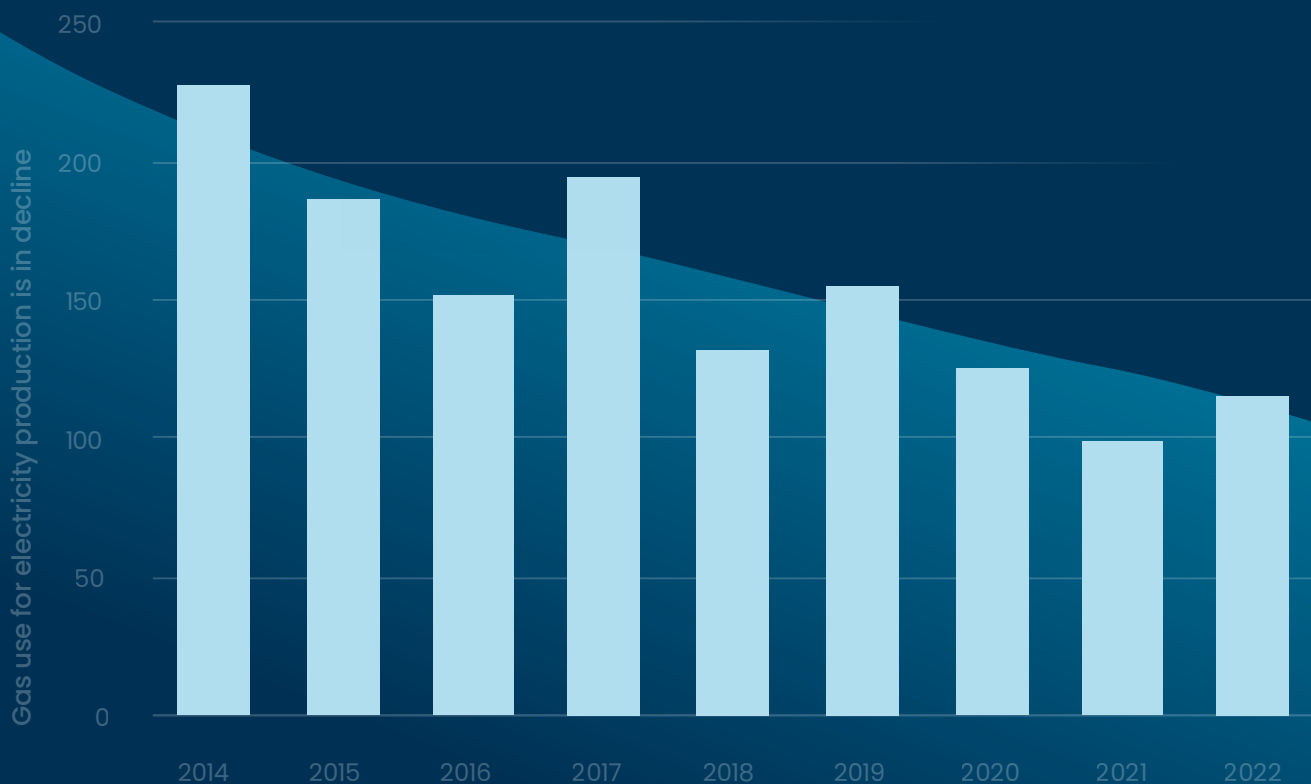


Small and getting smaller

The future of gas use for electricity in Australia





Foreword

Dealing with climate change is fundamental to the ALP's core mission of improving the lives of Australian workers and communities, particularly the most vulnerable.

The 2022 Climate Change bills were among the Albanese Labor Government's first pieces of legislation, acknowledging the need for urgent action.

Fundamental to the delivery of the ALP's ambitious and pragmatic policies is a need to understand the current and likely trajectory of the energy mix, supplies and sources.

The ALP National Platform, adopted in August 2023, says:

Labor recognises that gas and methane are powerful greenhouse gases and the gas industry must contribute its share of emissions reductions to achieve net zero emissions by 2050

An important part of securing meaningful emissions reductions from methane is the need to accelerate the removal of gas from our energy mix.

There is much commentary around a purported need for new gas to meet domestic supply. This is based on an assumption that domestic demand will continue on a growth trajectory, which this report demonstrates is highly unlikely.

This report by LEAN member and energy expert Tom Quinn details the current state of play and likely future scenario on the real likely role of gas for our energy needs in Australia.

We look forward to continuing to work constructively with you on formulating policy in this important area.



Felicity Wade
LEAN National Co-Convenor



This report was produced by Springmount Advisory for Solutions for Climate Australia and the Labor Environment Action Network, 2024.

