Sydney Ring South

Regulatory Investment Test for Transmission

Project Assessment Draft Report
29 May 2026

Acknowledgement of Country

We acknowledge the long-standing connection to Country shared by the Traditional Custodians of the lands, skies and waterways we live and work on. This connection inspires and informs the care we take when working across the lands as well.

We recognise that Country in every corner of every state we operate in, is rich in tens of thousands of years of history and culture. And that every community we work in has their own connection with the land. We honour this in the actions we take – and honour the Elders past, present and emerging.

See more information about Transgrid's commitment to cultural heritage and reconciliation

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Executive Summary

Securing reliable supply of clean, affordable power to NSW's major urban centres

The Sydney, Newcastle, and Wollongong region will be home to 8.1 million people by 2041.[1] It is Australia's largest economic powerhouse, underpinning a material share of GDP and serving as the country's major centre for finance, technology and trade. It currently accounts for 75 per cent of energy demand in NSW, with this share growing as homes and businesses electrify.[2]

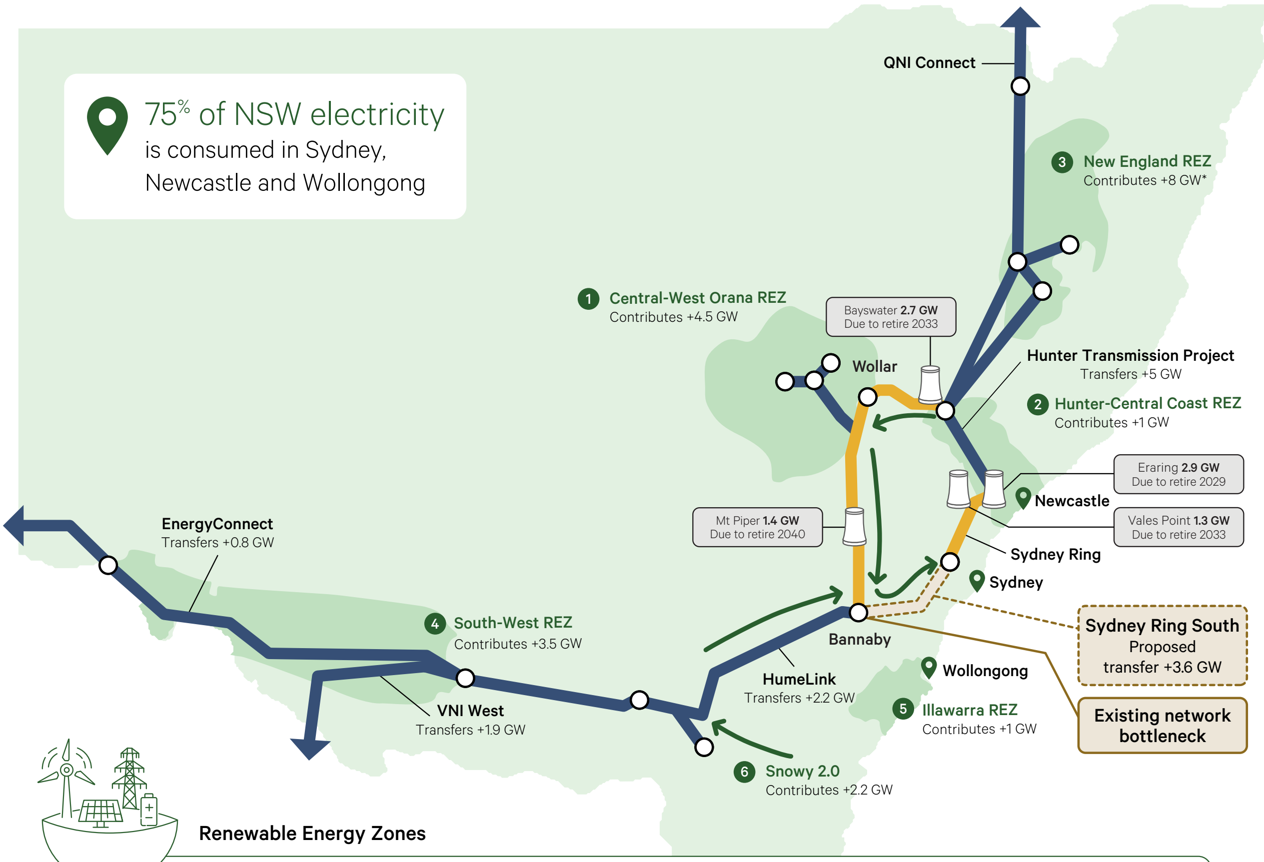
The electricity transmission network supplying the Sydney, Newcastle, and Wollongong region with generation from the south was built in the 1960s to connect the original Snowy Hydro Scheme, and it hasn't changed substantially for over 60 years. Since then, the region's population has more than doubled from less than three million people to more than six million today, and the way we now live and work in the modern economy has become far more energy intensive.

Securing a reliable and affordable, long-term power supply for electricity consumers in this region is critical as the system undergoes a new, highly dynamic phase of 'deep transition'. This transition means that as coal generators located close to Sydney, Newcastle, and Wollongong exit the system, our power will instead be generated in diverse locations across NSW and interstate.

The current transmission network approaching Sydney from the south relies on three single-circuit 330 kV transmission lines, which now represent a bottleneck that will increasingly limit the amount of renewable generation from South West NSW that reaches our rapidly growing cities to service their growing demand for electricity. While this network was fit for historical generation connections to coal-fired power stations and lower demand for electricity, it is not designed for the modern economy.

[1] NSW population projections - key findings | NSW Department of Planning, Housing and Infrastructure.
[2] AEMO Draft 2026 ISP demand forecast for the Sydney, Newcastle, and Wollongong subregion.

Figure E.1: Sydney Ring South will enable growing electricity demand in the Sydney, Newcastle, and Wollongong demand centres to be supplied by lower-cost renewable generation as aging NSW coal generators retire



Renewable Energy Zones

1 Central-West Orana REZ	2 Hunter-Central Coast REZ	3 New England REZ	4 South-West REZ	5 Illawarra REZ	6 Snowy 2.0
Contributes +4.5 GW From 2028 • Wind • Solar • Battery • Pumped hydro • Transmission	**Contributes +1 GW** From 2028 • Network upgrades • Wind • Solar • Battery	**Contributes +8 GW*** 6 GW from 2034 • Wind • Solar • Battery • Transmission	**Contributes +3.5 GW** • Wind • Solar • Battery • Transmission	**Contributes +1 GW** • Solar • Battery • Network upgrades	**Contributes +2.2 GW** From 2028 • Hydro • Transmission

Coal power stations

Eraring	Vales Point	Bayswater	Mt Piper
-2.9 GW exits 2029	-1.3 GW exits 2033	-2.7 GW exits 2033	-1.4 GW exits 2040

- Existing transmission
- In construction/development
- Indicative power flow
- Substations
- Renewable Energy Zone

*Intended.

Since the 1970s, network planners have proposed and constructed a transmission network that gradually formed a ring around Sydney, Newcastle, and Wollongong (known as the Sydney Ring), to transfer power from existing generators to our largest cities. A high voltage 500 kV network was envisioned to supply the Sydney Basin – running from South Western Sydney to the Southern Tablelands, turning north along the Great Dividing Range to the Upper Hunter, and looping back into Sydney via the Hunter and Central Coast.

The Hunter Transmission Project[3] in the north, and now the proposed Sydney Ring South Project are intended to strengthen the Sydney Ring by increasing its capacity to efficiently transfer over 15 GW of power generated by renewable sources across NSW to our growing cities, maintaining reliable supply as 8.3 GW of coal-fired generation, which our major economies rely on, leaves the system by 2040.[4]

The long-term impact of a strengthened ring on the NSW energy system becomes greater than the sum of its parts,

[3] Hunter Transmission Project.
[4] Combination of transfer capacity uplift from Hunter Transmission Project and a 500 kV transmission line option for the Sydney Ring South Project. Source: AEMO 2025 Electricity Network Options Report.

ensuring homes, small businesses and major industry in Sydney, Newcastle, and Wollongong will benefit from secure access to an abundant supply of reliable, lower-cost energy from renewable generation.

We anticipate that developing a Sydney Ring South transmission line will open up the supply of lower-cost energy, delivering significant bill savings to NSW energy consumers. If built, the preferred option is forecast to lower average household bills by $51 per year between 2034 and 2043, and to lower average small business bills by $110 per year (real $2024/25).

The project will provide greater access to lower-cost generation and enable the energy market to operate more efficiently, lowering wholesale electricity prices - the largest component of bills. While network charges will increase due to the investment, these costs will be more than offset by reductions in generation costs. Consumer benefits and lower prices will be even greater if electricity demand grows faster than currently forecast.

This Project Assessment Draft Report (PADR) identifies a new 500 kV line between Bannaby in the Southern Tablelands and South Western Sydney, to be in service as soon as practicable in the mid 2030s, as the best option to deliver new sources of energy in a changing system that meets the long-term needs of NSW energy consumers.

All options tested within this PADR that include a high voltage transmission line show similar cost-benefit results (within 4.5 per cent of each other), and effectively rank equal first (Option 6, Option 3, Option 4 and Option 5). These options all feature the development of a new transmission line at the core, with variations to initially operate at 330 kV (Option 3, which defers some capital expenditure); to add power flow control devices (Option 5 and Option 6); or, later in-service commissioning of a 500 kV transmission line (Option 5). Option 6, which combines a 500 kV transmission line planned in the mid 2030s with a power flow control solution in 2030/31, performs best under high-growth sensitivities and scenarios, given it delivers the largest uplift in network capacity.

> Strong engagement is crucial in getting this right. Community and stakeholder feedback will play a critical role in the project, and we are seeking community views before decisions are made, not after. We encourage communities and stakeholders to participate, challenge assumptions, and help inform the future of the electricity system for NSW.

Community will play a critical role

This document is a starting point for a long-term conversation, not a determined outcome. The final engineering solution will not be decided for some time. The project identified in this PADR will not be easy to build, with a new 500 kV transmission line extending more than 100 km from Bannaby in the Southern Tablelands to South Western Sydney.

Any pathway through South Western Sydney would traverse areas transformed by historic and unprecedented urban growth, from lower-density and semi-rural landscapes to Australia's third-largest and fastest-growing economy, which is now home to more than 2.5 million people, the new City of Bradfield and the Western Sydney International Airport. These diverse communities are experiencing rapid population growth, significant infrastructure investment, land-use transformation and new industrial development.

While the Sydney Ring South Project is critical to securing the reliable and affordable energy future that communities need, this significant change in the urban landscape across South Western Sydney means strengthening the Sydney Ring will create impacts on local landowners and communities. In this assessment, Transgrid has considered how this complexity may affect project delivery options and costs, and how impacts might be mitigated and recompensed. However, we recognise that it will not be an easy balance to strike for Transgrid, planning authorities, energy regulators, energy consumers and affected communities alike.

It will be critical that Transgrid works in partnership with communities and key local stakeholders to ensure transparent engagement, build trust, and enable meaningful participation in decision making.

This assessment sets out a high-level view, which focuses on the future and recommends a pathway forward that delivers the greatest economic net benefit and meets the long-term interests of NSW energy consumers.

Strong engagement is crucial in getting this right. Community and stakeholder feedback will play a critical role in the project, and we are seeking community views before decisions are made, not after. We encourage communities and stakeholders to participate, challenge assumptions, and help inform the future of the electricity system for NSW.

Transgrid is committed to working with local communities with honesty and integrity in a meaningful, responsive and equitable way through transparent and inclusive practices. Commencing early engagement on the corridor and route for a new 500 kV transmission line would allow more time to work with communities, government planners and developers, minimising the impacts of delivering this transformational project. Starting this process early would minimise risks and impacts to developing communities that may otherwise drive higher costs to deliver a more complex project in the future, resulting in higher costs for energy consumers.

Transgrid is responding to a need identified by the national transmission planner

As early as the *2020 Integrated System Plan* (ISP), the Australian Energy Market Operator (AEMO) expected that a future project would be needed to reinforce the network supplying the Sydney, Newcastle, and Wollongong region, reduce costs and enhance system resilience and optionality.[5]

Since the *2020 ISP*, the Sydney Ring South Project has been identified as a future need and was named an actionable project in the *2024 ISP*, with that status reaffirmed in the recent *Draft 2026 ISP*.[6]

This PADR is the first step in the Regulatory Investment Test for Transmission (RIT-T) that assesses a range of credible options against an identified need and proposes the option that delivers the greatest net market benefits in the long-term interest of consumers. AEMO identifies the need for the Sydney Ring South Project as:

- delivering net market benefits for consumers to increase the power system's capability to supply the Sydney, Newcastle, and Wollongong demand centres, replacing supply capacity that will be removed on the closure of coal-fired power stations in the Newcastle area; and
- efficiently service increasing peak demand.[7]

While the *2024 ISP* specified a publication date of June 2025 for this PADR, the Australian Energy Regulator (AER) granted Transgrid an extension in 2025 to publish the PADR by 30 April 2026.[8] On 16 April 2026, Transgrid advised the AER that publication of the Sydney Ring South PADR would be deferred until 29 May 2026. The extension has allowed Transgrid to better consider relevant new data and insights arising from the *2025 Inputs, Assumptions and Scenarios Report*[9] (IASR), the *2025 Electricity Statement of Opportunities*[10] (ESOO) and the *Draft 2026 ISP* to minimise the risk of material changes impacting the project between the release of this PADR and publication of the Project Assessment Conclusions Report (PACR).

Six Sydney Ring South Project options are assessed at this stage of the RIT-T

This PADR adopts and builds on the four credible Sydney Ring South Project options identified in the *2025 Electricity Network Options Report* (ENOR),[11] which were tested in AEMO's *Draft 2026 ISP*, including updated cost estimates. Two additional options that combine and stage components of the *2025 ENOR* options have also been considered.

The option numbering referenced in this PADR reflects the option numbering in the *2025 ENOR* except for Option 5 and Option 6, which are introduced in this PADR. Option 1 in the ENOR is not considered here as this is progressing separately as the Hunter Transmission Project; delivered by Energy Corporation of NSW (EnergyCo) as a Priority Transmission Infrastructure Projects (PTIP) under the *NSW Electricity Infrastructure Roadmap*.

[5] Sydney Ring South was originally part of the "Reinforcing Sydney, Newcastle & Wollongong Supply" project, which was identified as a future ISP project in the final 2020 ISP. See 2020 Integrated System Plan pg. 15-16.
[6] AEMO Draft 2026 ISP.
[7] ISP Appendix 5: Network Investments, pg. 25.
[8] Sydney Ring South PADR publication extension | Australian Energy Regulator.
[9] AEMO 2025 Inputs, Assumptions and Scenarios Report.
[10] AEMO 2025 Electricity Statement of Opportunities.
[11] AEMO 2025 Electricity Network Options Report.

Table E.1: Summary of the options assessed in this PADR

Option	Description	Added network capacity	Timing	Capital cost (nominal)
Incremental augmentations				
Option 2	New South Creek 500/330 kV substation	+0 MW (improves utilisation of existing network)	2030/31	$644 million
Option 2d	Install series reactors as power flow controllers in the existing 330 kV network (2024 ISP candidate option)	+0 MW (improves utilisation of existing network)	2030/31	$240 million
Options including a new transmission line				
Option 3	Staged delivery of a high-capacity transmission line from Bannaby in the Southern Tablelands to South Western Sydney: Stage 1: 500 kV double-circuit line from Bannaby, initially operated at 330 kV, plus a South Creek 330 kV switching station Stage 2: Upgrade South Creek to a 500/330 kV substation, and upgrade line operation at 500 kV	Stage 1: +1,300 MW Stage 2: +2,300 MW	Stage 1: 2033/34 Stage 2: 2040/41	Stage 1: $2,646 million Stage 2: $1,162 million Total: $3,808 million
Option 4	High-capacity transmission line from Bannaby in the Southern Tablelands to South Western Sydney, including a new South Creek 500/330 kV substation Stage 1: New South Creek 500/330 kV substation Stage 2: 500 kV double-circuit line from Bannaby to South Western Sydney	Stage 1: +0 MW (improves utilisation of existing network) Stage 2: +3,600 MW	Stage 1: 2030/31 Stage 2: 2033/34	Stage 1: $942 million[12] Stage 2: $2,411 million Total: $3,353 million
Option 5	Installing series reactors as power flow controllers and a deferred high-capacity transmission line from Bannaby in the Southern Tablelands to South Western Sydney and a new South Creek 500/330 kV substation (Draft 2026 ISP optimal development path): Stage 1: Install series reactors as power flow controllers in the existing 330 kV network Stage 2: New South Creek 500/330 kV substation and a 500 kV double-circuit line from Bannaby to South Western Sydney	Stage 1: +0 MW (improves utilisation of existing network) Stage 2: +3,600 MW	Stage 1: 2030/31 Stage 2: 2037/38	Stage 1: $251 million Stage 2: $4,664 million Total: $4,915 million
Option 6	Option 5 scope, delivered to an earliest in-service schedule: Stage 1: Install series reactors as power flow controllers in the existing 330 kV network, plus a new South Creek 500/330 kV substation Stage 2: 500 kV double-circuit line from Bannaby to South Western Sydney	Stage 1: +0 MW (improves utilisation of existing network) Stage 2: + 3,600 MW	Stage 1: 2030/31 Stage 2: 2033/34	Stage 1: $1,135 million Stage 2: $2,384 million Total: $3,519 million

Option numbering in this PADR aligns with the Draft 2026 ISP. Option 1 is not considered as it is progressing separately as the Hunter Transmission Project, and Options 2a, 2b and 2c were considered in previous ISPs, but are no longer being assessed.
Cost estimates provided reflect the cumulative risks, contingencies and timing associated with delivery of the entire program of works for each option. As a result, options demonstrating overlapping but varying scope do not reflect a 'building block' approach to cost estimates.

Option 3, Option 4, and Option 6 all reflect a new 500 kV line from Bannaby in the Southern Tablelands to South Western Sydney built by the mid 2030s, whereas Option 5 proposes later in-service commissioning of a 500 kV line (2037/38). Option 5 and Option 6 each combine series reactors as power flow controllers on the existing 330 kV network with a new 500 kV line delivered in different timeframes. Option 6 has been included to test the value of power flow control as a possible net beneficial addition when a new transmission line is planned for earliest in-service commissioning.

Several additional network options have also been considered over the course of preparing this PADR. These additional options and the reasons they have not progressed are summarised in the body of the PADR.

12 Compared with Option 2, the cost of delivering the South Creek 500/330kV substation in Option 4 includes additional scope to accommodate power flows from the 500 kV transmission line that would be delivered in Stage 2.

Cost estimates are based on the latest available information but are early stage and will undergo further detailed analysis as the project develops

Previous experience demonstrates that transmission cost estimates can increase as projects move beyond early concept as community expectations, scope, constructability and market conditions became clearer.

When assessing cost estimates for Sydney Ring South options, we have drawn on recent experience to enhance our approach to costing options at this stage of development. Estimates have been prepared using a first principles methodology supported by independent estimating specialists and have been benchmarked against major transmission projects at more advanced stages of delivery. Cost estimates for Sydney Ring South also include consideration of social licence, property and constructability constraints.

Transgrid acknowledges that costs presented in this PADR could increase or decrease as the project advances. Key elements include understanding corridor, routes and feasible design, engineering and constructability assessments, targeted community and stakeholder engagement to reduce scope and property risk, market testing through early contractor involvement, and procurement planning for long-lead equipment. Commencement of early works and engagement would help improve the accuracy of cost estimates for this project.

At this early stage of development, the project corridor, route and preferred technology are yet to be identified

For all options involving a new 500 kV transmission line, the costs presented in this PADR are primarily based on an overhead transmission design, which is typically the lower-cost design that addresses requirements in the *National Electricity Rules*[13] and the RIT-T economic assessment process for Transgrid to deliver economically-efficient investment.

Transgrid acknowledges that identifying an appropriate project corridor and preferred route for the proposed transmission line would require extensive community consultation and engagement, resulting in social licence considerations that may influence the length, location and design of the transmission line, including, if feasible, the potential for partial undergrounding . While this work has not yet commenced, Section 4 sets out our proposed approach, which is also outlined in more detail on the project website.

