Deloitte.

Browse to North West Shelf Project

Economic Impact Assessment Summary

May 2026

Deloitte
Access Economics

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Economic impacts of the Browse to North West Shelf Project

The findings presented in this report are based on an economic impact assessment of the Project

Increases energy security for a diversifying WA economy

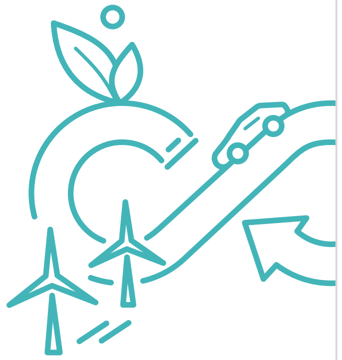
WA's growing population, expanding resources sector and emerging industries are expected to drive sustained growth in energy demand. Reliable, affordable electricity and gas are essential to support direct and indirect employment, investment and economic growth.

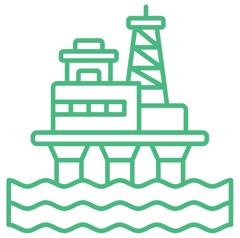
While renewable capacity is scaling rapidly, firm and dispatchable energy remains critical for system reliability. Without new domestic gas investment, WA faces increasing supply risks, including a potential shortfall from 2028.[1]

Eases pressure on the energy system in the transition to net zero by 2050

The Browse to North West Shelf Project delivers long term domestic gas supply to support energy security through WA's transition to net zero by 2050.

Browse gas provides WA with a reliable source of energy as renewables are deployed at record pace. It also supports hard to abate sectors, and allows the energy system to adjust in a more orderly and reliable manner.





Represents one of the largest projects in Australian history[2]

A$48.7b in investment[3]

Investment is comparable to more than six times the cost of the WA government's Westport program.[4]

Creates significant employment opportunities during the planning and construction phase

2,167 construction jobs created in WA

Equivalent to the level of employment generated by 361 new small businesses across Western Australia.[5]

Drives a significant uplift in economic activity

A$147b total uplift[6]

Equivalent to $33.7 billion in present value terms.[7]

Generates WA economy-wide employment opportunities

3,068 full-time jobs created[8]

Equivalent to providing full time employment for almost one half of UWA graduates.[9]

Delivers a significant increase in tax revenues

A$56.2b in tax payments[10]

Equivalent to funding one new hospital every year for 31 years.[11]

Creates positive spillovers for other industries

80% of impacts are outside the oil and gas sector

The vast majority of economic impacts flow to other sectors including construction and services.

Provides a significant contribution to federal tax revenues

A$50.5 billion to Australian government[12]

Through company income tax, PRRT, petroleum levy and excise taxes.

Generates a large increase in state tax revenue

A$5.7 billion to WA government[13]

Through royalties on WA gas production.

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[1] AEMO (2025) 2025 WA Gas Statement of Opportunities
[2] As of 2025, the project is larger than Sydney Metro West project and METRONET program
[3] Capital expenditure data provided by Woodside. Figure represents total project lifetime expenditure, equivalent to $27.0 billion in present value terms (discounted at seven per cent per annum)
[4] Australia New Zealand Infrastructure Pipeline (2024) Westport
[5] Australian Small Business and Family Enterprise Ombudsman (2025) Number of small businesses in Australia
[6] 2025 real undiscounted terms. Uplift over the life of the Project.
[7] Discounted at seven per cent per annum
[8] Peak employment uplift during operational phase
[9] Australian Government (2025) Perturbed Award Course Completions Pivot Table 2024
[10] 2025 real undiscounted terms
[11] Women and Babies Hospitals - WA Government (2025) Budget Paper No. 2 Volume 1
[12] 2025 real undiscounted terms
[13] 2025 real undiscounted terms

About the Browse to North West Shelf Project

Woodside, as operator for and on behalf of the Browse Joint Venture, is proposing to develop the Calliance, Brecknock and Torosa natural gas fields in the offshore Browse Basin, located approximately 425 km north of Broome, Western Australia. The Browse to North West Shelf (NWS) Project (the Project) concept includes two floating production storage and offloading (FPSO) facilities, and an approximately 900 km pipeline to the NWS Project's existing infrastructure. The Project includes carbon capture and storage infrastructure that would sequester the majority of Browse reservoir carbon dioxide.

Image courtesy of Woodside

Economic impacts of the Browse to North West Shelf Project

Energy supply and economic development in Western Australia

Ensuring secure, reliable and affordable energy supply is critical to supporting the economic performance of Western Australia (WA).

WA's economy is growing and diversifying, driving sustained increases in energy demand

Population growth, expanding resource operations, and continued industrial development are increasing energy requirements across the state.[1] In parallel, the diversification agenda, including advanced manufacturing, energy-intensive exports, and data centres, will further increase demand for reliable electricity and gas.

Secure and affordable energy supports industry development, underpins employment, and enables continued economic opportunity across the economy.

Achieving net zero while maintaining energy security presents a growing challenge for WA

Renewable energy is being deployed at scale, but its variable nature means firm, dispatchable supply remains essential to maintain system stability and reliability. The pace of renewables deployment and battery storage is also constrained by a range of factors including land availability, approvals processes, and workforce capacity.

Without timely investment in domestic gas supply, WA faces increasing risk of fuel supply shortages, with a projected gas shortfall in the early 2030s.[2] Recent geopolitical instability reinforces the importance of secure, domestic energy supply.

The Browse to North West Shelf Project (the Project) delivers additional domestic gas supply to support the energy system

The Project seeks to unlock one of Australia's largest untapped energy reserves and represents a significant prospective gas supply for WA. Located approximately 425km north of Broome, the Torosa, Brecknock and Calliance fields have an estimated contingent resource of 14.4 trillion cubic feet of dry gas (if used only for domestic gas supply, this is equal to roughly 38 years of WA's forecast domestic gas consumption in 2026) and approximately 411 million barrels of condensate.[3,4,5]

The Project provides an opportunity to stabilise domestic gas availability over the medium to long term, helping to maintain energy security during the energy transition. It is expected to deliver an uplift in economic growth and employment, provide positive spillovers to other industries, and support the diversification of the WA economy over time.

Impacts on transition to net zero by 2050

Modelling results show that the Project does not materially change the composition of WA's energy generation system in 2050, but it does alter the pathway taken to achieve net zero.

The Project changes the sequencing of the transition, rather than the ultimate destination

Without the Project, declining domestic gas supply may reduce gas fired electricity generation and threaten supply security for industrial use in the 2030s. This would require rapid electrification of industrial processes and very high rates of renewable deployment to maintain reliability and meet emissions constraints.

With the Project, additional gas supply allows parts of this transition to occur later. Renewable and electrification investment is moderated in the 2030s and increased in the 2040s, while still converging on comparable levels of renewable capacity by 2050.

Gas availability reduces near term delivery risk in the 2030s

Economy-wide modelling for WA highlights the 2030s as a critical pressure point for the energy system. Without the Project, projected gas shortfalls place significant strain on industry and the power sector, requiring early electrification of hard-to-abate loads such as industrial heat, compressors and processing equipment. These uses are technically challenging to electrify and place additional pressure on a power system that is already expanding rapidly.

With additional gas available, these industries and businesses can continue to use existing technologies for longer, easing near term power system constraints and reducing the risk of reliability challenges while renewable capacity scales up.

The Project lowers system costs by deferring, not avoiding, investment

The development of the Project allows some renewable, storage and network investment to be deferred to later years.

Because renewable energy technology costs continue to fall as industries mature (due to economies of scale, learning-while-doing and technology improvements), this deferral reduces total system costs over the transition period. Modelling shows that these savings arise from shifting the timing of capital expenditure rather than significantly reducing the overall scale of the build out.

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[1] Government of Western Australia (2025) SWIS Demand Assessment 2023 to 2042

[2] AEMO (2025) 2025 WA Gas Statement of Opportunities

[3] Ibid

[4] Woodside (2025) Developments and exploration: Browse

[5] Woodside (2026) Woodside releases annual reserves statement

A major capital expenditure project

The development and ongoing operation of the Project represents one of the largest undertakings in WA history and will require substantial capital investment. Total capital expenditure is estimated to be approximately A$48.7 billion, in real terms.

This level of investment would place the Project among the largest ever delivered in WA, with capital requirements broadly comparable to approximately six Westport programs (one of the largest government infrastructure projects in WA's history) or two Sydney Metro West projects.[6,7]

Delivering significant economic activity

The Project provides a historically significant economic uplift to WA and Australia

Modelling results indicate that the economic impacts of the Project on output are expected to be significant.

Gross State Product (GSP) in WA is estimated to increase by $147 billion, in real undiscounted terms. This equates to $33.7 billion in present value terms (discounted at seven per cent per annum). The total impact of the Project until 2070 is equivalent to one third of the State's total economic output in 2024-25.[8]

Economic impacts are estimated to peak in 2038, when annual GSP is anticipated to be $5.2 billion higher than otherwise.

Employment uplift across the duration of the Project

The planning and construction phase supports a major employment benefit

During the construction phase in WA, the Project is expected to create a peak uplift in employment of approximately 2,167 full-time equivalent (FTE) jobs.

This occurs in 2029 and is equivalent to the level of employment that would be generated by 361 new small businesses in WA.[9]

The Project delivers economy-wide employment opportunities throughout its operational phase

The Project is expected to make a material contribution to employment across Australia. Employment impacts are expected to peak in 2037, when an estimated 4,760 FTE jobs are created across the economy.

The estimated employment uplift includes the direct roles required to operate and maintain the Project, as well as increases in employment in other sectors which indirectly benefit from the Project. This includes employment in retail, hospitality, and trade, as well as professional services.

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[6] Australia New Zealand Infrastructure Pipeline (2024) Westport

[7] Australia New Zealand infrastructure Pipeline (2025) Sydney Metro-West

[8] Australian Bureau of Statistics (2025) Australian National Accounts: State Accounts

[9] Australian Small Business and Family Enterprise Ombudsman (2025) Number of small businesses in Australia

Image courtesy of Woodside

Positive Impacts on other industries

Approximately 80 per cent of the economic impact induced by the Project is experienced in industries outside the oil and gas sector.

In WA, the spillover impacts are experienced in the services, construction and government services industries, which see an approximate increase in output (measured in gross value added) of $62.9 billion, $31.8 billion and $9.7 billion respectively over the life of the Project ($12.7 billion, $5.5 billion and $1.8 billion in present value terms, respectively).

These industries also experience significant employment gains, with average increases over the study period estimated to be 1,668 FTE jobs per year in the services industry, 1,100 FTE jobs per year in the construction industry and 777 FTE jobs per year in the government services industry.

Tax revenues boosted

The Project is expected to provide a material source of revenue for both State and Federal governments. In total, tax contributions of the Project are estimated to be $56.2 billion, in real undiscounted terms.

The estimated tax and royalty revenue from the Project would be sufficient to fund the construction of approximately one new hospital annually for 31 years.[11]

The Project makes a significant contribution to Federal tax revenue

The Project is expected to generate approximately $50.5 billion (in real undiscounted terms) for the Federal Government through company income tax, PRRT, the offshore petroleum levy and excise taxes. These total:

- Corporate Income Tax: $28.8 billion
- Petroleum Resource Rent Tax: $19.8 billion
- Offshore Petroleum Levy: $1.6 billion
- Excise Tax: $0.4 billion

The contribution to WA's tax revenue flows through the State's royalty regime

It is estimated that the Project will generate $5.7 billion in royalties for the WA government (in real undiscounted terms). Royalties are paid to ensure the community benefits from the use of natural resources.

Whole of economy modelling

Results presented in this document are estimates calculated from Deloitte Access Economics' in-house general equilibrium model, D.Climate, for the study period 2025 to 2072.

D.Climate applies a whole-of-economy framework to estimate economic impacts, and includes second-round effects. The model allows for economic agents to respond to price signals and for capital and labour to reallocate across the economy.

D.Climate is able to account for the changing nature of the economy in the face of climate change. The model's baseline assumptions reflect a net-zero transition by 2050.

All monetary values in this report are estimated in 2025 real (inflation-adjusted) terms, unless noted otherwise. Present values are also in 2025 real terms, discounted at a social discount rate of seven per cent per annum.

At the time of publication, NWS participant interests are as follows:

- Woodside Energy Ltd: 16.67%
- Woodside Energy (North West Shelf) Pty Ltd: 16.67%
- BP Developments Pty Ltd: 16.67%
- Chevron Australia Ltd: 16.67%
- Japan Australia LNG (MIMI) Pty Ltd: 16.67%
- Shell Australia Pty Ltd: 16.67%

At the time of publication, Browse Project participant interests are as follows:

- Woodside Browse Pty Ltd: 30.60%
- BP Developments Pty Ltd: 44.33%
- Japan Australia (MIMI Browse) Pty Ltd: 14.40%
- PetroChina International Investment (Australia) Pty Ltd: 10.67%

[11] Women and Babies Hospitals - WA Government (2025) Budget Paper No. 2 Volume 1

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Economic Impact Assessment of the Browse to North West Shelf Project

May 2026

Contents

Executive summary

Deloitte has been engaged by Woodside Energy Ltd (Woodside), as operator for and on behalf of the Browse Joint Venture, to conduct an economic impact analysis of the proposed development of the Browse to North West Shelf Project, herein referred to as 'the Project'. The development includes the Calliance, Brecknock, and Torosa fields, representing one of the most significant corporate investments in Australia's energy infrastructure.[1]

The report was prepared as an independent economic modelling exercise

Deloitte was engaged to estimate the economic impacts of the Project, with a particular focus on changes in employment and economic activity. The assessment applies the same established modelling frameworks used by Deloitte across a range of sectors, including renewable energy, green hydrogen, and critical minerals. Consistent with the role of an independent assessment, this report provides estimates of economic impact, it does not provide a view on whether the Project should proceed.

The Browse fields hold significant untapped energy reserves

Operated by Woodside for the Browse Joint Venture, the proposed Browse development of the Calliance, Brecknock, and Torosa fields would provide a major new source of gas for domestic and international markets. With WA potentially facing a gas supply shortfall as early as 2028, the Project offers a key opportunity to secure additional domestic supply.[2] Gas accounts for 54 per cent of WA's energy use (based on AEMO data) and 85 per cent of industrial demand, meaning shortages could impact households and key sectors such as mining, mineral processing, and power generation.[3,4] The fields hold an estimated 14.4 trillion cubic feet (tcf) of gas – which if used only for domestic gas supply is equivalent to roughly 38 years of WA's forecast domestic gas consumption in 2026 (based on AEMO data) – alongside 411 million barrels of condensate.[5,6]

The development will be one of the largest in Australian history

The Project is expected to invest $48.7 billion of capital over its lifetime.[7] This primarily comprises offshore drilling and well construction, subsea production systems, floating production facilities, onshore processing modifications, carbon management infrastructure and decommissioning activities. It would be one of the largest projects in Australian history based on capital expenditure, with the capital required comparable to constructing nearly two Sydney Metro West projects.[8]

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[1] Project realisation is contingent upon Final Investment Decision (FID) by Joint Venture participants, execution of commercial agreements, and receiving any regulatory approvals or permits. Any assumptions regarding FID timing reflects information provided at the time of publication.

[2] AEMO. (2025). *2025 WA Gas Statement of Opportunities*. https://www.aemo.com.au/-/media/files/gas/national_planning_and_forecasting/wa_gsoo/2025/2025-wa-gas-statement-of-opportunities.pdf.

[3] Ibid

[4] DCCEEW. (2024). *Australian energy mix by state and territory 2023-24*. https://www.energy.gov.au/energy-data/australian-energy-statistics.

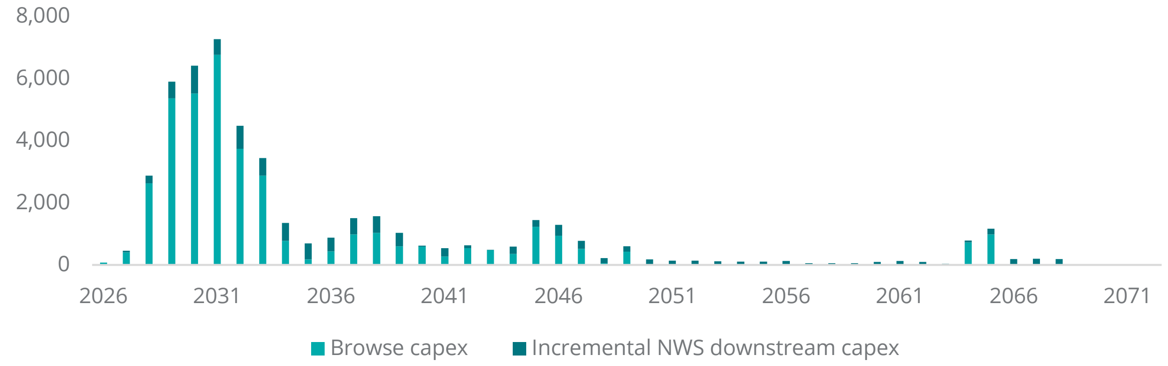
[5] AEMO. (2025). *2025 WA Gas Statement of Opportunities*. https://www.aemo.com.au/-/media/files/gas/national_planning_and_forecasting/wa_gsoo/2025/2025-wa-gas-statement-of-opportunities.pdf.

[6] Woodside. (2026). *Woodside releases annual reserves statement https://www.woodside.com/docs/default-source/asx-announcements/2026/woodside-releases-annual-reserves-statement.pdf?sfvrsn=e388fcaa_4*

[7] Capital expenditure data provided by Woodside, in real undiscounted terms. This is equivalent to $27.0 billion in present value terms (discounted at seven per cent per annum)

[8] Australia New Zealand Infrastructure Pipeline. (2025). *Sydney Metro - West*. https://infrastructurepipeline.org/project/sydney-metro-west

Chart i: Project capital expenditure profile ($ million, real undiscounted)



Source: Woodside, Deloitte Access Economics

The economic impact of the Project is expected to total more than $147 billion in WA, and almost $141 billion across Australia

The economic impacts of the Project on output and employment are expected to be significant. Over the life of the Project, Gross State Product (GSP) in WA is expected to increase by more than $147 billion in real undiscounted terms. This equates to $33.7 billion in present value terms (discounted at seven per cent).

During the construction period (2026 to 2032 in the model), the majority of GSP uplift is expected to occur in the construction sector in WA. On average, economic activity in WA is expected to increase by almost $3.1 billion each year over the life of the Project, equivalent to more than 40 per cent of WA's average annual GSP growth.[9]

In the model, once the Project enters its operational phase (2033 to 2064), the broader economy is expected to increasingly benefit as the impacts of increased spending from workers and suppliers cascade through the economy. These positive spillovers are estimated to be nearly $1.8 billion per year on average in WA during the operational phase, with much of these positive impacts in the services sector.

Most industries experience a marked increase in output (Chart iii), with the net impact across Australia estimated to be an uplift in GDP of approximately $141 billion, or $34.2 billion in present value terms.[10] As the gas industry in WA expands, labour and capital are projected to reallocate from other industries and regions across Australia to support project development and operations. Such dynamics reflect normal market adjustment and CGE modelling is specifically designed to estimate these dynamics.

Table i: Summary of CGE modelling results

	GDP / GSP ($b annual average)	GDP / GSP ($b total, undiscounted)	GDP / GSP ($b present value)
National impact	2.9	140.9	34.2
State impact	3.1	147.4	33.7

Source: Deloitte Access Economics

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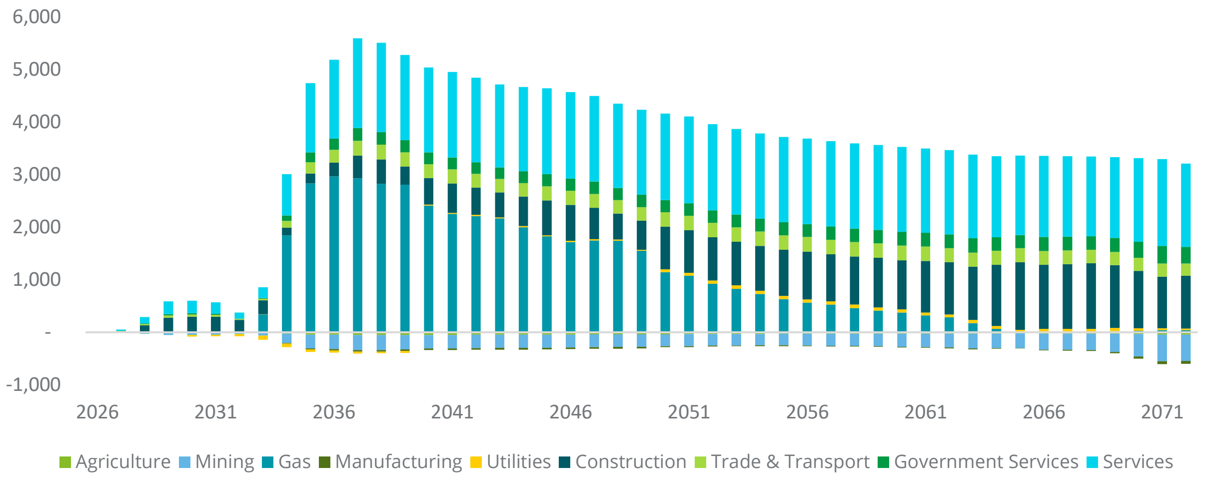
[9] On average over the last 10 years, the WA economy has grown approximately $7.3 billion per year. A $3.1 billion increase in output is more than 40% of the average annual uplift in economy wide economic output.