Acronyms

AEMO	Australian Energy Market Operator
GPG	Gas use for power generation
GSOO	AEMO Gas Statement of Opportunities report
NEM	National Electricity Market
SWIS	South West Interconnected System

Sources

- AEMO GSOO 2023
- AEMO Draft ISP 2024
- AEMO QED Q3 2023
- Geoscience Australia, Gas reserves data
- OpenNEM
- ACCC Gas Inquiry December 2023

Introduction

The true role of gas for electricity generation is limited and diminishing. Based on current trends and future demand scenarios modeled by the Australian Energy Market Operator and others, Australia's need for gas-fired electricity generation as a 'transition fuel' in the shift from coal to renewable energy is exposed as falling sharply.

This is already playing out in practice, gas use for power generation (GPG) peaked in the National Electricity Market in 2014 and has been falling ever since, hitting a record low in Q4 2023. Western Australia has also seen a more gradual decline in the South West Interconnected System since GPG peaked in 2009.

Forecast scenarios on future gas demand conducted by the Australian Energy Market Operator have indicated that the gas use in our electricity system will continue to decline in all modelled scenarios and will likely be half current usage in 2042.

This report is designed to provide a clear and concise summary of the quantity of gas that will be required for electricity generation in Australia over coming years based on official guidance, and cut through misinformation by vested interests which is otherwise clouding the debate.

While there will be a role for existing gas peaking plants in the medium term to provide firming capacity at times, the emergence and maturation of new technologies such as long duration battery storage and alternative liquid fuel solutions that are capable of providing long duration storage and firming services, may see gas consumption fall even faster than current forecasts indicate.

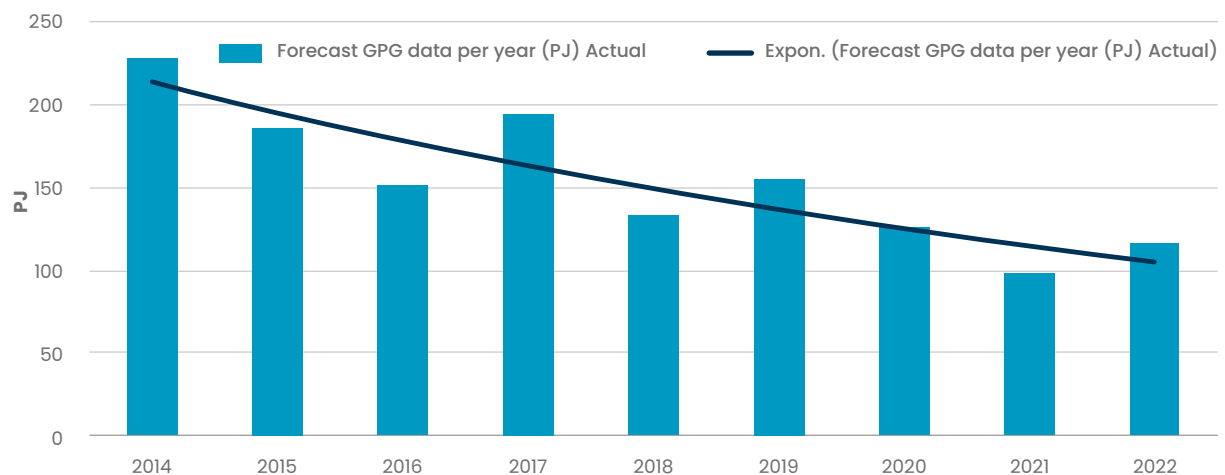


The role of gas is shrinking

Since 2014, the amount of gas used for electricity generation has shrunk in absolute terms at the national level as well as in relative terms in the National Electricity Market (NEM) and the South West Interconnected System (SWIS).

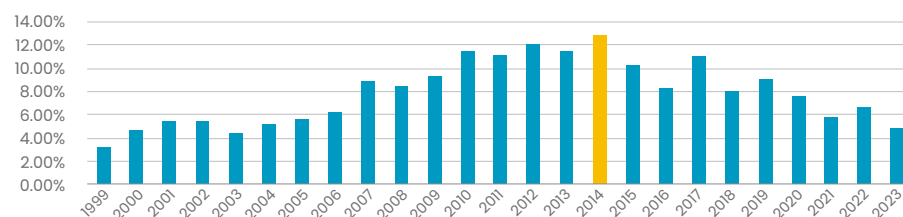
The quantity of gas used for electricity generation has halved from 228 PJ per annum in 2014, to 116 PJ per annum in 2022¹.

Gas use for electricity production is in decline



Source: AEMO - Gas Statement of Opportunities analysis

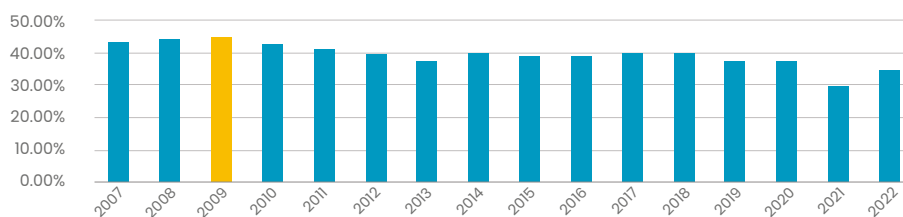
As a percentage of the energy mix, the drop has been even greater, with the share of gas generation in the NEM falling from a peak share of 12.8% in 2014, to 4.8% in 2023.