Transgrid acknowledges that identifying an appropriate project corridor and preferred route for the proposed transmission line would require extensive community consultation and engagement, resulting in social licence considerations that may influence the length, location and design of the transmission line, including, if feasible, the potential for partial undergrounding. This work has not yet commenced.

Recognising community and stakeholder interest in undergrounding transmission infrastructure, Transgrid has considered a range of possible route lengths and design options to inform the cost estimates for the options presented in this PADR. This includes preliminary assessment of a concept that reduces community impact, including partial undergrounding up to 20 km of the line, which is based on preliminary costings would increase costs by up to $2,700 million (nominal).

Noting the specific corridor, terrain, and geotechnical factors that will be key contributing factors to this figure are not yet determined, in general, undergrounding as a construction technique results in a higher-cost position attributed to greater construction complexity, longer delivery timeframes and higher property acquisition costs.

Our analysis is consistent with the *2025 Electricity Network Options Report* (ENOR) which notes that the cost of undergrounding a 500 kV AC transmission line is approximately three to seven times more expensive than an equivalent capacity overhead design.[14]

Transgrid anticipates feedback on social licence from a broad range of stakeholders, including consumers, government, community and regulators as the project develops; including questions and comments about the feasibility, cost and value of undergrounding. These considerations will be further addressed in the PACR.

[13] National Electricity Rules (v. 247) | AEMC.
[14] AEMO 2025 Electricity Network Options Report.

Non-network options were considered for the project

On 26 June 2024, AEMO sought submissions from providers of potential non-network solutions that may be capable of addressing or partially addressing the identified need.[15] Submissions closed on 18 September 2024, and AEMO received two submissions from proponents of prospective storage projects in the Greater Sydney Region (both of whom requested confidentiality).

Both proponents described prospective storage projects that could connect within the Greater Sydney region, but did not identify the network support services proposed to meet the identified need that extend beyond the standard market operation of grid-connected storage facilities, which are considered by default through the approach adopted for the PADR.

Analysis in this PADR highlights that a significant number of grid-scale storage projects are required within the Sydney, Newcastle, and Wollongong region, even if the Sydney Ring South Project is developed. If they progress, the submitters' proposed storage projects would play an important role in the energy system, but on their own, storage projects at this scale would not be a sufficient alternative to the Sydney Ring South Project.

Transgrid reviewed the submissions and concluded that neither submitter proposed a credible non-network option that would meet the identified need and warrant assessment in the PADR. We notified submitters that should a non-network option emerge for which their projects may be able to provide network services, Transgrid would re-engage to seek detailed information to assess technical and commercial feasibility of all potential service providers.

Early delivery of the 500 kV transmission line delivers the highest net market benefits

This PADR finds that at this stage of the RIT-T, Option 6 is the 'preferred option': planning a 500 kV transmission line from Bannaby in the Southern Tablelands to South Western Sydney in 2033/34, coupled with the installation of series reactors as power flow controllers on the 330 kV network in 2030/31. Option 6 represents the same infrastructure scope included in the *Draft ISP 2026* Optimal Development Path (ODP), except the 2033/34 timing brings the transmission line forward to the earliest in-service date.

This option delivers the greatest expected net market benefit of all options considered, and performs well across a range of plausible scenarios, particularly those involving strong growth in electricity demand. It is the top-ranked option on a scenario-weighted basis (and under the Accelerated Transition scenario). Overall, it is estimated to deliver approximately $3,200 million of (present value) net market benefits over the assessment period on a scenario-weighted basis.

For energy consumers, this means that on a probability-weighted basis, building and operating the top-ranked option for the Sydney Ring South Project (Option 6) would cost $3,200 million less than building and operating an alternative (or counterfactual) energy system that instead only relies on a mix of generation and storage investments that would otherwise be required within the Sydney Basin to meet their long-term needs.

The higher cost of this more expensive, alternative system would inevitably be passed on to energy consumers through higher bills for homes and businesses and would not represent the long-term interests of NSW energy consumers.

On a probability-weighted basis, the top-ranked option for the Sydney Ring South Project is Option 6. This involves planning a 500 kV transmission line between Bannaby in the Southern Tablelands to South Western Sydney in 2033/34, coupled with the installation of series reactors as power flow controllers on the 330 kV network in 2030/31. This would cost $3,200 million less than building and operating an alternative energy system that would instead rely on a mix of generation and storage investments in the Sydney Basin to meet long-term consumer needs.

[15] See: "Call for non-network options - 2024 Integrated System Plan" | AEMO.

Additionally, uncoordinated, market-driven investment carries a higher risk to reliability of supply for NSW energy consumers. It therefore represents a less prudent and efficient response to the identified need than the Sydney Ring South Project, which enables the transfer of abundant, lower-cost renewable energy generated across regional NSW.

Transgrid highlights that all options that plan the delivery of a new high-capacity transmission line achieve the highest market benefits. We note that Option 3, Option 4, and Option 5 have estimated net benefits that are within 4.5 per cent of those estimated for Option 6 on a scenario-weighted basis; and are therefore effectively ranked equal.

At their core, these options share a common foundational basis: the development of a high-capacity transmission line with relatively minor variances in the scope and staging of infrastructure. Option 3 involves the staged delivery of a high-capacity transmission line initially operated at 330 kV, plus a South Creek 330 kV switching station by 2033/34. This would allow for capital investment in the 500 kV switchyard at the South Creek substation to be deferred by approximately seven years.

Alternatively, Option 4 involves the delivery of the 500 kV transmission line in 2033/34 without power flow controllers; and Option 5 delays the in-service commissioning of the transmission line to 2037/38, following the installation of power flow controllers in 2030/31.

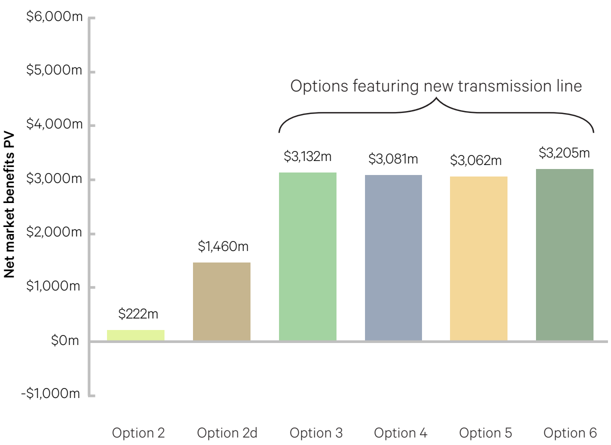
At this stage of the RIT-T, Option 6 is preferred as the top-ranked option on a scenario-weighted basis.

While the assessment indicates that series reactors as power flow controllers on the 330 kV network will deliver the energy system incremental value when a 500 kV transmission line is planned for 2033/34, Transgrid intends to undertake further analysis to determine the potential option value of proceeding with a power flow control solution. This analysis will be undertaken for the PACR and confirm whether this investment can be avoided, or whether it is indeed net-beneficial when combined with a longer-term, high-capacity transmission line solution.

In addition, given the closeness of the results, Transgrid intends to further investigate (and confirm in the PACR) the optimal timing of the transmission line under each scenario for the staged options (Option 3 and Option 5) to compare them to Option 6 and Option 4. A proportionate approach has been taken in this PADR where the timing of the second stage of these options has been fixed in all scenarios.

The option to deliver the South Creek substation work alone (Option 2) is not proposed to be assessed further as part of this RIT-T, given the PADR finds that it generates negligible net market benefits on a weighted basis (and net costs in the Step Change and Slower Growth scenarios).

Figure E.2: Cost benefit assessment and ranking of PADR options, weighted results across ISP scenarios ($2024/25)



Ranking	Option	Net benefit ($ millons PV)	Difference from first ranked
1	Option 6	3,205	
2	Option 3	3,132	-2.3%
3	Option 4	3,081	-3.9%
4	Option 5	3,062	-4.5%
5	Option 2d	1,460	-54.5%
6	Option 2	222	-93.1%

Option 2	New South Creek 500/330 kV substation in 2030/31
Option 2d	Series reactors as power flow controllers in existing 330 kV network in 2030/31
Option 3	Staged delivery of 500 kV transmission line from Bannaby to South Western Sydney, initially operated at 330 kV from 2033/34
Option 4	Staged delivery of 500 kV transmission line from Bannaby to South Western Sydney, in service 2033/34
Option 5	Series reactors as power flow controllers in 2030/31, followed by 500 kV transmission line from Bannaby to South Western Sydney in 2037/38
Option 6	Series reactors as power flow controllers in 2030/31 followed by 500 kV transmission line from Bannaby to South Western Sydney in 2033/34

Option numbering in this PADR aligns with the Draft 2026 ISP. Option 1 is not considered as it is progressing separately as the Hunter Transmission Project, and Options 2a, 2b and 2c were considered in previous ISPs, but are no longer being assessed.
The cost-benefit of each option is assessed against the counterfactual scenario where no Sydney Ring South infrastructure is developed

Sensitivity testing confirms the ranking and the strong expected net benefits from the preferred option

We have investigated a range of sensitivities that reflect credible trajectories of the NSW energy transition over the coming decades. Table E.2 illustrates the impact of each of these sensitivities on the estimated net market benefit of the preferred option at this stage of the RIT-T. The sensitivities also demonstrate that the delivery of a new 500 kV transmission line (Option 6, Option 3, Option 4 and Option 5) provide the greatest expected net market benefits.

Option 6 provides particularly high benefits in scenarios and sensitivities featuring strong growth in electricity demand, including rapid electrification and decarbonisation (Accelerated Transition); and if data centre growth materially exceeds forecasts included in the *Draft 2026 ISP*. Under these conditions, the energy system supplying Greater Sydney would become increasingly strained without the Sydney Ring South Project.

Even under sensitivities for a higher adoption of consumer and distribution-connected solar and storage resources, or lower growth in data centres, the analysis shows that a new high-capacity transmission line planned for 2033/34 will maximise net benefits in the long-term interests of consumers.

Table E.2: Net market benefits for preferred option (Option 6) under select sensitivities, Step Change scenario ($2024/25)

Sensitivity	Net market benefits PV
Alignment with NSW Electricity Infrastructure Roadmap development *Inclusion of generation projects that have been awarded Access Rights in South West and Central West Orana REZs, and Stage 2 of the New England REZ transmission project, which were not included in the Draft 2026 ISP.*	$4,100 million *+ $700 million to core Step Change scenario*
Constrained use of diesel as a back-up fuel *Constrained use of diesel as a back-up fuel at gas power stations in the Newcastle and Central Coast regions, consistent with environmental license conditions.*	$3,600 million *+ $200 million to core Step Change scenario*
NSW Electricity Infrastructure Roadmap aligned development & constrained use of diesel as a back-up fuel	$4,600 million *+ $1,200 million to core Step Change scenario*
Very high data centre growth *Data centre demand forecast for Greater Sydney increased by 2 GW above the Draft 2026 ISP Step Change scenario, resulting in an approximate demand forecast of 2.3 GW by 2035, 3.2 GW by 2040 and 4.1 GW by 2050*	$9,800 million *+ $6,400 million to core Step Change scenario*
High data centre growth *Data centre demand forecast for Greater Sydney increased by 1 GW above the Draft 2026 ISP Step Change scenario, resulting in an approximate demand forecast of 1.9 GW by 2035, 2.5 GW by 2040 and 3.1 GW by 2050*	$7,300 million *+ $3,900 million to core Step Change scenario*
Low data centre growth *New development of large data centres within the Greater Sydney region assumed not to progress, resulting in lower demand than forecast in the Draft 2026 ISP Step Change scenario. This sensitivity allows for the isolation of new data centre growth as a driver of Sydney Ring South net market benefits*	$900 million *- $2,500 million to core Step Change scenario*
Higher adoption of distributed and consumer energy resources *Increase year-on-year uptake of behind-the-meter storage by approximately 50% for 10 years to 2035/36, resulting in an additional 760 MW and 1,490 MWh of behind the meter storage installed in the Sydney, Newcastle, and Wollongong region, and increased generation hosting capacity of distribution networks in the Sydney, Newcastle, and Wollongong region from 0.89 GW to 5.31 GW*	$2,000 million *- $1,400 million to core Step Change scenario*
Higher capital cost *Capital cost of the 500 kV transmission line increased by 100%, reflecting the upper uncertainty limit of capital cost estimates (on weighted results)*	$2,200 million *- $1,000 million to weighted results*

We also find the preferred option (Option 6) and Option 3 are robust to sensitivities relating to the commercial discount rate and an alternative approach to annualising and discounting option costs.

All sensitivity tests will be reassessed in the PACR and take account of the two key intended updates to the options assessment; specifically further consideration of proceeding with a power flow control solution, and further investigation into the optimal timing of the staged transmission line options (Option 3 and Option 5) under each scenario.

A 500 kV transmission line delivers for NSW consumers and the economy

The PADR also demonstrates that a Sydney Ring South 500 kV transmission line provides NSW energy consumers, the NSW economy, and market participants significant benefits outside the market benefits we are required to test under the RIT-T. The timely delivery of these benefits is critical to the long-term interests of NSW energy consumers, and reflects the *National Electricity Objectives*[16] of delivering long-term energy security, affordability and reliability by:

- increasing consumers' long-term access to the cheapest available energy
- lowering and stabilising wholesale prices over time (the largest component of consumer bills)
- securing a long-term reliable supply as energy sources powering the grid change
- meeting NSW energy consumers' long-term needs with the most efficient investment, at the least cost and with the lowest risk of untimely delivery.

Securing access to lower-cost renewable generation for our largest cities and growing economies

A new high-capacity transmission line between Bannaby and South Western Sydney would more than double the capacity of the southern transmission corridor into Sydney, securing reliable access to lower-cost renewable energy for consumers in our largest cities and fastest growing economies.

We estimate that during its first decade of full operation, the Sydney Ring South Project will deliver a net saving of $51 per year for an average NSW household, and a net saving of $110 per year for an average small business.

Overcoming network bottlenecks sooner will place downward pressure on bills

By removing a known bottleneck, a Sydney Ring South 500 kV line reduces exposure to local supply constraints and extreme price risks as coal-fired generation exits the system, placing downward pressure on wholesale electricity prices (the largest component of electricity bills) over time. Although price spikes occur relatively infrequently, they have a disproportionate impact on average wholesale prices because retailers must manage the financial risk associated with these events when setting the prices charged to homes and businesses.

Modelling by Endgame Analytics for Transgrid indicates that bringing forward the commissioning of the transmission line by four years to 2033/34 would immediately place downward pressure on NSW wholesale electricity prices by significantly reducing the frequency of extreme price events.

We estimate that during its first decade of full operation, the Sydney Ring South Project will deliver a net saving of $51 per year for an average NSW household, and a net saving of $110 per year for an average small business (real $2024/25).

Strengthening the ring creates a more resilient energy backbone, securing supply to growing cities

By linking Sydney and the Illawarra with the 500 kV backbone at Bannaby in the Southern Tablelands, the Sydney Ring South Project boosts capacity on a constrained network corridor. This improves the ability of market operator to draw on a broader, more competitive pool of lower-cost generation across the NEM, rather than being limited by a network bottleneck.

This flexibility makes the system more resilient to disturbances like localised periods of low renewable generation in the New England REZ and Central West Orana REZ, by increasing access to power from energy storage, diversified renewables in the South West REZ, and interstate from South Australia and Victoria via the interconnectors.

[16] National Electricity Objectives | AEMC.

Strengthening the Sydney Ring also hardens the network against shocks that would otherwise challenge system security, such as outages on the northern 500 kV ring triggered by events like bushfires or lightning strikes. A resilient network backbone is critical for reliable and affordable energy supply as our cities grow.

New capacity will boost confidence for investment

The Sydney Ring South 500 kV transmission line will increase investor confidence in the security and affordability of energy to support the growth of industries such as advanced manufacturing, logistics, health, education and digital services across Greater Western Sydney.

Sydney Ring South provides a step towards the electrification of heavy industry in the Illawarra and underpins the productivity of major investments in the new City of Bradfield and Western Sydney International Airport, while also supporting the growth of energy intensive digital industries, boosting productivity, creating high-value jobs, and delivering long-term economic growth across Greater Western Sydney and the Illawarra.

Transgrid recognises that energy policymakers in NSW and nationally are progressing regulatory reforms to ensure that the data centres underpinning digital industries meaningfully contribute to network investments that support their connection. This growth in demand would amplify the need for Sydney Ring South, and Transgrid will work with all stakeholders to implement timely reforms that protect the broader consumer base from higher network costs.

Sydney Ring South provides a step towards the electrification of heavy industry in the Illawarra and underpins the productivity of major investments in the new City of Bradfield and Western Sydney International Airport, while also supporting the growth of energy intensive digital industries, boosting productivity, creating high-value jobs, and delivering long-term economic growth across Greater Western Sydney and the Illawarra.

Additionally, the Sydney Ring South 500 kV transmission line will send an important signal to energy investors that new generation and firming projects located in regional NSW will have reliable access to the state's largest electricity market. Removing the southern bottleneck into Sydney improves the ability of renewable energy projects in Southern NSW to deliver electricity to customers, reducing curtailment risks that create hurdles for project bankability, and encouraging the timely development of new renewable capacity, consistent with least-cost system outcomes.

Proposed re-opening triggers for this RIT-T

Under the *National Electricity Rules* (NER) relating to a Material Change in Circumstance (MCC), Transgrid is required to include the re-opening triggers for this RIT-T in the PADR and consult with stakeholders on them before they are confirmed in the PACR.

Consistent with these requirements and drawing on the results of the sensitivity testing in this PADR, Transgrid has considered the impact of changes in key underlying assumptions to identify reopening triggers. Specifically, we consider that the following are expected to form re-opening triggers for this RIT-T:

- Real total capital cost increases of more than the amount determined in the PACR threshold tests for making Option 2d become preferred[17]
- Commercial discount rates or regulated transmission WACC, as determined by AEMO in a future draft or final ISP or IASR, being above the amount determined in the PACR threshold test for making Option 2d become preferred.

Should any of these events occur, Transgrid will update its analysis to identify whether the preferred option in this RIT-T has changed or is no longer expected to provide positive net market benefits and will propose a course of action to the AER. Additionally, if the *2026 ISP* includes any change to the ODP from the *Draft 2026 ISP*, Transgrid will reflect this change (which does not constitute an MCC) in the PACR.

[17] We have not included this proposed percentage (nor the equivalent for the commercial discount rate trigger) in the proposed re-opening trigger in this PADR given the uncertainty affecting the assessment of the preferred option for this RIT-T. We propose to provide these percentages in the PACR.

Submissions and next steps

We are seeking your views early, before decisions are made. Transgrid welcomes written submissions from stakeholders on the analysis and conclusion presented in this PADR. We encourage you to participate, make a submission, challenge assumptions and help inform the future of the electricity system for NSW.

Stakeholders will have extended time to provide submissions given the scale and complexity of the project. Submissions are due on or before 28 August 2026 and should be emailed to srs@transgrid.com.au. Unless clearly requested otherwise at the time of lodgement, submissions will be published on the Sydney Ring South Project page on Transgrid's website, and on AEMO's website.

To provide stakeholders the opportunity to address questions to Transgrid prior to the close of submissions, a series of stakeholder briefings and webinars will be held in early July 2026. Information on the program of stakeholder engagement activities and additional information regarding the submission process is contained in Section 4 and has also been published on the Sydney Ring South Project page on Transgrid's website.[18]

The publication of a PACR represents the next formal stage of this RIT-T. The PACR will address submissions and feedback received on the PADR and determine the final preferred option. The PACR will also consider any updated analysis contained in AEMO's final *2026 ISP*, due to be published in June 2026.

For more information on this PADR or our engagement program, or to make a submission, please contact srs@transgrid.com.au or call 1800 222 537.

Transgrid acknowledges that while the RIT-T framework focuses on the economic assessment of net market benefits, consumer concerns about energy affordability, reliability and equitable access to the benefits of the energy transition, as well as environmental, social, cultural, and community matters remain important. Stakeholder feedback on any project-related matters is welcome.

[18] Sydney Ring South Project page | Transgrid.

Contents

Transgrid

1. Introduction

1. Introduction

This section introduces and explains the purpose of the Project Assessment Draft Report (PADR). It provides a high-level overview of the regulations Transgrid must adhere to when proposing and assessing significant infrastructure as well as the history of Sydney Ring South Project; and includes advice to help interested stakeholders participate in consultation.