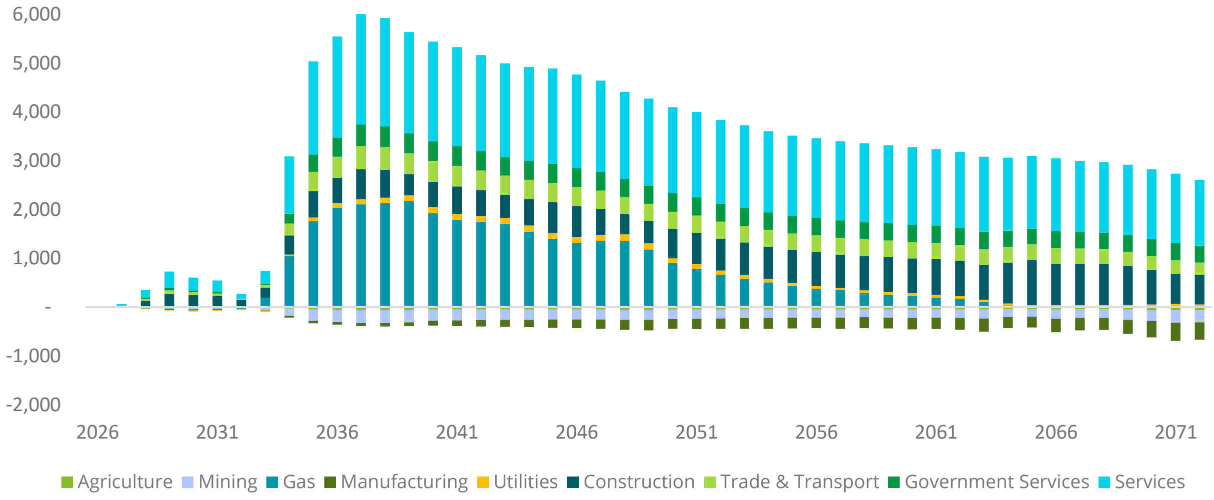
[10] The GDP impact is lower than the GSP impact due to the 'crowding out' effect. Further detail is provided in section 3.

Chart ii: Change in Gross State Product ($ millions, real undiscounted)



Source: Deloitte Access Economics

Chart iii: Change in Gross Domestic Product ($ millions, real undiscounted)



Source: Deloitte Access Economics

The Project is expected to see a peak increase in employment of 4,760 FTE workers in Australia across the economy, equivalent to approximately 5.4 per cent of the population of the north-west region.

The labour market impacts of the Project are also expected to be material. The model results indicate that across Australia, employment impacts peak at an additional 4,760 full-time equivalent (FTE) jobs in 2037 during the early operational period, reflecting not only the direct jobs created in project delivery but also the broader supply chain and service industry roles generated across all regions. This includes roles in manufacturing, logistics, and professional services to support the Project's operations, and additional employment in downstream industries driven by worker and supplier activity.

Across WA, this analysis indicates development of the Project would see an additional 2,167 FTE jobs created in the planning and construction period. During operations, the Project is expected to lead to a peak employment impact of an additional 3,068 FTE jobs in 2038 in WA during the early operational period. Across the life of the Project, it is estimated to provide an additional 1,921 FTE jobs each year, on average.

Table ii: Summary of CGE modelling results

	Average employment (FTEs)	Peak employment (FTEs)
National impact	1,388	4,760 in 2037
State impact	1,921	3,068 in 2038

Source: Deloitte Access Economics

The Project is expected to provide a material source of revenue for both State and Federal governments

Fiscal contributions of the Project will include corporate income tax, excise taxes, the Petroleum Resource Rent Tax (PRRT), state-based royalties, and the Offshore Petroleum Cost Recovery Levy (OP Levy).

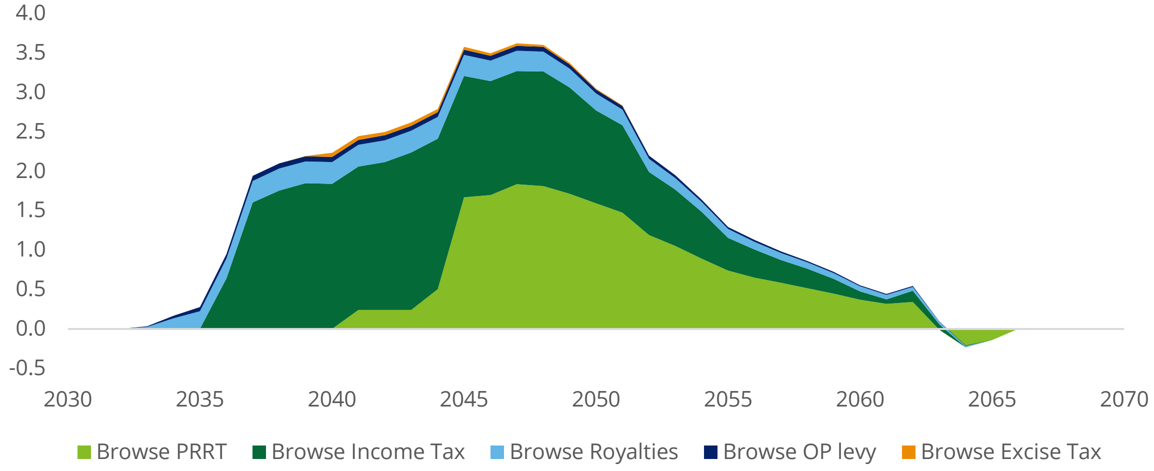
In total, tax contributions of the Project are estimated to be approximately $56.2 billion, with $50.5 billion to be received by the Federal Government and $5.7 billion by the WA Government (all in real terms). The estimated uplift in tax and royalty revenue from the Project is equivalent to funding a new hospital every year for 31 years or the entire National Disability Insurance Scheme (NDIS) for 14 months.[11],[12]

The federal share comprises $28.8 billion in corporate income tax, $0.4 billion in excise taxes, $19.8 billion in PRRT, and $1.6 billion from the OP Levy. WA's share is predominantly from royalties.

CGE and tax modelling were used to estimate financial impacts of the Project under a 2050 net zero scenario

The impacts of the Project on economic activity (e.g., gross domestic product) and employment were estimated using Deloitte's Regional CGE Climate Integrated Assessment Model – D.Climate. This modelling approach is favoured over simpler alternatives because it allows for the interactions of economic agents, capturing both positive and negative impacts, as capital and labour are reallocated across the economy. It also allows for modelling to be conducted within the context of the current energy transition. Tax modelling was also undertaken to identify the Project's fiscal impacts.

Chart iv: Tax contribution profile ($ billions, real undiscounted)



Source: Woodside, Deloitte

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[11] Cost of the Women and Babies Hospital, taken from Government of Western Australia. (2025). *Budget Paper No. 2 Volume 1*. https://www.ourstatebudget.wa.gov.au/2025-26/budget-papers/bp2/2025-26-wa-state-budget-bp2-vol1.pdf.

[12] Commonwealth of Australia (2025). *Portfolio Additional Estimates Statements 2025-26* https://www.dss.gov.au/system/files/documents/2026-02/paes-2025-2026.pdf

The Project is expected to generate a range of economic and environmental impacts

While multiple economic modelling approaches have been applied in this study, the analysis necessarily captures only a subset of the Project's economy-wide effects. Factors such as potential impacts on domestic gas prices, contributions to decarbonisation outcomes in Asia, and broader environmental considerations are important but fall outside the scope of this assessment. Accordingly, this report should be read alongside complementary studies that examine these issues in greater depth to provide a more complete understanding of the Project's implications.

In addition, this study does not incorporate the effects of the conditions set out in the environmental approval for the extension of the North West Shelf Project.[13] This reflects the process to determine how those conditions will be implemented, with studies to identify solutions currently underway.

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[13] State Government approval was received in December 2024 and Federal approval was received in September 2025. In October 2025, three separate legal proceedings were commenced in the Federal Court of Australia challenging the Australian Government's decision to approve the NWS Project extension. These are in addition to one legal proceeding commenced in June 2025 in the Western Australian Supreme Court, challenging the State Government's environmental approval for the NWS Project extension. These proceedings were ongoing at the time of publication of this report.

1 Background

1.1 Project context and background

1.1.1 Project context

Deloitte has been engaged by Woodside Energy Ltd (Woodside), as operator for and on behalf of the Browse Joint Venture, to conduct an economic impact analysis of the proposed development of the Browse to North West Shelf Project (the Project). The modelling captures the direct and certain indirect impacts on the Australian and Western Australian economies.

1.1.2 Project background

1.1.2.1 Unlocking the Browse fields

Operated by Woodside for the Browse Joint Venture (BJV), the Project represents a significant prospective gas supply for Western Australia (WA), providing an opportunity to stabilise domestic gas availability over the medium to long term. Without the integration of new gas sources, WA is expected to face a potential domestic supply shortfall as early as 2028.[14] With natural gas accounting for 54 per cent of WA's total energy consumption (as per AEMO) and representing 85 per cent of industrial demand, any supply shortfall would likely have economy-wide implications, affecting both households and WA's core industries, including mining operations, mineral processing and power generation.[15, 16]

Located approximately 425 km north of Broome, WA, the Torosa, Brecknock, and Calliance fields have an estimated contingent resource of 14.4 trillion cubic feet of dry gas (equivalent to roughly 38 years of WA's forecast domestic gas consumption in 2026 based on AEMO estimates, if used only for domestic gas) and approximately 411 million barrels of condensate (equivalent to around 1.5–2 years of Australia's total liquid fuel consumption) (Figure 1.1).[17] The proposed Browse development includes:

- **Offshore facilities**: two Floating Production, Storage, and Offloading (FPSO) facilities to extract the hydrocarbons from the gas fields.[18]
- **Export pipeline**: an approximate 900 km subsea pipeline would transport the hydrocarbons to NWS Project's existing infrastructure, leveraging its extended life for processing raw resources.[19]
- **Carbon management:** A commitment to carbon management is embedded in the Project design, with the Carbon Capture and Storage (CCS) system at its core.[20] The CCS infrastructure is incorporated into the offshore design to sequester the majority of the reservoir's CO_2 deep underground into the Calliance Storage Formation.

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[14] AEMO. (2025). *2025 WA Gas Statement of Opportunities.* https://www.aemo.com.au/-/media/files/gas/national_planning_and_forecasting/wa_gsoo/2025/2025-wa-gas-statement-of-opportunities.pdf.

[15] Ibid

[16] DCCEEW. (2024). *Australian energy mix by state and territory 2023-24.* https://www.energy.gov.au/energy-data/australian-energy-statistics/data-charts/australian-energy-mix-state-and-territory-2023-24.

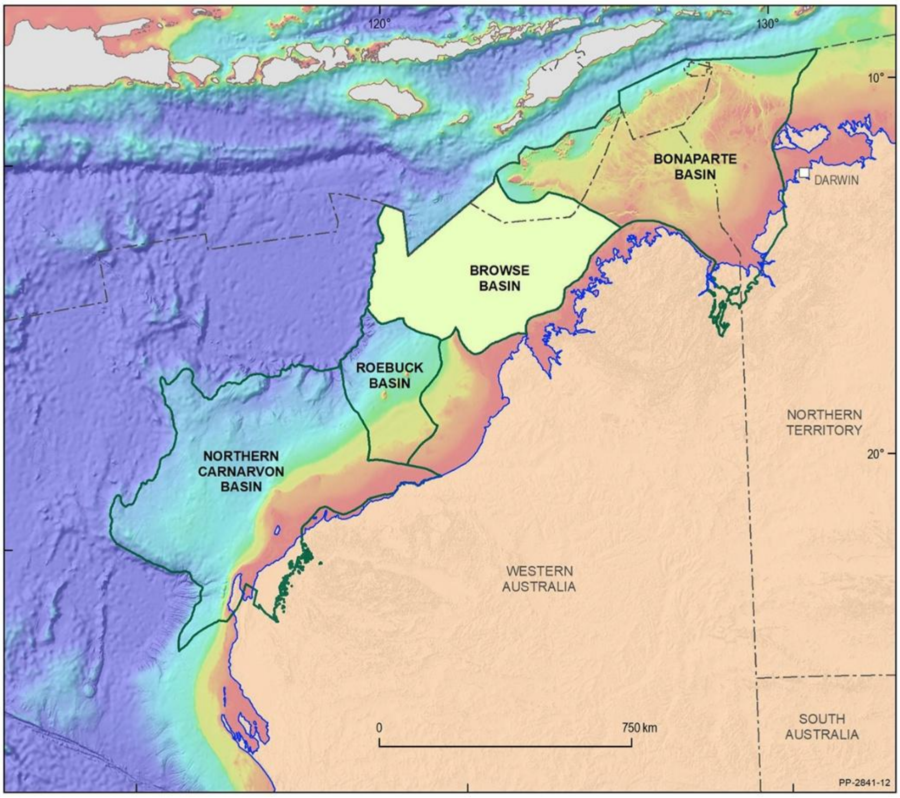
[17] Woodside. (2026). *Woodside releases annual reserves statement https://www.woodside.com/docs/default-source/asx-announcements/2026/woodside-releases-annual-reserves-statement.pdf?sfvrsn=e388fcaa_4*

[18] Woodside. (2025). *Developments and exploration: Browse.* https://www.woodside.com/what-we-do/developments-and-exploration/browse.

[19] Ibid

[20] Woodside. (2023). *Proposed Browse to North West Shelf Project: EPBC 2019/2319.* https://www.dcceew.gov.au/sites/default/files/documents/75951.pdf.

Figure 1.1: Browse Basin location



Source: Geoscience Australia

1.1.2.2 The Role of the North West Shelf Project (NWS Project)

Gas from the Browse fields would be processed through the Karratha Gas Plant (KGP), the onshore hub of the NWS Project. One of Australia's largest operating oil and gas ventures, the NWS Project comprises an integrated offshore and onshore system that has been in operation since 1984. In 2024, it provided approximately 14 per cent of WA's total domestic supply.[21]

Since 1989, the NWS Project has shipped more than 6,500 LNG cargoes globally, helping Australia become the world's largest LNG exporter in 2019.[22,23] Utilising this existing processing and export capacity for Browse would improve asset efficiency while leveraging established infrastructure and economies of scale to support supply of affordable gas to local consumers.

The development of Browse fields is the critical next step in the transition of the NWS Project as a regional and local gas hub. The original offshore fields - North Rankin, Goodwyn A and Angel – are naturally declining and consequently, the NWS Project is operating below its nameplate capacity.[24,25]

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[21] Woodside. (2025). *NWS Project Extension.* https://www.woodside.com/what-we-do/developments-and-exploration/NWS-project-extension.

[22] Ibid

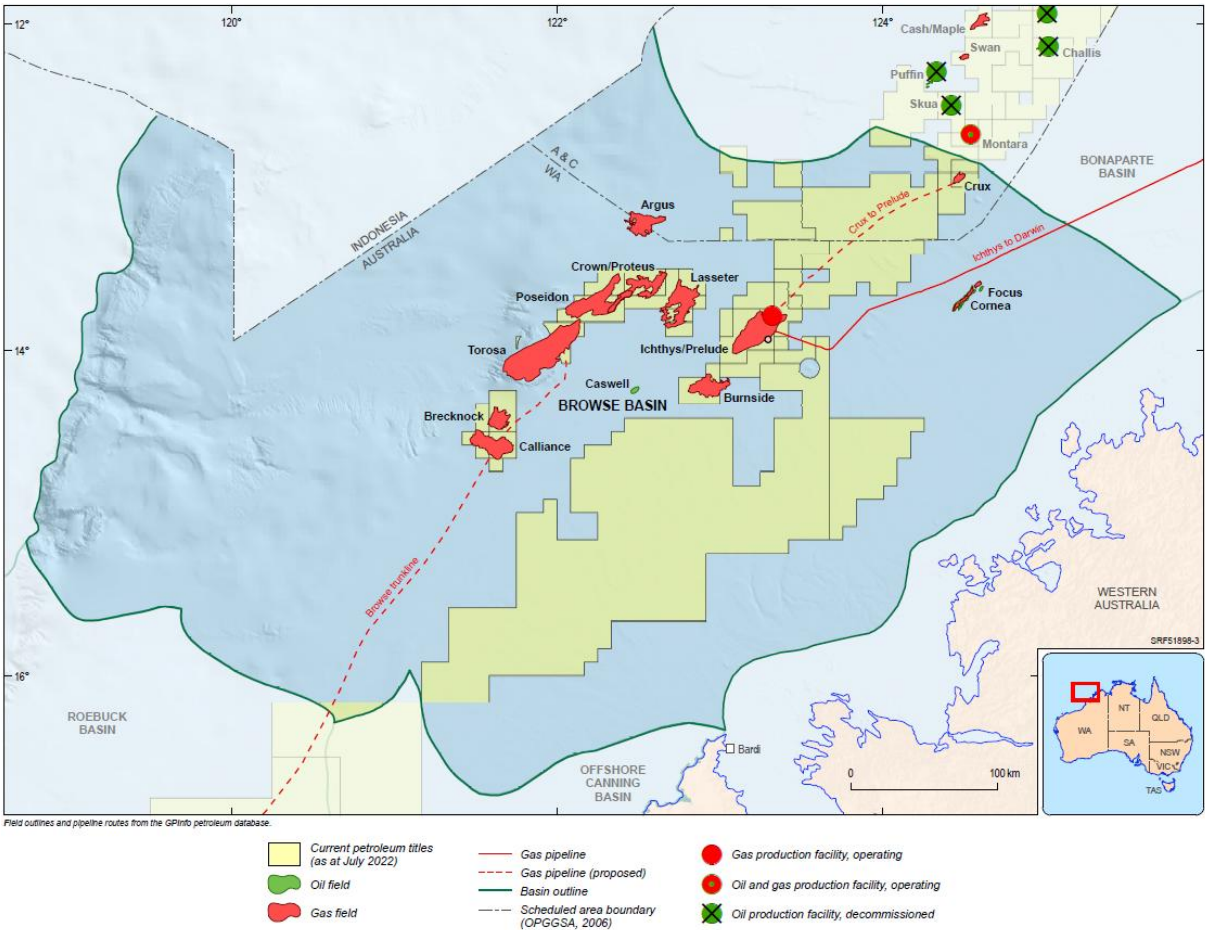
[23] Petroleum Australia. (2020). *Australia formally becomes world's largest LNG exporter in 2019.* https://petroleumaustralia.com.au/news_article/australia-formally-becomes-worlds-largest-lng-exporter-in-2019.

[24] Woodside. (2025). *Half-year report for period ended 30 June 2025.* https://www.woodside.com/docs/default-source/asx-announcements/2025/044-half-year-2025-report.pdf.

[25] AEMO. (2025). *2025 WA Gas Statement of Opportunities.* https://www.aemo.com.au/-/media/files/gas/national_planning_and_forecasting/wa_gsoo/2025/2025-wa-gas-statement-of-opportunities.pdf.

With State and Commonwealth environmental approvals secured in 2024 and 2025, the NWS Project's operational life has been extended.[26,27] Should the Project proceed, it is expected to play a strategically important role in underpinning WA's energy security and allow the NWS Project to continue as a regionally significant gas processing hub for decades to come.[28]

Figure 1.2: Browse Basin petroleum permits fields infrastructure



Source: Geoscience Australia

1.2 Scope of analysis

Multiple methods were applied to quantify the economic impacts of the Project, including:

- Computable general equilibrium (CGE) modelling, leveraging Deloitte Access Economics' Regional CGE Climate Integrated Assessment Model - D.Climate. This model focuses on key macroeconomic outcomes such as the impact on Gross Domestic Product (GDP), Gross State Product (GSP) and employment.
- Tax modelling to determine detailed estimates for corporate income tax, Petroleum Resource Rent Tax (PRRT), royalties, federal excise and the Offshore Petroleum Levy (OP Levy).

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[26] Minister for the Environment and Water. (2025). *Media statement: North West Shelf Project Extension final decision'*. https://minister.dcceew.gov.au/watt/media-releases/media-statement-north-west-shelf-project-extension-final-decision.

[27] See footnote 13 for information regarding approval and current legal proceedings.

[28] The NWS Project's operational life has been approved to 2070. However, the State approval for KGP's operation is only approved until 2059, at which point it would require additional approval to continue operations.

Typically, economic impact assessments evaluate how a project influences broader macroeconomic and sectoral outcomes such as GDP, employment, industry output, and regional growth. CGE modelling is widely recognised as best-practice methodology for estimating these economic impacts and is the preferred approach for most major Commonwealth and State government agencies. Deloitte's in-house CGE model, includes households, firms, factor markets (e.g., labour) and goods markets, and can model the impact of 'shocks' such as new investments and trace their effects by industry, region, and over time. The Project has been modelled in the context of the energy transition, where the economy is simulated to reach net zero by 2050.

2 Methodology

This section outlines the methodology used to assess the economic impacts of the Project. The analysis applies a CGE modelling framework to estimate the impacts of the Project on economic activity and employment at the national and state level. The modelling compares a project scenario against a baseline scenario to isolate the incremental economic impacts attributable to the Project.

In addition to the CGE modelling, a separate tax revenue assessment has been undertaken to estimate the fiscal impacts of the Project. This analysis draws on Project specific production and financial assumptions to estimate Commonwealth and State tax and royalty receipts over the life of the Project. The following sections set out the study parameters, modelling approach and key assumptions underpinning both components of the analysis.