The generation share of gas in the NEM peaked in 2014

Source: OpenNEM

A smaller, but longer term decline is underway in the South West Interconnected System (SWIS) with gas generation peaking in 2009 and gradually declining since then.



The generation share of gas in the SWIS peaked in 2009

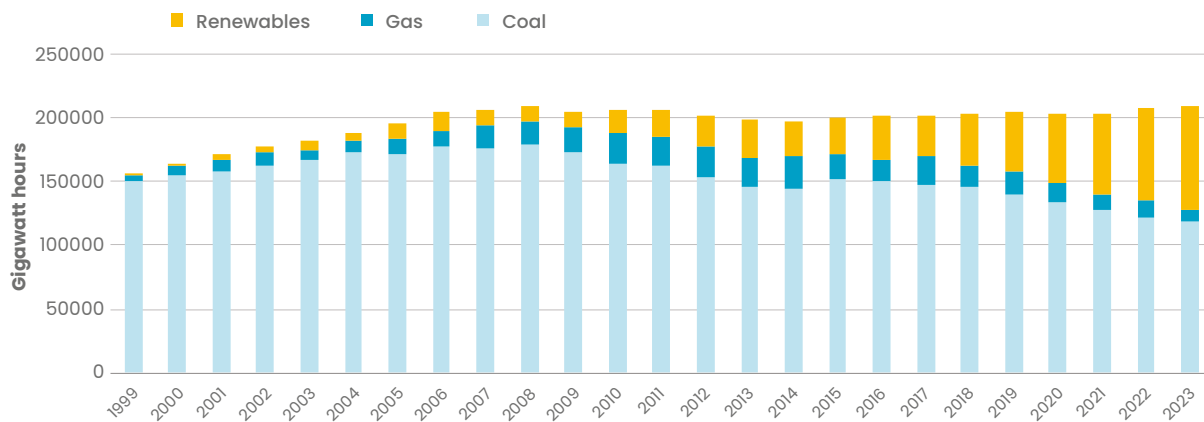
Source: OpenNEM

2. AEMO, Gas Statement of Opportunities (2023)

The 'transition fuel' furphy

The declining role of gas generation in the electricity system has occurred as the quantity of renewable energy generation in the National Electricity Market has surged. Renewable energy output for electricity has tripled between 2014 and 2023.

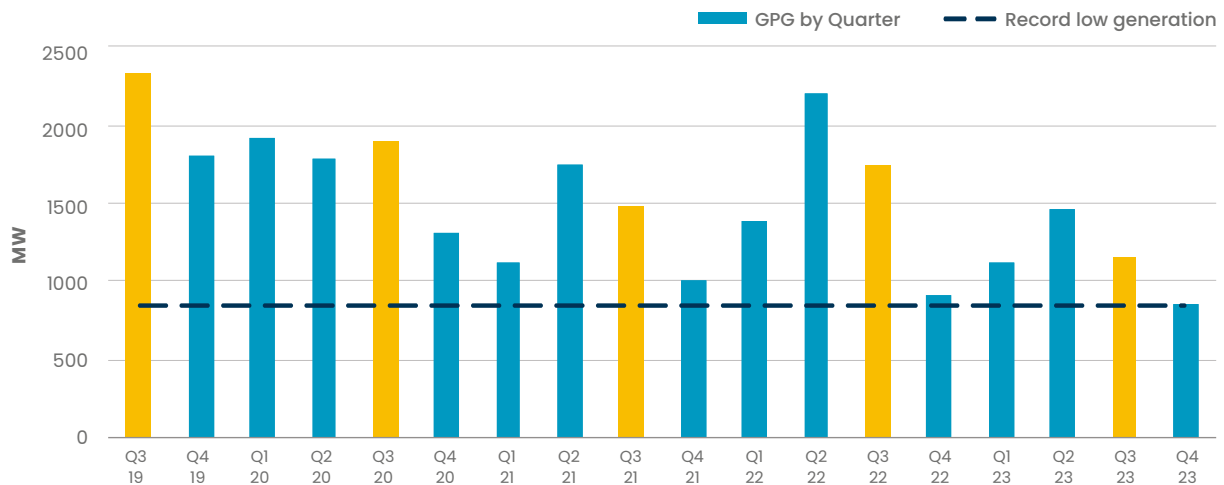
Proportion of electricity generation by source in the National Electricity Market



Source: OpenNEM

Rather than having a growing role as a transition fuel, the gas is actually being squeezed out of the energy mix. In fact, the latest data from AEMO's Quarterly Energy Dynamics report for the fourth quarter in 2023 shows gas-fired generation was the lowest on record for any quarter since the year 2000².