1.1. Purpose of this report

The Regulatory Investment Test for Transmission (RIT-T) applies an economic cost-benefit test to new transmission electricity infrastructure that is proposed for the National Electricity Market (NEM) in response to an identified need.

The RIT-T process requires transmission network providers considering significant investment in new transmission infrastructure to publish a Project Assessment Draft Report (PADR) to identify the most economically efficient infrastructure investment option that delivers the greatest net market benefit to meet a specific, long-term need of consumers identified in the Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP).

This PADR assesses credible options for the Sydney Ring South Project, which was first referenced in AEMO's *2020 ISP*[19] and was subsequently identified as an 'actionable' ISP project in the *2024 ISP*.[20] The project remains an actionable project in the *Draft 2026 ISP*. The *Draft 2026 ISP* currently identifies the implementation of a power flow control solution at existing transmission substations as the candidate option, with a 500 kV transmission line identified as a 'future' ISP project.

The identified need for the Project[21] is to:

- deliver net market benefits for consumers to increase the power system's capability to supply the Sydney, Newcastle, and Wollongong demand centres, replacing supply capacity that will be removed on the closure of coal-fired power stations in the Newcastle area, and
- efficiently service increasing peak demand.

As the relevant Transmission Network Service Provider (TNSP), Transgrid is tasked with reviewing options for the Project and providing a PADR to AEMO as part of the RIT-T process. The core function of this process is to identify the option that would maximise the present value of net economic benefit to all who produce, consume and transport electricity in the market.

Accordingly, the *Draft 2026 ISP* specifies that as part of the RIT-T process, Transgrid will assess the near-term actionable ISP project (i.e. the power flow control option) and also further test the scope and timing of the 500 kV transmission future ISP project, to identify which option best positions New South Wales for a range of credible futures, delivering an outcome that best reflects the long-term interests of consumers.[22]

AEMO has identified this need because the NSW electricity network must continue to deliver secure, reliable and affordable power to energy consumers in the fast-growing centres of Sydney, Newcastle, and Wollongong as coal-fired generators retire and the grid becomes powered by renewable energy generators and storage that are located more dispersedly across NSW.

The transmission network in the Sydney, Newcastle, and Wollongong region, which accounts for 75 per cent of all energy consumed in NSW, was originally designed to connect large, coal-fired generators closely situated in the Hunter Valley and Central Coast to the nearby demand centres in our major metropolitan cities.

When these coal-fired generators close (forecast between 2029 and 2040), the legacy transmission network design will lack the capacity and flexibility to alternatively and efficiently supply our major demand centres with the renewable energy being generated across a broader geographical distribution in regional NSW and interstate.

AEMO has identified this need because the NSW electricity network must continue to deliver secure, reliable and affordable power to energy consumers in the fast growing centres of Sydney, Newcastle, and Wollongong as coal-fired generators retire and the grid becomes powered by renewable energy generators and storage that are located more dispersedly across NSW.

[19] Sydney Ring South was originally part of the "Reinforcing Sydney, Newcastle & Wollongong Supply" project, which was identified as a future ISP project in the final 2020 ISP. See AEMO's 2020 Integrated System Plan pg. 15-16.
[20] AEMO 2024 Integrated System Plan, p.15-16.
[21] See AEMO's ISP Appendix 5: Network Investments.
[22] See AEMO's Draft 2026 Integrated System Plan page 79.

The Sydney Ring South Project is intended to deliver a long-term, intergenerational uplift in network capacity that the people and the economy of NSW need. To do so, it must be capable of increasing transfer capacity into the growing Sydney, Newcastle, and Wollongong demand centres, securing a reliable supply that maximises energy consumers' access to the clean and affordable energy that will be generated and stored across regional NSW in new Renewable Energy Zones (REZ), supported by the deep storage of Snowy 2.0.

It will allow for the efficient transport of electricity and enhance the reliability, stability and resilience of the electricity grid during the transition of the NSW power system and economy to net zero emissions by 2050 and beyond.

A key purpose of this PADR (and the RIT-T more generally) is to provide interested stakeholders the opportunity to review Transgrid's assumptions and analysis, provide input to the process, and have confidence in the process by which the preferred option has been identified as optimal. This report:

- Outlines the 'identified need' for the investment, which is consistent with that identified in the recently released *Draft 2026 ISP* (and earlier *2024 ISP*).
- Describes the options being assessed in the RIT-T having regard to submissions received in response to the *Draft 2026 ISP*.
- Identifies the market benefits expected from relieving congestion on the existing 330 kV network supplying the Sydney and Illawarra regions from the south.
- Presents the results of the net present value (NPV) analysis of net market benefits for each of the credible options assessed.
- Details the assessment methodology that has been undertaken to ensure the robustness of the conclusion.
- Identifies the option that is expected to maximise net market benefits in the long-term interest of consumers.

Importantly, this report provides transparency in the planning considerations for investment options to ensure continuing reliable supply to NSW electricity consumers.

1.2. Regulatory Investment Test for Transmission

The RIT-T is an economic cost-benefit test used to assess and rank different options that address an identified need. The purpose of the RIT-T is to identify the investment option that maximises the present value of economic benefit to all those who produce, consume and transport electricity in the market. Transgrid is undertaking this RIT-T to identify the preferred option to meet the identified need.

Transgrid has adopted AEMO's latest ISP inputs and assumptions in undertaking modelling for this RIT-T to identify and seek feedback on a preferred option for the Sydney Ring South Project. Transgrid will maintain a consistent approach to the subsequent Project Assessment Conclusions Report (PACR), which will present the recommended solution and Transgrid's intended course of action to deliver the highest net economic benefit.

Clause 5.16A.4 of the National Electricity Rules sets out the procedure a TNSP must follow when applying the RIT-T. Pursuant to cl 5.16A.4(c), this PADR has been prepared in accordance with paragraphs (d) to (h).

While the *2024 ISP* specified a publication date of June 2025 for this PADR, the Australian Energy Regulator (AER) granted Transgrid an extension in 2025 to publish the PADR by 30 April 2026 (see footnote 8). On 16 April 2026, Transgrid advised the AER that publication of the Sydney Ring South PADR would be deferred until 29 May 2026. The extension has allowed Transgrid to better consider relevant new data and insights arising from the 2025 Inputs, Assumptions and Scenarios Report[9] (IASR), the 2025 Electricity Statement of Opportunities[10] (ESOO) and the *Draft 2026 ISP* to minimise the risk of material changes impacting the project between the release of this PADR and publication of the PACR.

1.3. Project History

Since first being identified as a future ISP project in the *2020 ISP*,[23] Sydney Ring South has moved from concept to an actionable project through a clear sequence of regulatory and planning milestones, and collaborative system planning between AEMO, Transgrid and other market participants.

The *2020 ISP's* recognition of the need to increase the power system's capability to supply Sydney, Newcastle, and Wollongong (from the north and south) prompted Transgrid's first preparatory activities and the provision of cost estimates to AEMO in early 2021, establishing an evidence base for options assessment.

AEMO incorporated the augmentation costs required to strengthen the southern part of the Sydney Ring in its 2021 *Transmission Cost Report*[24] and listed options to augment the northern part of the Sydney Ring as actionable the *2022 ISP*. The northern augmentation proceeded as the Waratah Super Battery Project[25] and Hunter Transmission Project[26] delivered by Energy Corporation of NSW (EnergyCo) as *Priority Transmission Infrastructure Projects* (PTIP) under the *NSW Electricity Infrastructure Roadmap*.[27]

Transgrid continued preparatory works to augment the southern part of the Sydney Ring through 2023 and 2024. Updated option cost estimates for a 500 kV augmentation

[23] Sydney Ring South was originally part of the "Reinforcing Sydney, Newcastle & Wollongong Supply" project, which was identified as a future ISP project in the final 2020 ISP. See AEMO 2020 ISP pg. 15-16.
[24] 2021 AEMO Transmission Cost Report.
[25] Waratah Super Battery Project | EnergyCo.
[26] Hunter Transmission Project | EnergyCo.
[27] NSW Electricity Infrastructure Roadmap | NSW Department of Planning, Industry and Environment.

Since first being identified as a future ISP project in the 2020 ISP, Sydney Ring South has moved from concept to an actionable project through a clear sequence of regulatory and planning milestones, and collaborative system planning between AEMO, Transgrid and other market participants.

option were published in AEMO's *Draft 2023 Transmission Expansion Options Report,*[28] with the additional power flow control option first identified in an addendum[29] to earlier preparatory activities for the project, submitted in response to the *Draft 2024 ISP*.

The Sydney Ring South Project became actionable in the *2024 ISP* with the ISP candidate option being the newly identified power flow control option, paving the way for it to progress through the ISP framework as separate from the Hunter Transmission Project.

The *Draft 2026 ISP* reinforced the project's actionable status, again finding the power flow control solution as the candidate option, but for the first time also recognising the need for a 500 kV Sydney Ring South transmission line as a future ISP project, with the Optimal Development Path (ODP) calling for its delivery by 2037/38.

The Draft *2026 ISP* invites Transgrid to explore and assess the value and feasibility of all options, specifically referencing the need for this PADR to further test the scope and timing of the 500 kV transmission options, and identify the option that best positions New South Wales for a range of credible futures, maximising benefits in the long-term interests of NSW consumers.

Transgrid's continued engagement with a range of market participants including renewable energy generators, distributors and large energy users supports the need to assess the benefits achieved by options that plan the delivery of new transmission lines earlier than 2037/38 (as proposed in the *Draft 2026 ISP*).

This PADR marks a substantial step in the development of the Sydney Ring South Project, building on nearly six years of preliminary assessment through three ISP cycles, and a broad range of industry feedback received along the way.

1.4. Submissions and next steps

Transgrid welcomes written submissions from stakeholders on the analysis and conclusion presented in this PADR.

Submissions are due by 28 August 2026 and should be emailed to srs@transgrid.com.au. Unless clearly requested otherwise at the time of lodgement, submissions will be published on the Sydney Ring South Project page on Transgrid's website, and on AEMO's website.

To provide stakeholders the opportunity to address questions to Transgrid before the close of submissions, a series of briefings and webinars will be held in early July 2026. Information on the program of stakeholder engagement activities and additional information regarding the submission process has been published on the Sydney Ring South Project page on Transgrid's website.

The publication of a PACR represents the next formal stage of this RIT-T. The PACR will address submissions and feedback received on PADR and determine the final preferred option. The PACR will also consider any updated analysis contained in AEMO's final *2026 ISP*, due to be published in June 2026.

Transgrid acknowledges that while the RIT-T framework focuses on the economic assessment of net market benefits, consumer concerns about energy affordability, reliability and equitable access to the benefits of the energy transition, as well as environmental, social, cultural, and community matters remain important. Stakeholder feedback on any project-related matters is welcome.

The *Draft 2026 ISP* invites Transgrid to further test the scope and timing of the 500 kV transmission options in this PADR, and identify the option that best positions New South Wales for a range of credible futures, maximising benefits in the long-term interests of NSW consumers.

[28] 2023 Transmission Expansion Options Report Consultation | AEMO.
[29] Preparatory Activities Report: Reinforcing Sydney, Newcastle, and Wollongong Supply – March 2024 Addendum | Transgrid.

2. Identified Need

2. Identified Need

This section examines the need for the Sydney Ring South Project to increase the energy system's capacity to serve NSW energy consumers' long-term needs. It details the growing demand for electricity in NSW's largest economic centres, the imminent departure of coal generation on which we have traditionally depended, and the need to connect our largest economic centres with replacement sources of renewable energy that are widely dispersed across NSW and interstate. This section also identifies the alternate investment and infrastructure that would be needed if the Sydney Ring South Project does not proceed.

2.1. Overview

Transgrid is undertaking this RIT-T to identify the preferred option that best meets the identified need at the optimal time. The identified need for the Sydney Ring South Project, as stated by AEMO in the *2024 ISP*,[30] is to:

- deliver net market benefits for consumers to increase the power system's capability to supply the Sydney, Newcastle, and Wollongong demand centres, replacing supply capacity that will be removed on the closure of coal-fired power stations in the Newcastle area; and,
- efficiently service increasing peak demand.

The Sydney, Newcastle, and Wollongong region will be home to 8.1 million people by 2041.[31] It is Australia's largest economic powerhouse, underpinning a material share of GDP and serving as the country's major centre for finance, technology and trade. It currently accounts for 75 per cent of energy demand in NSW, with this share growing as homes and businesses electrify.[32]

The electricity transmission network supplying the Sydney, Newcastle, and Wollongong region with generation from the south was built in the 1960s to connect the original Snowy Hydro Scheme, and it hasn't changed substantially over 60 years. While the delivery of this infrastructure was a nation-building achievement of its day, it was not designed to support today's modern economy.

Since then, the region's population has more than doubled from less than three million people to more than six million today and is forecast to grow to eight million by 2041. The way we now live and work in the modern economy has become far more energy intensive. The energy system of the future must power millions of customers through a diverse and increasingly decentralised mix of lower-cost, renewable generation. NSW's future growth will be supported by gigawatts of clean, lower-cost energy, driving economic competitiveness and the modern lifestyles of millions of people.

To achieve this, the electricity sector is undergoing a highly dynamic phase of 'deep transition' in which the grid is experiencing dramatic change, with coal-fired generators exiting the system and being replaced by an accelerated buildout of renewable generation, storage and connecting transmission, as well as Consumer Energy Resources (CER) including rooftop solar PV and battery storage.

The success of this transition depends on coordinated action across the entire electricity supply system to ensure a seamless handover to modern, renewable energy, which is the cleanest and lowest-cost energy Australia now produces. This will be critical to ensuring consumers continue to access clean, affordable and reliable energy without disruption.

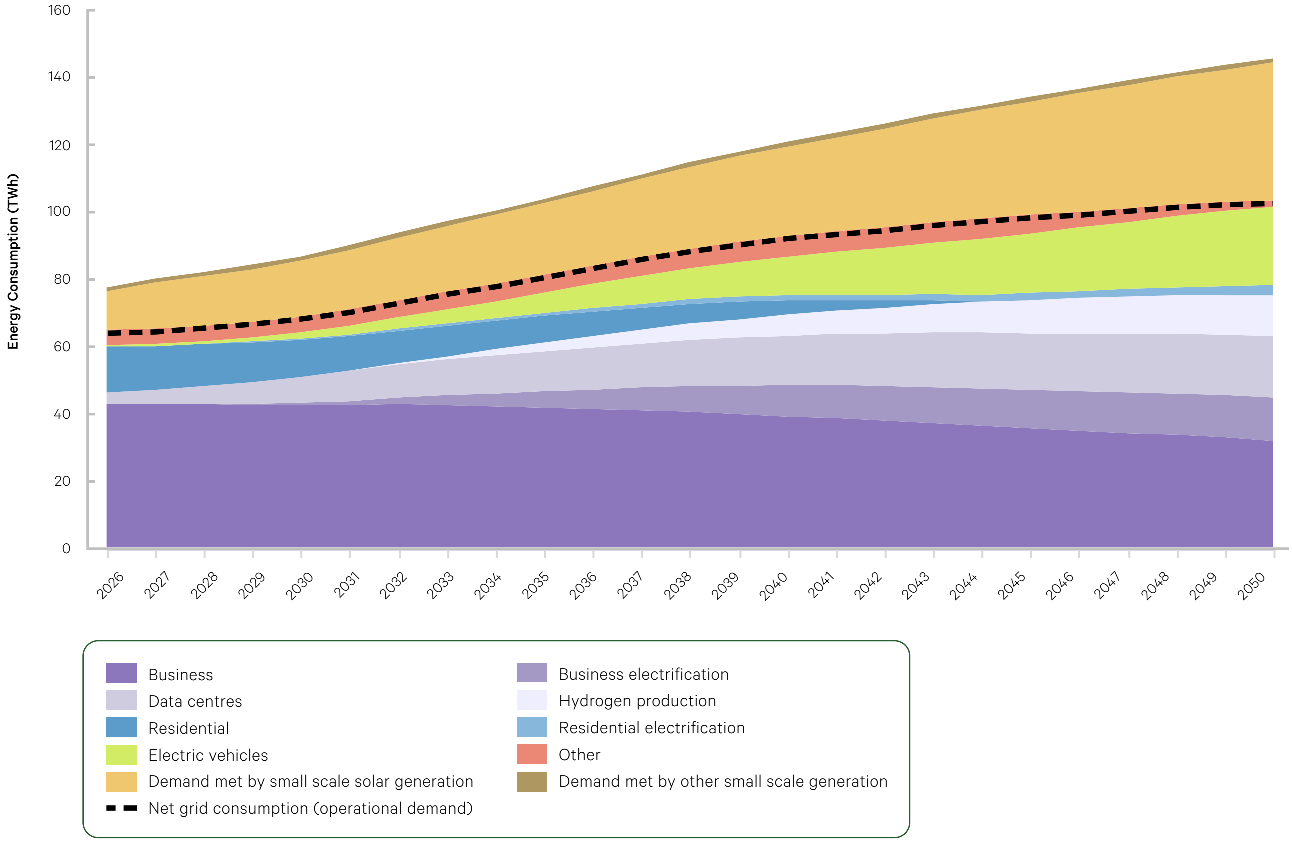
At the same time, the Sydney, Newcastle, and Wollongong regions face significant future growth pressures. Population increases, the widespread electrification of homes, businesses and transport, and the rapid expansion of data centres and the broader digital economy will to gether drive a major uplift in electricity demand. While a share of this growth is likely to be supplied locally within distribution networks by local solar generation and increasingly sophisticated coordination of CER, this will not be sufficient by itself.

Servicing this growing need with legacy transmission infrastructure will result in a transmission bottleneck, whereby the existing network lacks the capacity at certain times to transfer the volume of energy that will be generated within NSW Renewable Energy Zones (REZs) and is needed by households and businesses in NSW's largest urban centres.

Delivered at the right time for NSW energy consumers, the Sydney Ring South Project will maximise the operational efficiency of the whole grid in NSW, at the most efficient cost and with the least potential disruption to a rapidly growing Greater Western Sydney.

[30] See AEMO 2024 ISP Appendix A5, pg. 25.
[31] NSW population projections - key findings | NSW Department of Planning, Housing and Infrastructure.
[32] AEMO Draft 2026 ISP demand forecast for the Sydney, Newcastle, and Wollongong subregion.

Figure 2.1: Forecast NSW electricity consumption by category to 2050, Step Change scenario[33]



The timely delivery of the Sydney Ring South Project will address this structural constraint on power transfers from regional REZs and interstate interconnectors into the Sydney, Newcastle, and Wollongong demand centre. Augmentation of this corridor through the Sydney Ring South Project is expected to materially increase transfer capability, reduce congestion, improve stable access to lower-cost renewable generation, and enhance system resilience.

In the absence of timely augmentation, constraints on this network are expected to bind more frequently by the mid 2030s, leading to worse outcomes for NSW energy consumers, including higher wholesale costs, greater price volatility, greater curtailment of renewable generation and increased reliance on local firming resources.

Modernising this part of the network is essential to strengthening the resilience and optionality of NSW's power system, and to ensuring NSW energy consumers derive the maximum benefit of investment in renewable generation and storage to meet both current and emerging needs.

The completion of the Sydney Ring South Project will help reduce price volatility by improving access to lower-cost renewable generation, supporting a more stable and affordable energy market for millions of customers, which is fundamental to NSW achieving its renewable energy and net-zero commitments.

Delivered at the right time for NSW energy consumers, the Sydney Ring South Project will maximise the operational efficiency of the whole grid in NSW, at the most efficient cost and with the least potential disruption to a rapidly growing Greater Western Sydney.

It is vital to a resilient, efficient and modern electricity system fit for the twenty-first century; one that supports economic growth, underpins the clean energy transition and ensures the state remains energy secure, competitive and prosperous in the decades ahead.

2.2. Investment in new generation and storage is predominantly in regional NSW

The Sydney, Newcastle, and Wollongong region currently hosts 4.2 GW of coal fired generation between the Eraring (2.9 GW) and the Vales Point B (1.3 GW) power stations. The proximity of this generation to NSW's major demand centres has allowed the network to operate efficiently without the need for additional high-capacity transmission networks importing power to the urban centres from regional NSW.