2.1 Study parameters

2.1.1 Study period and financial basis

The study period is 2025 through 2072, reflecting the Project's proposed development, operation and decommissioning. All monetary values in this report are presented in real and undiscounted 2025 Australian dollars, unless specifically noted otherwise. Where present values are reported, future cash flows have been discounted at seven per cent per annum.

2.1.2 Scenario definition

The study quantifies the impact of the Project across the study period by comparing two distinct scenarios. Under the baseline scenario, Browse is not developed and the NWS Project ramps down and ceases operations due to insufficient in-fill gas reserves. Under the project scenario, the Project receives all required development and environmental approvals and delivers gas to the NWS Project.

The economic impact of the Project is determined by analysing the difference between these two scenarios, such that only the incremental impact of the project scenario is captured. Table 2.1 provides a high-level summary of how the two scenarios are defined for modelling.

Table 2.1: Study scenarios

	Baseline scenario	Project scenario
Scenario description	Includes the investment, employment, revenue and taxation generated under the continued production decline and decommissioning of the NWS Project.	Includes the additional investment, employment, revenue and taxation generated by the development of Browse and the extension of the NWS Project.
Policy environment	Common across both: • Australia's federal legislation and Nationally Determined Contribution to meet net zero by 2050. • State Coal Phase-Out: WA's state-owned, coal-fired power stations are retired by 2030, aligning with announced WA policy.[29]	

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[29] WA Government. (2023). *State-owned coal power stations to be retired by 2030 with move towards renewable energy*. https://www.wa.gov.au/government/announcements/state-owned-coal-power-stations-be-retired-2030-move-towards-renewable-energy.

	• Non-viability of nuclear: modelling excludes nuclear energy as a supply option under current Federal and State law. • Domestic Gas Reservation: A minimum of 15 per cent of all LNG production is reserved for domestic supply, aggregated and provided at a Joint Venture level, as mandated by the current WA domestic gas reservation policy.[30]
Economy-wide emissions constraint	Common across both: • Economy-wide emissions constrained to a pathway consistent with achieving net zero emissions by 2050.

2.2 Data Inputs

A number of key project forecasts and assumptions provided by Woodside are utilised in this economic impact assessment, outlined in Table 2.2.

Table 2.2: Key data inputs used in modelling

Data	Definition
Capital expenditure	Includes initial construction costs, other capital costs required over the project life, and end of life decommissioning costs. Comprises both onshore and offshore capital expenditure. Expressed in 2025 real terms.
Revenue	Revenue generated from the value of sales of LNG, condensate, domestic gas and LPG from the Project. Revenue has been calculated using production volumes provided by Woodside and energy price assumptions developed independently by Deloitte. A three-month average of the spot price (taken end October 2025[31]) for each fuel type was used, held constant in real terms over the study period.
Production volume	Represents the expected volume of product generated by the Project each year.
Financial data	Provided by Woodside for NWS Project and Browse, and BJV participants to allow for estimation of taxation paid.[32]

Deloitte has reviewed these Woodside supplied forecasts, assumptions and data. This included benchmarking against publicly available information and seeking confirmation with Woodside where publicly available information is limited. While benchmarking suggests that the data provided is reasonable, Deloitte is not responsible for the accuracy of these inputs.

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[30] WA Government. (2025). *WA Domestic Gas Policy: WA Domestic Gas Statement*. https://www.wa.gov.au/government/publications/wa-domestic-gas-policy-wa-domestic-gas-statement.

[31] LNG US$11.5/MMBtu (for tax calculations LNG price is adjusted for 1% boil off and $0.3 shipping costs associated with international export), LPG US$510/t, condensate US$64/bbl, domestic gas AUD$6.5/GJ,

[32] At the time of publication, the Browse Joint Venture Participants are Woodside Browse Pty Ltd, BP Developments Pty Ltd, Japan Australia (MIMI Browse) Pty Ltd and PetroChina International Investment (Australia) Pty Ltd. Financial data was not provided by PetroChina.

Operational and capital expenditure data was provided by Woodside and validated through multiple interviews with Woodside's cost estimator and other commercial team analysts. Noting the unique specifications, limited publicly available data was also used where possible.

Operational revenue has been calculated using production volumes provided by Woodside and energy price assumptions developed independently by Deloitte. A three-month average of the spot price for each fuel type was used, held constant in real terms over the study period.

Annual production data was provided by Woodside and validated through interviews. Noting the recent change to conversion factors, forecast production alignment with domestic gas policy requirements was also verified and confirmed with Woodside.

2.3 CGE

2.3.1 Estimating economic impacts using a CGE framework

CGE modelling is regarded as the best-practice methodology for estimating the economic impacts of changes in any one part of the economy, such as those triggered by the development of the Project. CGE is the preferred method for most major Australian government agencies because it explicitly accounts for a range of impacts that are otherwise omitted in alternative approaches.

For example, CGE analysis incorporates:

- the impact of trade-offs from resource constraints, such as the increased use of labour or capital by one industry coming at the expense of its use elsewhere.
- the possibility of changes in the mix of inputs used for production due to changes in relative prices or technology.
- the responsiveness of prices and other variables to policy changes affecting - for example - tariffs on imported goods, budgetary support to industry, industry productivity and workforce participation.

These assumptions allow for the modelling of 'second-round' impacts – where agents in the economy respond to changes in price signals. This feature enables CGE models to account for the impacts of a policy change or program across the entire economy. Second-round impacts enable the development of 'real-world' insights such as crowding out effects, where some industries and regions lose out from an increase in economic activity elsewhere, or positive spillovers to other regions and industries resulting from the policy, program, or disruption modelled.

The ability to incorporate second-round impacts is especially important for modelling significant capital investment, such as that required by the Project, given that large levels of investment are likely to create increased competition for labour and capital resources. Other economic modelling techniques (such as input-output modelling) are not sufficiently dynamic to address the above issues and are therefore not considered fit-for-purpose for these types of modelling tasks.

2.3.2 D.Climate

For this study, Deloitte Access Economics' in-house Regional CGE Climate Integrated Assessment Model (D.Climate) was used. D.Climate extends standard CGE modelling by integrating economic projections with climate science to assess how emissions pathways feed back into long-term economic outcomes. The model is underpinned by the latest evidence in climate science and science economics, and builds on Deloitte's established national and regional CGE model, DAE-RGEM.

The D.Climate framework provides a robust, economy-wide assessment by projecting economic output alongside an emissions trajectory aligned with a selected Representative Concentration Pathway (RCP). By linking these elements, the model produces top-down, order-of-magnitude estimates of how the Project interacts with macroeconomic outcomes and resource use within a defined climate scenario.

Through this approach, D.Climate offers a clear, robust view of how the Project sits within the context of economic activity and long-term climate trajectories.

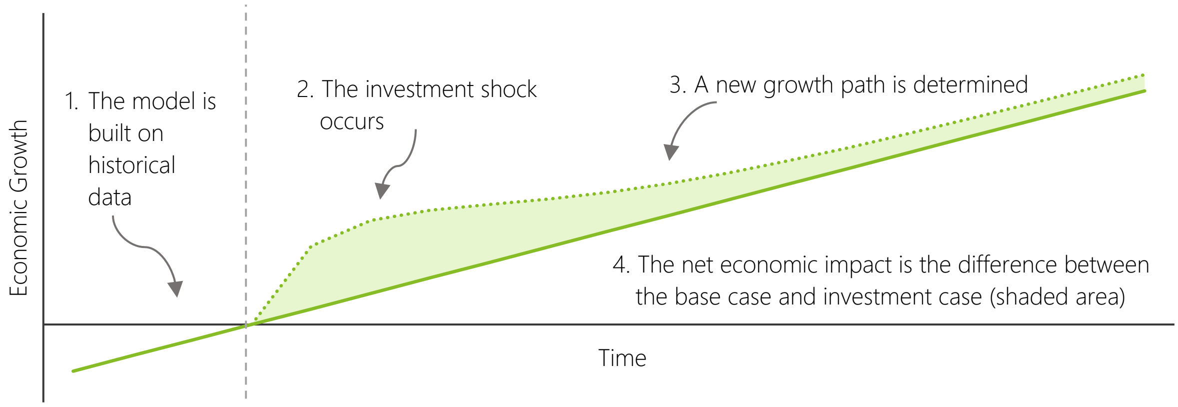
2.3.3 Modelling economic impacts using CGE

To model the economic impact of the Project, the additional capital expenditure, operational expenditure and operational revenue associated with the Project are coded into the CGE model as a 'shock'. The modelling then compares the project scenario to the baseline scenario to determine the incremental effects. Figure 2.1 illustrates a stylised representation of CGE modelling outputs resulting from a major structural change.

The resulting difference between the two scenarios demonstrates the changes that occur across different sectors of the economy as a direct result of the Project. Modelling outputs reflect how the project scenario differs from a world where the Project does not proceed to development, thereby illustrating the incremental impact of the Project on the Australian economy.

This means that results are presented as *relative* to the baseline scenario and do not represent absolute values. For example, if the increase in output for Australia is stated to be $50 million, output for Australia is $50 million higher than it would have been without the Project proceeding to execution.

Figure 2.1: Stylised representation of CGE modelling



Source: Deloitte Access Economics

2.3.4 CGE data inputs

Capital expenditure, operational expenditure and production volume data was provided by Woodside for both the NWS Project only case and for the development of the Project. The baseline scenario reflects the expenditure and production under the NWS Project only case, while the project scenario reflects this for the development of Browse and the extension of the NWS Project. Energy price assumptions developed by Deloitte were used to approximate the operational revenue under both scenarios.

The additional capital expenditure (the difference between the project and baseline scenarios) deployed as a result of the Project being developed is projected to total $38.5 billion in real undiscounted terms, with a further $10.2 billion in incremental downstream capital expenditure also expected. Additional revenue over the evaluation period is estimated to total approximately $252 billion.

The capital expenditure figures stated assume that approximately 44 per cent of expenditure is domestic, reflecting the share of total investment expected to occur within Australia[33]. This provides a more accurate representation of the Project's impact on the Australian economy by capturing only in-country expenditure.

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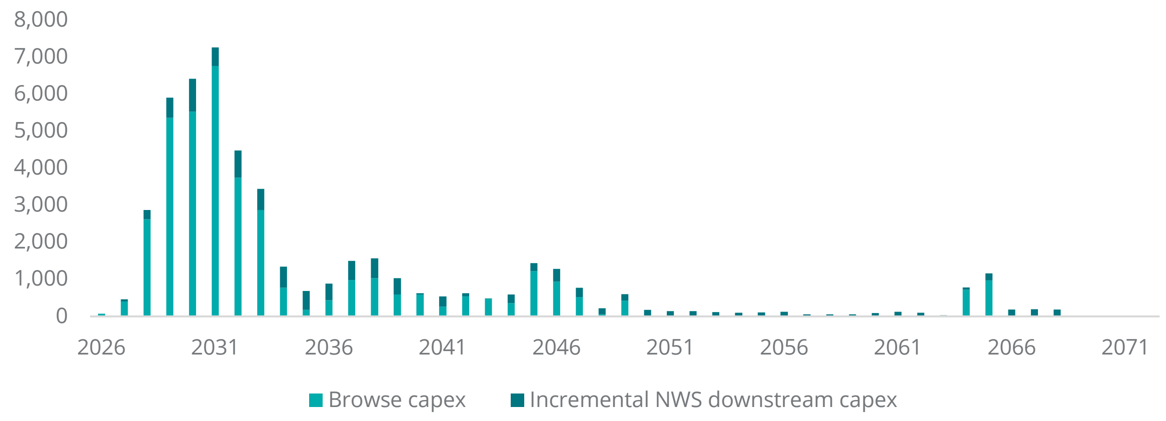
[33] Calculated using data provided by Woodside

Chart 2.1: Project capital expenditure profile ($ million, real)



Source: Woodside, Deloitte Access Economics

2.3.5 CGE model limitations

CGE modelling is built upon a series of informed assumptions regarding economic behaviour, technology adoption, and policy settings. As such, the outputs represent internally consistent, scenario-based projections rather than precise predictions of future economic outcomes. While results are based on the best available data and policy settings at the time of modelling, actual outcomes may vary due to shifts in government policy, technology costs, market conditions, or external shocks. The results should therefore be interpreted as indicative scenarios illustrating potential outcomes under defined assumptions, rather than definitive forecasts of future performance.

The CGE modelling does not explicitly account for direct impacts on natural ecosystems, including effects on biodiversity, land use or water resources associated with the Project's operations. For information on these issues, Deloitte recommends reviewing material published by Woodside.

Additionally, the key emissions-related conditions set out in the approval of the NWS Project extension have not been incorporated into this assessment. At the time of modelling, studies for the practical implementation of the conditions are under assessment. The associated costs and scope implications of these conditions are not yet known and are therefore not included as parameters within the economic model. Once implementation approaches are confirmed, these conditions can be incorporated into the modelling framework to test the sensitivity of economic outcomes to compliance-related changes.

2.4 Tax estimates

This analysis assesses the various Commonwealth and State taxes applicable to the Project throughout its lifecycle within the Australian oil and gas industry. Tax modelling has been conducted to estimate the total cash outlays expected to be collected by the Australian government, specifically incorporating Project tax estimates alongside the additional tax liabilities forecasted for the NWS Project resulting from the Project development. This integrated approach ensures the data reflects the combined fiscal impact across both Commonwealth and State jurisdictions.

2.4.1 Commonwealth taxes

2.4.1.1 Corporate income tax

The Project is subject to the standard Australian corporate income tax rate of 30 per cent. During the pre-production phase (prior to 2033 in the model), significant capital outlays would be required. As a simplified assumption for modelling purposes, these outlays are capitalised and depreciated once production begins in 2033. Following the start of production, operating costs and tax depreciation would be available to reduce taxable income.

2.4.1.2 Petroleum Resource Rent Tax

The Project is subject to the Petroleum Resource Rent Tax (PRRT) at a rate of 40 per cent, given five of its permits are located in Commonwealth waters. PRRT is historically levied on taxable profit, and the Project has accumulated carried-forward expenditure credits (subject to augmentation) that would normally offset taxable income during the early years of production. However, under recently introduced PRRT deductions cap measures for LNG projects, 10 per cent of assessable receipts will be treated as taxable profit regardless of the remaining credit balance, beginning eight years after the first petroleum receipts (projected for 2041, with the model assuming first production in 2033). In practice, this means that even with large historic costs, the government will start taxing a minimum portion of revenue from 2041, accelerating PRRT payments.

2.4.1.3 Offshore Petroleum Levy

The offshore petroleum levy (OP Levy) is a temporary charge, introduced in 2021, designed to recover the Commonwealth's costs associated with the decommissioning and remediation of the Laminaria and Corallina oil fields. The current proposed rate for this levy is 0.48 cents per barrel or equivalent, and it is presently scheduled to cease on June 30, 2029. The Project would only be subject to this levy and required to make payments if the OP Levy's sunset date is extended beyond its current proposed termination. In this analysis, it is assumed the OP Levy will apply for the life of the Project. This is a conservative position that reflects the current policy, noting that the levy may not extend beyond June 30, 2029.

2.4.1.4 Excise taxes

The Federal excise tax is a levy imposed on certain petroleum products that are produced within Australia, with the specific rate being dependent on the product type. For the Project, it is assumed that the only product produced within Australia that is excisable is a portion of condensate. Consequently, the Project participants, as the manufacturers of this condensate, would be liable to pay the excise tax on the quantity of production that is subject to excise.

2.4.2 State taxes

2.4.2.1 Royalties

The Project would be subject to royalties imposed by the State Government on petroleum production revenue, as two of its permits are situated in WA State waters. The precise royalty rate is typically determined through a negotiation process between the WA State Government and the Project participants. This negotiation has not yet occurred for the Project. Consequently, the Project's financial model estimates the payable royalty using revenue less costs (capped at 90% of revenue) at a 12.5 per cent rate.

3 Economic impact results

3.1 Economic impact assessment

3.1.1 Overview

CGE modelling results indicate the Project is likely to provide a significant uplift in employment and economic activity for the Australian, WA and north-west WA economies. Table 3.1 provides a summary of the results.

Across Australia, the Project is expected to increase GDP by almost $141 billion in real undiscounted terms between 2025 and 2072 ($34.2 billion in present value terms). The annual increase in GDP peaks at $5.6 billion, occurring in 2038, reflecting the peak capital deployment period, when project expenditures flow through the economy via wages, supplier payments, and related spending. Direct project employment occurs first as these expenditures are made, while the wider economic impacts, including GDP, peak about a year later, reflecting the lag as project spending propagates through the economy.

WA is expected to experience greater economic gains than national levels, as sectors outside of WA reallocate capital and labour. This results in WA's GSP increasing by just over $147 billion in total over the same period (or $33.7 billion in present value terms). The annual GSP impact peaks in 2038 at $5.2 billion.

The Project is also expected to provide a significant uplift to employment across Australia, with an additional 1,388 FTE jobs (both direct and indirect) expected to be added to the national economy each year on average relative to the baseline. This impact is expected to peak in 2037, with an additional 4,760 FTE jobs added. Due to the migration of labour to WA, the state is estimated to see an additional 1,921 FTE jobs per year on average as a result of the Project. Peak employment impacts occur in 2038, where it is estimated that an additional 3,068 FTE jobs would be added to the WA's labour market.

Further detail on these results is provided below.

Table 3.1: Summary of CGE modelling results

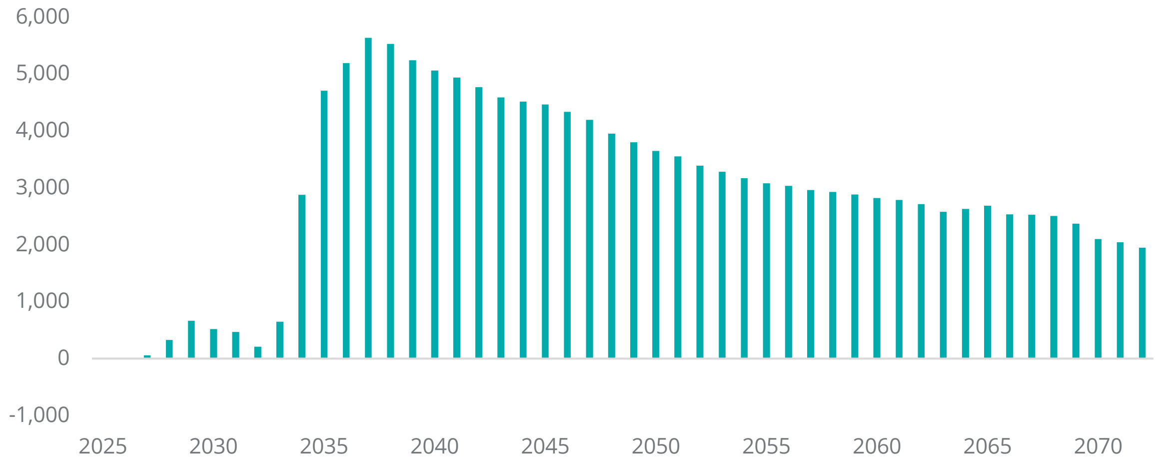
	GDP / GSP ($b annual average)	GDP / GSP ($b total, undiscounted)	GDP / GSP ($b present value)	Average employment (FTEs)	Peak employment (FTEs)
National impact	2.9	140.9	34.2	1,388	4,760 in 2037
State impact	3.1	147.4	33.7	1,921	3,068 in 2038

Source: Deloitte Access Economics

3.1.2 Economic impacts

The Project is estimated to generate approximately $141 billion in additional economic activity nationally over the evaluation period ($34.2 billion in present value terms). The contribution is expected to peak in 2037 following the commencement of operations, when annual GDP is estimated to be $5.6 billion higher than under the baseline scenario.

Chart 3.1: Change in Gross Domestic Product ($ millions, real undiscounted)

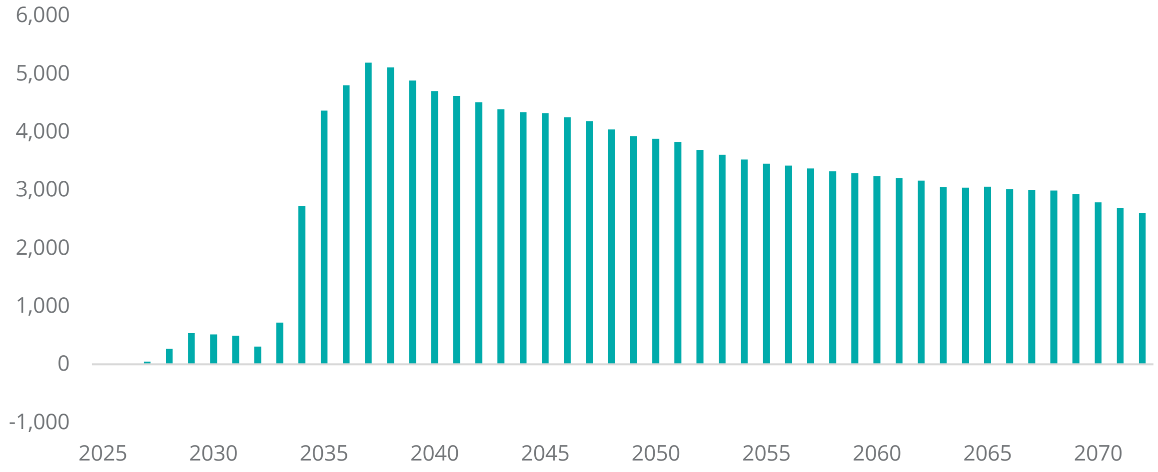


Source: Deloitte Access Economics

In WA, the Project is estimated to contribute approximately $147 billion to the economy over the evaluation period ($33.7 billion in present value terms). Economic impacts are expected to peak in 2038, when annual GSP is anticipated to reach $5.2 billion above the baseline scenario.