Gas-fired generation lowest on record since the year 2000



AEMO - Quarterly Energy Dynamics Q3 2023

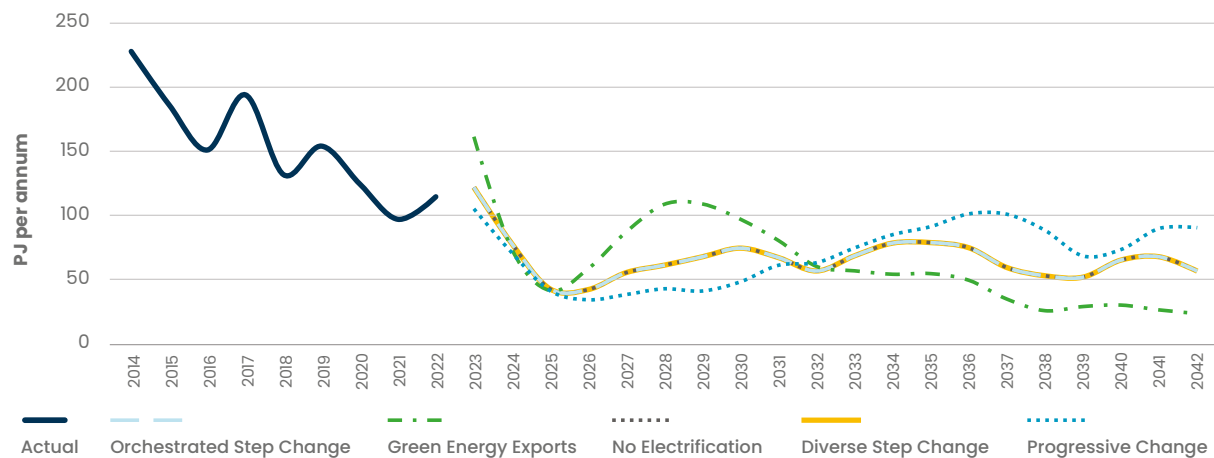
3. OpenNEM, accessed 21 January 2024

4. AEMO Quarterly Energy Dynamics Report Q3 2023

Gas use will continue to decline

The trend over the past decade is set to continue. AEMO’s authoritative Gas Statement of Opportunities 2023 report models a range of scenarios for future GPG demand, which all show the role of gas for electricity as small and getting smaller.

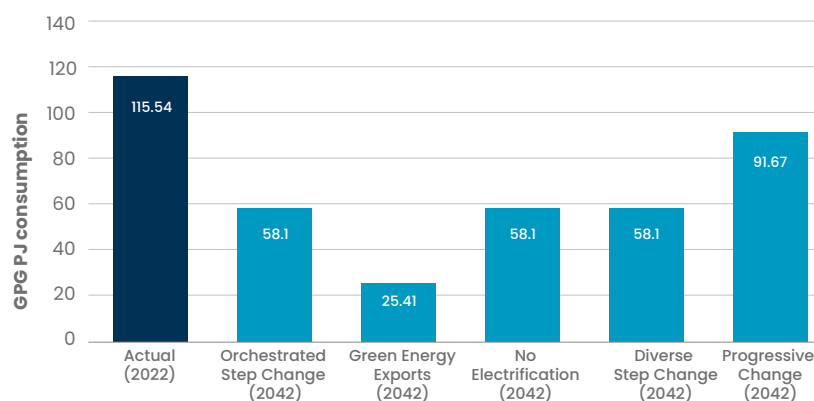
Small and getting smaller: AEMO annual gas generation current and future scenarios



Source: AEMO, Gas Statement of Opportunities (2023)

In every single scenario modeled, future gas use for energy generation is significantly lower than today by 2042, with particularly steep drops in generation expected by 2025.

Gas consumption for electricity generation falls under all AEMO scenarios



Source: AEMO, GSOO 2023 scenarios

Notably, annual updates to the Gas Statement of Opportunities (GSOO) have progressively revised down³ expected future GPG gas demand in the Orchestrated Step Change scenario and previous equivalents. This trend will likely continue in subsequent GSOO updates as battery storage increases.

Orchestrated Step Change (1.8°C) scenario: consumers are forecast to embrace opportunities to reduce emissions through electrification where technically and commercially practical, as well as investing in energy efficiency applications. This is seen as the most likely scenario.

Diverse Step Change (1.8°C) scenario: greatest action to decarbonise on the industrial gas sector and features a lower contribution from end-use consumers to the energy transformation with early development of biomethane resources and a slower fuel-switching to electricity trend.

Green Energy Exports (1.5°C) scenario: very strong decarbonisation activities domestically and globally to limit temperature increases to 1.5°C, resulting in rapid transformation of Australia’s energy sectors, particularly green hydrogen development.

The Orchestrated Step Change (1.8°C), No Electrification scenario: assumes electrification is halted and gas consumption would continue. This is identified by AEMO as a “highly implausible” scenario.