By 2033/34 all this capacity, plus a further 2.7 GW of capacity from the Bayswater Power Station is forecast to exit the energy system, leaving only the Mt Piper Power Station in operation, which is anticipated to retire by 2040. This represents a material reduction in dispatchable capacity to the Sydney, Newcastle, and Wollongong demand centre.

[33] AEMO 2025 Electricity Statement of Opportunities (ESOO).

Figure 2.2: Projected NSW coal retirements to 2050, Step Change scenario[34]

In contrast, few new projects close to urban centres are actively progressing through the connections process. Projects presently in the connection pipeline near Sydney, Newcastle, and Wollongong are predominantly short-to-medium duration battery energy storage systems, with an aggregate capacity of approximately 2 GW[35] and an average storage duration of less than four hours.

Additional projects are emerging at the connection enquiry stage and Transgrid expects more to be developed in coming years, which will be important to balancing the power system and energy market on a day-to-day basis. However, storage alone will not be sufficient to replace the energy and capacity of retiring coal generators.

To date, almost all generation and storage projects supported by current NSW and Commonwealth Government policy incentives are located in regional NSW, particularly in the Southern NSW and Central NSW regions. Generators in these regions will be among the most affected by congestion on the southern part of the Sydney Ring network, meaning that at certain (and critical) times, generation and storage capacity in these regions will not be able to be fully dispatched to meet load, and may need to be curtailed.

This includes 6 GW of new generation and storage projects in regional NSW backed by the NSW Government through Long-Term Energy Service Agreements (LTESA), and 7.6 GW of generation and storage projects in regional NSW backed by the Commonwealth Government's Capacity Investment Scheme (CIS). Of the 13.6 GW of policy-supported capacity, only 0.2 GW is located within the Sydney, Newcastle, and Wollongong region.

Figure 2.3: NSW generation capacity awarded support under State and Commonwealth Government policies

Analysis does not include outcomes of most recent CIS Tender 7 (announced 23 May 2026) or NSW Roadmap Tender 7 (announced 15 May 2026).

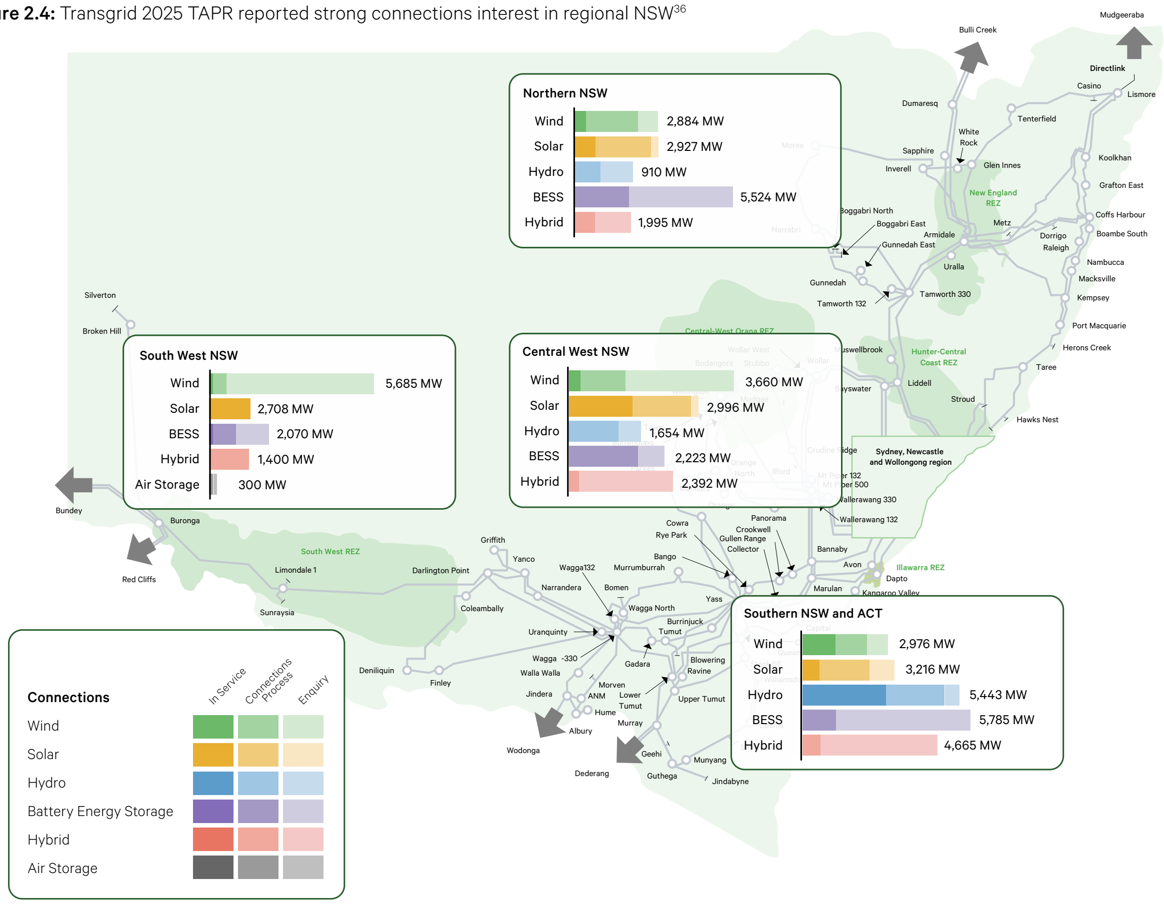
[34] AEMO 2026 Draft ISP (Step Change scenario amended with announced extension to Eraring Power Station to April 2029).
[35] Projects connecting to the Sydney, Newcastle, and Wollongong transmission network progressing through Transgrid's connection application process.

Developer interest in connecting to Transgrid's network further indicates strong interest across regional NSW, particularly in the Central NSW and Southern NSW regions, reflecting commercial resource availability, land use suitability and network access considerations.

REZs, Snowy Hydro and interstate to NSW's urban demand centres.

Accordingly, a strong, stable transmission backbone will be critical in enabling secure and efficient dispatch for generators and consumers accessing least-cost generation.

Figure 2.4: Transgrid 2025 TAPR reported strong connections interest in regional NSW[36]



> To date, almost all generation and storage projects supported by current NSW and Commonwealth Government policy incentives are located in regional NSW, particularly in the Southern NSW and Central NSW regions - which will be among the most affected by congestion on the southern part of the Sydney Ring network.

The increasingly geographically-dispersed generation and storage across NSW is expected to provide system-wide benefits by diversifying renewable resource profiles and improving resilience to regional, weather-driven variability in renewable output. It will, however, also increase the reliance on the transmission network to transport energy from the

2.3. Network bottlenecks prevent new generation reaching growing urban centres

From the south, the Sydney, Newcastle, and Wollongong region is currently supplied by a limited-capacity 330 kV transmission network that was developed during the 1960s to transfer power from the original Snowy Hydro scheme.

It currently provides approximately 2.7 GW of transfer capacity across three single-circuit 330 kV transmission lines, representing a binding bottleneck under the currently forecast development scenarios. While this network was fit for historical generation connections and demand patterns, it is not designed for the newly-configured, future power system that relies on power being transferred from geographically-dispersed REZs across regional NSW to urban centres.

As new sources of renewable generation and storage develop across regional NSW, (concentrating in the South West REZ, Central West Orana REZ, and New England REZ), large power flows from these regions will increasingly

[36] 2025 Transmission Annual Planning Report.

converge on the existing southern corridor of the Sydney Ring network, which is limited by its 330 kV capacity.

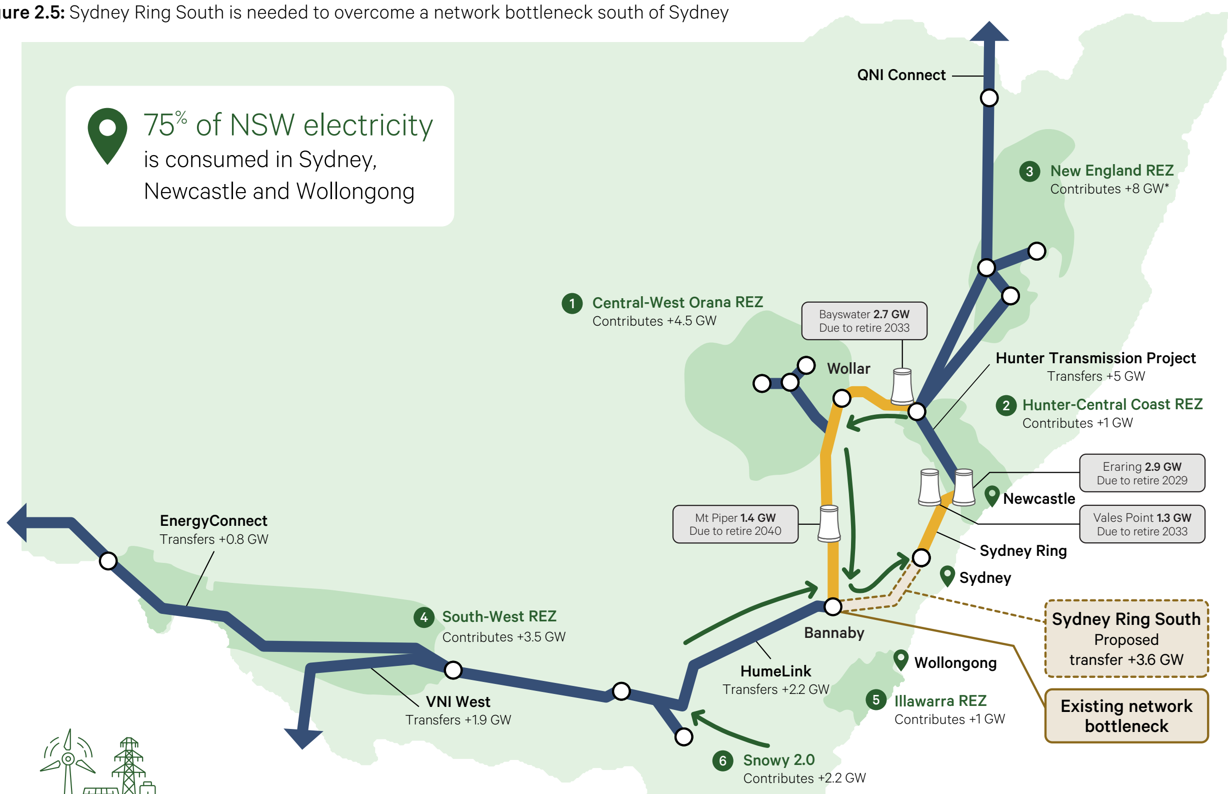
These large flows of power from Renewable Energy Zones will compete for access to the limited network transfer capacity currently available south of Sydney. The bottleneck in this part of the network means the transmission system is forecast to frequently operate at or near its limits. When more power is generated than the existing network can transfer to our major urban centres, the power that can't be transferred will instead have to be soaked up by batteries and pumped hydro; or, renewable generators across NSW may be curtailed by the market operator (their output lowered to match the transfer capacity of the network).

Accordingly, the 330 kV transmission network south of Sydney will inevitably limit the amount of available, clean, lower-cost renewable generation that reaches our largest urban and economic centres. At the same time, increasing electricity demand within the Sydney, Newcastle, and Wollongong demand centre may instead need to be supplied by local storage or peaking generation, which tends to be higher cost.

The Hunter Transmission Project (HTP) will materially increase transfer capability into the northern segment of the Sydney Ring, adding up to 5 GW of capacity. However, it is not easy to redirect the power flowing through the transmission network, which means that excess northern transfer capacity can't automatically be used when the southern corridor is constrained.

Due to the physics of the power system, HTP is most effective at transferring power from Northern NSW towards the Sydney, Newcastle, and Wollongong region. It is only partially effective when transferring large volumes of power

Figure 2.5: Sydney Ring South is needed to overcome a network bottleneck south of Sydney



Renewable Energy Zones

1 Central-West Orana REZ	2 Hunter-Central Coast REZ	3 New England REZ	4 South-West REZ	5 Illawarra REZ	6 Snowy 2.0
Contributes +4.5 GW From 2028 • Wind • Solar • Battery • Pumped hydro • Transmission	**Contributes +1 GW** From 2028 • Network upgrades • Wind • Solar • Battery	**Contributes +8 GW*** 6 GW from 2034 • Wind • Solar • Battery • Transmission	**Contributes +3.5 GW** • Wind • Solar • Battery • Transmission	**Contributes +1 GW** • Solar • Battery • Network upgrades	**Contributes +2.2 GW** From 2028 • Hydro • Transmission

Coal power stations

Eraring	Vales Point	Bayswater	Mt Piper
-2.9 GW exits 2029	-1.3 GW exits 2033	-2.7 GW exits 2033	-1.4 GW exits 2040

Existing transmission
In construction/development
Indicative power flow
Substations
Renewable Energy Zone

*Intended.

from Central NSW towards the urban centres; as due to network topology, more than a third of the power generated in Central NSW will naturally flow to the southern corridor of the Sydney Ring and compete for access to this limited-capacity.

Once the southern corridor reaches its operational limits, upstream generation in multiple REZs will be curtailed, even where spare transmission capacity exists elsewhere. The bottleneck south of Sydney thereby creates inefficiencies right across the energy system affecting generators, consumers and the market operator.

While network planners can implement solutions that make small changes to network parameters using power flow control devices to 'push' or 'pull' power around the network, these solutions are best suited to incremental power flow balancing, rather than large-scale power flow management on the backbone of the grid.

In the absence of network augmentation, the bottleneck south of Sydney will reduce consumer access to lower-cost renewable generation, increase congestion and generator curtailment, and consequently heighten wholesale price volatility. It also limits system flexibility at a time when operational challenges – including steeper evening peaks and deeper midday troughs – are increasing.

If this constraint is left unaddressed, alternative investment pathways would be required to maintain reliability as coal exits the energy system. Our modelling suggests that would need to a comprise a mix of offshore wind from the late 2030s, large amounts of additional storage, and new peaking gas-powered generation backed up by diesel close to major demand centres.

2.4. Counterfactually, the need must be met with new generation and storage close to urban centres

If the network constraint outlined above were left unaddressed as coal exits the system, alternative investments in significant new generation and storage projects would be required to meet the identified need and maintain reliability for NSW energy consumers. In the modelling counterfactual (the 'do nothing' scenario) where no investment in transmission infrastructure occurs to deliver the Sydney Ring South Project, maintaining supply to our growing major cities becomes very challenging.

Electricity market modelling conducted for the PADR shows that without new Sydney Ring South transmission infrastructure, the least-cost counterfactual investment under the Step Change (central) scenario would include all the following:

- **Local renewable generation supplying the Sydney Basin:** Due to land and infrastructure constraints (such as gas pipeline limitations), our modelling shows the need for 1.8 GW of future offshore wind in the Hunter and/or Illawarra regions,[37] as well as 0.9 GW of new medium-to-large scale solar. This is in addition to the 11.9 GW of distributed solar forecast to be installed in the region by 2040 (more than double the 5.4 GW installed today). Even in a scenario where 5.3 GW of additional distributed solar is installed across Sydney (reflecting the network hosting capacity flagged by the region's distribution network service providers in the *2025 Distribution System Pla*n), [38] the resulting total of 18.1 GW of solar installed across Sydney, Newcastle, and Wollongong by 2040 would still require complementary investment in 0.6 GW of offshore wind.
- **Utility scale storage close to urban centres, complementing consumer energy resources:** Our modelling shows a requirement for 4 GW of new medium-to-long duration storage (up to 8-hour duration), which would require land approximately equivalent to 300 to 600 football fields. This would be needed in addition to the 2.7 GW of distributed storage (equivalent to 270,000 typical home batteries with a 10kW inverter) that is forecast in the *Draft 2026 ISP* to be installed by homes and businesses in the Sydney, Newcastle, and Wollongong region by 2040. Consistent with the assumptions of AEMO's *Draft 2026 ISP*, this counterfactual scenario relies on almost one in every two (44%) of these batteries to be fully coordinated, meaning that they operate as a virtual power plant (VPP) to support the grid when needed.

> Without Sydney Ring South, the 330 kV capacity transmission network south of Sydney will inevitably limit the amount of available, clean, lower-cost renewable generation that reaches Sydney, Newcastle, and Wollongong. At the same time, growing demand for electricity may instead need to be supplied by local storage or peaking generation, which tends to be higher cost.

[37] While the Hunter and Illawarra were declared priority areas for offshore wind development by the Commonwealth Government in 2023 and 2024 respectively, to date no feasibility licences (which last for 7 years), have been granted in the Illawarra, and no feasibility licences have been granted in the Hunter after Novocastrian Wind Pty Ltd declined the offer of a licence in February 2025.

[38] The 2025 Distribution System Plan reports 3.3 GW of renewables hosting capacity for the Endeavour Energy network, and 4.7 GW of hosting capacity for the Ausgrid network, from which we have netted the 1.8 GW hosted in the Hunter Central Coast REZ and the 890 MW of hosting capacity reflected in AEMO's DRAFT 2026 ISP, resulting in a total hosting capacity of 5.31 GW.

- **New gas-fired generators to firm renewables:** Modelling identifies that 3.3 GW of new flexible peaking gas generators are required as part of the counterfactual energy mix, equivalent to five more Kurri Kurri Power Station[39] projects, and necessitating investment of over $3,000 million[40] plus the costs associated with gas connection and storage infrastructure and onsite storage of liquid fuel as a back-up fuel supply. To have access to the transmission network supplying key demand centres, these facilities would likely need to be sited in Greater Sydney, along the Central Coast (where the Colongra Gas Power Station is currently connected), or in the Lower Hunter region.
- **Back up diesel capabilities and fuel storage:** The natural gas pipeline supplying gas-fired generators in the Newcastle and Central Coast region is already constrained. From the mid 2030s, these constraints are anticipated to worsen as natural gas is increasingly relied upon for bulk-energy generation. Our modelling of the counterfactual shows this may require key generators, like the diesel-capable Kurri Kurri and Colongra gas-fired power stations, to switch to diesel operation for more than 25 days per year on average, and by the end of the outlook period these power stations are projected to operate on diesel for over 70 days per year. During cold winter periods with low local rooftop solar generation, these power stations may need to run on diesel almost continuously, requiring dozens of diesel truck deliveries per day to keep them running when the natural gas pipeline is at maximum capacity. During these periods, it is likely that these power stations would exceed environmental permit conditions for air pollution to maintain reliability of supply.

Crucially, the counterfactual is not a 'do nothing' scenario. It is inevitably a 'do many things' scenario in which the scale and pace of investment require significant coordination and market support to ensure the technological mix, location and operation of generation and storage can provide adequate system reliability.

Uncoordinated, market-driven investment is unlikely to meet the long-term needs of NSW energy consumers on its own and carries a higher risk to reliability of supply. It would be less efficient than enabling the transfer of abundant, lower-cost renewable energy generated across regional NSW.

Crucially, the counterfactual is not a 'do nothing' scenario. It is inevitably a 'do many things' scenario in which the scale and pace of investment require significant coordination and market support to ensure the technological mix, location and operation of generation and storage can provide adequate system reliability.

2.5. When renewables can't access the urban centres, prices increase

When generation from regional NSW is constrained from supplying the Sydney, Newcastle, and Wollongong demand centres, system operators must dispatch generation located closer to the load. Following the forecast exit of coal from this region by 2033/34, the energy mix close to urban centres is expected to comprise gas-fired generation and battery storage, which have higher marginal costs (and shadow prices) than renewable generation from REZs.

Binding constraints therefore reduce competitive pressure from lower-cost generation and increase reliance on scarce firming resources, placing upward pressure on wholesale market prices, which ultimately flows through to the retail electricity prices seen by homes and businesses over time.

Transmission constraints also reduce system flexibility, resilience and optionality, and the ability to respond efficiently to system shocks, such as unplanned outages of generation or network infrastructure. In constrained conditions, such events are more likely to result in sustained price spikes, further increasing price volatility and expected energy consumer costs.

Recent analysis by the Australian Energy Regulator (AER) provided two clear examples of how constraints on the southern corridor of the Sydney Ring can limit access to lower-cost generation and contribute to extreme price outcomes. The first was on 26 November 2025, when an outage on the Marulan to Avon 330 kV line south of Sydney prevented between 1,596 MW and 2,193 MW of low-priced capacity from reaching the market,[41] enough to have supplied approximately 15 per cent to 20 per cent of NSW grid demand at the time.