Modelling indicates that the economic uplift in WA is greater than that for Australia, reflecting the Project's concentration of activity in WA. This results in some reallocation of capital and labour from other states to support the delivery of the Project. Despite this, the Project is still expected to deliver a significant increase in economic activity at the national level.

Chart 3.2: Change in Gross State Product ($ millions, real undiscounted)



Source: Deloitte Access Economics

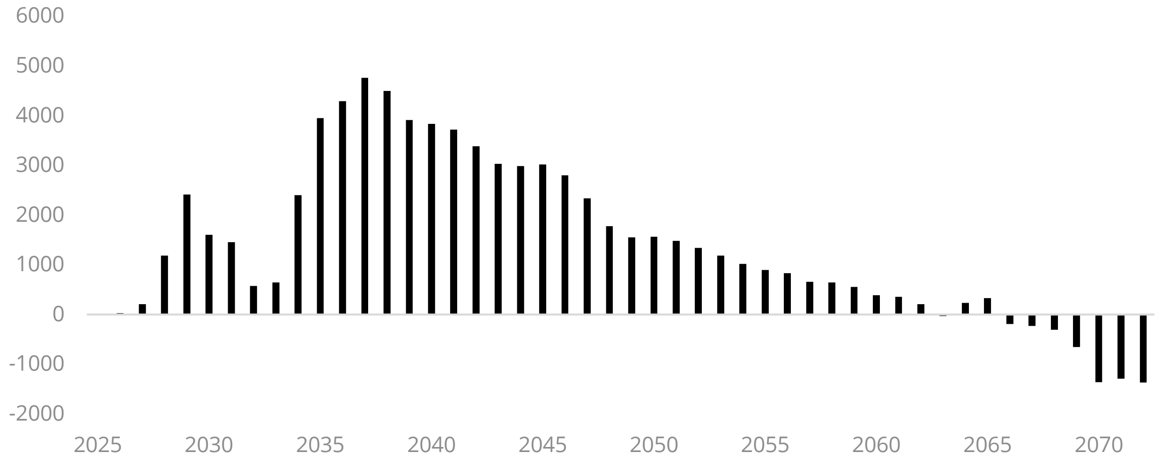
3.1.3 Labour impacts

Modelling results indicate that the Project is expected to make a material contribution to employment across Australia, supporting 1,388 additional FTE jobs per year on average over the evaluation period relative to the baseline. Employment impacts are expected to peak in 2037 during early operations, in line with the peak in economic activity, when an estimated 4,760 FTE jobs are supported. This includes roles in manufacturing, logistics, and professional services to support the Project's operations, and additional employment in downstream industries driven by worker and supplier activity.

In the CGE modelling framework, the labour market adapts to the Project by redistributing employment across industries and regions. For example, while the net employment impacts are strongly positive (as noted above), the modelling demonstrates how workers may be drawn from other regions and sectors to the Oil and Gas sector in WA. Under the CGE modelling framework, the primary mechanism for the reallocation is workers being drawn to relatively higher wages in the Oil and Gas sector in WA.

The decline in employment observed in the final years of the modelling period reflects the Project's lifecycle and broader economy-wide adjustment effects. As operational activity gradually tapers toward the end of the Project's life, the demand for labour declines relative to the baseline. At the same time, labour previously supported by the Project is reallocated across the economy, with some transitional adjustment effects resulting in lower employment relative to the baseline in the final years of the forecast period. This is not uncommon in modelling of large, capital-intensive projects.

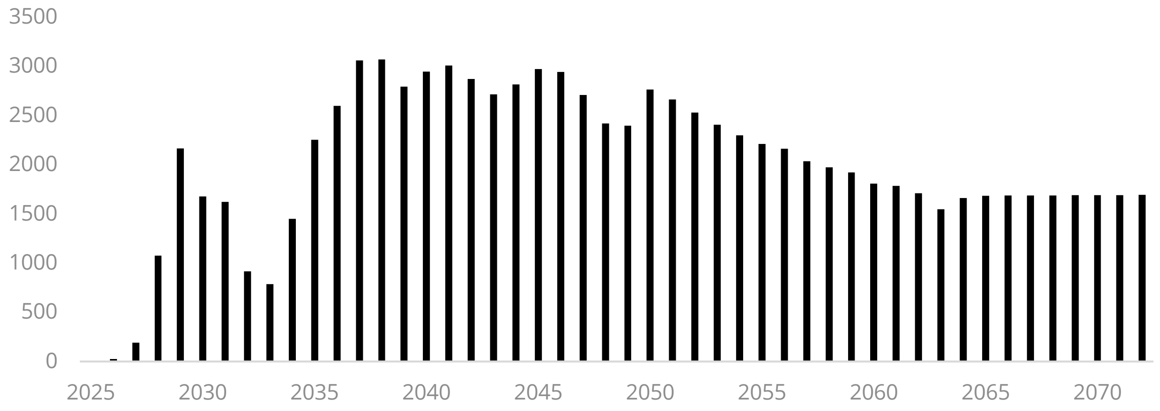
Chart 3.3: Change in employment in Australia (FTE jobs)



Source: Deloitte Access Economics

The modelling indicates that the Project is also expected to provide an uplift to employment across WA, with 2,167 FTE jobs created in the planning and construction phase. At the height of the operational phase in 2038, there are 3,068 additional FTE jobs added to the WA economy. Over the full evaluation period, the number of FTE roles added to the WA economy is expected to average 1,921 each year.

Chart 3.4: Change in employment in WA (FTE jobs)



Source: Deloitte Access Economics

3.1.4 Sectoral impacts

3.1.4.1 National sectoral impacts

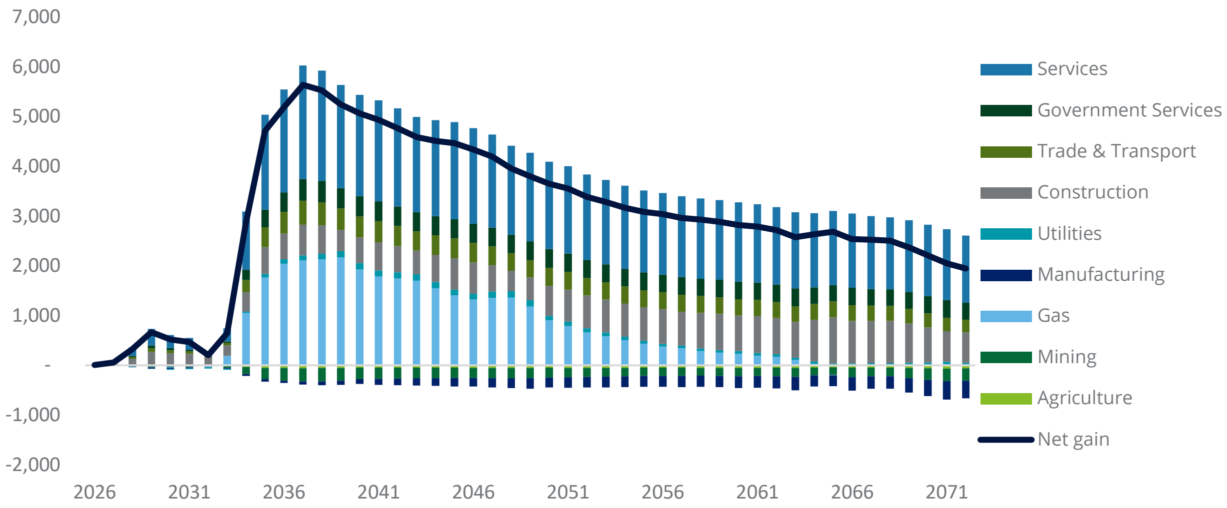
The modelling indicates that the Project stimulates economic activity across most sectors of the economy, with the gas, services, and construction sectors experiencing the largest increases in output and employment. At a national level, the gas industry is estimated to contribute an increase in Australia's GDP of approximately $32.7 billion ($10.3 billion in present value terms) over the study period as a result of the Project. This is supported by a contribution of around $68.8 billion ($15.2 billion in present value terms) from the services sector and $26.1 billion ($5.3 billion in present value terms) from construction. This equates to an average annual GDP impact of $595 million from the gas industry, just over $1.2 billion form the services industry and $475 million from the construction industry.

These impacts are driven by a combination of direct project activity during construction and operations, as well as indirect and induced effects across the supply chain. During the construction phase, demand for labour, materials and specialist services rises sharply, generating flow-on effects across a broad range of industries beyond the gas sector itself. Following this, increased demand for professional, technical and community services, together with higher spending by workers and businesses associated with the Project, generates additional flow-on activity across a broad range of industries.

As the Project progresses through its operational life and gas production gradually tapers, additional activity within the gas sector declines, reflecting the Project's lifecycle. However, the modelling indicates that economic activity in other sectors remains positive over the longer term, supported by a larger economy than otherwise, and investment in energy-related infrastructure.

Output in the mining and manufacturing sectors is expected to be marginally lower than under the baseline scenario. This reflects the standard crowding out effect, where the high demand of a large-scale project creates competition for limited resources. As the Project scales, it draws capital and skilled labour away from other industries on account of higher returns to capital and labour. Consequently, as these resources shift, the annual GDP on average in both the mining and manufacturing sectors are estimated to be approximately $148 million lower per year relative to the baseline scenario.

Chart 3.5: Change in Gross Domestic Product ($ millions, real undiscounted)



Source: Deloitte Access Economics

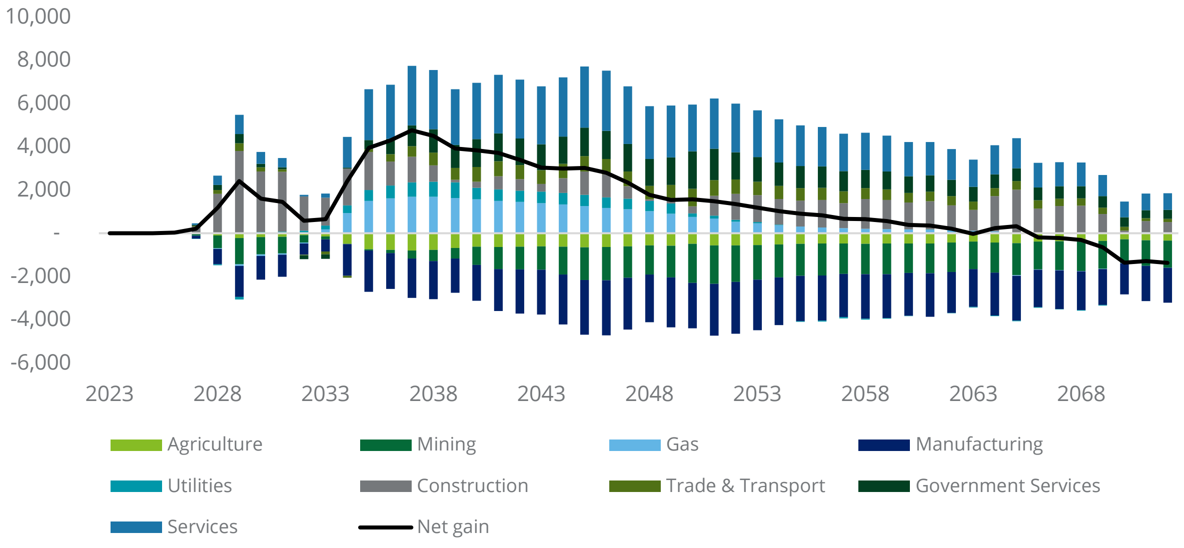
The sectoral output effects translate into corresponding shifts in national employment patterns. In addition to roles directly required to operate and maintain the Project, increased activity in gas production supports higher employment across service-based industries that supply or respond to project activity, including retail, hospitality and professional services.

The largest employment gains are expected in the services, construction and government services sectors, with average increases of 1,668, 1,100 and 777 FTE jobs per year, respectively. These gains reflect both direct project demand and broader flow-on effects through the supply chain.

In contrast, employment in the manufacturing, mining and agriculture sectors are estimated to be marginally lower than under the baseline, with an average reduction of 1,760, 1,080 and 458 jobs per year, respectively. This reflects a reallocation of similarly skilled labour toward sectors more directly stimulated by the Project's construction and operational requirements.

Despite these sector specific adjustments, modelling indicates that aggregate national employment increases overall, reflecting a net expansion in economic activity attributable to the Project. The reallocation of labour toward higher-demand sectors occurs within a context of increased total labour demand, rather than a contraction in employment opportunities. This suggests that the Project supports a more intensive utilisation of the national workforce, particularly in sectors aligned with large-scale infrastructure delivery and service provision. Over time, these dynamics are expected to facilitate skills development, labour mobility, and income growth, helping to broaden economic resilience.

Chart 3.6: Change in employment in Australia (FTE jobs)



Source: Deloitte Access Economics

Table 3.2 National economic and employment impacts across sectors

Sector	Total GDP change ($ billion, real undiscounted)	Total GDP change ($ billion, discounted present value)	Average annual GDP change ($ million, real undiscounted)	Average employment (FTEs)
Gas	32.7	10.3	595	559
Construction	26.1	5.3	475	1,100
Government services	14.6	3.0	265	777
Services	68.8	15.2	1,250	1,668
Mining	-8.2	-1.7	-148	-1,080
Manufacturing	-8.2	-1.2	-148	-1,760
Agriculture	-2.0	-0.4	-37	-458
Other	17.2	3.7	685	582
Total	140.9	34.2	2,937	1,388

Source: Deloitte Access Economics

3.1.4.2 State sectoral impacts

The Project also induces a range of impacts across WA's industries, resulting in a net positive economic impact on the WA economy. Over the evaluation period, the gas sector is expected to contribute an additional $815 million to WA's gross value-added (GVA), on average per year. GVA measures the additional economic value created by an industry or region after accounting for the cost of inputs used in production.

Positive spillovers are experienced by several other sectors, particularly the services and construction sectors, which are estimated to contribute an additional approximately $1.1 billion and $579 million on average to WA's value-added, per year over the evaluation period, respectively. However, this comes at the expense of the mining sector, which is expected to experience a reduction in value-added of around $198 million per year relative to the baseline.

These output effects are reflected in employment outcomes across WA. The development and operation of the Project increases demand for labour particularly in the services, construction and gas sectors, which are directly and indirectly involved in project delivery. Average annual employment in these sectors is estimated to increase by 1,239 FTE jobs in construction, 1,214 FTE jobs in services and 606 FTE jobs in the gas sector. Employment in the mining sector is estimated to be lower than under the baseline by an average of 1,006 FTE jobs per year, reflecting the same reallocation effects as observed in the GVA results.

Overall, the results indicate that the Project functions as a material driver of economic activity in WA. The expansion in GSP and employment across the gas, construction and services sectors more than compensates for the contraction observed in mining, resulting in a net positive contribution to the WA economy.

Table 3.3: Western Australia economic and employment impacts across sectors

Sector	Total GVA change ($ billion, real undiscounted)	Total GVA change ($ billion, discounted present value)	Average annual GVA change ($ million, real undiscounted)	Average employment (FTEs)
Gas	44.8	14.3	815	606
Construction	31.8	5.5	579	1,239
Government services	9.7	1.8	176	212
Services	62.9	12.7	1,144	1,214
Mining	-10.9	-2.1	-198	-1,006
Manufacturing	-0.9	-0.2	-17	-180
Agriculture	-1.5	-0.4	-27	-196
Other	11.5	2.1	600	32
Total	147.4	33.7	3,072	1,921

Source: Deloitte Access Economics

3.2 Tax assessment

Tax modelling results show that the production of the Browse field would result in significant taxation revenues to be collected by the Australian Federal and State Governments. The total taxes to be collected is estimated to be approximately $56.2 billion in real undiscounted terms, reflecting the value of these future revenues in 2025 dollars. This equates to a real undiscounted amount of $13.9 billion in present value. Approximately $50.5 billion is estimated to be collected by the Federal Government and $5.7 billion to be collected by the State Government.

For all taxes other than PRRT, Deloitte have modelled using a 100 per cent Project Basis. PRRT balances have been modelled on a participant basis using data provided to Deloitte, with estimates applied where specific participant balances were unavailable.

Federal tax revenues

At the Federal level, several tax instruments apply to upstream petroleum developments:

- Corporate Income Tax is estimated to contribute approximately $28.8 billion. Corporate income tax is a tax on the net profits of incorporated entities and reflects the profitability of the Project over its operating life. Corporate income tax is assumed to begin being paid in 2035, continuing thereafter. The eventual decommissioning phase is expected to generate further tax losses. Depending on each Project participant's tax profile and corporate structure, these tax losses may be able to offset other profitable Australian projects.

- Excise Tax is estimated to contribute just over $0.4 billion. Excise is a volumetric tax imposed on the production of excisable petroleum products. For offshore gas projects, Excise is levied on the volume of petroleum produced from a non-Resource Rent Tax Area (i.e., production that is not subject to PRRT).

- Petroleum Resource Rent Tax is estimated to contribute approximately $19.8 billion. PRRT is a profits-based tax applied to offshore petroleum projects, designed to capture a share of economic rents (i.e., returns above a normal rate of profit). PRRT is payable only when cumulative project revenues exceed deductible expenditure uplifted at specified rates.

  Despite the large credit balance, modelling suggests the Project would commence cash PRRT payments in 2041. While PRRT legislation allows for refunds of "closing down expenditure" up to the amount previously paid, the current projected profile suggests that the Project would still be a net cash PRRT payable project over its life, even after accounting for refunds available.

- Offshore Petroleum Levy is estimated at approximately $1.6 billion. This levy recovers the Commonwealth's regulatory, safety, and environmental oversight costs associated with offshore petroleum activities.

Together, these taxes reflect the Federal Government's fiscal framework for capturing economic value from offshore petroleum extraction.

State tax revenues

At the WA level, all tax revenue attributable to the Project in this study is derived from State Royalties – estimated at approximately $5.7 billion over the life of the Project. Royalties are payments to the State Government for the right to extract non-renewable resources. They are typically levied as a percentage of the value of production or as a volume-based charge, ensuring the State receives a return for the depletion of publicly owned natural resources.

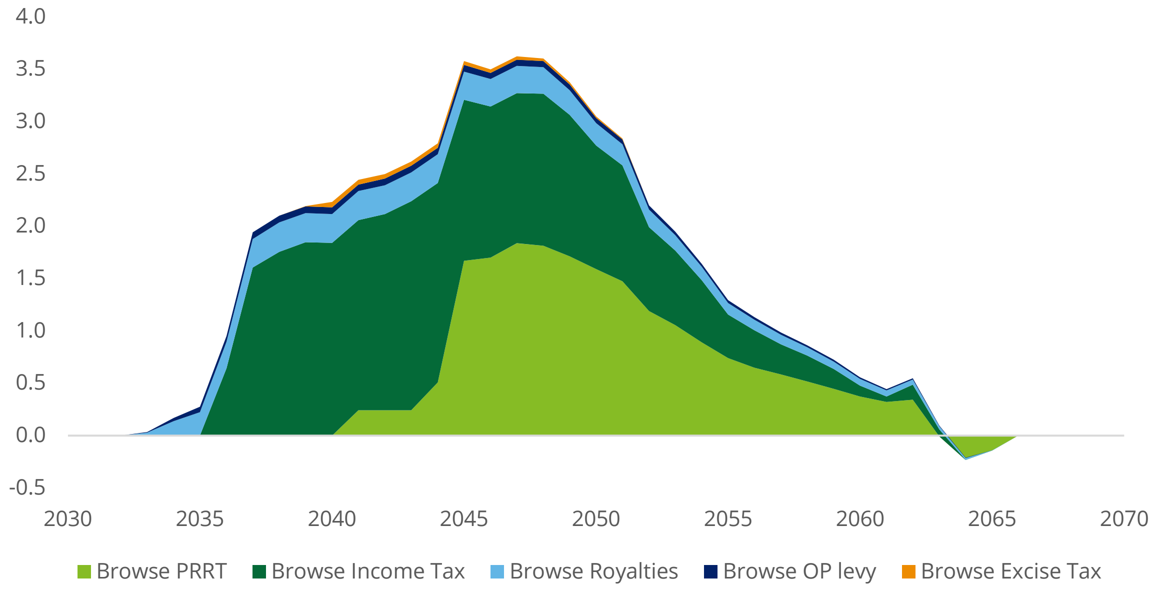
It should be noted that taxes are only a transfer of resources, not an additional source of activity. The increase in taxation revenue received by the Federal and State Governments is therefore already captured in the economic impact reported in section 3.1 and should not be considered an addition to this.

Table 3.4: Tax receipts expected to be paid over project life ($ billion, real undiscounted)

Tax Type	Total value[34]
Corporate income tax[35]	$28.8 billion
Excise Tax	$0.4 billion
Petroleum Resource Rent Tax[36]	$19.8 billion
Offshore petroleum cost recovery levy	$1.6 billion
WA State Royalties	$5.7 billion
Total	**$56.2 billion**

Source: Woodside, Deloitte

Chart 3.7: Tax contribution profile ($ billions, real undiscounted)[37]



Source: Woodside, Deloitte

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[34] Estimates are based on assumptions outlined in Appendix B. Figures may not add due to rounding.