Progressive Change (2.6°C) scenario: anticipates slow economic growth and a challenging economic environment affecting energy consumers’ actions to decarbonise the economy, including the greatest industrial closure risks.

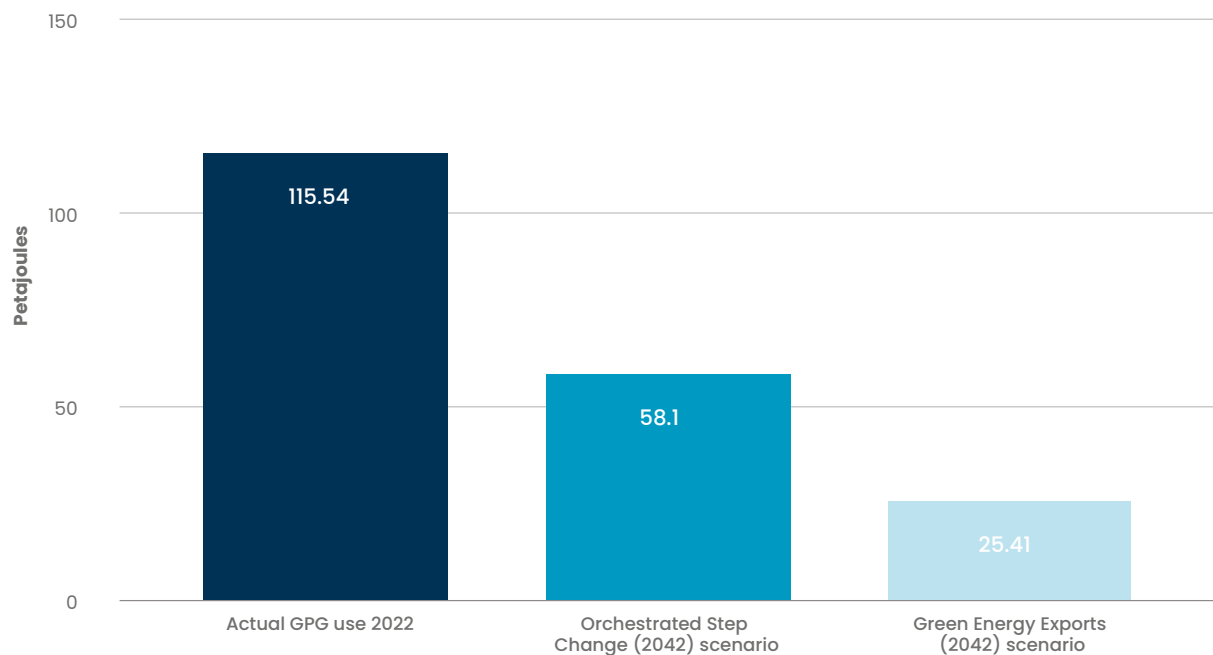
5. AEMO, Gas Statement of Opportunities 2023, Figure 18

Gas use for electricity to halve again

The 'Orchestrated Step Change' scenario models an energy transition that aligns with limiting global temperature rise to 1.8°C compared to pre-industrial levels. In this scenario gas usage for electricity generation will halve again by 2042, dropping from 115 PJ of gas consumption per annum, down to 58 PJ.

However, under the 'Green Energy Exports' scenario which aligns with 1.5°C and the federal aim to establish Australia as a Renewable Energy Superpower, the drop is even greater, with demand in 2042 forecast at only 25 PJ, a 78% reduction from today's levels.⁴

Gas consumption for electricity generation will halve over the next two decades



Source: AEMO, Gas Statement of Opportunities (2023)