The AER also reported a case on 19 December 2025, when the Bannaby to Sydney West 330 kV line reached its limit, forcing flows into NSW from Queensland to be capped, preventing between 491 MW and 729 MW of low-priced capacity from reaching the market.[42] In both events, NSW wholesale electricity prices rose to above $5,000/MWh. These examples show how constraints on the southern corridor of the Sydney Ring can have far-reaching, negative impacts on the energy system.

[39] The Kurri Kuri Power Station is also known as the Hunter Power Project and is currently being delivered by Snowy Hydro.
[40] $FY25, CSIRO GenCost 2024-25 | CSIRO.
[41] Prices above $5,000/MWh - October to December 2025 | Australian Energy Regulator (AER) (pg. 13).
[42] Prices above $5,000/MWh - October to December 2025 | Australian Energy Regulator (AER) (pg. 17).

2.6. Bottlenecks reduce resilience to credible system shocks

A renewables-based power system requires a strong and flexible transmission backbone capable of efficiently transferring energy over long distances and accommodating variability in renewable output. Geographic diversity means that, at different times, the system will rely on generation from different regions, requiring the network to support dynamic and constantly shifting power flows.

The future NSW transmission system will rely heavily on the high-capacity northern corridor of the Sydney Ring strengthened by the Hunter Transmission Project. The existing bottleneck on the southern corridor of the Sydney Ring, however, limits the system's ability to reroute power flows when conditions change, reducing operational flexibility and resilience. Without resolving this bottleneck, the system is more exposed to a range of credible adverse scenarios including:

- Supply shortages under trajectories of higher than forecast electricity demand growth
- Unplanned outages of key transmission or generation assets supplying the Sydney, Newcastle, and Wollongong demand centres
- Delays in commissioning planned transmission, generation or storage projects
- Under severe but credible contingencies (such as the loss of a key asset in the northern corridor of the Sydney Ring due to bushfires, lightning strikes, or equipment failure), the inability to redirect power flows through the southern network would materially increase the risk of supply shortfalls. In such circumstances, the system operator may be required to shed load across parts of the Sydney, Newcastle, and Wollongong region to maintain system security.

2.7. Identified need addressed by public submissions to AEMO for the *2024 ISP* and *Draft 2026 ISP*

Transgrid acknowledges that the need for, timing, and scope of options for the Sydney Ring South Project have been raised in independent, public submissions to AEMO for the *Draft 2024 ISP* and *Draft 2026 ISP*; and that recent submissions[43] to the *Draft 2026 ISP* reflect increased support from diverse stakeholders for an expedited delivery of a 500 kV transmission line to more urgently address the identified need, including:

- BlueScope Steel
- Snowy Hydro
- NSW Department of Climate Change, Energy, the Environment and Water

> Recent AER analysis has identified how constraints on the southern corridor of the Sydney Ring are already having far-reaching, negative impacts on the energy system and contributing to extreme price outcomes. This includes two examples in November and December 2025 when constraints limited access to lower-cost generation and caused NSW wholesale electricity prices to spike above $5,000/MWh.

- Centre for Independent Studies
- Squadron Energy
- EnergyAustralia
- International Hydropower Association;
- Tilt Renewables
- HILT CRC.

Notwithstanding these submissions do not contribute to the economic test applied in this RIT-T, Transgrid notes that the extended deadline for this PADR has, as intended, permitted stakeholders to consider Sydney Ring South options in the context of the *Draft 2026 ISP*, using the latest data and insights.

Transgrid observes that the number of public, independent submissions to AEMO strongly supporting or acknowledging the value of expediting the Sydney Ring South Project to meet the identified need has increased from two submissions in 2024[44] (from Snowy Hydro and BlueScope Steel) to 10 submissions in 2026.[45]

A common theme in these submissions is that the existing transmission constraints south of Sydney will significantly impact supply reliability, wholesale prices, consumer bills and the operational efficiency of the NSW grid if the Sydney Ring South Project does not deliver increased capacity in good time pending the closure of coal-fired generation plants. While impacts on pricing are not considered in a RIT-T as a market benefit assessment, Transgrid acknowledges energy affordability remains a primary and ongoing concern for residential, small business and industrial energy consumers in NSW.

43 AEMO Draft 2026 ISP Consultation.
44 AEMO Draft 2024 ISP Consultation.
45 AEMO Draft 2026 ISP Consultation.

3. Options development

3. Options development

This section details the scope, planned delivery timeframes, and indicative costs of each of the six credible options assessed in this PADR. It addresses the potential cost impact of different construction methodologies and identifies and discusses the non-network options that were considered, as well as the other network options that were considered but not assessed in this PADR.

3.1. Six credible options have been assessed

3.1.1. Overview of the options considered

This PADR adopts and builds on the four credible Sydney Ring South Project options identified in the *2025 Electricity Network Options Report* (ENOR), which were tested in AEMO's *Draft 2026 ISP*. Two additional options (Option 5 and 6) that combine and stage components of the 2025 ENOR options have also been considered. This PADR presents updated cost estimates for each option which supersede those presented in the ENOR.

The option numbering referenced in this PADR reflects the option numbering in the 2025 ENOR except for Option 5 and Option 6, which are introduced in this PADR. Option 1 is not considered, as this is progressing separately as the Hunter Transmission Project under the NSW Electricity Infrastructure Investment Act 2020 (NSW). Options 2a, 2b and 2c refer to options considered in previous ISP, but are no longer being assessed in this PADR.

For all options involving a new 500 kV transmission line, the costs presented in this PADR are primarily based on an overhead transmission design, which is typically the lower-cost design that addresses requirements in the *National Electricity Rules*[46] and the RIT-T economic assessment process for Transgrid to deliver economically efficient investment.

Recognising community and stakeholder interest in undergrounding transmission infrastructure, Transgrid has considered a range of possible route lengths and design options to inform the cost estimates for the options presented in this PADR. This includes preliminary assessment of a concept to reduce community impact including partially undergrounding approximately 20 km of the transmission line.

Depending on the capacity, terrain and proximity to existing underground infrastructure such as water, telecommunications and electricity distribution assets, the 2025 ENOR notes that the cost of undergrounding a 500 kV AC transmission line is approximately three to seven times more expensive than an equivalent-capacity overhead design,[47] particularly where tunnelling is required. Section 3.2 addresses construction methodologies in more detail.

Transgrid has prepared capital cost estimates reflecting the AACE[48] cost estimate classification system 'Class 5' for the options in this PADR. The Class 5 estimates are of an expected accuracy of +100 per cent/-50 per cent. Further detail of the Class 5 cost estimation approach can be found in Section 6. Annual routine operating and maintenance costs are assumed to be one per cent of the capital costs for substations and 0.5 per cent for transmission lines.

Bannaby 500/330 kV substation, NSW

[46] National Electricity Rules | AEMC.
[47] 2025 AEMO Electricity Network Options Report.
[48] Association for the Advancement of Cost Engineering.

Table 3.1: A summary of the PADR options

Option	Description	Added network capacity	Timing	Capital cost (nominal)
Incremental augmentations				
Option 2	New South Creek 500/330 kV substation	+0 MW (improves utilisation of existing network)	2030/31	$644 million
Option 2d	Install power flow control technology in the existing 330 kV network (ISP candidate option)	+0 MW (improves utilisation of existing network)	2030/31	$240 million
Options including a new transmission line				
Option 3	Staged delivery of a high-capacity transmission link from Bannaby in the Southern Tablelands to South Western Sydney: • Stage 1: 500 kV double-circuit line from Bannaby, initially operated at 330 kV, plus a South Creek 330 kV switching station • Stage 2: Upgrade South Creek to a 500/330 kV substation, allowing line operation at 500 kV	Stage 1: +1,300 MW Stage 2: +2,300 MW	Stage 1: 2033/34 Stage 2: 2040/41	Stage 1: $2,646 million Stage 2: $1,162 million Total: $3,808 million
Option 4	High-capacity transmission link from Bannaby in the Southern Tablelands to South Western Sydney, including a new South Creek 500/330 kV substation: • Stage 1: New South Creek 500/330 kV substation • Stage 2: 500 kV double-circuit line from Bannaby	Stage 1: +0 MW (improves utilisation of existing network) Stage 2: +3,600 MW	Stage 1: 2030/31 Stage 2: 2033/34	Stage 1: $942 million[49] Stage 2: $2,411 million Total: $3,353 million
Option 5	Power flow control plus a deferred high-capacity transmission link from Bannaby in the Southern Tablelands to South Western Sydney and a new South Creek 500/330 kV substation (Draft 2026 ISP optimal development path): • Stage 1: Install power flow control technology in the existing 330 kV network • Stage 2: New South Creek 500/330 kV substation and a 500 kV double-circuit line from Bannaby	Stage 1: +0 MW (improves utilisation of existing network) Stage 2: +3,600 MW	Stage 1: 2030/31 Stage 2: 2037/38	Stage 1: $251 million Stage 2: $4,664 million Total: $4,915 million
Option 6	Option 5 scope, delivered to an earliest in-service schedule: • Stage 1: Install power flow control technology in the existing 330 kV network, plus a new South Creek 500/330 kV substation • Stage 2: 500 kV double-circuit line from Bannaby	Stage 1: +0 MW (improves utilisation of existing network) Stage 2: + 3,600 MW	Stage 1: 2030/31 Stage 2: 2033/34	Stage 1: $1,135 million Stage 2: $2,384 million Total: $3,519 million

Option numbering in this PADR aligns with the Draft 2026 ISP. Option 1 is not considered as it is progressing separately as the Hunter Transmission Project, and Options 2a, 2b and 2c were considered in previous ISPs, but are no longer being assessed.
Cost estimates provided reflect the cumulative risks, contingencies and timing associated with delivery of the entire program of works for each option. As a result, options demonstrating overlapping but varying scope do not reflect a 'building block' approach to cost estimates.

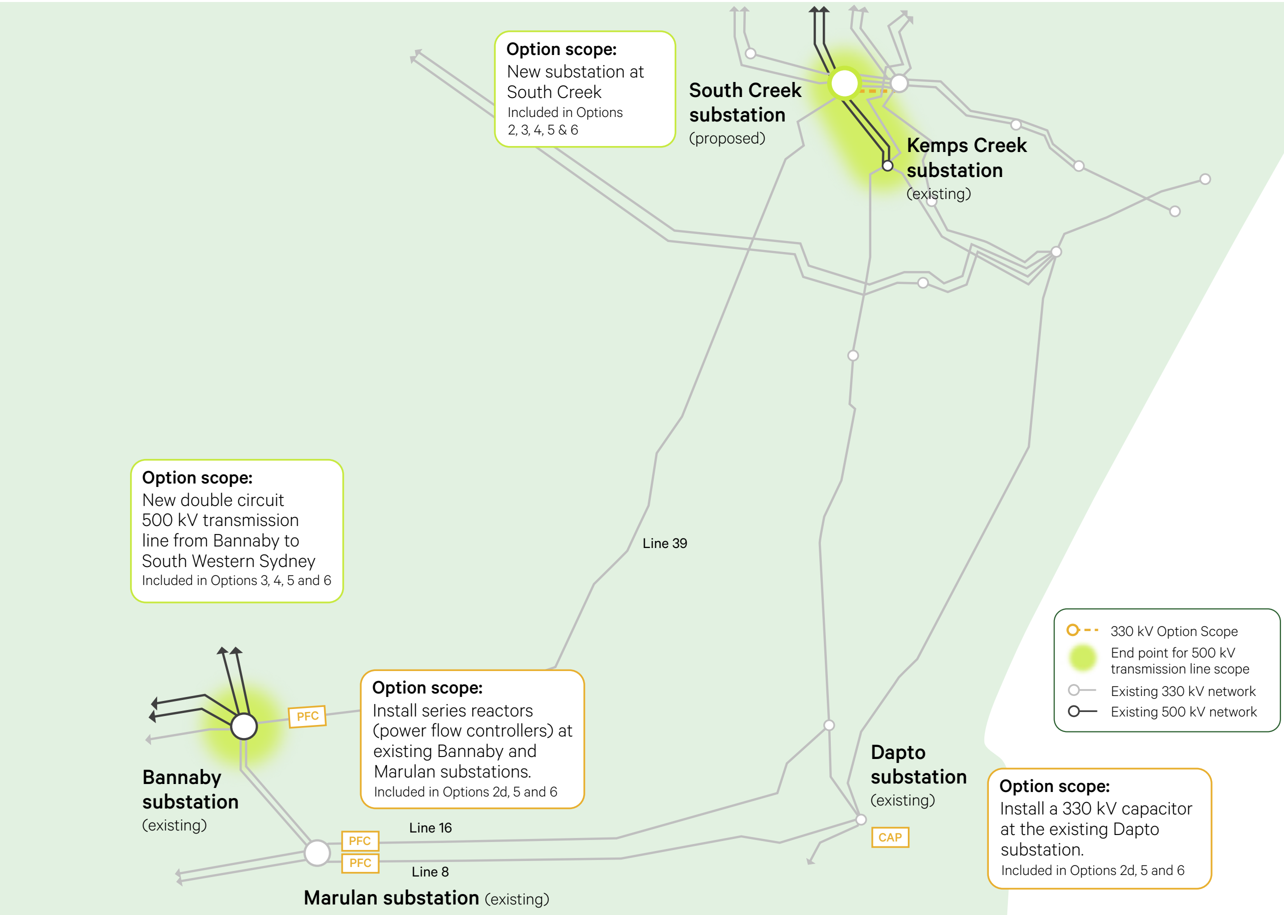
Among these, Option 3, Option 4, and Option 6 reflect a 500 kV transmission line from Bannaby in the Southern Tablelands to South Western Sydney built by the mid 2030s, whereas Option 5 proposes a later delivery for a 500 kV transmission line (2037/38).

Option 5 and Option 6 each combine series reactors as power flow controllers on the existing 330 kV network with a new 500 kV transmission line that is delivered in different timeframes. Option 6 has been included to test the value of power flow control as a possible net beneficial addition to a new transmission line that is delivered on its earliest in-service timing.

[49] Compared with Option 2, the cost of delivering the South Creek 500/330kV substation in Option 4 includes additional scope to accommodate power flows from the 500 kV transmission line that would be delivered in Stage 2.

Figure 3.1 shows the indicative location of the proposed scope options in South Western Sydney, this includes the South Creek substation, 500kV line and power flow control devices.

Figure 3.1: Indicative location of proposed scope options for the Sydney Ring South Project



Option numbering in this PADR aligns with the Draft 2026 ISP. Option 1 is not considered as it is progressing separately as the Hunter Transmission Project, and Options 2a, 2b and 2c were considered in previous ISPs, but are no longer being assessed.

All transmission line options assessed in this PADR assume the new line terminates at the South Creek substation, however, other connection points may also be considered as the project develops, including the Kemps Creek substation (see Figure 3.1 above).

Several additional network options have been considered over the course of preparing this PADR. These options, and the reasons they were not progressed for further assessment, are summarised in Section 3.4.

3.1.2. A range of commissioning dates have been considered for a 500 kV transmission line

The *Draft 2026 ISP* calls on Transgrid[50] to further test the scope and timing of 500 kV transmission line options and identify which option best positions New South Wales for a range of credible futures, delivering the best long-term outcome for consumers. Furthermore, in response to the *Draft 2026 ISP*, AEMO received 10 submissions[51] that noted either risks of deferring a 500 kV Sydney Ring South transmission line to the late 2030s, or benefits of delivering this option as early as practicable.

Given broad support for further assessment of the timing for a 500 kV transmission line in the Sydney Ring South Project, this PADR presents four options that include scope for a 500 kV transmission line.

Our assessment of these options demonstrates whether planning the deferral of a 500 kV transmission line to 2037/38 and relying initially on a power flow control solution delivered by 2030/31 as identified in the *Draft 2026 ISP* (Option 5), indeed maximises net benefits for consumers; or whether an alternative staging of this option can deliver greater benefits and better prepare NSW for the deep energy transition through the 2030s and beyond.

The alternatives tested in this PADR are as follows:

- **Option 3** tests whether planning the earlier delivery of a 500 kV transmission line by 2033/34 but initially operating it at 330 kV, which defers $707 million in capital costs (nominal) for the 500 kV switchyard and transformers at South Creek, represents a better investment than starting with power flow control and planning the deferral of the 500 kV transmission line for 2037/38. Option 3 assumes that the line is later upgraded to 500 kV in 2040/41. This option is envisaged

[50] AEMO Draft 2026 ISP Appendix A5, p32.
[51] Centre for Independent Studies (CIS), EnergyAustralia, HILT CRC, International Hydropower Association (IHA), Malcolm Park, NSW DCCEEW, Snowy Hydro, Squadron Energy, Tilt Renewables, Windlab.

to balance the risks of over-investment in a network solution with the risks of a deferred transmission line project becoming increasingly costly and complex due to urban development in South Western Sydney.

- **Option 4** tests whether simply planning earlier delivery of the transmission line for 2033/34 and commissioning the South Creek substation as early as practical in 2030/31 can avoid the need for an earlier, complementary $210 million investment in a power flow control solution.
- **Option 6** adopts the same scope and timing as Option 4, but tests whether adding the power flow control scope included in Option 5 would be net beneficial when combined with a 500 kV transmission line delivered as early as practical.

3.1.3. Option 2: Build a new 500/330 kV substation at South Creek

Deliver a new South Creek substation in Western Sydney at the intersection of existing 500 kV and 330 kV transmission lines by 2030/31, improving Greater Sydney's access to transmission flows diverted to the high-capacity northern flow path established by the Hunter Transmission Project.

This option involves establishing a new South Creek 500/330 kV substation on land owned by Transgrid at the cross section of existing 500 kV lines 5A1 and 5A2 (double circuit from Eraring to Kemps Creek) and existing 330 kV line 32 (Bayswater to Sydney West), line 38 (Regentville to Sydney West) and line 39 (Bannaby to Sydney West), reinforcing the 330 kV connection between the new South Creek substation and the key 330 kV hub at Sydney West.

By creating a new, high-capacity link between the existing 500 kV network and Transgrid's existing Sydney West 330/132 kV substation, which is a key hub for distribution of power to Greater Sydney, this option has the potential to deliver market benefits by drawing power flows from the northern 500 kV network, improving power flow balancing on the northern and southern networks supplying the Greater Sydney region.

While this option does not add new capacity to the transmission network south of Sydney, it enables greater flows from Southern NSW to reach the Sydney, Newcastle, and Wollongong demand centres by diverting them via the northern 500 kV flow path created by the Hunter Transmission Project.

At a high-level, the scope of Option 2 includes:

- Establishing of a new South Creek 500/330 kV substation with two 500/330 kV 1,500 MVA transformers.
- Works to cut-in existing 500 kV lines 5A1 and 5A2 and 330 kV lines 32, 38 and 39 to the new South Creek substation.
- Rebuilding a six-kilometre section of existing 330 kV line 39 between South Creek substation and Sydney West substation as a double circuit 330 kV line within the existing easement, with both circuits strung with high-capacity conductors.
- Re-stringing a six-kilometre section of existing 330 kV lines 32 and 38 between South Creek substation and Sydney West substation with high-capacity conductors.
- Augmentations at the existing Sydney West substation to allow connection of a new transmission line to the new South Creek substation.

All works are expected to take four years to complete. The earliest in-service timing modelled for Option 2 is 2030/31, which considers early works commencing in 2026/27.

The estimated capital cost of this option is approximately $644 million (nominal) based on a P50 Class 5 estimate (+100 per cent/-50 per cent).

3.1.4. Option 2d: Install series reactors as power flow control devices in the existing network

Install series reactors as power flow control devices in the transmission network south of Sydney by 2030/31 to improve utilisation of other transmission flow paths into the Sydney, Newcastle, and Wollongong region.

This option involves deploying series reactors as power flow control devices in the 330 kV network south of Sydney to redirect flows towards the northern 500 kV flow path created by the Hunter Transmission Project, and away from the congested, limited capacity 330 kV existing network. While this option does not add new capacity to the transmission network, it enables more power from REZs in Southern and Central NSW to reach the Sydney, Newcastle, and Wollongong region before the network reaches its limit.