[35] Corporate tax has been modelled on a project basis only. This does not factor in project participant tax profiles or corporate structures which may result in lower income tax overall, noting tax payable is calculated at the Project participant level.

[36] PRRT balances have been modelled on a participant basis as provided to Deloitte, with estimates utilised where specific data was unavailable.

[37] Negative values shown in the final period are driven by PRRT alone, with all other tax elements remaining positive throughout the study period

Conclusion

The development of the Browse to North West Shelf Project represents a significant investment for WA and Australia, and can be expected to drive sustained economic growth, employment uplift, and substantial fiscal returns.

Economic modelling suggests that the Project will increase output in WA by more than $147 billion ($33.7 billion present value terms), and GDP by almost $141 billion ($34.2 billion present value terms). The peak annual increase in output is expected to be $5.2 billion in WA, and $5.6 billion across Australia.

On average, economic activity in WA is expected to increase by nearly $3.1 billion each year, equivalent to more than 40 per cent of WA's average annual GSP growth.[38] Over time, the downstream impacts to the broader economy will grow, and the Project's positive spillovers are estimated to be approximately $1.8 billion per year on average, with most of this uplift in the services sector.

Employment gains are also significant, with an additional 1,921 FTE jobs expected in WA and an additional 1,388 across Australia, on average each year. The employment impacts peak at an additional 4,760 FTE jobs in 2037 across Australia.

The Project is estimated to generate approximately $56.2 billion in tax and royalty revenues over its life. These revenues accrue to both the Federal and WA State governments and represent a significant increase relative to the baseline.

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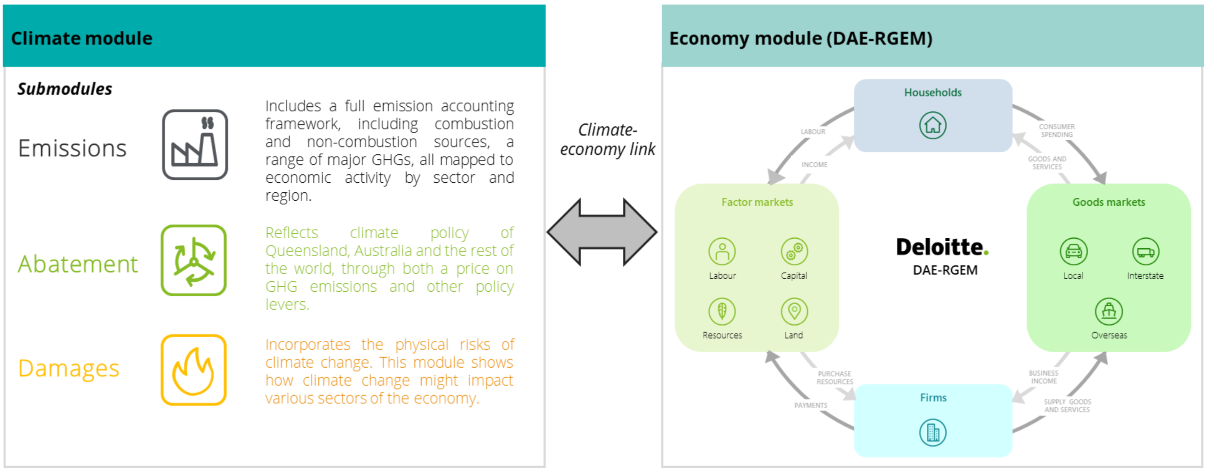
[38] On average over the last 10 years, the WA economy has grown approximately $7.3 billion per year. A $3.1 billion increase in output is more than 40% of the average annual uplift in economy wide economic output.

Appendix A D.Climate

D.Climate, is Deloitte Access Economics' in-house climate-integrated computable general equilibrium (CGE) and integrated assessment model (IAM). It combines emissions, abatement, and climate damages with an economic model to represent the implications of the latest climate science and climate policy for economic activity (Figure A.1 and Figure A.2). In doing so, this model can capture the sub-national, national and global picture of climate change policy, accounting for global trends in emissions reduction, technological development and changes in public policy to reflect the physical and transitional costs associated with different abatement pathways.

Figure A.1: D.Climate modelling framework

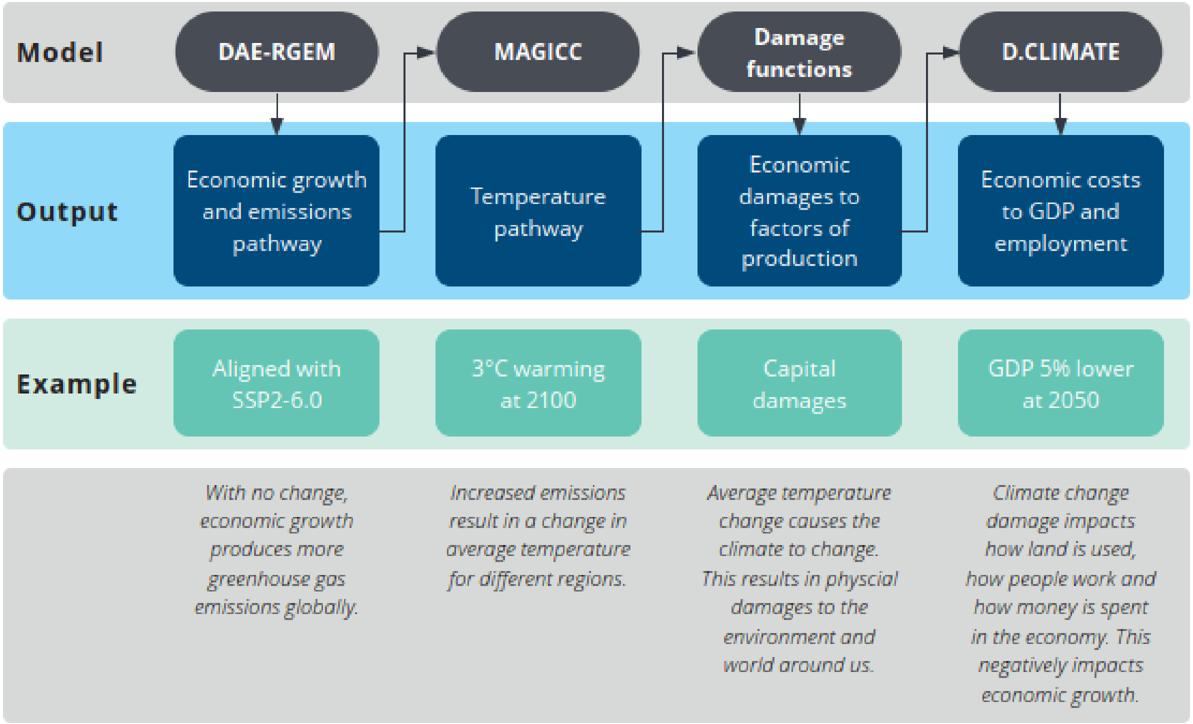


Emissions: Includes a full emission accounting framework, including combustion and non-combustion sources, a range of major GHGs, all mapped to economic activity by sector and region.

Abatement: Reflects climate policy of Queensland, Australia and the rest of the world, through both a price on GHG emissions and other policy levers.

Damages: Incorporates the physical risks of climate change. This module shows how climate change might impact various sectors of the economy.

Figure A.2: D.Climate climate-economy link



Model	DAE-RGEM	MAGICC	Damage functions	D.CLIMATE
Output	Economic growth and emissions pathway	Temperature pathway	Economic damages to factors of production	Economic costs to GDP and employment
Example	Aligned with SSP2-6.0	3°C warming at 2100	Capital damages	GDP 5% lower at 2050
	With no change, economic growth produces more greenhouse gas emissions globally.	*Increased emissions result in a change in average temperature for different regions.*	*Average temperature change causes the climate to change. This results in physcial damages to the environment and world around us.*	*Climate change damage impacts how land is used, how people work and how money is spent in the economy. This negatively impacts economic growth.*

Results from D.Climate provide a 'top down' order-of-magnitude estimate of the impact of climate change on economic outcomes such as gross domestic product (GDP), employment, industry value added (at the industry and regional level), investment and trade. These outputs can be used to provide insights into which industries, jobs and economic activity have the most to lose - or gain - from different decarbonisation trajectories. Further insights involve which local economies are impacted the most by the choices being made, the costs and benefits of different options for decarbonisation, and by how much any degree of climate change would impact the economy and organisations. To this end, the core function of D.Climate is to provide an economic analysis tool that can be used to answer a variety of questions relating to the economic impacts of a changing climate and evolving policy landscape.

Importantly, results from D.Climate should not be interpreted as forecasts or 'most likely' estimates of climate-change or net zero policy impacts. The scenario analysis and modelling framework instead provides a consistent lens through which to understand the economic difference between possible future worlds, enabling conclusions to be drawn about trade-offs and the direction of change in industries, and regional economic outcomes.

Regional and Industry definitions

D.Climate is a global model and can be tailored to a specified regional concordance in line with the GTAP database. Two WA subregions (Perth and Rest of WA) have been modelled (Table A1), in addition to other Australian states and territories, the Asia Pacific and the rest of the world.

Table A.1: Regional definitions

Modelled sub-region	SA4 Breakdown
Perth	Perth – Inner, Perth – North East, Perth – North West, Perth – South East, Perth South West, Mandurah
Rest of WA	Wheatbelt, Bunbury, Outback

The industries reported on in this report are defined in Table A2 below. These industry aggregations are based on specified sectoral concordance in line with the GTAP database. A specific effort was made to distinguish two non-GTAP sectors (hydrogen and critical minerals mining) to aid in the representation of the transition to net zero. In addition, metallurgical coal was split out from other coal mining in the model.

Table A.2: Industry definitions

Industry	Definition
Agriculture and forestry	Crops, grains, animal products, forestry and fisheries
Chemical manufacturing	Manufacturing of chemicals and chemical products
Coal mining	Thermal and metallurgical coal mining
Construction	Houses, roads and other structures
Critical minerals mining	Critical minerals mining and all other mining and extraction (e.g., metal ores)
Critical minerals manufacturing	Refining critical minerals
Electricity transmission and distribution	Electricity transmission and distribution
Fossil fuel electricity generation	Production of electricity from fossil fuel inputs
Gas manufacturing and distribution	Manufacturing and distribution of gas fuels
Government services	Public Administration and defence, Human health and social work, Education

Heavy manufacturing – electrical equipment, motor vehicles and machineries	Computer, electronic and optic, Electrical equipment, Machinery and equipment nec, Motor vehicles and parts, Transport equipment nec, Manufactures nec
Hydrogen	Hydrogen and water services
Metals manufacturing	Mineral products nec, Ferrous metals, and metal products manufacturing
Oil and gas	Oil and gas extraction
Other manufacturing	Heavy manufacturing, chemical manufacturing, food and light materials manufacturing
Other mining	Other mining extraction: mining of metal ores; other mining and quarrying – largely iron ore
Other services	Financial, real estate, business and professional
Petroleum coal manufacturing	Manufacture of coal and refined petroleum products
Renewable electricity generation	Hydro base load, Hydro peak load; Wind base load; Solar peak load, solar base load
Trade – wholesale and retail trade	Wholesale and retail trade
Transport – land and other transport	Transport nec, Water transport, Air transport, Warehousing and support activities
Water	Water supply, sewerage, and waste management

Valuing greenhouse gas emissions

The economy and climate dynamics are intertwined, with the value of emissions factored into pricing dynamics. As the imperative to reduce emissions intensifies, the value of emissions rises accordingly. This value incentivises both businesses and households to adjust their behaviour by adopting technological solutions or substituting lower-emission goods or services. This compounds pricing dynamics across economic sectors and over time to align with the rising value of emissions.

In D.Climate, this value is a reflection of shifting governmental policies and regulations, as well as the changing of preferences of businesses and households to mitigate emissions.

Global assumptions

Several global assumptions shape WA's and Australia's economic outcomes. They are consistent between the reference and target scenarios.

Table A.3: Summary of key assumptions under Reference and Target Scenarios - Global

Key Parameter	Assumptions	Source
Emissions	Global greenhouse gas emissions rapidly reduce to keep warming 'well below 2°C' (aligned to SSP1-1.9 IPCC scenario).	Climate Resources as per Meinshausen, M. et. Al.[28]
Technology learning rates	Average annual reductions in $/Kwh in capital costs for renewables (approximately 1.25% p.a. between 2030 and 2050)	IEA Net zero by 2050

Hydrogen demand	Total demand for hydrogen increases from ~100 Mt per year to ~500 Mt per year by 2050.	IEA Net zero by 2050

Appendix B Tax Assumptions

The following key assumptions have been applied during preparation of the tax estimates.

Table B.1: Taxation modelling key assumptions

General Assumptions	
Presentation Currency	Models are presented in Australian dollars (AUD).
Project Representation	Models are representative of 100% of the Browse Project and NWS Projects unless specifically stated.
Model Purpose	Models have been prepared for the purpose of calculating the estimated actual taxes the Browse Project would contribute to the Australian Government. The Models do not contemplate the financing of the Browse Project or NPV for expected cash outflows.
Income Tax Income Year	The year end for income tax is based on calendar year, this being 31 December.
PRRT Income Year	The year end for Petroleum Resource Rent Tax (PRRT) is based on financial year, this being 30 June.
Foreign Exchange Rates	The foreign exchange rate source to convert data provided in United States Dollars (USD) to AUD is based on the rate provided by the Reserve Bank of Australia as at November 2025.
Pricing	The estimated pricing for different petroleum products inputted into our models has been provided by Deloitte. Deloitte's models have used the Real Forecasts for pricing of petroleum products.
Historic Long Term Bond Rate and GDP Rates	For historic Long Term Bond Rate (LTBR) and GDP rates we have used the Australian Taxation Office (ATO) issued rates as set out on their website.
Long Term Bond Rate Forecasts	The LTBR rate forecasts are based on the Deloitte Access Economics business outlook.
GDP Rate Forecasts	The GDP rate forecasts are based on the Deloitte Access Economics business outlook.
Browse Project Assumptions	
Browse Project Participants	The Browse Project participants at 30 June 2025 are as follows: - Woodside Browse Pty Ltd (30.60%) - BP Developments Pty Ltd (44.33%) - Japan Australia (MIMI Browse) Pty Ltd (14.40%) - PetroChina International Investment (Australia) Pty Ltd (10.67%)
Browse Project Participants Interests	Deloitte's models assume there are no changes to the Browse Project participants interests in any future periods.
Browse Project Permits Allocation	The Browse project permits sit in both Commonwealth and WA State Waters. Permits WA-30-R, WA-28-R, WA-31-R, WA-29-R and WA-32-R are in Commonwealth Waters. Permits R2 and TR5 sit in WA State Waters.
Browse Permit Treatment	Offshore permits that sit in Commonwealth waters should be subject to *Petroleum Resource Rent Tax 1987* (PRRT). Offshore permits that sit in WA State Waters should be subject to WA State Royalties.
Browse Permit Apportionment	Apportionment is required for all revenue and expenses to calculate PRRT liabilities and State WA Government royalties. Apportionment has been calculated based on information provided by Woodside on resource allocation for YE22.

	Deloitte’s models are based on these apportionments stated below. To the extent these are different there is likely to be changes to the PRRT and State Royalties outputs.
Browse PRRT Application Percentage	71%
Browse WA State Government Royalties Application Percentage	29%
Browse WA State Government Royalty Rate	The Browse Project participants and WA State Government have not agreed a royalty rate for Browse state waters production. The Project's financial model estimates the royalty payable using revenue less costs (capped at 90% of revenue) at a 12.5% rate.
Browse Upstream/Downstream Split	Deloitte have relied on Woodside's response that all of the Browse Project operations would be upstream. This split is utilised for PRRT purposes.
NWS Project Assumptions	
NWS Project Participants	The NWS Project participants are as follows: - Woodside Energy Ltd - Woodside Energy (North West Shelf) Pty Ltd - BP Developments Pty Ltd - Chevron Australia Pty Ltd[39] - Japan Australia LNG (MIMI) Pty Ltd - Shell Australia Pty Ltd
NWS Project Participants Interests	Deloitte’s models assume there are no changes to the NWS participants interests in all future periods. At time of publication, participant interests are as follows: - Woodside Energy Ltd: 16.67% - Woodside Energy (North West Shelf) Pty Ltd: 16.67% - BP Developments Pty Ltd: 16.67% - Chevron Australia Pty Ltd: 16.67% - Japan Australia LNG (MIMI) Pty Ltd: 16.67% - Shell Australia Pty Ltd: 16.67%
NWS Permits PRRT and State Government Royalty Allocation	The NWS is subject to PRRT and state royalties for 100% of production. No apportionment of revenue and expenses are required, as 100% of both should be subject to both taxes.
NWS Upstream/Downstream Split	Deloitte have relied on Woodside's response regarding calculating the upstream/downstream split of operations for NWS. This split is utilised for PRRT purposes.
Income Tax Assumptions	
General	
Corporate Income Tax Rate	30%
Browse Project	
Browse Tax Loss Carried Forward Balance	The Browse Project participants do not have any carried forward tax loss balances that can be utilised.
Browse Tax Losses Generated Through Income Tax Model	To the extent the Browse Project incurs tax losses at the beginning of development, in the subsequent year the Browse Project participants seek to utilise the tax losses the loss recoupment rules are satisfied.
Browse PRRT Refunds	To the extent that PRRT refunds are generated in the Browse PRRT model, these PRRT refunds are assessable to the Browse Project for income tax purposes.

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[39] In December 2024, Woodside simplified its Australian portfolio and consolidated its focus on operated LNG assets by entering into an agreement with Chevron. Subject to completion, Woodside will acquire Chevron’s 16.67% interest in the NWS Project and the NWS Oil Project.

Browse PRRT payments	To the extent that PRRT is expected to be paid in the Browse PRRT model, these PRRT payments should be deductible to the Browse Project for income tax purposes.
NWS Project	
NWS income tax loss carried forward balance	The NWS Project participants do not have any carried forward tax loss balances that can be utilised.
NWS Tax Losses Generated Through Income Tax Model	To the extent the NWS Project incurs tax losses, if these tax losses are then recouped the NWS Project participants are able to satisfy the loss recoupment rules.
Petroleum Resource Rent Tax Assumptions	
General	
PRRT Tax Rate	40%
Browse Production License Grant Year	2028
Browse Production First Assessable Receipts Year	2033
Browse Estimated Project Life In Years	31
Browse Deduction Cap Application First Year	2041
Browse Upstream Operations	100%
General Expenditure Augmentation Rate	LTBR + 5%. LTBR for 10 years after the financial year the Project first derives assessable petroleum receipts.
Exploration Expenditure Augmentation Rate	LTBR + 5% Then GDP factor 10 years after the exploration spend was first incurred.
GDP Augmentation Rate	GDP factor.
Closing Down Expenditure Augmentation Rate	No augmentation available.
Starting Base Expenditure Augmentation Rate	LTBR + 5%
Browse Project	
Browse - Carried Forward PRRT Credits - 30 June 2025	Browse PRRT credits can continue to be carried forward, augmented until production begins and utilised if required. Deloitte have received carried forward credits for the following Browse participants at 30 June 2025: - Woodside Browse Pty Ltd - BP Developments Pty Ltd - Japan Australia (MIMI Browse) Pty Ltd No Browse credits for PetroChina have been received. Deloitte have taken the following approach for PRRT credits for the Browse Project participants: 1. If Deloitte received the unaugmented spend per year from a Browse Project participant, we have built up a position based on the year of spend and the production license (PL) grant year

	for Browse. 2. If Deloitte received the augmented balances from a Browse Project participant the opening PRRT credit position has been determined by 100% reliance on the classifications provided by that Browse Project participant. To the extent these classifications are incorrect this would impact the carry forward credits available to that Browse Project participant.
Browse - PRRT Petroleum Sales Revenue	Deloitte's PRRT model assumes all petroleum product income for a year should be the same for PRRT as income tax. This excludes LNG sales as for PRRT purposes, as a Residual Pricing Method (RPM) is required to determine the sales price.
Browse - LNG Sales Price for PRRT	As the Browse Project would be an integrated gas to liquids project, to calculate the LNG price under the PRRT rules an RPM calculation must be completed. The LNG price for Browse for a PRRT year would be the average of the cost-plus and netback prices calculated.
PRRT Historical Expenditure Classification	Deloitte have assumed the following in respect of historical classification of expenditure incurred for PRRT up until 30 June 2025: For each joint venture participant who we received the unaugmented spend we have modelled a formula that classifies all expenditure to be GDP unless the spend year is within 5 years of granting of the production license. Deloitte have then relied on the participant's classification between general and exploration. This has allowed flexibility and for augmented values to be accurately calculated. To the extent we were not provided with unaugmented spend per year for a participant for Browse Deloitte have relied on the participant's classification. To the extent the classification and augmentation is incorrect, this would have an impact on the carried forward balance available for 30 June 2025.
PRRT Future Expenditure Classification	Deloitte have modelled the following for future Browse expenditure: 1. All expenditure incurred more than 5 years before the granting of the production license occurs would be treated as GDP expenditure. 2. All "opex", "capex" and "tolling costs" incurred less than 5 years before the granting of the production license is treated as general expenditure. 3. All "abex" costs are closing down expenditure.
Deductions cap application	As the Browse Project is an LNG project, the deductions cap will apply to deem 10% of revenue to be taxable for PRRT purposes, regardless of the carried forward balance. An exemption to the deductions cap applies in the first year of production then the subsequent seven years, i.e. 8 years in total. The deductions cap only applies when the exemption period has ended or the project is in either a PRRT loss position for a PRRT year or its PRRT profit is less than 10% of assessable receipts.
NWS Project	
Carried Forward Credits of NWS Participants	Deloitte have only received the carried forward credits of NWS from Woodside. To come up with a theoretical carried forward balance for the entire project we have grossed up Woodside's interest to 100%.
NWS Petroleum Sales for PRRT	The PRRT sales for all petroleum products including LNG is calculated with reference to the sales price as set out in the pricing assumption multiplied by production values for each year. In reality, the revenue from LNG sales gas should be computed using an RPM calculation (which would result in less assessable receipts for PRRT purposes). However, as there is estimated to be no PRRT payable for the NWS project under either Scenario 1 or 2, this conservative assumption does not have any impact on the total tax payable under either scenario.
PRRT Historical Expenditure Classification	NWS carried forward credits are starting base expenditure. This is a specific category that only applies to the NWS project.
PRRT Future Expenditure Classification	As the NWS project has been operating for more than five years Deloitte has treated all "opex", and "capex" as general expenditure. All "abex" costs are closing down expenditure.