6. AEMO, Gas Statement of Opportunities 2023

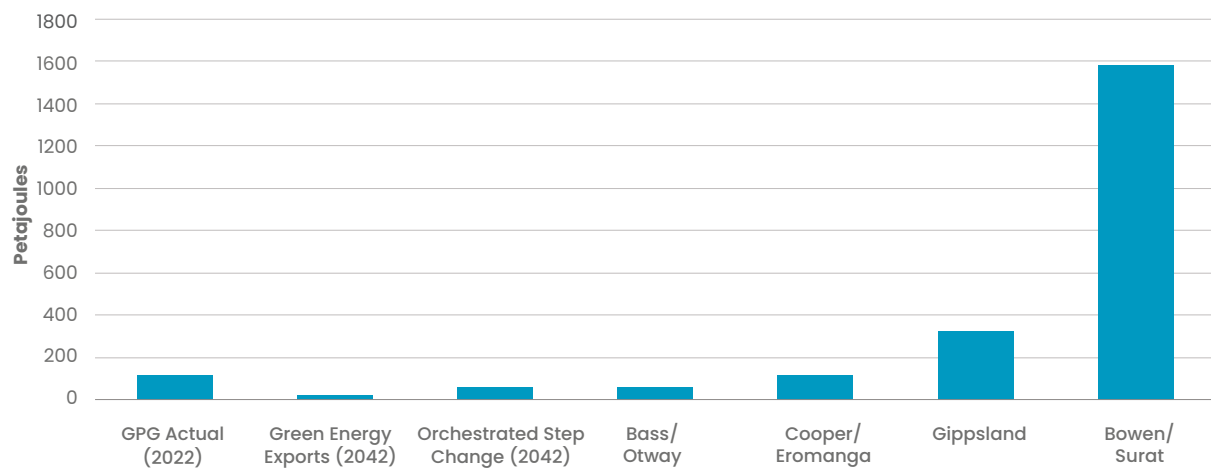
Looking forward

Existing gas reserves exceed gas generation needs

Australia's future gas needs for electricity generation are dwarfed by the volume of available gas produced by gas fields currently in production, including when major WA offshore basins like Northern Carnarvon/Roebuck – 3,403 PJ annual production, and the Bonaparte/Browsebasins – 671 PJ annual production⁵ are excluded.

The cumulative annual production from just the Bass/Otway, Cooper/Eromanga, Gippsland, and Bowen/Surat basins is 2,076 PJ – nearly 20 times greater than current GPG demand of 116 PJ⁶.

Gas required for electricity for the next 20 years only requires 4.2% of existing reserves



Source: Geoscience Australia. Australia's gas reserves data

While some basins are experiencing declining production, the volume of gas in existing fields combined with shrinking gas demand for electricity generation means current fields far exceed domestic demand.

While some basins are experiencing declining production, shrinking gas demand for electricity generation, means there is both sufficient flow of gas being extracted to meet current needs, as well as sufficient supplies left in the reserves to meet the next 20 years worth of gas-fired electricity demand.

AEMO's Gas Statement of Opportunities 2023 modeling shows annual GPG gas demand out to 2042. Under the Orchestrated Step Change scenario, total GPG gas demand over the next 20 years is expected to equal 1351 PJ.

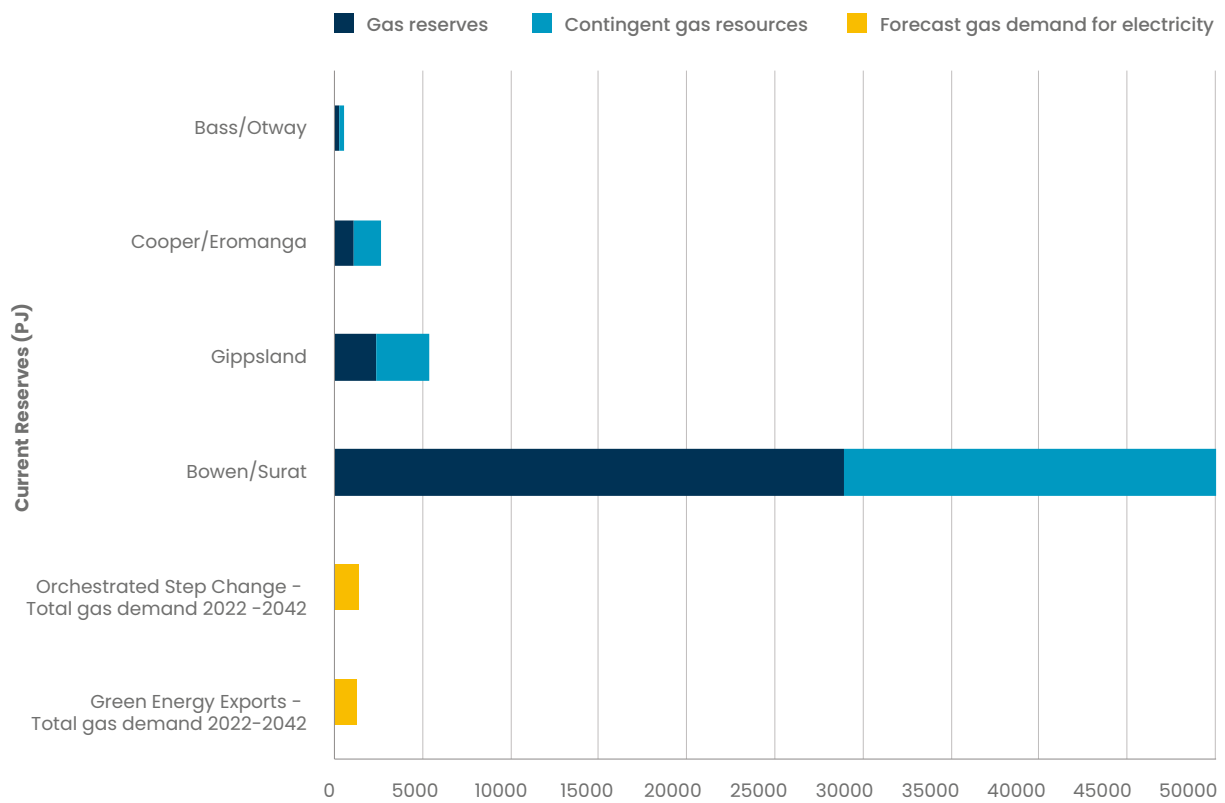
The basins listed above have a cumulative total of 32,576 PJ of remaining reserves and an additional 26,105 PJ of contingent gas resources remaining.