A version of this option was first proposed in March 2024 via an addendum[52] to Transgrid's 2023 preparatory activities for the Sydney Ring South Project. It became the candidate option for the Sydney Ring South Project when it became actionable in the *2024 ISP* and remains the candidate option for the Sydney Ring South Project in the *Draft 2026 ISP*.

The scope of this option has been refined since first proposed, with series reactors as power flow controllers at Transgrid's existing Marulan and Bannaby substations in the Southern Tablelands now being assessed in this PADR, instead of at a new switching station, as this was determined to have a lower overall capital cost while maintaining equivalent network benefits.

At a high level, the scope of Option 2d includes:

- Augmentation of the existing Bannaby 330 kV switchyard to install series reactors on line 39 (Bannaby to Sydney West), including provision for line bypass arrangements.

[52] Preparatory Activities Report: Reinforcing Sydney, Newcastle, and Wollongong Supply – March 2024 Addendum | Transgrid.

- Augmentation of the existing Marulan 330 kV switchyard to install series reactors on lines 8 (Marulan to Dapto) and 16 (Marulan to Avon), including provision for line bypass arrangements.
- Installation of a 330 kV 10 MVAr capacitor bank at the Dapto substation in the Illawarra to manage voltage drop in the region due to addition of series reactors into the network.
- Reinforcement of communications infrastructure between the Bannaby, Marulan and Dapto substations to enable the power flow control scheme.

All works are expected to take four years to complete. The earliest in-service timing modelled for Option 2d is 2030/31, which considers early works commencing in 2026/27.

The estimated capital cost of this option is approximately $240 million (nominal) based on a P50 Class 5 estimate (+100 per cent/-50 per cent).

3.1.5. Option 3: Staged delivery of a new 500 kV transmission line to South Western Sydney

Build a new double circuit 500 kV transmission line from Bannaby in the Southern Tablelands to South Western Sydney planned for 2033/34, which would initially operate at 330 kV and add 1.3 GW of capacity to the network supplying Sydney from the south. Under a future stage, the transmission line would be uprated to 500 kV operation, increasing the capacity of the network by a further 2.3 GW.

This option responds to the need for new capacity on the transmission network supplying the Sydney, Newcastle, and Wollongong regions from the south by adding a new, high-capacity transmission line built to a 500 kV design between Bannaby and South Western Sydney, which would initially be operated at 330 kV, deferring works for a 500 kV switchyard at South Creek to a future second stage, which could be triggered in response to future developments in the energy transition. For this PADR, the second stage of this option is modelled in 2040/41 in all scenarios.

Stage 1: Build a new high capacity 500 kV transmission line from Bannaby to South Western Sydney, operated at 330 kV initially

Stage 1 of this option involves construction of a new, high-capacity double circuit transmission line from the existing Bannaby 500/330 kV substation in the Southern Tablelands to South Western Sydney. When initially energised at 330 kV, this option will add 1.3 GW of transfer capacity to the network supplying the Sydney, Newcastle, and Wollongong region from the south.

At a high level the scope for Stage 1 of Option 3 involves:

- Establishing a new South Creek 330 kV switching station in South Western Sydney cutting into existing 330kV line 32 (Bayswater to Sydney West), line 38 (Regentville to Sydney West) and line 39 (Bannaby to Sydney West).
- Construction of a new double circuit transmission line from Transgrid's existing Bannaby substation to South Western Sydney, adopting a 500 kV transmission line design that would initially be operated at 330 kV.
- Rebuilding a six-kilometre section of existing 330 kV line 39 between South Creek 330 kV switching station and Sydney West substation as a double circuit 330 kV line within the existing easement, with both circuits strung with high-capacity conductors.
- Re-stringing a six-kilometre section of existing 330 kV lines 32 and 38 between South Creek 330 kV switching station and Sydney West substation with high-capacity conductors.
- Augmentations at Transgrid's existing Sydney West substation to allow connection of a new transmission line to the new South Creek 330 kV switching station and at the Bannaby substation to accommodate the new transmission lines to the new South Creek 330 kV switching station.

Works for Stage 1 are expected to take seven years to complete. The earliest in-service timing modelled for Option 3 Stage 1 is 2033/34, which considers early works commencing in 2026/27.

The estimated capital cost of Stage 1 is approximately $2,646 million (nominal) based on a P50 Class 5 estimate (+100 per cent/-50 per cent).

Stage 2: Upgrade South Creek to a 500/330 kV substation, enabling 500 kV transmission line operation

Stage 2 of this option sees the South Creek 330 kV switching station upgraded to a 500/330 kV substation, allowing the transmission line built as part of Stage 1 to be uplifted to 500 kV operation, adding a further 2.3 GW of transfer capacity to the network supplying the Sydney, Newcastle, and Wollongong regions from the south.

At a high level the scope for Stage 2 of Option 3 involves:

- Upgrade the South Creek switching station constructed as part of Stage 1 to a 500/330 kV substation with three 500/330 kV 1,500 MVA transformers and the associated switch bays.
- Cut in existing 500 kV lines 5A1/5A2 (double circuit from Eraring to Kemps Creek) at the new South Creek substation.
- Augmentations at existing Bannaby substation to accommodate new upgrade of the Stage 1 transmission line to 500 kV operation.

Works for Stage 2 are expected to take four years to complete. For the PADR, the timing of the Stage 2 capacity uplift is modelled in 2040/41, however, if delivered concurrently with Stage 1 works, the earliest in-service timing is modelled for 2033/34.

Option 3 provides potential flexibility in the timing of the second stage in response to the evolving market demand and other developments, like the higher build out of renewable generation and storage in the Southern NSW region, which would require the increased capacity to reach customers in the Sydney, Newcastle, and Wollongong region.

While the PADR assessment models Stage 2 being delivered in the same year (2040/41) in all three scenarios, this is considered a proportionate assumption for the analysis at this point in time.

The estimated capital cost of Stage 2 is a further $1,162 million (nominal) based on a P50 Class 5 estimate (+100 per cent/-50 per cent), bringing the total estimated capital cost of the option to $3,808 million (nominal).

3.1.6. Option 4: Build a new 500 kV transmission line to South Western Sydney by 2033/34

Build a new South Creek 500/330 kV Substation by 2030/31 followed by a double circuit 500 kV transmission line from Bannaby in the Southern Tablelands to South Western Sydney planned for 2033/34, adding 3.6 GW of capacity to the network supplying Sydney from the south.

Like Option 3, this option responds to the need for increased capacity in the energy system supplying the Sydney, Newcastle, and Wollongong region from the south by adding a new, high-capacity 500 kV transmission line between Bannaby and South Western Sydney. Under Option 4, the South Creek 500/330 kV substation and new transmission line would be energised to their full capacity as soon as practicable.

Option 4 is envisaged to be commissioned and energised in two steps. First, a new 500/330 kV South Creek substation would be built and commissioned in 2030/31, creating a high-capacity link between the existing 500 kV network and Transgrid's existing Sydney West 330/132 kV substation which is a key hub for distribution of power to Greater Sydney, improving power flow balancing on the northern and southern networks supplying the Greater Sydney region.

Then in 2033/34, a new 500 kV double circuit transmission line is modelled to be commissioned between Bannaby and South Western Sydney. When complete, Option 4 would add 3.6 GW of transfer capacity to the transmission network supplying the Sydney, Newcastle, and Wollongong region from the south.

At a high level, the scope for Option 4 involves:

- A new South Creek 500/330 kV substation, with associated works to improve the tie with the existing Sydney West substation, as outlined in the scope for Option 2. Under Option 4, the South Creek 500/330 kV substation would be built with three 500/330 kV 1,500 MVA transformers.
- Construction of a new 500 kV double circuit transmission line from Transgrid's existing Bannaby substation to South Western Sydney.
- Augmentations at Transgrid's Bannaby substation to allow connections of the new 500 kV transmission line.

All works are expected to take seven years to complete, with the South Creek substation expected to be ready for commissioning after four years. The earliest in-service timing modelled for Option 4 is 2030/31 for the South Creek substation, and 2033/34 is modelled for the 500 kV transmission line, which considers early works commencing in 2026/27.

The estimated capital cost of Stage 1 is approximately $942 million (nominal), with Stage 2 adding a further $2,411 million (nominal) based on a P50 Class 5 estimate (+100 per cent/-50 per cent). The total estimated capital cost of the option is $3,353 million (nominal).

3.1.7. Option 5: Install series reactors as power flow control devices in the existing network, followed with a future 500 kV transmission line

Install series reactors as power flow control devices in the transmission network south of Sydney by 2030/31 followed by construction of a double circuit 500 kV transmission line from Bannaby in the Southern Tablelands to South Western Sydney by 2037/38, adding 3.6 GW of capacity to the network supplying Sydney from the south.

Consistent with the option staging and timing identified as part of the Optimal Development Path in the *Draft 2026 ISP*, Option 5 considers a staged project that delivers both a power flow controller solution as proposed by Option 2d in 2030/31 (Stage 1), followed by a deferred new 500 kV double circuit transmission line between Bannaby and South Western Sydney in 2037/38 (Stage 2). Following completion of Stage 2, Option 5 will add 3.6 GW of transfer capacity to the transmission network supplying the Sydney, Newcastle, and Wollongong regions from the south.

Stage 1: Install power flow control devices in the existing 330 kV network

Stage 1 of this option is the same as Option 2d and involves deploying power flow control devices in the 330 kV network south of Sydney to redirect flows towards the northern 500 kV flow path created by the Hunter Transmission Project, and away from the congested, limited-capacity 330 kV existing network. While this option does not add new capacity to the transmission network, it meets the identified need by enabling more power from REZs in South West NSW and Central NSW to reach the Sydney, Newcastle, and Wollongong regions before the network reaches its limit.

The scope for delivering Stage 1 of Option 5 is the same as Option 2d.

Works for Stage 1 are expected to take four years to complete. The earliest in-service timing modelled for Option 5 Stage 1 is 2030/31, which considers early works commencing in 2026/27.

The estimated capital cost of Stage 1 is approximately $251 million (nominal) based on a P50 Class 5 estimate (+100 per cent/-50 per cent).

Stage 2: Build a new 500 kV transmission line to South Western Sydney

Stage 2 adds the high-capacity double circuit 500 kV transmission lines proposed in Option 4 from Bannaby to South Western Sydney at a deferred date. Stage 2 adds 3.6 GW of transfer capacity to the transmission network supplying the Sydney, Newcastle, and Wollongong region from the south.

The scope for delivering Stage 2 of Option 5 is the same as Option 4.

All works are expected to take seven years to complete. Consistent with the timing under the Optimal Development Path in the *Draft 2026 ISP*, the in-service timing modelled for Option 5 Stage 2 is 2037/38.

Option 5 provides potential flexibility in the timing of the second stage, in response to the evolving market demand and other developments. However, unlike the flexibility offered by Option 3, where the second stage is a capacity uplift of a transmission line requiring only substation upgrades, planning for flexible delivery of a major transmission line as the second stage is less practical due to the complex nature of such projects, and the need for extended, transparent community engagement.

While the PADR assessment models Stage 2 being delivered in the same year (2037/38) in all three scenarios, this is considered a proportionate assumption for the analysis at this point in time. Given the closeness of the option rankings (as shown in Section 8), we intend to reassess this in the PACR analysis and align the timing of the second stage to when it is expected to be optimal and feasible under each scenario.

The estimated capital cost of Stage 2 is a further $4,664 million (nominal) based on a P50 Class 5 estimate (+100 per cent/-50 per cent), bringing the total estimated capital cost of the option to $4,915 million (nominal).

3.1.8. Option 6: Build a new 500 kV transmission line to South Western Sydney by 2033/34, and install series reactors as power flow control devices in the existing network

Install series reactors as power flow control devices in the transmission network south of Sydney and build a new South Creek 500/330 kV substation by 2030/31, followed by a double circuit 500 kV transmission line from Bannaby in the Southern Tablelands to South Western Sydney by 2033/34, adding 3.6 GW of capacity to the network supplying Sydney from the south.

Option 6 combines the scope for Option 2d and Option 4 on the same timing as these respective options. This option has been included to test whether adding series reactors as power flow control is net beneficial when a new 500 kV transmission line is modelled for an earlier in-service delivery (2033/34).

Option 6 is envisaged to be commissioned and energised in two steps. First, a new 500/330 kV South Creek substation would be built and commissioned, creating a high-capacity link between the existing 500 kV network and Transgrid's existing Sydney West 330/132 kV substation, which is a key hub for distribution of power to Greater Sydney, improving power flow balancing on the northern and southern networks supplying the Greater Sydney region. The benefits of this new South Creek substation would be boosted by the deployment of power flow control devices in the 330 kV network south of Sydney, which redirect flows towards the northern 500 kV flow path created by the Hunter Transmission Project, and away from the congested, limited-capacity existing network.

Once ready, a new 500 kV double circuit transmission line will be commissioned from Bannaby to South Western Sydney. When complete, Option 6 will add 3.6 GW of transfer capacity to the transmission network supplying the Sydney, Newcastle, and Wollongong region from the south.

The scope for delivering Option 6 combines the scope of Option 2d and Option 4.

All works are expected to take seven years to complete, with the South Creek substation and power flow control scope (series reactors) expected to be ready for commissioning after four years. The earliest in-service timing modelled for Option 6 is 2030/31 for the South Creek substation and power flow control scope (series reactors), and 2033/34 for the 500 kV transmission line, which considers early works commencing in 2026/27.

The estimated capital cost of Stage 1 is approximately $1,135 million (nominal), with Stage 2 adding a further $2,384 million (nominal) based on a P50 Class 5 estimate (+100 per cent/-50 per cent). The total estimated capital cost of the option is $3,519 million (nominal).

3.2. Construction Methodologies

Cost estimates for credible options involving a new high voltage transmission line for the Sydney Ring South Project include consideration of social licence, property and constraints during construction.

At this stage of the project, no preferred corridor, route or transmission technology has been identified. However, Transgrid has undertaken a preliminary assessment of a concept to reduce community impact by partially undergrounding approximately 20 km of the transmission line. Indicative analysis suggests that these considerations could increase the cost of the transmission line by $2,700 million (nominal) as noted in the following paragraphs.

Both overhead and underground transmission technologies are technically feasible in certain circumstances and involve different cost, technical, environmental and social considerations. For long-distance, high-capacity 500 kV transmission, overhead transmission is generally the lower-cost and less technically complex option. Underground transmission can reduce visual impacts and may be appropriate in specific locations, but typically involves materially higher capital costs, greater construction complexity, longer delivery timeframes, and more complex maintenance and repair requirements.

Underground transmission may also require wider construction corridors, more intensive civil works, additional land acquisition in some locations, and can involve longer outage durations if faults occur, as repairs typically require excavation and replacement of cable sections.

Transgrid will continue to assess overhead and underground design options, including opportunities for targeted or partial undergrounding where technically feasible and proportionate to the impacts being addressed. Other impact mitigation measures may include route refinements, micro-siting of towers, visual screening and consultation on tower design.

Transgrid welcomes input from communities, government, regulators and other stakeholders on the costs, benefits and broader considerations associated with undergrounding. The feasibility, cost implications and potential role of undergrounding will be considered further in the PACR.

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3.3. Consideration of non-network options

On 26 June 2024, AEMO sought submissions from providers of potential non-network solutions for information on options that may be capable of addressing or partially addressing the identified need.[53] Submissions closed on 18 September 2024. AEMO received two submissions from proponents of prospective storage projects in the Greater Sydney Region, both of whom requested confidentiality.

Both proponents described prospective storage projects that could connect within the Greater Sydney region but did not identify the network support services proposed to meet the identified need, which go beyond standard market operation of grid-connected storage facilities, and are considered by default through the market modelling approach adopted for the PADR.

Transgrid notes that all storage projects within the Sydney, Newcastle, and Wollongong region inherently support the ability to support growing demand centres. The ISP market modelling methodology includes built-in options to deploy energy storage solutions as an alternative to network augmentation, and the costs and benefits of these alternatives are therefore tested in this PADR.

The analysis highlights that a significant number of grid-scale storage projects are required within the Sydney, Newcastle, and Wollongong region, even if the Sydney Ring South Project is developed.

If they progress, these submitters' storage projects will play an important role in the energy market and power system, but by themselves, storage projects at this scale would not be a sufficient alternative to the Sydney Ring South Project. Transgrid notified submitters that should a non-network option emerge for which their projects may be able to provide network services, we would re-engage to seek detailed information to assess technical and commercial feasibility of all potential service providers.

[53] See: "Call for non-network options- 2024 Integrated System Plan" | AEMO.

3.4. Summary of options considered but not progressed

Transgrid has considered a range of other potential options but has not progressed these for assessment in the PADR on the grounds that they are not considered technically and/or economically feasible and therefore are not credible options. A summary of these options is presented in Table 3.2 below:

Table 3.2: Options considered but not progressed

Option	Overview	Reasons for not progressing the option
Power flow control at a new switching station in South Western Sydney	Original proposal for a power flow control option, as described in an addendum to Transgrid's Preparatory Activities for the 2024 ISP[54]	Higher cost and technically equivalent to the revised Option 2d scope using series reactors installed at existing Transgrid substations, as assessed in this PADR. This option is therefore not considered economically feasible under the RIT-T.
Building new transmission lines at a voltage other than 500 kV	Consideration of alternative design voltages for a new transmission line between Bannaby and South Western Sydney	A lower voltage design (e.g. double circuit 330 kV) would provide materially lower capacity and present only modest reductions in cost or community impact. At this stage, we therefore do not consider the use of a lower voltage design to be economically feasible under the RIT-T.
Rebuild an existing single circuit 330 kV transmission line	Re-purpose the easement of an existing single circuit by rebuilding as a double circuit 500 kV transmission line	This option would necessitate substantial outages on critical lines when the rebuild occurs, that would considerably disrupt the efficient operation of the power system and wholesale electricity market over a prolonged period. We do not consider that any cost savings associated with the use of the existing easement (which would need to be widened to accommodate a 500 kV double circuit line) would offset these impacts. At this stage, we therefore do not consider this option to be economically feasible under the RIT-T. Further justification is outlined in Section 3.5 below.
HVDC bi-pole conversion of existing assets	Convert an existing 330 kV single circuit transmission line (e.g. line 39) to ±300 kV DC bi-pole operation	Not currently considered credible, due to the higher cost and extensive footprints of converter stations which would be required at space-constrained substations in Sydney. Given there is not expected to be a commensurate increase in estimated market benefits for this option, we therefore do not currently consider it to be economically feasible under the RIT-T. Transgrid will continue to monitor HVDC technological advancements globally and may undertake further assessments if there are material changes to these technical and economic feasibility considerations.

[54] Preparatory Activities Report: Reinforcing Sydney, Newcastle, and Wollongong Supply – March 2024 Addendum | Transgrid.

3.5. Rebuilding existing 330 kV transmission lines south of Sydney is not considered feasible

Rebuilding an existing single circuit 330 kV transmission line south of Sydney as a double circuit 500 kV line within the same easement was considered as part of options development. While reusing an existing alignment could reduce community impacts and costs associated with establishing new greenfield easements for a transmission line more than 100 km in length, in practice this approach presents material delivery challenges.

Even where works are proposed to occur mostly within and along existing easements, a line reconstruction option would require widening the easements from 60 m to 70 m, new environmental planning approvals and extensive community engagement, given the greater scale and impact of a new double circuit 500 kV line. Taller structures are also more likely to intrude height restrictions governed by the Civil Aviation Safety Authority (CASA) obstacle limitation surface (OLS) around the new Western Sydney International Airport.

Notwithstanding, the fundamental limitation of rebuilding in an existing easement is that the existing line must be taken out of service before the replacement can be constructed. While the demolition and reconstruction can be done progressively, this work would require prolonged outages of critical infrastructure on the transmission line supplying Sydney and the Illawarra.

Assessment of current network conditions indicates that the existing 330 kV network supplying Sydney and the Illawarra from the south already lacks sufficient redundancy to accommodate prolonged outages of this nature without considerable adverse impacts on the wholesale market, system operability and security. Even temporary reductions in network availability on this network have been shown[55] to materially constrain dispatch and increase system stress, leading to elevated prices and reliability risks.

By the early 2030s, which is the earliest a 500 kV line could be delivered, dependence on this network is expected to amplify as new capacity in Southern NSW (including Snowy 2.0 and South West REZ) are required to replace the Eraring Power Station when it retires in 2029.