Excise Tax Assumptions	
General (Browse)	
Commodities subject to excise tax	For modelling purposes, approximately 71% of Browse production is assumed to be subject to the Petroleum Resource Rent Tax (PRRT), with the remaining 29% assumed to fall within the excise regime. Accordingly, excise has been applied to 29% of total condensate production over the life of the project. It is possible that a portion of this 29% of condensate production may not ultimately be subject to excise (for example, where production does not occur under a State permit). This will need to be confirmed and the modelling updated if required.
Change in excise tax rates	Deloitte note that the above excise tax rates are as at 18 March 2026 and these are the rates which have been used for the life of the Project. Condensate production is generally subject to excise duty calculated at progressive rates based on annual production and the Volume Weighted Average of Realised Prices (VOLWARE).
Offshore Petroleum Cost Recovery Levy (OP levy) Assumptions	
General (Browse & NWS)	
OP levy rate	Deloitte have assumed that the OP levy rate of $0.48/bbl applies to the total production from the Browse & NWS projects for their project life. Deloitte note that the OP levy is due to end on 30 June 2029, however Deloitte have assumed that the OP levy may apply to the life of the Project.

Limitation of our work

General use restriction

This report is prepared solely for the use of Woodside Energy Ltd. This report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose set out in the Engagement Letter dated August 2025. You should not refer to or use our name or the advice for any other purpose.

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Modelling the impacts of the Browse to North West Shelf Project on WA’s energy system

May 2026

Executive Summary

The study considers whether Browse is compatible with WA's transition to net zero by 2050

This study assesses how WA's energy system could transition to net zero emissions by 2050 and how the proposed Browse to North West Shelf Project (referred to herein as Browse) would affect the transition. Using Deloitte's Energy System Pathways model, the analysis compares WA's net zero pathway without Browse to an alternative pathway that includes Browse. The purpose is not to forecast the future, but to examine whether Browse is consistent with net zero by 2050 and to understand how it changes the pathway to that outcome.

WA can reach net zero by 2050 through large scale transformation of the energy system

The modelling demonstrates that a range of pathways to net zero by 2050 exist for WA. In all cases that achieve net zero, electrification and renewable electricity are the dominant decarbonisation mechanisms across the economy. Wind, solar and battery storage expand dramatically, and residual emissions are addressed through carbon capture and negative emissions technologies.

Browse changes the sequencing of the transition, rather than the ultimate destination

Introducing Browse does not materially change the net zero energy system in 2050, but it does alter the pathway taken to get there.

Without Browse, declining domestic gas supply in the 2030s forces rapid electrification of industrial processes and rapid expansion of the power sector to maintain reliability and meet emissions constraints.

With Browse, additional gas supply allows parts of this transition to occur later, by relying on other negative emissions technologies to maintain the trajectory to net zero by 2050. Renewable and electrification investment is moderated in the 2030s and increased in the 2040s, while still converging on comparable levels of renewable capacity by 2050. As such, Browse does not prevent renewables from being deployed at the rates required to reach net zero by 2050 but reduces the need for more challenging capacity deployment peaks in earlier years.

Gas availability reduces near term delivery risk in the 2030s

The modelling highlights the 2030s as a critical pressure point for the energy system. Without Browse, projected gas shortfalls place significant strain on industry and the power sector, requiring early electrification of hard-to-abate loads such as industrial heat, compressors and processing equipment. These uses are technically challenging to electrify and place additional pressure on a power system that is already expanding rapidly.

With Browse gas available, these loads can continue to use gas for longer, easing near term power system constraints and reducing the risk of reliability challenges while renewable capacity scales up.

Browse lowers system costs by deferring, not avoiding, investment

Introducing Browse gas allows some renewable, storage and network investment to be deferred to later years. Because renewable energy costs continue to fall as industries mature (due to economies of scale, learning-while-doing and technology improvements), this deferral reduces total system costs considerably over the transition period. The analysis shows that these savings arise from shifting the timing of capital expenditure rather than materially reducing the overall scale of the build out. By 2050, the total installed renewable capacity is immense in both scenarios.

Net zero still requires unprecedented renewable deployment in all scenarios

With or without Browse, achieving net zero by 2050 requires renewable and storage deployment at rates far above those achieved historically. Solar, wind and battery installation rates must increase by multiples of past averages, and this acceleration must be sustained for decades.

Model sensitivity testing indicates that a renewable deployment rate five times larger than historical rates will only reduce emissions by circa 50 per cent by 2050, irrespective of whether Browse proceeds. Browse can reduce pressure by providing energy for which emissions can be abated with CCUS when renewables are constrained, but delivery of net zero by 2050 remains dependent on renewable deployment significantly exceeding historical trends.

Negative emissions technologies are critical and represent a shared risk

As the system approaches net zero, both scenarios rely increasingly on carbon capture, land-based sequestration and direct air capture to offset residual emissions from hard-to-abate sectors. The Browse scenario relies slightly more on these technologies in later years, reflecting higher residual emissions. However, large scale deployment of carbon capture and direct air capture is required even without Browse. The deliverability of these technologies remains an important uncertainty across all pathways.

Higher energy demand increases the value of additional gas supply

The modelling shows that demand growth materially affects system outcomes. Higher demand scenarios, reflecting potential economic diversification, accelerated data centre growth and new energy intensive industries, place greater stress on generation, storage and networks. In these cases, Browse gas plays a more important role in supporting reliability and affordability while renewables are deployed at the maximum feasible pace. Lower demand scenarios reduce system pressure but do not eliminate the need for gas or the challenge of scaling renewables and storage.

There is no perfect pathway and trade offs are unavoidable

Every transition pathway involves trade offs in cost, reliability, and deliverability from the mix of technologies used - and different choices shift risk rather than remove it. Reducing reliance on gas increases pressure on renewable deployment and early electrification. Increasing reliance on gas reduces near term delivery risk but increases dependence on carbon capture and negative emissions technologies later.

Browse alone does not solve the transition challenge, but it can smooth the renewable build out during the 2030s, reduce short term delivery risk, and lower system costs without materially altering the ultimate destination.

Across a range of modelling scenarios, it is evident that a portfolio approach that advances renewables, storage, networks, gas and emissions management is required to get to net zero by 2050.

WA’s evolving energy system

From a coal-built grid to a flexible, renewable-ready system shaped by gas, rooftop solar and large-scale storage.

WA’s energy system has evolved from a coal-dominated South West Interconnected System (SWIS) to one increasingly shaped by gas, renewables, and storage. This evolution reflects changes in technology, policy and demand.

Coal and system stability

For decades, the SWIS was centred on large coal-fired power stations near Collie. From the 1970s through to the 1990s, coal provided stable baseload generation that matched predictable demand patterns and supported synchronous system operation. As recently as 2014, coal supplied more than half of SWIS electricity, accounting for around 1GW of electricity demand on average.[1]

Gas as the flexible backbone

The expansion of domestic gas supply, enabled by the Dampier to Bunbury Natural Gas Pipeline, marked the next major shift. From the 1990s onward, gas-fired generation expanded rapidly across the SWIS and became an important energy source in the Pilbara, where mining and heavy industry drive large, continuous loads. In recent years, gas has overtaken coal as the largest source of generation in the SWIS, valued for its lower emissions intensity and operational flexibility.[1]

Renewables and storage reshape operations

From the mid-2000s, utility-scale wind farms were commissioned in WA, followed by rapid growth in rooftop solar from the mid-2010s.[2,3] More recently, utility-scale solar and large batteries have accelerated change further. Together, these technologies have reshaped demand profiles and system operations in the SWIS, while the Pilbara is now beginning a similar transition, where there is the potential to leverage strong renewable resources alongside gas to support industrial decarbonisation and system reliability.

Gas and oil still dominate the energy mix

Despite recent growth in renewables, WA’s energy system remains dominated by fossil fuels. In 2024, gas accounted for 53 per cent of primary energy consumption, reflecting its role in electricity generation, mining, industry, and domestic energy use. Oil made up a further 35 per cent, driven largely by transport, freight, and aviation, where alternatives remain limited at scale.[4]

By contrast, renewables represented just three per cent of total primary energy consumption, while coal accounted for eight per cent.[4] The dominance of gas and oil reflects WA’s economic structure, including energy-intensive resource extraction, long transport distances, and export-oriented industries. It also reflects the historical availability of low-cost domestic gas and established liquid fuel supply chains.

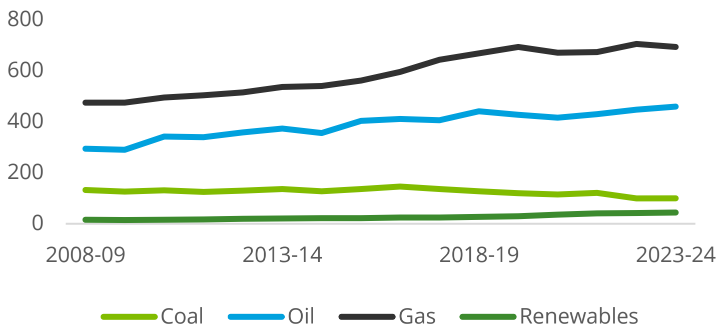
Fuel sources are changing, but slowly

Over the past decade, renewable energy has expanded rapidly in percentage terms, but from a low base. While renewables have grown at just under eight per cent per annum, the average annual increase in absolute terms has been only 2.3 petajoules per year, representing approximately 10 per cent of total growth in energy supply.[4]

As a result, renewable growth has only partially offset the decline in coal consumption, which has fallen by around 3.7 petajoules per year over the same period.[4] Once the offsetting effects of coal reduction and renewable growth are accounted for, all net growth in energy consumption has been met by oil and gas.

Gas has been the fastest-growing fuel source, increasing by 15.7 petajoules per annum, reinforcing its dominant role in the energy system.[4]

Figure 1: WA’s evolving energy needs
Primary energy consumption, by fuel, PJ



Source: DCCEEW, Australian Energy Statistics 2025

Table 1: Growth in fuel sources
Primary energy consumption, 2014 to 2024

	Growth rate (per cent)	Annual change (PJ)	Share of consumption (2024)
Coal	-2.5%	-2.8	8%
Oil	2.6%	10.4	35%
Gas	2.5%	15.3	53%
Renewables	7.0%	2.2	3%
System total	**2.2%**	**25.0**	**100%***

*Totals may not sum to 100% due to rounding

Source: DCCEEW, Australian Energy Statistics 2025

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[1] AEMO The Wholesale Electricity Market [2] Synergy [3] DCCEEW Australian Energy Statistics 2025, Table O [4] DCCEEW Australian Energy Statistics 2025, Table C

Historical energy system data has been sourced from DCCEEW, Australian Energy Statistics 2025, and is not an output of the modelling.

Lowest-cost decarbonisation under real-world constraints

Delivering the lowest-cost pathway to net zero depends on managing real-world limits across technologies, infrastructure, and system reliability.

The energy quadrilemma

Energy transitions are often framed around the traditional energy trilemma: reducing emissions, maintaining reliability, and keeping energy affordable. These remain core objectives. However, recent experience increasingly shows that a fourth dimension is equally decisive: deliverability.

Deliverability captures the practical ability to build, integrate, and operate the energy system at the required pace to reach net zero. Without deliverability, even the most cost-effective or technically sound pathways cannot be realised.

In this sense, the energy transition is better understood as a quadrilemma, where emissions, reliability, affordability, and deliverability must be balanced together.

The traditional trilemma still matters

Decarbonisation remains a defining objective for WA and commonwealth governments, with net zero targets setting the long-term direction of travel. Reliability is non-negotiable in an isolated system, where energy must be available at all times, not just on average. Affordability underpins social licence, competitiveness, and economic growth.

Trade-offs between these three dimensions are unavoidable. Accelerating renewable deployment can reduce emissions but increase short-term cost and system complexity. Prioritising reliability through firming can increase residual emissions. Managing affordability can constrain the pace of investment. These tensions are well understood and form the basis of most energy transition debates.

Deliverability as the missing dimension

What the trilemma does not fully capture is whether proposed energy transition pathways can actually be delivered in practice. Deliverability reflects a set of real-world constraints that shape the feasible transition space.

These constraints include planning and approvals timelines, traditional-owner considerations, transmission access, supply chains, workforce availability, capital mobilisation, system integration limits, and social licence. They also include the institutional capacity to plan, coordinate, and sequence investments across generation, networks, storage, and demand.

Critically, these constraints are dynamic. What is deliverable at one point in time may not be deliverable at another. As deployment scales, new constraints emerge, and previously minor issues can become binding.

Managing the quadrilemma in practice

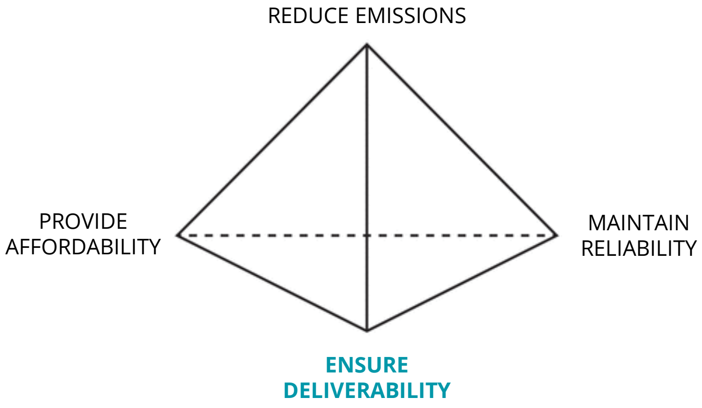
Viewed through the quadrilemma lens, the energy transition becomes a problem of managing interacting constraints rather than choosing a single optimal technology. Lowest-cost pathways remain important, but only to the extent that they remain deliverable under realistic assumptions. The same applies for lowest emission pathways, important but only to the extent that they can be delivered.

When renewables, networks, or storage cannot scale fast enough, pressure shifts to other parts of the system to maintain reliability and affordability. Gas, emissions management technologies, and alternative sequencing options play a role in absorbing these pressures. Conversely, relying too heavily on any one solution increases exposure to delivery risk elsewhere. At its extreme, the system ceases to function and system brownouts and blackouts occur.

Implications for transition strategy

There is no silver-bullet pathway that simultaneously optimises emissions, reliability, affordability, and deliverability. Each scenario resolves the quadrilemma differently, shifting trade-offs across time and technologies.

A robust transition strategy therefore maintains optionality across a portfolio of solutions and focuses on anticipating where constraints are most likely to bind. Framing the challenge as a quadrilemma provides a more realistic foundation for designing pathways that are not only ambitious, but achievable.



Net Zero by 2050 without Browse scenario (1 of 2)

A transition pathway for WA that demonstrates the scale of electrification, renewable deployment, fuel switching, and carbon management required.

Using Deloitte's energy system model, ESP, a Net Zero by 2050 without Browse transition scenario has been modelled.[5] This scenario is not intended to be a forecast and does not capture all deliverability considerations. Rather, it illustrates the scale, speed, and nature of change required across the energy system and the broader economy.

The modelling results below quantify the energy transition in WA under the Net Zero by 2050 without Browse scenario.

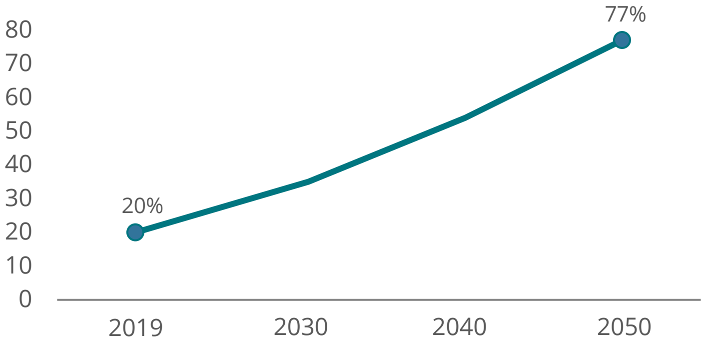
Under this scenario, net zero is achievable, but only with an unprecedented pace and scale of capital deployment, alongside deep structural shifts in how energy is produced and consumed.

Electrification as the primary driver

By 2050, the electrification rate across the economy would need to reach roughly 77 per cent, with most energy-intensive sectors relying primarily on electricity as their main energy source. Electrification enables the decarbonisation of several traditionally high-emitting sectors, including mining, industry, and oil and gas, and also supports emerging end uses such as electric vehicles and electrolysers.

As electrification accelerates, electricity consumption increases sharply. Total electricity consumption is projected to more than quadruple by 2050. Electricity is increasingly used in applications that are currently dominated by fossil fuels, including industrial process heat, mining operations, transport, and oil and gas activities. This rising reliance on electricity underpins the need for a large expansion in electricity generation and supporting infrastructure.

Figure 2: Electricity as a fraction of all energy consumption
Energy consumption, expressed as a percentage (%)



Source: Deloitte Access Economics

Scaling firmed renewables

Meeting growing electricity demand while maintaining reliability requires a major build-out of renewable generation supported by firming capacity.

Under the Net Zero by 2050 without Browse scenario, WA deploys over 52 GW of additional installed solar capacity and nearly 44 GW of onshore wind capacity by 2050. This equates to average annual deployment rates of around 1.99 GW of solar and 1.59 GW of wind. For comparison, only a total of 0.8 GW of solar and wind were deployed in 2019.

The majority of new renewable capacity is added between 2040 and 2050, reflecting both the scale of electrification and the challenge of the final stages of the transition. Variable renewable generation alone is not sufficient to ensure system stability. As coal exits the system from 2030, firming capacity becomes increasingly important.

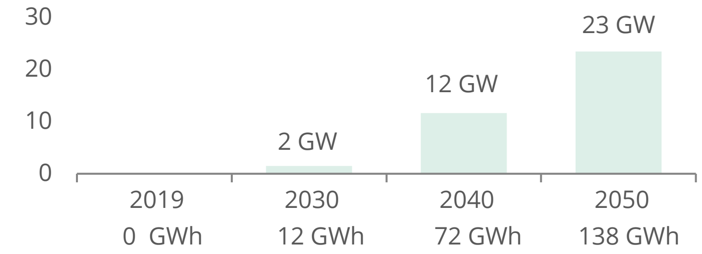
The critical role of storage

As renewable penetration increases, storage becomes essential to maintaining reliability. The scenario shows a steep increase in battery deployment, particularly after 2030.

Installed battery capacity grows to around 23 GW by 2050, with total installed energy of approximately 138 GWh.

In 2030, only around 2 GW of battery capacity is installed. Battery deployment accelerates sharply between 2030 and 2050 to keep pace with renewable generation and growing electricity demand.

Figure 3: Utility-scale battery storage
Installed capacity, in GW



Source: Deloitte Access Economics

The ESP model uses least cost optimisation

- Multiple combinations of energy sources, energy transformation processes, and abatement technologies are made available.
- The model is technology agnostic: low-cost technology combinations are deployed before high-cost combinations to achieve the lowest system cost while reducing overall emissions.
- Availability of a new energy sources does not inherently displace other energy options unless it is part of a lower-cost pathway to net zero in 2050.

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[5] Emissions reductions are enforced by an annual emissions cap, so total emissions act as a model input rather than an output. The fact that the model solves for scenarios with and without Browse indicates there is a technically feasible path to net zero in either case but does not guarantee deliverability. The model does not consider the source of the capital investment required to reach net zero. For full scenario details see page 61.

Net Zero by 2050 without Browse scenario (2 of 2)

A transition pathway for WA that demonstrates the scale of electrification, renewable deployment, fuel switching, and carbon management required.

Natural gas continues to play an important role

Gas serves as a firming fuel, whilst remaining significant in certain industrial processes where electrification is technically or economically challenging.

Declining fossil fuel use

As electrification and renewable generation expand, fossil fuel consumption declines significantly. Total fossil fuel energy use falls to around 28 per cent of 2019 levels by 2050, accounting for less than a quarter of total energy consumption in 2050.

Coal is phased out from the power sector by 2030 in line with current government policy.

Diesel use declines as transport, mining, and rail electrify, although remains in some remote mining operations. Petrol use also declines steadily as road transport electrifies.

Hydrogen and biofuels as complementary fuels

Hydrogen and biofuels play an increasing role in the transition, particularly in applications where electrification is not feasible or not cost-effective. The scenario shows growing production of low-carbon fuels, including hydrogen, renewable diesel, sustainable aviation fuel, biomethane, and other biofuels.[6]

In the near and medium term, grey and blue hydrogen dominate hydrogen production.[7] Grey hydrogen is the main form produced in 2030 and 2040, with blue hydrogen gradually increasing as carbon capture technology matures.