Future GPG gas demand for the next 20 years only requires 4.2% of existing reserves, or just 2.3% of the total reserves and contingent resources.

There is no justification for new gas developments for Australia's electricity needs.

7. <https://www.ga.gov.au/digital-publication/aecr2022/gas#references-for-onshore-reserves-contingent-resources-and-production-data-section>
8. AEMO, GSOO 2023 data

Existing basin gas reserves compared to total gas demand in GSOO GPG scenarios



Source: Geoscience Australia

Less gas can help lower electricity prices

The reduced role of gas fired electricity generation can help deliver progressively lower wholesale electricity prices.

AEMO's Q3 2023 Quarterly Energy Dynamics report shows that gas generation had an average price \$154 per MWh when setting the wholesale price, versus \$74 per MWh for black coal, and -\$50 and -\$36 for wind and solar generation respectively.

Gas consumption for electricity will reduce, even with higher gas-fired generation capacity

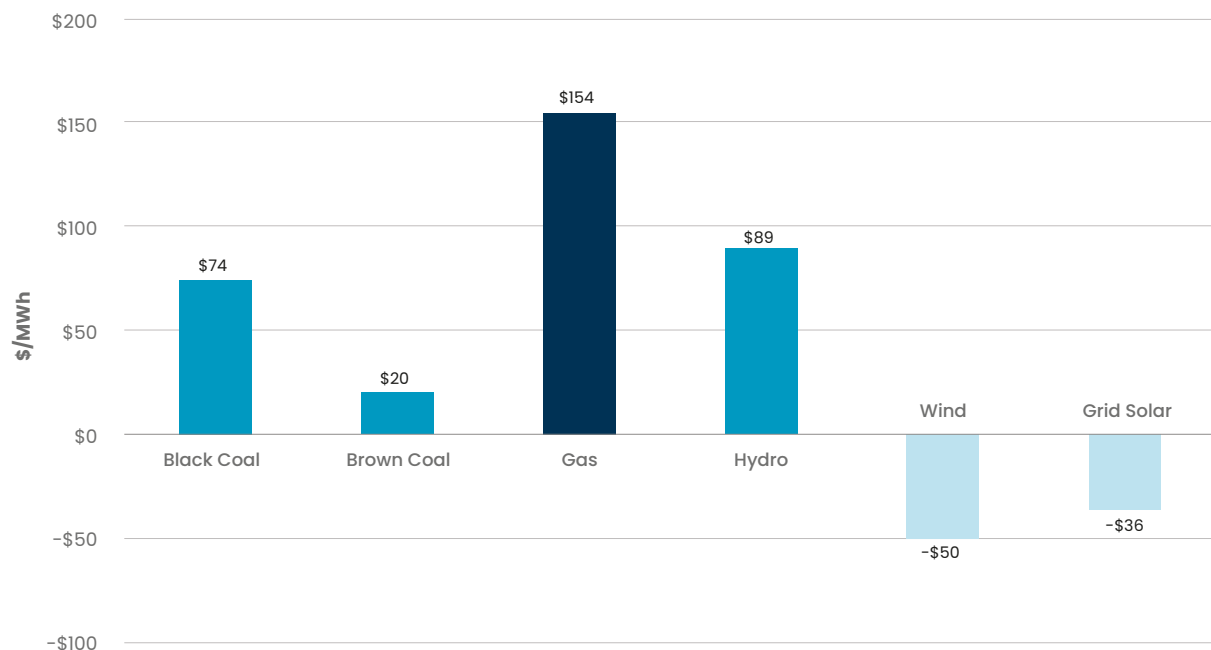
Existing gas-fired generators will continue to play a role in providing electricity as a backup power supply for hydro and battery storage during rare weather and peak demand events. Depending on the pace of large scale storage deployment, more thermal generating capacity may be required as an insurance mechanism for these rare events.

More fossil gas generation however may not be suitable due to technical limitations such as pipeline capacity and pressure constraints that will limit utility of new gas-fired plants.

A more technologically viable pathway may instead be to establish peaking capacity supplied with liquid secondary fuels such as methanol or diesel which can be colocated with peaking plants in purpose built tanks.

More likely still, the continued emergence and maturation of new technologies, such as extra long duration battery storage and alternative liquid fuel solutions, may provide more competitive and lower risk solutions for backup power supply in the future grid.