We do not consider that cost savings associated with the use of the existing easement would offset the market impact associated with the necessary prolonged outages. At this stage, we therefore do not consider this option to be economically feasible under the RIT-T.

Transgrid will monitor the development of new and innovative construction methodologies that may have the potential to reduce or eliminate the need for high-impact outages, and may undertake further assessments of this option if there are material changes to these economic feasibility considerations.

The existing 330 kV network supplying Sydney and the Illawarra from the south already lacks sufficient redundancy to accommodate prolonged outages without considerable adverse impacts on the wholesale market, system operability and security. Even temporary reductions in availability on this network materially constrain dispatch and increase system stress, leading to elevated prices and reliability risks.

A 500 kV transmission line in South West NSW

[55] For example, the AER reported that on 26 November 2025, a planned outage on 330 kV line 16 (Avon to Marulan) prevented between 1,596 MW and 2,193 MW of low-priced capacity from making it to market, causing wholesale prices to exceed $5,000 for a 30-minute period. See: [Prices above $5,000/MWh - October to December 2025 | Australian Energy Regulator (AER)](#).

4. Social and environmental considerations

4. Social and environmental considerations

This section outlines Transgrid's approach to engaging with the community and stakeholders, and also describes how we aim to minimise social and environmental impacts when delivering new infrastructure. It explains opportunities for stakeholders to provide feedback on the PADR, details the decision-making process for the Sydney Ring South Project, and describes the planned consultation process for selecting the project corridor and route - which has not yet commenced. The section also covers key environmental, planning, and land considerations relevant to the project.

4.1. Social Considerations

We are at a very early stage of planning for Sydney Ring South. This PADR signifies the start of a long-term conversation. Transgrid acknowledges that while the community is generally supportive of the energy transition that is now well underway; stakeholders who live in closer proximity to potential future transmission lines and associated infrastructure, are likely to have different perspectives or concerns about the potential impacts, and may not feel that the benefits outweigh the impacts.

Transgrid recognises the critical role that community organisations, local government, state departments, elected representatives, business groups and landholders have in the planning and delivery of major transmission infrastructure projects. We will work with communities, stakeholders and industry from the outset, before decisions are made.

We will continue to engage with a range of key stakeholders on the outcomes presented in this PADR. The engagement will aim to communicate the rationale for, and benefits of, the project, and facilitate early stakeholder input to shape an outcome in the PACR that is both in the long-term interests of energy consumers and supports the long-term growth requirements of the Greater Western Sydney region.

At this stage of the RIT-T, the work to identify an appropriate project corridor and preferred route for the proposed transmission line has not yet commenced. However, a new 500 kV transmission line between Bannaby in the Southern Tablelands and South Western Sydney, could extend to around 100 km and traverse up to seven local government areas.

We acknowledge that such an undertaking would be very challenging given the potential project area spans diverse communities, many experiencing rapid population growth, intensive infrastructure development, and significant land-use transition from rural to residential, commercial and industrial land users. Major projects such as the Western Sydney International Airport and emerging manufacturing hubs are also accelerating growth across the region.

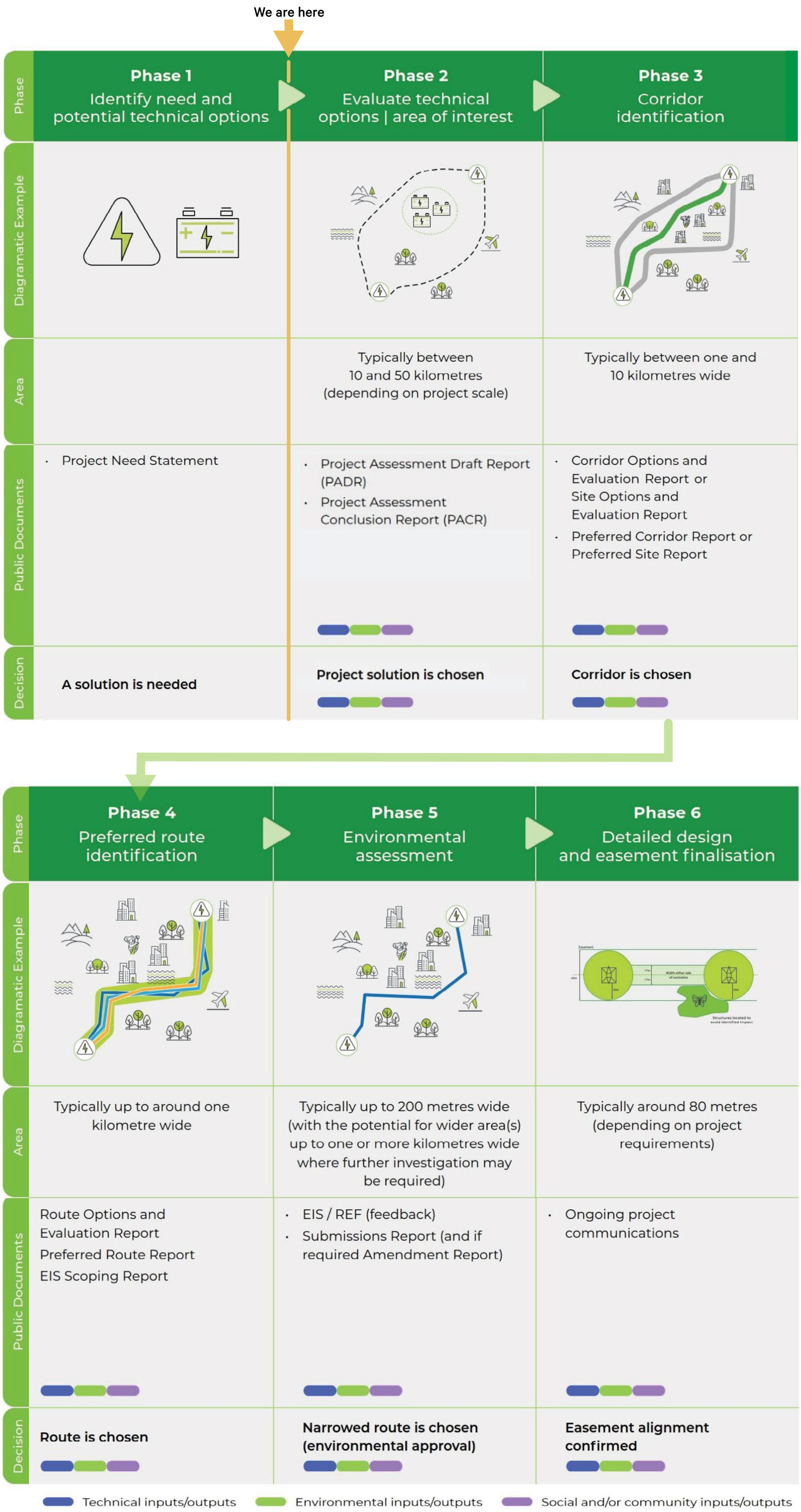
Transgrid would apply a transparent, evidence-based route development process (see Figure 4.1) to navigate the identified corridor, recognising that strong social licence principles are critical to project delivery. This process would be informed by a combination of rigorous desktop analysis and community and stakeholder feedback captured through the PADR, ensuring environmental, property and social considerations are explicitly identified, tested and integrated.

The route development process would be progressed once a preferred option is determined by the PACR. This process would be underpinned by a clear commitment to transparency, seeking genuine community and stakeholder inputs to help determine and directly influence outcomes and decisions. Transgrid adopts best-practice engagement, working in genuine partnership with communities, landowners and stakeholders to understand local impacts, address concerns, and manage risks early.

This approach ensures that social and environmental impacts are actively incorporated into decision-making, strengthening trust, reducing conflict, and supporting the principles of social licence. Pending the outcome of the RIT-T process, further development of the project will continue to be fully informed by stakeholder and community consultation and engagement. Stakeholder input will help inform the PACR and will also be retained for use in the delivery of the project.

Transgrid recognises the critical role that community organisations, local government, state departments, elected representatives, business groups and landholders have in the planning and delivery of major transmission infrastructure projects. We will work with communities, stakeholders and industry from the outset, before decisions are made.

Figure 4.1: Transgrid corridor and route development process



4.1.1. Approach to community and stakeholder engagement

Best practice says that early engagement based on the values of trust, integrity, empathy and transparency is fundamental to building understanding and the foundation for support. These values inform our *Community Engagement Policy,*[56] which guides our engagement practices and objectives.

Transgrid is committed to working with local communities with honesty and integrity in a meaningful, responsive and equitable way, through transparent and inclusive practices, and seeks to minimise the social, environmental and cultural impacts of our projects and operations. We will do this by engaging with our communities to understand what matters most, and to build trust and positive relationships.

Transgrid's approach to community and stakeholder engagement is based on best practice principles and the International Association of Public Participation (IAP2) *Spectrum of Public Participation*[57] – an internationally recognised tool for planning public participation in major projects.

This approach takes into consideration guidance from industry – including the Clean Energy Council's *Community Engagement Guidelines for Building Powerlines,*[58] the Energy Charter's *Better Practice Landholder and Community Engagement Guide,*[59] and the *2021 AER Guidance Note: Regulation of actionable ISP projects,*[60] which states that there is a clear expectation for TNSPs to carry out high-quality, early engagement with local community and consumer representatives, which may result in:

- Improved stakeholder and community understanding of the project's costs and risks.
- Opportunities for the project solution to be designed with input from the local communities impacted by the proposed major transmission project.
- TNSPs having a better understanding of community concerns about route selection, which in turn would help the TNSP manage the associated risks.
- Opportunities for the TNSP to address and manage concerns raised by stakeholders. The proposed project will also draw on the relevant recommendations contained in the *Australian Energy Infrastructure Commissioner's 2024 Annual Report*[61] (and prior reports) in helping guide the project's approach to the implementation of landholder community relations programs.

4.1.2. Lessons learnt from previous projects

Strong engagement is critical to getting this project right. Transgrid has developed comprehensive engagement processes arising from several years of planning other transmission projects of this nature. This has allowed us to better understand the experience of impacted landholders and communities and determine improvements for future project consultation. Transgrid has reflected on multiple stakeholder perspectives and lessons learned through the HumeLink, VNI-West and EnergyConnect community and landholder engagement and other comparable projects.

In particular, the following themes have been identified as critical to building awareness and support, and are a key priority for this project:

- A commitment to early engagement, listening to and communicating with stakeholders with honesty and integrity to understand their views and concerns, and ensuring the project team is equipped to have these conversations.
- Co-designing and clearly communicating the engagement process and opportunities to stakeholders including landholders and communities – including how and when to provide feedback, and how their feedback will be used.
- Ensuring all interested stakeholders and communities can easily access project information through a variety of channels including websites and other platforms, and that any information can be easily understood.
- Providing ample notice of consultation or engagement opportunities and ensuring educational materials are available to help increase energy literacy, to facilitate meaningful participation.
- Dispelling myths in a timely manner to help alleviate undue anxiety.

[56] Community Engagement Policy
[57] IAP2 Spectrum of Public Participation.
[58] Community Engagement Guidelines for Building Powerlines | Clean Energy Council.
[59] Landholder & Community Better Practice Engagement Guide | Energy Charter.
[60] Regulation of actionable ISP projects | Australian Energy Regulator.
[61] 2024 Annual Report | Australian Energy Infrastructure Commissioner.

4.1.3. Engagement to date and in the future

As part of our commitment to understanding the full raft of social and environmental considerations, we will engage key stakeholders from the very early stages of project development.

Transgrid is already engaging with a range of stakeholders including Federal and NSW Energy Ministers and their respective departments, Transgrid's Consumer Advisory Group, the Australian Energy Regulator, the Australian Energy Market Operator and EnergyCo.

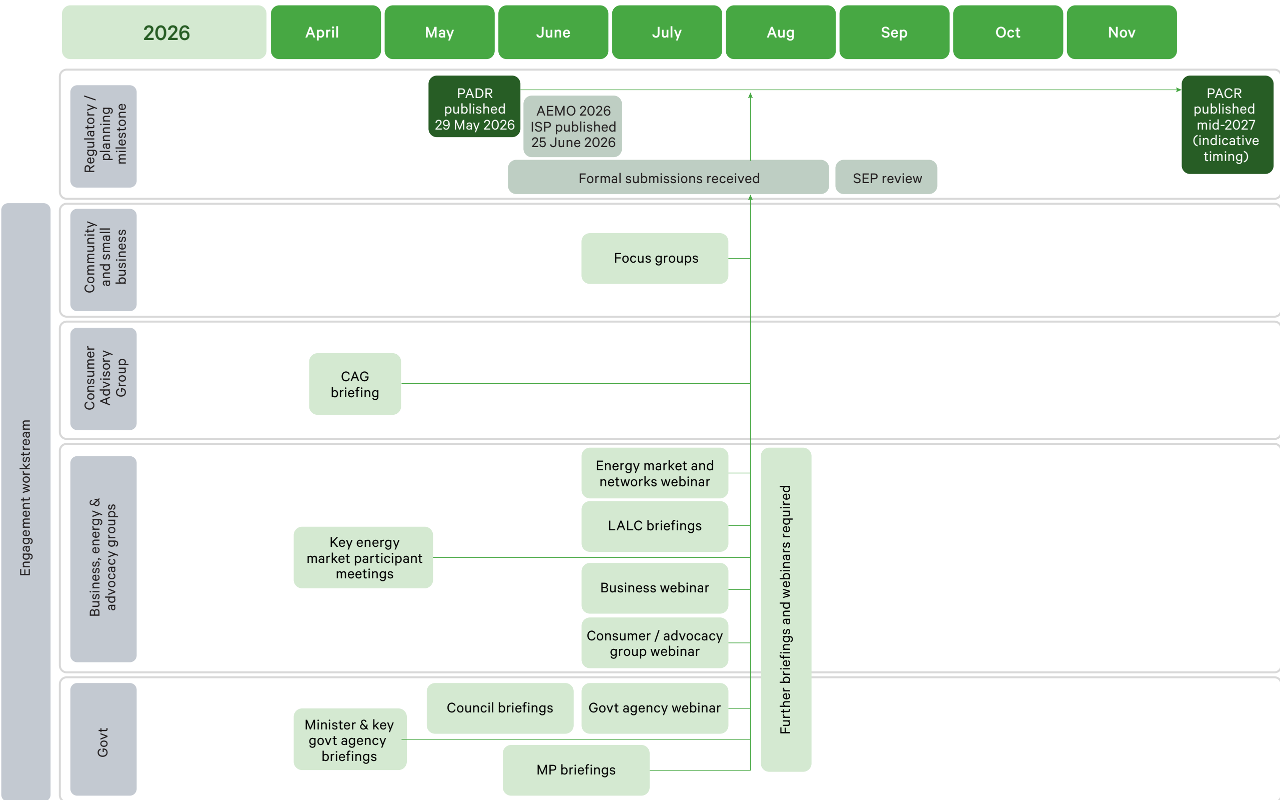
Transgrid's *Stakeholder Engagement Plan for Sydney Ring South PADR (SEP)*[62] for this PADR sets out the many interested and potentially affected project stakeholders that Transgrid has identified to participate in engagement regarding this PADR and the Sydney Ring South Project. The AER has confirmed that Transgrid's SEP fulfills the *Cost Benefit Analysis (CBA) Guidelines*.[63]

Transgrid's SEP also outlines a robust program on the outcome of the PADR itself, employing a wide variety of engagement tools and channels that Transgrid will proactively adopt to ensure engagement is transparent, accessible, and enables stakeholders to participate in the RIT-T process.

These include but are not limited to consumer, industry and stakeholder webinars, stakeholder briefings, government engagement at all levels, consumer focus groups and the use of Transgrid's website and social media channels, videos and 'plain English' project summaries.

Transgrid will apply the most appropriate communication and engagement tools based on identified engagement objectives, as well as the needs, expectations and preferences of stakeholders and the community. Engagement activities and outcomes will be tracked against the engagement plan and amended as needed.

Figure 4.2: Sydney Ring South PADR engagement program



> The Stakeholder Engagement Plan for Sydney Ring South PADR also outlines a robust program on the outcome of the PADR itself, employing a wide variety of engagement tools and channels that Transgrid will proactively adopt to ensure engagement is transparent, accessible, and enables stakeholders to participate in the RIT-T process.

[62] Stakeholder Engagement Plan for Sydney Ring South PADR | Transgrid.
[63] The AER's Cost Benefit Analysis (CBA) Guidelines require Transgrid to publish a stakeholder engagement plan as soon as practicable before publication of the PADR (and for Transgrid to report against this engagement plan in each RIT-T report).

4.2. Environmental, planning and land considerations

4.2.1. Preliminary environmental constraints identification

As part of the feasibility analysis for a 500 kV transmission line project, a high-level, desktop, constraints identification process was carried out in 2024 in accordance with Transgrid's *Route Selection Guideline* (referenced in previous section) to inform the early identification of environmental and land use constraints in the broad 'area of interest' between Bannaby and South Western Sydney. This information has guided our approach to this PADR and will inform any subsequent more detailed corridor and route selection processes.

The constraints identified were used to prepare the Class 5 cost estimates presented in this PADR and identification of potential biodiversity offsets to deliver the project, which are described in the following sections.

4.2.2. Planning approval process

Pending the outcomes of the PACR, as the project progresses through the RIT-T, a robust corridor and route selection process would commence, with the envisaged planning approval pathway becoming clearer. Based on the anticipated scope and complexity of a 500 kV transmission line project, it is likely that the project would be determined *State Significant Infrastructure* or *Critical State Significant Infrastructure* by the NSW Minister of Planning and Public Spaces. The project would therefore require assessment (through the development of an Environmental Impact Statement) and approval under the NSW's *Environmental Planning and Assessment Act 1979*.

Commonwealth approval under the *Environment Protection and Biodiversity Conservation Act 1999* may also be required if the project has the potential to impact any Matters of National Environmental Significance.[64]

4.2.3. Land access and acquisition

Landholders are a critical stakeholder in the planning and delivery of transmission projects, including the RIT-T and associated corridor studies. As we assess potential options, we work closely with landowners, communities and local councils to incorporate local knowledge and ensure on-the-ground insights inform early planning.
The following section outlines preliminary information on land access and easement acquisition requirements that may apply to a future transmission line project.

Land Access

As the project is explored further, there is a need to better understand environmental and local conditions, which may involve targeted surveys and studies planned in consultation with landowners. In parallel, formal engagement with councils, community stakeholders and potentially affected landholders will be undertaken to transparently capture environmental, social and property considerations to inform route option identification and refinement.

Access to private property may be required to support detailed environmental assessments. Where this occurs, Transgrid will engage directly with landholders to negotiate access arrangements at the appropriate time, taking a relationship-first approach that recognises each property and situation is unique.

Subject to landholder agreement, all access is undertaken in accordance with the Transgrid Land Access Code of Conduct,[65] which sets clear expectations for respectful behaviour before, during and after activities. Established processes and practical guides are also available to support both landholders and project teams, ensuring access arrangements are managed clearly and transparently as projects progress.

Transgrid routinely performs essential tasks developing, inspecting and maintaining the transmission network that requires access to public and private land.

Land Acquisition

Safety is Transgrid's number one priority, and we are committed to ensuring the safety of the communities within which we work. Having appropriate spaces for our substations and transmission lines is key to the safe delivery of secure and reliable electricity to the people of NSW. To achieve this, Transgrid must acquire appropriate property rights over its electricity supply networks. For a substation this will usually be freehold title and for transmission lines an easement.

An easement is a property right that is used to protect both the public and Transgrid's transmission line infrastructure and provides access along the route of a transmission line. While there are some restrictions on the use of land within an easement for overhead transmission lines, there are numerous permitted activities (some with conditions) that may be included in the easement terms, such as grazing and agriculture, fencing and water storage dams. However, easements do impose rights and obligations on both Transgrid and the landholder to restrict activities that could endanger the public or impact the safe operation of the transmission network.

[64] Matters of National Environmental Significance Guidelines | DCCEEW.
[65] Land Access Code of Conduct | Transgrid.