Turquoise hydrogen, produced via methane pyrolysis, also emerges as a significant contributor, leveraging WA's methane resources while avoiding direct emissions.

Biofuels increase from around 2030, with renewable diesel and bioethanol providing early abatement opportunities as drop-in fuels. Renewable diesel consumption rises sharply around 2030 but remains relatively steady thereafter due to feedstock constraints and competition from electrification. Biomethane and sustainable aviation fuel scale more gradually, becoming increasingly important in the 2040s and 2050s, particularly in aviation and other hard-to-electrify applications.

The role of negative emissions

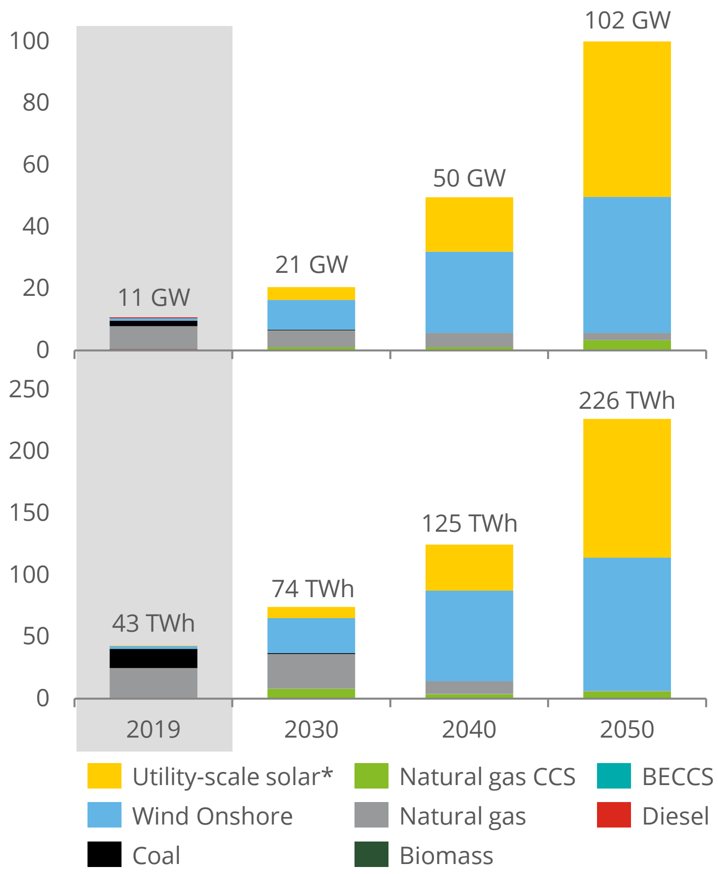
While changes in the energy mix drive most emissions reductions, achieving net zero requires negative emissions to address residual emissions in hard-to-abate sectors. Net emissions fall from around 91.9 $MtCO_2$-e per year in 2019 to net zero by 2050. Aggregate emissions across the economy decline by around 85 per cent, while negative emissions technologies play an increasingly important role.

By 2050, around 17 $MtCO_2$-e per year is removed through a combination of direct air capture and land use, land use change, and forestry, while carbon capture utilisation and storage reduces net emissions by a further 25 $MtCO_2$-e. The scenario highlights that this scale of carbon removal represents a major challenge, given the limited deployment of such technologies to date.

Implications

In this scenario, electrification and firmed renewables form the backbone of decarbonisation, supported by large-scale deployment of storage, declining but persistent use of gas and other fuels, increasing use of hydrogen and biofuels, and a critical role for negative emissions in the final stages. Modelling suggests that the pathway requires sustained delivery at a scale and speed that is unprecedented for WA's energy system.

Figure 4: Installed capacity (GW) and electricity generated (TWh) in the *Net Zero by 2050 without Browse* scenario
Installed capacity, in GW and electricity generated, in TWh



Source: Deloitte Access Economics

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[6] Low-carbon fuels are fuels with lower lifecycle greenhouse gas emissions than conventional fossil fuels.
[7] Grey hydrogen is produced from fossil fuels (typically natural gas) without capturing emissions; blue hydrogen is also fossil fuel-based but incorporates carbon capture and storage (CCS) to reduce associated emissions.

Ambition and pace in the Net Zero by 2050 without Browse pathway

Net Zero by 2050 without Browse requires renewable and storage deployment at multiples of historical rates, with even modestly slower build-out pushing the achievement of net zero out by decades.

An ambitious baseline

The Net Zero by 2050 without Browse scenario is highly ambitious relative to historical rates of renewable energy deployment (Table 2). It will require a pace of change that is well beyond what has been delivered across the past decade.

In this scenario, solar power is deployed at roughly 23 times the average annual rate achieved over the last ten years. Wind power is deployed at nine times the average annual rate achieved over the last ten years. Battery storage deployment is also ambitious, reaching around six times historical rates.

This represents a step change in both speed and coordination. It highlights that Net Zero by 2050 without Browse is not a marginal adjustment to the system, but a fundamentally different build-out trajectory that compresses what would have been decades of infrastructure development into a much shorter period.

The Net Zero by 2050 without Browse scenario demonstrates what is required if emissions reduction goals are to be met, assuming coal is exited in 2030 as per the current retirement schedule, rather than what would occur under business-as-usual conditions.

A slower deployment pathway and its consequences

To test scenarios in which required deployment rates are not achieved, alternative sensitivities were modelled using less extreme renewable deployment rates. For example, a scenario was designed with renewable deployment (wind, solar, battery) at five times the average rate of the last ten years. It represents a material acceleration relative to historical experience and would require sustained effort, coordination, and investment. In this scenario, emissions are only reduced to around 50 per cent of current levels in 2050.

A range of other scenarios were also tested (Table 2 and Figure 5) and show renewables deployment rate (wind, solar, battery) must be circa 11 times historical rates in order to achieve net zero by 2050. All other scenarios miss the targets by decades. Importantly, the difference between these scenarios is not driven by technology cost or efficiency, but by delivery. Small changes in deliverability translates into decades of delay in emissions outcomes.

If net zero by 2050 remains the objective, renewable deployment rates must exceed historical experience by a wide margin. If deployment proceeds closer to historical norms, later decarbonisation becomes unavoidable.

Implications of accelerated deployment

This level of acceleration in delivery implies rapid investment mobilisation, faster planning and approvals, and significant expansion of supply chains and workforce capability. It also assumes that high to extreme deployment rates can be maintained consistently over multiple decades.

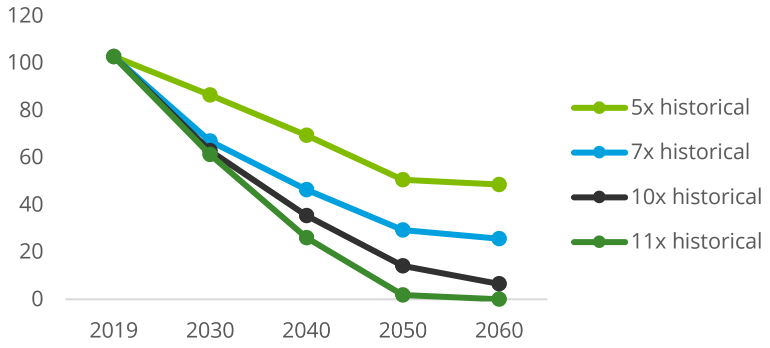
The path to these targets faces major challenges. While WA's renewable workforce grew 66 per cent between 2010 and 2019, it began from a modest baseline of just 1,020 roles.[8] Scaling the workforce to deliver deployment goals is likely to be constrained by labour and skills shortages. These pressures are compounded by global supply chain constraints, with AEMO already reporting multi-year lead times for critical grid infrastructure that would only be further exacerbated by such a rapid acceleration in demand.[9]

Table 2: Deployment rate requirements of net zero scenario
MW per annum

	Historical installation rate, 2016-25[10]		Required installation rate, model output, 2025-50	
	Average	Peak	Average	Peak
Solar	88	367	**23x average** 1,993	**9x peak** 3,479
Wind	171	401	**9x average** 1,590	**13x peak** 5,291
Batteries	139	683	**6x average** 819	**2x peak** 1,192
Renewables			**11x average**	**7x peak**

Source: CER, Deloitte Access Economics

Figure 5: Emission levels under varying renewable deployment
Total CO2e emissions (Mt), varying deployment rates, no Browse



Source: Deloitte Access Economics

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[8] Australian Bureau of Statistics

[9] AEMO

[10] Clean Energy Regulator

Modelling the transition to net zero in 2050 with Browse supplied gas

The energy system in 2050 is not materially altered with the addition of Browse gas.

To evaluate the effect of Browse gas on the energy transition, the Net Zero by 2050 without Browse scenario was modified to include the Browse Project, enabling a clear comparison between the two pathways. The key differences between scenarios are:

- Increased natural gas available for use in WA based on the expected domgas production from Browse.
- Increased LNG export volumes to include projections of gas liquified at the North West Shelf facility using gas extracted from Browse.
- Increased energy demand and emissions from extraction and processing activities at Browse, and gas liquefaction at the North West Shelf project LNG line.

All other assumptions remain the same as the Net Zero by 2050 without Browse scenario.[11]

Browse does not significantly change the destination of the energy transition

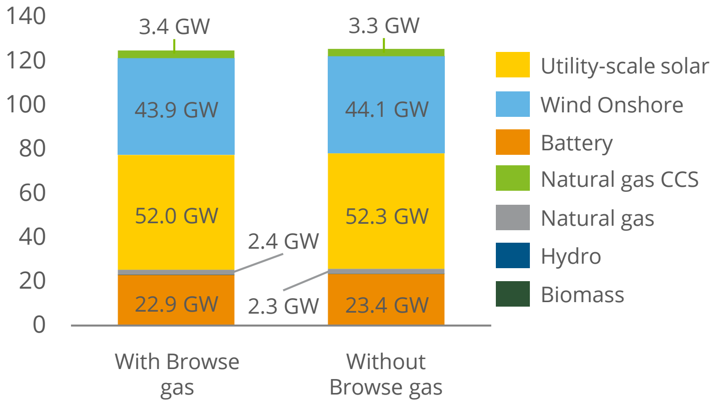
The 2050 energy system in the Browse scenario is very similar to the 2050 energy system in the without Browse scenario, with only minor differences that are explored in subsequent sections.

In both scenarios, electrification and the transition to renewable electricity generation drive the energy transition. This is reflected in the similar power sector composition observed in 2050, as shown in Figure 6.

As in the Net Zero by 2050 without Browse scenario, variable renewables alone are insufficient to meet electricity demand and require support from battery storage and natural gas. The Net Zero by 2050 with Browse scenario shows only a marginal shift towards gas fired generation in 2050, with gas generation capacity around three per cent higher and battery storage capacity around two per cent lower.

Figure 6: Installed electricity generation capacity in 2050

With and without Browse gas, GW



Source: Deloitte Access Economics

Consistent characteristics across the rest of the net zero energy system in 2050

Natural gas continues to play a role in the energy system, while most other fossil fuels are phased out in favour of electrification or displaced by low carbon alternatives.

Hydrogen, ammonia and biofuels remain important energy sources in hard-to-abate sectors.

Table 3 outlines key parameters that define the energy system in 2050 and shows how they are affected by the availability of Browse gas. Negative emissions technologies remain critical to offset the remaining 'last mile' emissions that are most difficult to eliminate. Direct air capture capacity in 2050 increases by nine per cent and total carbon captured in 2050 increases by 3.5 per cent when Browse gas is available.

Table 3: Difference in key model outputs (in 2050)

With and without Browse gas

	Net Zero without Browse gas	Net Zero with Browse gas	Impact of Browse gas (% change)
Renewable generation capacity in 2050	96.4 GW	95.9 GW	-0.5%
Battery capacity in 2050	23.4 GW	22.9 GW	-2% GW
Electrification in 2050	77%	77%	No change
Hydrogen production in 2050	3.36 Mt	3.38 Mt	+0.3%
Direct air capture in 2050	6.3 Mt	6.9 Mt	+9%
Total Carbon captured in 2050	31.3 Mt	32.4 Mt	+3.5%

Source: Deloitte Access Economics

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[11] For full scenario details see page 61

Browse as a sequencing lever in the energy transition

Browse gas de-risks delivery and the cost of decarbonisation by moderating electrification and renewables rollout in earlier decades, while still converging on net zero outcomes by mid-century.

While the energy system in 2050 is similar with or without Browse, modelling shows that the pathway to get there is different.

The principal difference between scenarios is the moderation of renewable energy deployment. This shift occurs alongside more subtle shifts in system dynamics, including a greater reliance on negative emissions technologies such as direct air capture.

Electrification remains essential

In the Net Zero by 2050 with Browse scenario, electrification remains a cornerstone of the transition, although its deployment profile changes over time, as shown in Figure 7. Greater gas availability leads to lower electricity demand in the near- and medium-term relative to the Net Zero by 2050 without Browse scenario. In both cases, electrification reaches 77 per cent by 2050.

Renewable deployment is moderated, not prevented

By 2050, installed renewable capacity in the Net Zero by 2050 with Browse scenario is only marginally lower than in the Net Zero by 2050 without Browse scenario. The more material difference lies in the timing of deployment rather than the end state.

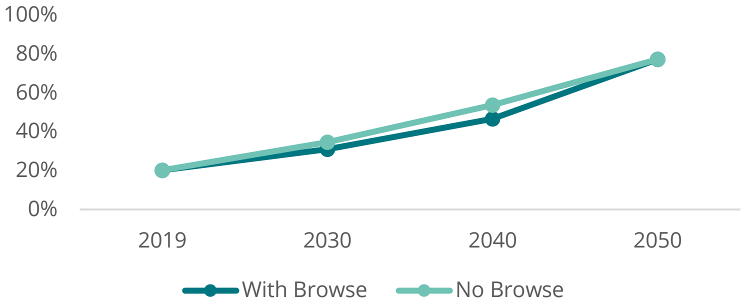
Browse gas results in a slower rollout of renewables during the 2030s, helping to mitigate deployment risks. In the later years leading up to 2050, renewable deployment accelerates to meet the net zero target. Taken together, these dynamics suggest Browse smooths the transition pathway without materially changing the total level of renewable deployment required by 2050.

Mitigating a gas supply shortage in the 2030s

A key transition impact of Browse gas is its role during the projected gas shortfall in the early 2030s.[12] In the Net Zero by 2050 without Browse scenario, constrained gas supply encourages industrial processes such as heat generation and mechanical energy for pumps and compressors to electrify earlier. These high demand processes are among the most challenging and expensive to electrify and would otherwise continue relying on gas until later in the transition.

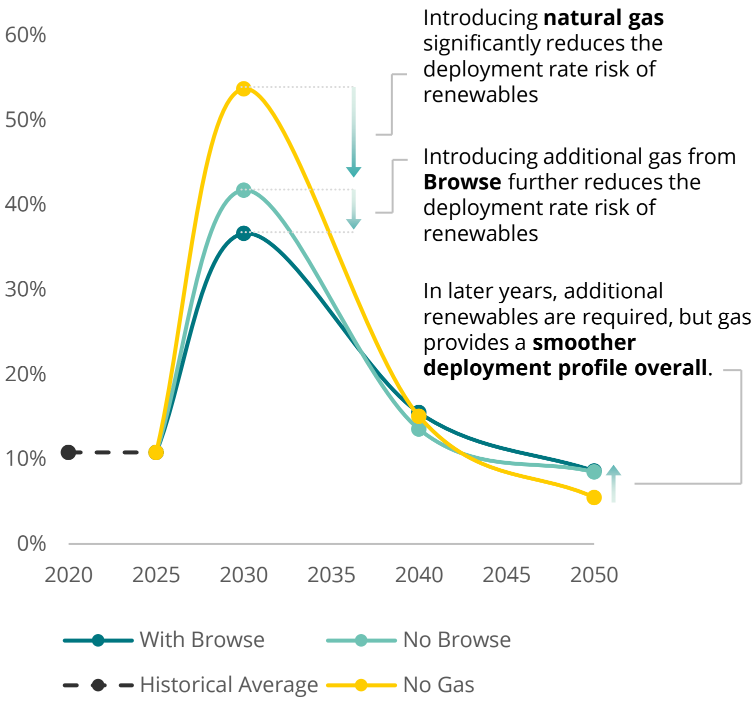
With the introduction of Browse gas, these sources of demand continue to use available gas supplies, reducing pressure on the power sector and freeing up generation capacity for use in other sectors such as mining and transport. This additional electricity availability enables faster electrification across these sectors during the 2030s.

Figure 7: Electricity as a fraction of all energy consumption
Energy consumption, expressed as a percentage (%)



Source: Deloitte Access Economics

Figure 8: Renewable energy growth rates per decade under multiple scenarios[13]
CAGR (%) renewable energy capacity deployment



Introducing **natural gas** significantly reduces the deployment rate risk of renewables

Introducing additional gas from **Browse** further reduces the deployment rate risk of renewables

In later years, additional renewables are required, but gas provides a **smoother deployment profile overall**.

Source: Deloitte Access Economics

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[12] AEMO - 2024 WA GSOO

[13] Historical average CAGR calculated based on increase in WA renewable energy generation capacity between 2020 and 2025. This calculated historical CAGR is sensitive to years chosen due to step-change nature of large facilities coming online, but global average CAGR for renewable generation is 12% between 2013 and 2025 (IEA WEO).

Additional impacts of Browse gas on the energy transition

Browse gas enables a marginally earlier displacement of liquid fossil fuels, marginally higher hydrogen production and a greater reliance on direct air capture.

Changing sectoral emissions profile and more direct air capture

Browse gas increases emissions within the oil and gas sector, which must be offset through abatement in other sectors. This is realised partially through changes in the energy mix, while also generating an increased reliance on CCUS and DAC in the power sector (as shown in Figure 9).

The Net Zero with Browse scenario shifts the peak growth of CCUS technologies and direct air capture capacity in 2050 relative to the Net Zero without Browse scenario, with these increasing by 0.1 per cent and nine per cent, respectively. This is a modest increase, with both scenarios requiring significant growth and expansion of CCUS technology above the growth rate implied by IEA global projections up to 2030.[14]

The accelerated deployment of these technologies carries an important delivery risk – with peak CAGR of CCUS technologies exceeding 30% p.a. in both scenarios – which will require careful management to achieve net zero emissions by 2050.

Earlier electrification of diesel, petrol and heavy fuel oil

With Browse alleviating the impact of gas supply shortages in the 2030s, the power sector is expected to retain sufficient capacity to facilitate the electrification of more carbon-intensive liquid fossil fuels. As shown in Figure 10, this leads to reduced consumption of liquid fossil fuels during the 2040s.

Additional hydrogen production pathways

Browse gas provides a feedstock for gas-to-hydrogen production, which could enable a marginal increase in the domestic supply of ammonia and hydrogen during the energy transition (Figure 10). This supports the decarbonisation of the industrial and transport sectors, accelerates the uptake of low-emission fuels, and provides flexibility in meeting energy demand.

Cost savings from reprofiled investment

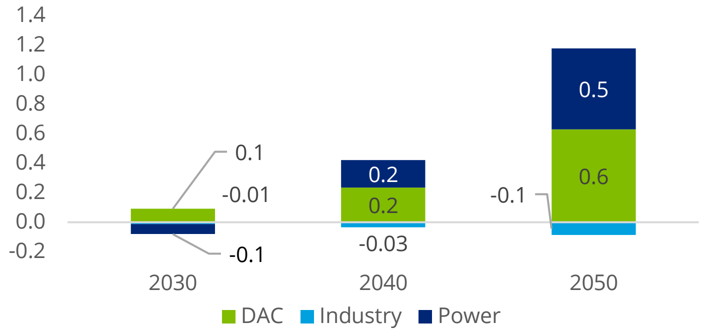
The modelling suggests that reprofiling investment across the energy system generates material system wide cost savings. It assumes that deferring capital expenditure to later years allows projects to benefit from global technology learning, increased manufacturing scale and more mature supply chains, reducing unit costs and improving procurement outcomes.

In addition to renewable generation, aligning renewable deployment with the availability of Browse gas supports system reliability and reduces the required build-out rate for other firming solutions (such as batteries).

Under these assumptions, the lower near-term requirement for new renewable generation capacity reduces the total capital investment needed, resulting in estimated savings of $9.4 billion in real undiscounted terms (or $2.9 billion net-present value discounted at 7% p.a.) across the energy system to 2050.[15]

Figure 9: Change in the volume of carbon captured with Browse

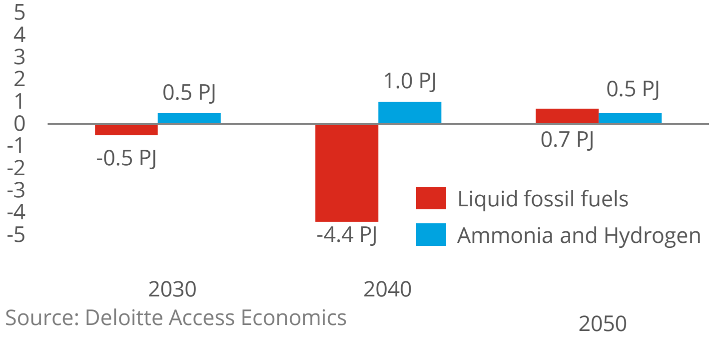
Change in carbon captured by sector, Mtpa



Source: Deloitte Access Economics

Figure 10: Change in energy consumption with Browse

Final energy consumption, by fuel type, PJ



Source: Deloitte Access Economics

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[14] IEA Global Projection Report

[15] The ESP model identifies least cost pathways but cannot robustly capture all aspects of deliverability, which could in turn impact required capital expenditure.