Gas fired electricity drives prices higher



AEMO - Quarterly Energy Dynamics Report Q3 2023

9. AEMO, Draft 2024 Integrated System Plan for the National Electricity Market, Section 6.4.
10. Brown, Tom and Johannes Hampp. 2023. "Ultra-long-duration energy storage anywhere: Methanol with carbon cycling." *Joule*, V7, Issue 11. <https://www.sciencedirect.com/science/article/pii/S2542435123004075>
11. Wongel, Alicia, and Ken Caldeira. 2023. "Broad Range of Technologies Could Firm Up Wind and Solar Generation in Net Zero Carbon Dioxide Emission Electricity Systems." *Findings*, December. <https://doi.org/10.32866/001c.90391>.

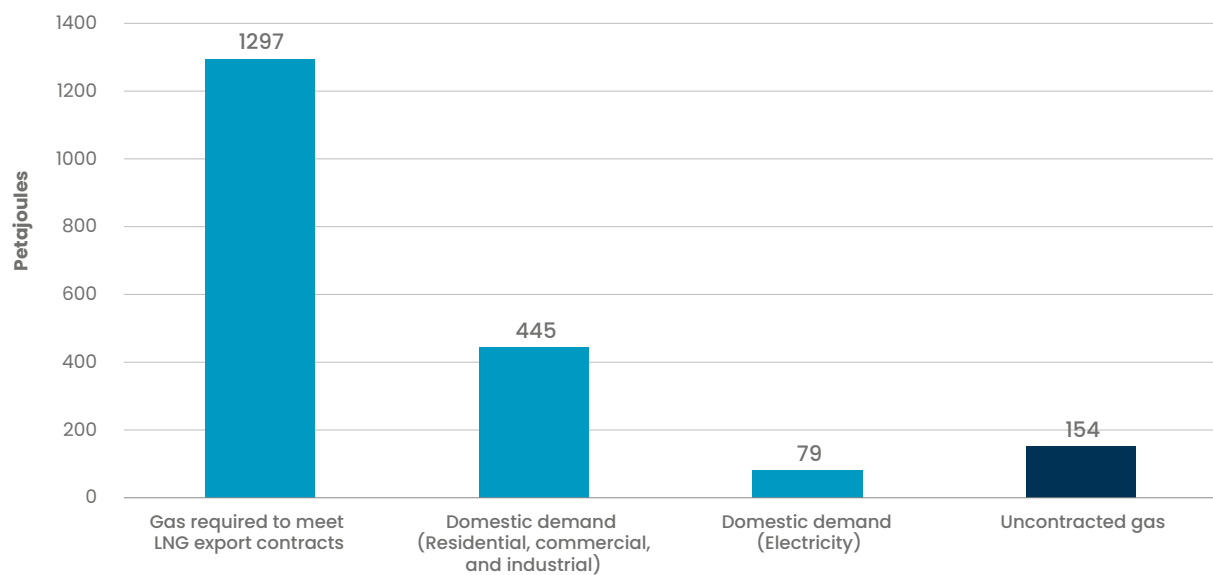
Australia's needs over corporations' export profits

Existing East Coast gas reserves are more than sufficient to meet the forecast demand for gas electricity generation - so long as resources are prioritised and allocated appropriately.

Gas companies striking long term export contracts to overseas markets, without ensuring sufficient reserves are allocated to meet local demand, are a threat to domestic security.

Australia needs to secure a long term domestic gas supply, for example via a domestic reservation, to ensure that private corporations don't prioritise export profits over domestic needs.

Gas production allocation in 2024 (PJ)



Source: ACCC, Gas Inquiry December 2023 interim report

Expedite more storage and electrification

In addition to securing sufficient supply to meet long term domestic requirements, **prioritisation must also be given to expediting the rollout of large scale energy storage solutions**. This will help reduce long term demand and mitigate the number and duration future peaking power events that require back up gas generation.

Finally, **accelerating the electrification of the residential, commercial and industrial sectors will further reduce demand pressures on remaining gas reserves** and ensure sufficient supply is available in existing gas basins to meet GPG requirements for decades to come.

The accelerated rollout of storage and electrification solutions will ensure that the continued phase out of gas fired generation from the electricity system is smooth with minimal impact on consumers and avoid the need for costly exploration and exploitation of new fossil fuel reserves.

Conclusion

New renewable and storage technologies are fast diminishing demand for gas. It is clear from the Australian Energy Market Operator's trends, forecasts and analysis, alongside other expert analysis, that the role of gas for electricity in Australia is small and getting smaller. With this in mind, we recommend policy makers accelerate the rollout of renewables and clean technologies, and consider Australia's limited domestic demand in the context of the gas corporations' pursuit of profits via new gas developments.

Key recommendations

- 1** Understand the diminishing role of gas in Australia's electricity markets, and halt all new gas developments.
- 2** Expedite the rollout of renewable energy infrastructure and large scale storage solutions.
- 3** Accelerate the electrification of the residential, commercial and industrial sectors to reduce total gas demand.
- 4** Publish public data on cumulative quantity of Australian gas that has been contracted for export and the volume contracted for extraction from each basin.