Demand sensitivity and system constraints

Adjusting demand assumptions materially changes how the energy transition unfolds, but does not eliminate the role of Browse gas in the energy system.

An important overlay to the State's energy transition is the State Government's diversification agenda, both of which are playing out over a similar timeframe. The Government's focus areas include domestic manufacturing, expanded minerals processing, data centres, and energy-intensive exports such as hydrogen and downstream value-adding activities.[16]

These ambitions will require a larger and more complex energy system than today. Further, it is likely that electricity demand will accelerate and become more concentrated in large industrial loads.

In this context, the State's energy system must balance multiple objectives over the next 25 years, including decarbonisation, enabling new growth, and preserving reliability and affordability.

Several additional scenarios were modelled to understand the impacts of potential changes to energy demand over time. The role of Browse gas was also considered in this context.

Higher demand scenarios

This scenario reflects plausible futures that may involve expanded domestic manufacturing, hydrogen production and export, large-scale data centres, or other energy-intensive industries.

Under these assumptions, system constraints emerge rapidly. Peak demand increases by up to 21 gigawatts relative to the Net Zero by 2050 without Browse scenario, placing significant pressure on generation, storage, and network capacity.

Renewable deployment accelerates, but even with wind and solar capacity exceeding 40 gigawatts by the mid-2030s, the system struggles to meet demand reliably without additional firming capacity.

As a result, the role of gas increases materially. Gas-fired generation provides up to 13 per cent of generation capacity in the 2030s (compared with around five per cent in the Net Zero by 2050 without Browse), with Browse gas supplying around 20 per cent of this requirement. The introduction of Browse gas also decreases system costs over the transition period.

Lower demand scenarios

Under a lower demand scenario without Browse, the opposite is true. From 2030 to 2040, renewable energy installation grows at an annual average rate of seven per cent – half of what is required under the high growth scenario. Under this lower demand scenario, less Browse gas is required for the WA energy system.

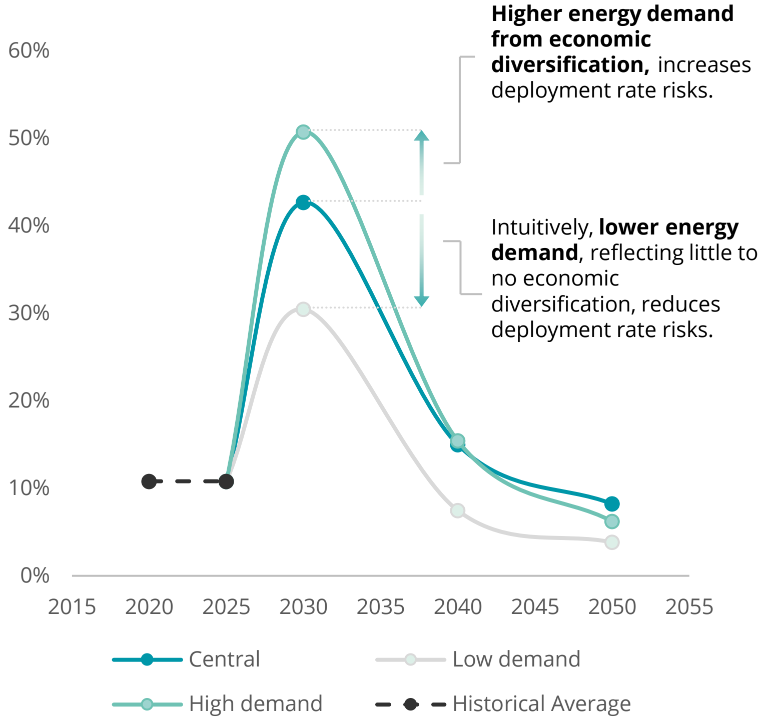
Implications for system planning

Across all demand scenarios, a consistent result emerges. Lower demand reduces system pressure but does not eliminate the role of gas.

Higher demand significantly increases system stress and materially increases the value of additional gas supply.

Browse gas therefore acts as a stabiliser in the energy system, supporting reliability and economic growth as the energy system decarbonises.

Figure 11: Renewable energy growth rates per decade under multiple demand scenarios[17]
CAGR (%) renewable energy capacity deployment



Higher energy demand from economic diversification, increases deployment rate risks.

Intuitively, **lower energy demand**, reflecting little to no economic diversification, reduces deployment rate risks.

Source: Deloitte Access Economics

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[16] Future State

[17] Historical average CAGR calculated based on increase in WA renewable energy generation capacity between 2020 and 2025. This calculated historical CAGR is sensitive to years chosen due to step-change nature of large facilities coming online, but global average CAGR for renewable generation is 12% between 2013 and 2025 (IEA WEO).

Trade offs and transition pathways

Demand assumptions and realised renewables deployment materially change how the energy transition unfolds and the role of Browse gas.

The modelled pathways provide a range of insights in relation to the role of Browse in the energy transition in WA.

1. Browse shapes the transition pathway, not the end state

The Browse Project influences the pace and cost of WA's energy transition.

Modelling shows that the availability of Browse gas allows electrification and renewable investment to be more gradually sequenced through the 2030s, delivering short to medium term cost savings and greater operational flexibility for hard-to-abate sectors through the transition to net zero by 2050.

While the sequencing differs, scenarios with and without Browse arrive at a similar energy system by 2050. Each reaches similar levels of electrification and a power sector characterised by firmed renewable electricity generation.

2. Browse supports the transition where renewables deployment is constrained

WA will not achieve net zero by 2050 if renewables deployment is limited to historical rates.

Even at five times historical deployment levels, emissions are only reduced to roughly 50 per cent of current levels by 2050.

Modelling shows that achieving net zero by 2050 requires a renewable build-out at around 11 times historical deployment rates, creating significant delivery, coordination, and system integration challenges.

In this context, Browse gas provides an additional source of energy that helps mitigate these constraints.

3. Browse supports the development of new industries

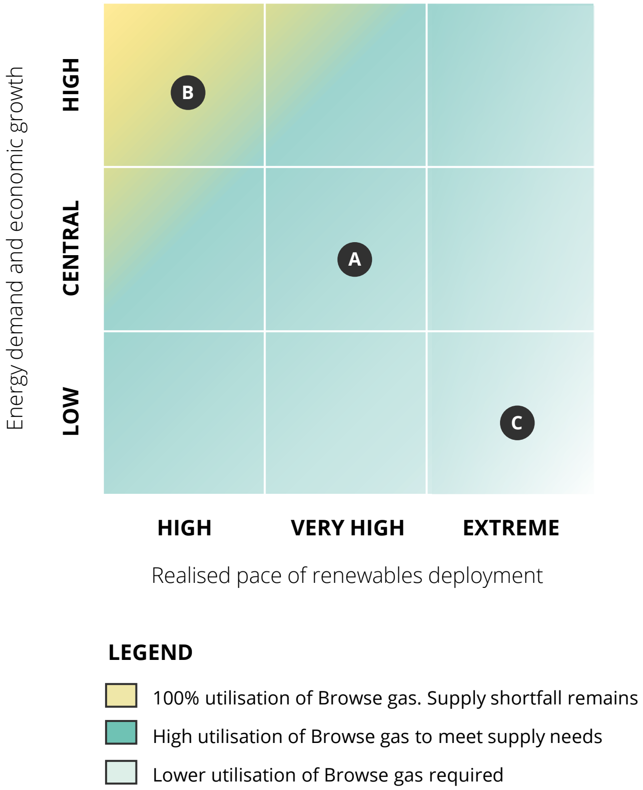
The WA diversification agenda requires a growing, more energy-intensive economy.

Under these conditions, electricity demand increases materially, placing greater pressure on generation, storage, and networks as the system decarbonises.

Should energy demand accelerate, Browse gas is anticipated to meet this demand while renewables are deployed at the maximum feasible pace.

However, in a high energy demand scenario with economic diversification, the State will likely face an energy shortfall that needs to be addressed.

Figure 12: Utilisation of Browse gas in WA's energy system



Takeaways

A. With very high renewables deployment and energy demand, natural gas supplied by Browse **plays an important role** in meeting WA's energy needs.

B. In a high demand case, without a commensurate increase in renewables, WA experiences an energy supply deficit. **More energy is required** but Browse gas helps bridge the gap.

C. Where there is an extreme pace of renewables deployment and low energy demand, **only a portion of domestic gas reservation is used** from Browse.

Additional considerations

Browse is a complex project, playing a key role in WA's domestic energy transition

Domestic gas is only one part of the puzzle

While the purpose of this study is to assess the implications of the Browse development on WA's energy system, it is only part of the story of WA's gas sector.

Under WA's domestic gas reservation policy, current LNG export projects (via project specific agreements) are expected to make available circa 15 per cent of gas extracted for domestic supply, over the life of the project. The remaining circa 85 per cent of production is available for export (as LNG) to trade partners including Japan, China and South Korea.

The economics of Browse (and other offshore gas developments) usually require LNG exports to support the commercial case for field development. Without this, projects such as Browse would not be developed on a commercial basis, impacting gas supply into the domestic market.

Equally, WA's LNG exports play a critical role ensuring energy security for gas customers across the Asian region. WA LNG assists individual countries to significantly reduce reliance on coal.

Energy security remains a key consideration for Australia's industrial trade partners. Recent gas supply disruptions in Europe following Russia's invasion of Ukraine, alongside emerging supply challenges in Asia linked to the Iran crisis, illustrate the importance of reliable energy suppliers. In both cases, energy users have been required to identify alternative sources of supply, including shifts toward Australia. WA has a long-standing reputation as a reliable gas supplier to Asia, and recent geopolitical developments highlight the continuing strategic importance of its energy exports.

No perfect pathway

Energy system modelling reinforces that there is no perfect pathway to reaching net zero. Each pathway shifts risks and constraints rather than eliminating them.

Ultimately, the pace of decarbonisation is shaped by a series of rate-limiting factors. These include how quickly infrastructure can be delivered, and which technologies can be deployed at scale.

Emissions management is critical

A common feature across all scenarios, with and without Browse, is the reliance on emissions management, particularly in the later stages of the transition. CCUS and DAC must scale materially (22x the average rate of the past decade without Browse gas and 23x with Browse gas).

Achieving this scale of deployment presents a significant delivery risk, as it requires rapid expansion of CCUS infrastructure within a relatively short timeframe in what remains a comparatively nascent industry. Historical experience highlights these challenges, with a large number of projects failing to reach completion due to technical setbacks, regulatory delays and financing constraints.

In addition, deploying CCUS across different processes is technically complex due to variations in gas composition, temperature and pressure. A one size fits all approach is not feasible, and CCUS systems must be tailored to individual applications, increasing both complexity and cost.

Trade-offs abound

This highlights an important system level trade off. Reducing pressure on renewables deployment and supporting growth through gas increases reliance on negative emissions later in the pathway.

This approach increases exposure to risks that are more difficult to quantify, given the limited deployment of CCUS and DAC across the required use cases and at the necessary scale. This risk is present in the energy transition pathway presented here, as well as in many similar studies.

Conversely, minimising the need for CCUS and DAC requires faster renewable rollout, higher upfront costs, and greater delivery risk in the power sector. Neither approach is costless or risk free.

A portfolio approach is required

From this perspective, a portfolio approach can be considered as the least-regret strategy. Progressing renewables, storage, networks, gas, and emissions management technologies in parallel reduces reliance on any single solution and lowers overall system risk.

Basis of analysis

This work has been undertaken based on the Project as of February 2026. Deloitte have relied on project details (including costings and timings) as provided by Woodside.

The analysis does not include amendments or potential compliance requirements resulting from pending State or Federal ministerial or environment approval processes.

Appendix 1: estimating energy impacts by simulating pathways across potential futures

Deloitte's proprietary Energy System Pathways (ESP) model, calibrated for the WA economy, simulates how the state's energy systems is likely to evolve under various decarbonisation scenarios.

Modelling for this report was undertaken in Deloitte's proprietary Energy System Pathways (ESP) model.

ESP is calibrated for the WA economy and simulates how the state's energy system is likely to evolve under various decarbonisation scenarios.

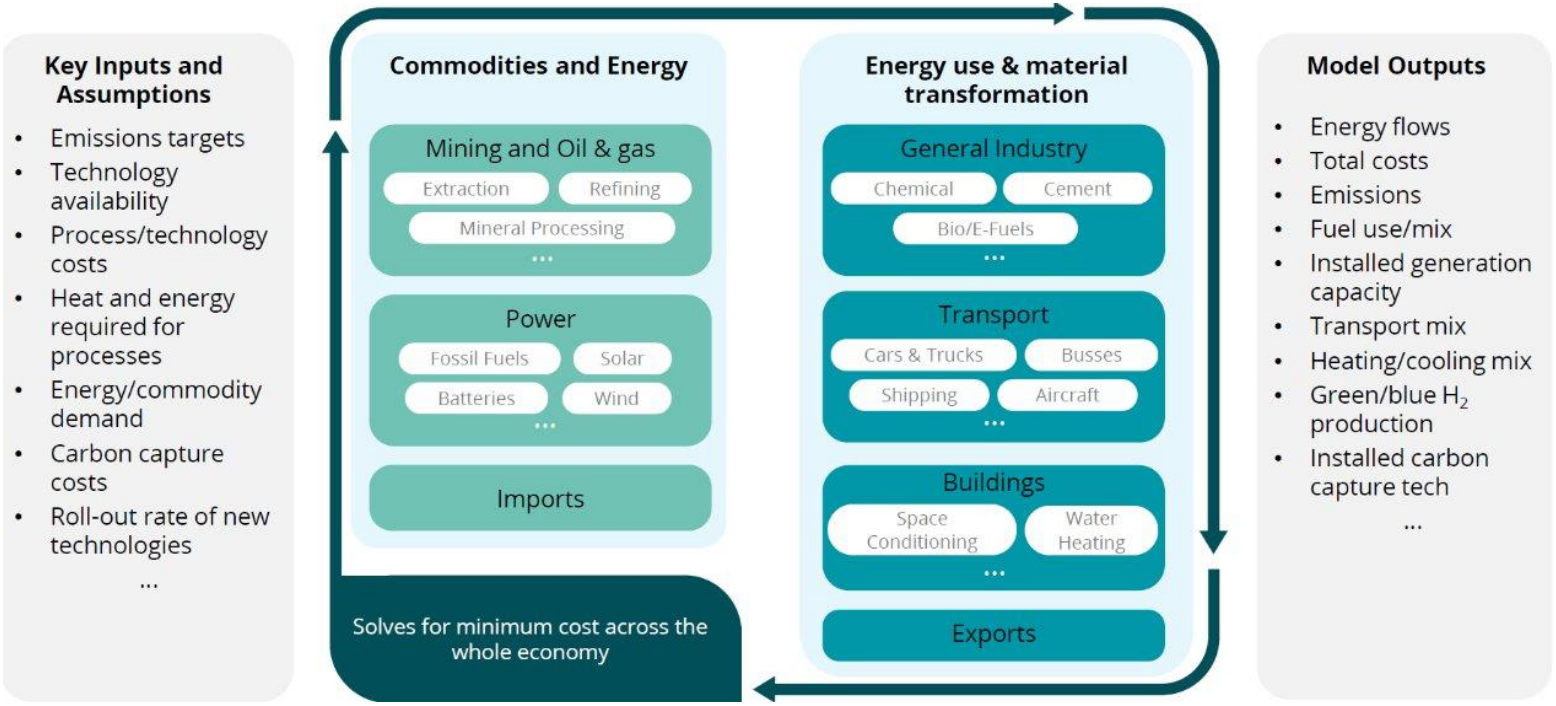
As a multi-sectoral energy system model, it simulates detailed energy system pathways across a range of potential futures, delivering quantitative insights into the key challenges and opportunities of the energy transition.

ESP tracks energy from primary sources through to final use, monitoring key metrics at each stage such as energy cost, emissions, total use and losses. The model's energy system represents the end-to-end energy flows across the WA economy - the technologies, fuels, infrastructure, costs and policy settings that govern production, transformation, delivery and consumption.

For example, one pathway may start with crude oil (primary energy) which is converted to petrol (secondary energy) and then used in an internal combustion engine vehicle (final energy). The model optimises by simulating this conversion of primary energy sources into final energy across thousands of potential pathway.

Energy flows and capacity are calculated at ten-year intervals, with detailed hourly balancing for representative days to ensure the power sector's adequacy in meeting electricity demand.

As an economy-wide model, ESP reveals the interconnected dynamics of decarbonisation across all sectors, highlighting both efficiencies and potential bottlenecks within WA's energy system.



Key Inputs and Assumptions

- Emissions targets
- Technology availability
- Process/technology costs
- Heat and energy required for processes
- Energy/commodity demand
- Carbon capture costs
- Roll-out rate of new technologies

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Commodities and Energy

Mining and Oil & gas
- Extraction
- Refining
- Mineral Processing
- ...

Power
- Fossil Fuels
- Solar
- Batteries
- Wind
- ...

Imports

Energy use & material transformation

General Industry
- Chemical
- Cement
- Bio/E-Fuels
- ...

Transport
- Cars & Trucks
- Busses
- Shipping
- Aircraft
- ...

Buildings
- Space Conditioning
- Water Heating
- ...

Exports

Solves for minimum cost across the whole economy

Model Outputs

- Energy flows
- Total costs
- Emissions
- Fuel use/mix
- Installed generation capacity
- Transport mix
- Heating/cooling mix
- Green/blue H_2 production
- Installed carbon capture tech

...

Appendix 2: The Net Zero by 2050 with Browse and without Browse scenarios identify least-cost pathways to transition the WA energy system to net zero emissions under central assumptions

The ESP model traces energy flow from primary sources through to final consumption, modelling both energy transformation and usage. By allowing for multiple energy pathways to meet a given demand, it enables comprehensive mapping of the system-wide transformation required to deliver the transition to a net-zero economy.

Key general assumptions of the Net Zero by 2050 without Browse and Net Zero by 2050 with Browse scenarios

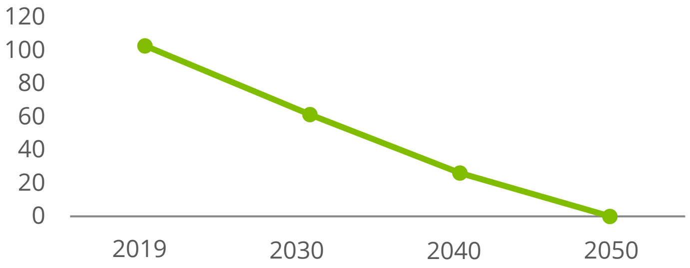
- Emissions reduction is enforced by an emissions cap which governs the maximum total allowable CO_2-e emitted in each year. This cap decreases following the trajectory shown in Figure 13, guided by a commitment to reach net zero by 2050.
- The majority of coal-fired electricity generation is phased out by 2030, following the announced retirement schedules.
- Emissions generated in the agricultural sector and carbon sequestration through Land Use, Land-Use Change and Forestry (LULUCF) are informed by the SERS report.[18]
- The model can utilise natural gas with total volume limited by a domestic supply cap. In the Net Zero by 2050 without Browse scenario, the supply is assumed to follow trajectories calculated from the 2024 WA-GSOO. In the Net Zero by 2050 with Browse scenario, the gas supply cap is increased by the forecast Browse domgas production.

Technology costs

- Operational and investment costs for key technologies are taken from Australian and international studies.[19-22] These studies include assumed cost reductions due to economies of scale, learning-by-doing, and supply chain improvements to provide a best estimate of how these emerging industries will evolve.
- Transmission infrastructure costs are based on transmission and connection cost projections in the draft 2026 AEMO ISP.[23]
- The model optimises for the lowest net present value of the total system cost, which is discounted at seven per cent per annum.
- The model base year is 2019.
- All costs presented in real 2025 AUD.

Figure 13: Assumed emissions trajectory to reach net zero

CO2e emissions (Mt)



Source: Deloitte Access Economics

Changes to assumptions in other scenarios presented

Net Zero by 2050 without Browse, including varied renewable installation rates (slide 7)

- Emissions reductions are incentivised by an emissions penalty rather than a cap. The size of the penalty is adjusted to impact the rate of renewables deployment and the rate of decarbonisation.

Net Zero by 2050 with Browse (slides 8, 9, 10)

- Gas supply cap increased by projected domgas production
- Increased LNG exports, energy demand and emissions

Net Zero by 2050 without Browse with high demand (slide 11)

- Additional industrial energy demand to produce green steel (utilising renewable energy sources)
- Higher growth in hydrogen/ammonia production, consistent with delivery of the majority of the announced production capacity in the Western Green Energy Hub and the Australian Renewable Energy Hub.[24, 25]
- Higher growth of datacentres, reaching 0.8 GW in 2050.

Net Zero by 2050 without Browse with low demand (slide 11)

- Lower growth in hydrogen/ammonia production, roughly doubling production levels by 2050.
- Lower growth of datacentres, reaching 0.1 GW in 2050
- No growth in the mining sector

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[18] SERS Report for WA [19] NREL, 2024 Electricity ATB Technologies [20] Deloitte, Low Carbon Liquid Fuels Report [21] NETL, Cost of Capturing CO_2 from industrial sources [22] CSIRO, GenCost [23] Draft 2026 AEMO ISP [24] WGEH [25] AREH

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