The acquisition of property and easements for substations and transmission lines in NSW is governed by various NSW laws. As the authorised network operator, section 44 of the *NSW Electricity Supply Act 1995 (ES Act)* authorises Transgrid to acquire an interest in land for the purposes of building and operating the network. The *NSW Land Acquisition (Just Terms Compensation) Act 1991 (Just Terms Act)* establishes the process that Transgrid must follow when seeking to acquire an interest in land.

In exercising its duties as the network operator under the *Electricity Supply Act 1995* (NSW), Transgrid has established a range policies and process guidelines to support the land acquisition function across all stages of project development, as seen in Table 4.1 below.

Table 4.1: Transgrid policies and process guidelines

Project Stage	Procedure and Process Guidelines
Stage 1 – Evaluation of Technical Options	Route Selection Guideline Land Access Guide for Projects Compensation Principles for Major Projects Property Holding Management Procedure GIS Cloud mapping Work Instructions GIS Cloud Data Governance Procedure Survey Procedure
Stage 2 – Corridor Identification	Work Instructions for Major Project Geotech Investigations Route Selection Guideline Land Access Guide for Projects Property Holding Management Procedure Mapping Task Procedure Data & Spatial Analysis Procedure Title Alert Notification Instructions Survey Procedure
Stage 3 – EIS & Property Acquisition	Property Acquisition Procedure Landowner easement compensation guideline Compulsory Acquisition Process for NSW EIS Guideline EIA Review and Approval Requirements Procedure Work Instruction Requirements for Major Project Geotechnical Investigations Survey Procedure
Stage 4 – Construction	Land Access Guide for Projects Property Holding Management Procedure
Stage 5 – Post Construction	Monthly – collaboration sessions across Enviro and Property team members Lessons Learned: at the end of each project across disciplines, with updates to procedures and lessons learned registers

Once a preferred route is identified, Transgrid will seek to negotiate the acquisition of easement interests from landholders for a minimum of six months in accordance with the *Just Terms Act*. This period provides time to negotiate compensation; and for landholders to understand the acquisition process, obtain independent legal and valuation advice and have questions and concerns addressed.

When agreement is reached, Transgrid will provide the landholders with all the documents required to grant an easement over the land, arrange for the registration of the easement and pay the agreed compensation.

Transgrid is committed to genuine negotiations to reach agreement with landholders. However, in some circumstances, agreement cannot be reached for a variety of reasons. In that case, Transgrid may take steps towards the compulsory acquisition of the required land and easement interests under the *Just Terms Act*.

The process for acquiring property interests by a compulsory process must be carried out strictly in accordance with the Transgrid Compulsory Acquisition Process for NSW. This document establishes the detailed steps and timeline required to meet the obligations conferred on Transgrid by the:

- Transmission Network Lease
- *Land Acquisition (Just Terms Compensation) Act 1991* (NSW)
- *Electricity Network Assets (Authorised Transactions) Act 2015* (NSW)
- *Foreign Acquisitions and Takeovers Act 1975* (Cth).

5. Ensuring the robustness of the analysis

5. Ensuring the robustness of the analysis

This section is more technical in nature. It details the specific input parameters that Transgrid has applied to meet the regulatory requirements of a RIT-T assessment for the Sydney Ring South Project. These include the reasonable scenarios considered, scenario weightings applied, and the additional sensitivities that Transgrid has analysed to test the robustness of the outcomes arising from AEMO's approach.

Each of the six credible options described in Section 3 have been assessed across three energy demand and sector transition scenarios. These scenarios, and assumptions feeding into the scenarios, are consistent with those used in the *Draft 2026 ISP*. Under the actionable ISP framework, the ISP directs the use of specific scenarios (and their weightings) for each RIT-T.

5.1. The assessment considers three 'reasonable scenarios'

The RIT-T is focused on identifying the top-ranked credible option that maximises expected net benefits. However, uncertainty exists about how quickly the energy transition will occur, including the scale of future distributed energy resource uptake, as well as the level of demand growth as other sectors electrify or consider use of alternate zero-emission fuels.

To deal with this uncertainty, the actionable ISP framework requires AEMO to direct the use of specific scenarios for each RIT-T. The costs and market benefits for each credible option are estimated across these scenarios and then weighted based on the likelihood-based weightings identified in the ISP for each scenario to determine a weighted net benefit. It is this weighted net benefit that is used to rank credible options and identify the preferred option.

The three scenarios reflect different assumptions about future market development, the pace of the energy transition and other uncertain but potentially material factors that are expected to affect the relative market benefits of the options being considered. The different scenarios investigated test the robustness of the benefits of each option to different assumptions about how the energy sector may develop in the future.

Table 5.1: Key input parameters for modelled scenarios

Input parameter	Source for inputs and assumptions
Underlying consumption	Draft 2026 ISP – Scenario specific inputs
New entrant capital cost for generation and storage	Draft 2026 ISP Inputs and Assumptions Workbook (v7.5) – Scenario specific inputs
Retirements of coal-fired power stations	Draft 2026 ISP – Scenario specific inputs; Eraring retirement updated to April 2029[66]
Gas fuel cost	Draft 2026 ISP Inputs and Assumptions Workbook (v7.5) – Scenario specific inputs
Coal fuel cost	Draft 2026 ISP Inputs and Assumptions Workbook (v7.5) – Scenario specific inputs
Variable cost for renewable generation and storage	Negligible non-zero variable cost adopted for renewable generation and storage to support more detailed, robust modelling of the power system than considered by AEMO. See section 7.3.3 for further detail about changes to inputs and assumptions from the Draft 2026 ISP.
NEM carbon budget to achieve 2050 emissions levels	Draft 2026 ISP Inputs and Assumptions Workbook (v7.5) – Scenario specific inputs
Jurisdictional (state) carbon budgets to achieve 2050 emissions levels	Draft 2026 ISP Inputs and Assumptions Workbook (v7.5) – Scenario specific inputs: Slower Growth: 727 Mt CO2-e 2026/27 to 2049/50; Step Change: 583 Mt CO2-e 2026/27 to 2049/50; Accelerated Transition: 303 Mt CO2-e 2026/27 to 2049/50
Government policies and targets	Draft 2026 ISP Inputs and Assumptions (v7.5): • Powering Australia Plan 2030: 82% renewable generation by 2030 • New South Wales Electricity Infrastructure Roadmap: 12 GW renewable energy by 2030; 16 GWh storage by 2030 • Infrastructure Investment Objectives (IIO) development plan (modelling in Step Change and Accelerated Transition only) – Additional renewable generation capacity capable of producing 88 GWh by 2037, measured from a November 2019 baseline; 42.4 GWh of long duration storage (8+ hours) by 2037 • Victoria Renewable Energy Target (VRET): 65% renewable generation by 2030 and 95% by 2035 • Victorian Energy Storage Target: 2.6 GW of storage by 2030; 6.3 GW of storage by 2035 • Tasmanian Renewable Energy Target (TRET): 15,750 GWh renewable generation by 2030 and 21,000 GWh by 2040 • Capacity Investment Scheme (CIS) generation targets with state allocations: New South Wales: 7,100 MW by 2029; Queensland: 628 MW by 2029; South Australia: 1,200 MW by 2029; Tasmania: 1,200 MW by 2029; Victoria: > Solar 1,500 MW by 2028 > Wind 3,500 MW by 2029 • Capacity Investment Scheme (CIS) clean dispatchable targets: NEM wide: 6,745 MW / 27,105 MWh by 2029; NSW: 1,850 MW/7,400 MWh; SA: 930 MW/3,720 MWh by 2027; VIC: 1,700 MW/6,800 MWh by 2028 • Victorian Offshore Wind Target: 2 GW of offshore wind by 2032; 4 GW of offshore wind by 2035; 9 GW of offshore wind by 2040 • South Australia Firm Energy Reliability Mechanism (FERM): 2,300 MW of dispatchable capacity (8+ hour duration) • South Australia net renewable energy generation target: Net renewable energy in SA by 2027 onwards
Committed and Anticipated Generation and Storage	AEMO Generation Information July 2025

The three scenarios hold constant the timing of Committed, Anticipated and Actionable ISP projects from the *Draft 2026 ISP*, but where need for and timing of future ISP projects varies across scenarios in later years, the optimal timing in each scenario is tested to ensure a right-sized, broader network context is reflected in each scenario.

[66] Eraring Power Station extension | NSW Government.

Table 5.2: Committed and anticipated projects

Project	Slower Growth	Step Change	Accelerated Transition
Committed & Anticipated Projects			
EnergyConnect Stage 2 (NSW / SA)		Nov-27	
Humelink (NSW)		Dec-27	
Central West Orana REZ Network Infrastructure Project (NSW)		Dec-28	
Hunter Central Coast REZ Network Infrastructure Project (NSW)		Nov-29	
Western Renewables Link (VIC)		Nov-29	
Marinus Stage 1 (TAS / VIC)		Dec-30	
CopperString (QLD)		Jun-31	
***Draft 2026 ISP* Actionable Projects (including previously actionable projects undergoing further analysis)**			
Hunter Transmission Project (NSW)		Nov-29	
New England REZ Network Infrastructure Project Stage 1 (NSW)		Jul-32	
Wondalga switching station (NSW)		Jul-29	
Gladstone Grid Reinforcement (QLD)		Mar-29	
VNI West (NSW / VIC)		Nov-31	
Marinus Stage 2 (TAS / VIC)		Dec-34	
Waddamana to Palmerston transfer capability upgrade (TAS)		Dec-30	
Gippsland Offshore V8 Option 1 (VIC)		Jul-31	
Gippsland Offshore Option 2 (VIC)		Jul-34	
Gippsland Offshore SEVIC1 Option 1 (VIC)		Jul-38	
Western Victoria Reinforcement Program (VIC)		Jun-29	
QNI Connect (NSW / QLD)		Mar-34	
Northern Transmission Project (SA)		Jul-29	
Draft 2026 ISP Future Projects			
Eastern Victoria Reinforcement program (VIC)	Jul-38	Jul-33	Jul-33
Central Queensland to Southern Queensland Stage 1 (QLD)	Jul-41	Dec-33	Dec-34
Central Queensland to Southern Queensland Stage 2 (QLD)	Jul-41	Dec-35	Dec-35
South-West Victoria Expansion (VIC)	-	Jul-35	Jul-35

5.2. Scenario weightings

The RIT-T for Sydney Ring South applies scenario weightings consistent with *Draft 2026 ISP*.[67]

Table 5.3: Scenario weightings

Scenario	2026 ISP probability weighting
Slower Growth	27%
Step Change	46%
Accelerated Transition	27%

While the above weightings were applied to weight the estimated market benefits and identify the preferred option across scenarios, Transgrid has also carefully considered the results in each scenario in Section 8 to better understand how differences in the future 'states of the world' can impact the benefits of the options assessed.

[67] AEMO 2026 ISP Scenario Weighting.

5.3. Inputs and assumptions for sensitivity analysis

In addition to the scenario analysis, Transgrid has considered the robustness of the outcome of the cost benefit analysis through sensitivity testing. The set of sensitivities have been tested in this PADR and the inputs and assumptions varied relative to the core cost benefit assessment are summarised in Table 5.4 below. The results of the sensitivity analysis are discussed in Section 8.5.

Table 5.4: Sensitivities tested

Sensitivity	Factors varied from core cost benefit assessment
Alignment with NSW Electricity Infrastructure Roadmap developments	• Generation projects that have been awarded with South West REZ and Central West Orana REZ are treated as 'anticipated' projects. • Stage 2 of the New England REZ transmission project is treated as an actionable project progressing under the NSW Electricity Infrastructure Roadmap framework.
Constrained use of diesel as a backup fuel for electricity generation	• Ability for existing gas-fired generators in the Hunter and Central Coast regions to run on diesel as a backup fuel is limited to the conditions of relevant environmental and planning permits and assume that future facilities are required to meet equivalent standards.
Alignment with NSW Electricity Infrastructure Roadmap developments & constrained use of diesel as a backup fuel	• Combination of sensitivities outlined above.
Higher data centre growth, with supply side adjustments	• Add 1 GW and 2 GW by 2050 (as separate sensitivities) to the baseline Draft 2026 ISP Step Change data centre demand forecast for the Sydney, Newcastle and Wollongong region. • Match growing data centre demand with equivalent local demand management mechanisms which could include demand flexibility agreements or local generation and storage. For modelling purposes, this flexibility is modelled as additional dispatchable demand side particiaption. • Alignment with NSW Electricity Infrastructure Roadmap developments (as above). • Constrained use of diesel as a backup fuel (as above). • Inclusion of LTESA Tender 6 outcomes, consistent with treatment of other policy supported projects.[68] • Disable modelled targets set by the 2025 NSW Infrastructure Investment Objective (IIO) Report and 82% of electricity generation from renewable energy sources under the Commonwealth Government's Powering Australia Plan. These adjustments are made to ensure that this large increase in electricity demand is met by a realistic capacity mix which still observes longer term carbon reduction objectives.
Low data centre growth	• Limits data centre capacity and growth to only existing facilities in the Sydney, Newcastle, and Wollongong region. This results in data centre demand growing from approximately 0.5 GW in 2026 to approximately 0.9 GW by the late 2030s (compared to over 2 GW by the end of the assessment period in the Step Change scenario).
Higher adoption of distributed and consumer energy resources	• Increase year-on-year uptake of behind-the-meter storage by approximately 50% for 10 years to 2035/36,[69] relative to the AEMO forecast adopted in the Draft 2026 ISP Step Change scenario. This results in an additional 760 MW (1,490 MWh) of behind-the-meter storage installed in the Sydney, Newcastle, and Wollongong region by 2035/36, in addition to the forecast 2,000 MW (3,960 MWh) forecast by this date. • Increase generation hosting capacity of distribution networks in the Sydney, Newcastle, and Wollongong region from 0.9 GW to 5.3 GW, consistent with the 2025 Distribution System Plan[70] assuming that this capacity would be available to solar generation only.
Adopting a negligible non-zero variable cost for renewable generation and storage	• Revert adoption of a negligible non-zero variable cost ($0.10 per MWh) for renewable generation and storage to the ISP parameter ($0 per MWh).[71]
Higher and lower capital costs for credible options	• Capital costs for transmission infrastructure options tested in this PADR adjusted by a factor of +100% and -50%, covering the expected accuracy range of the Class 5 estimates presented at this stage of the RIT-T.
Higher and lower commercial discount rate assumptions	• Adopt higher (10%[72]) and lower (3%) discount rates for the purpose of calculating the present value of the net market benefits of each option.
Alternative approach to annualising and discounting option costs	• Adopt a regulated transmission WACC based on current market conditions (4.9%) for calculating the annualised option costs in the cost benefit analysis and subsequently discount those annualised costs at the same rate of 4.9%.

68 The outcomes of LTESA Tender 6 were announced on 5 February 2026. The timing of this announcement meant this development was not able to be considered in the base case modelling for the PADR, but will be considered for the PACR.

69 This was modelled as a 100% increase to the forecast year-on-year uptake of 'aggregated' (coordinated) embedded energy storage capacity in the Sydney, Newcastle, and Wollongong region.

70 The 2025 Distribution System Plan reports 3.3 GW of renewables hosting capacity for the Endeavour Energy network, and 4.7 GW of hosting capacity for the Ausgrid network, from which we have netted the 1.8 GW to be hosted in the Hunter Central Coast REZ and the 890 MW of hosting capacity reflected in AEMO's draft 2026 ISP, resulting in a total hosting capacity of 5.31 GW.

71 This parameter was adopted to ensure that the market modelling results are robust, interpretable and representative of real-world power system operation. See Section 7.3.3.

72 This represents the lower and upper bound discount rate of the most recent IASR.

6. Estimating Methodology

6. Estimating Methodology

This section discusses Transgrid's methodology for estimating the costs of the six credible options assessed for the Sydney Ring South Project at this stage of the RIT-T process. This is a regulatory requirement when publishing a PADR, addressing cost elements including substation and transmission line costs, land acquisition, biodiversity offsets, as well as cost contingencies and escalations.

Transgrid recognises that transmission cost estimates evolve as projects progress beyond conceptual phases, with increased definition of scope, land and environmental understanding of constraints, community consideration and prevailing market conditions. In recent years, this has often resulted in upward cost revisions across the sector. In response, Transgrid has sought to draw on recent experience and improve our approach to costing project options at this stage of development.

Estimates have been prepared using a first principles, bottom-up methodology consistent with AACE Class 5 standards and supported by independent, specialist estimating consultants. The Class 5 estimates are of an expected accuracy of +100 per cent/-50 per cent. This approach incorporates current unit rates, construction productivity assumptions, and benchmarking against comparable transmission projects that are at more advanced stages of delivery.

Cost estimates for Sydney Ring South also reflect elevated delivery risks in the South Western Sydney environment, including community, property and constructability constraints.

Further work is to be undertaken to develop cost certainty as the project develops, where cost items will shift in response to a complex stakeholder and community environment. This includes understanding corridor, routes and feasible design, engineering and constructability assessment, targeted community and stakeholder engagement to reduce scope and property risk, as well as market testing through early contractor involvement and procurement planning for long lead equipment. This work will progressively mature cost estimates and narrow the assessed cost range as the project advances.

Cost estimates were based on desktop identification and analysis of the credible options with associated line work and substations. A further desktop analysis of environmental, social and community, engineering and property constraint criteria was also used to inform the corresponding cost elements.

Consistency in addressing key criteria has been critical to estimating costs for each option, including:

- contractual packaging approach (for example, separate substations and transmission line delivery partners or geographical packaging of works by value)
- development and Delivery Phase Program(s)
- staging requirements (where appropriate)
- allocation of either Contractor or Transgrid supplied Long Lead Equipment (LLE) based on current market determined lead times
- separation of:
  - Estimated Delivery Partner(s) Costs and
  - Owner's (Indirect) Costs.

A third party Estimating and Cost-Planning Consultant carried out estimates for Delivery Partner Costs, which the Transgrid Major Projects Estimating Team reviewed, agreed and incorporated in the final project option estimates. A bottom-up Class 5 AACE estimate was produced with itemised pricing and clear separation of the below areas using current market pricing, projects in delivery and benchmarks.

6.1. Substation cost estimates

Substation cost estimates have been prepared using typical substation layouts and indicative concept designs for the relevant Sydney Ring South options. The estimates include the major cost elements expected for substation delivery, including contractor design and project management, material supply, civil works, installation plant and labour, specialist subcontractors, commissioning, and associated line cut-in works.

The estimates also include contractor preliminaries and indirect delivery costs such as site establishment and demobilisation, site supervision, survey, workforce accommodation where required, logistics, temporary facilities, utilities, insurances, management plans, operations and maintenance documentation, inclement weather allowances, contractor contingency, escalation, overheads and margin.

6.2. Transmission line cost estimates

Transmission line cost estimates are highly dependent on route-specific factors, including terrain, topography, geotechnical conditions, soil conditions, access requirements, environmental constraints, land use, property impacts and construction methodology. At this stage, the transmission line estimates have been prepared using desktop studies, current project benchmarks, and assumptions informed by transmission projects currently in development and delivery.

For options that include a new 500 kV transmission line, estimates are primarily based on an overhead design, assuming a double circuit tower line with four conductors per phase per circuit, optical earth wire and overhead earth wire. The estimates also include relevant Western Sydney network augmentations, including 330 kV rebuild works and cut-ins to existing substations where required.

The transmission line estimates include allowances for access and local road upgrades, civil works, foundations, towers, stringing, commissioning, contractor preliminaries, contractor design and construction phase support, contractor contingency, escalation, overheads and margin.

Transgrid acknowledges that pending the outcomes of the PACR, identifying an appropriate project corridor, and preferred route of the proposed transmission line will require extensive community consultation and engagement. This may identify social license considerations that could influence the length, location and design of the transmission line, and may include partial undergrounding where technically feasible and proportionate to impacts being addressed. This work has not yet commenced.

Line lengths and construction assumptions will continue to be refined as the project progresses, including through route and corridor analysis, technical studies, environmental assessment, land access investigations, community and stakeholder engagement, and constructability assessment.

6.3. Transgrid's owner's costs

Transgrid has separately estimated owner's costs for each credible option. These costs include Transgrid labour and non-labour costs across development, delivery and integration phases, based on benchmarked allowances from comparable major projects. They also include corporate support, project management, external advisory support, technical support, governance, assurance, and integration activities.

Transgrid-supplied long-lead equipment has been estimated using first-principles pricing where available, including major substation equipment such as transformers and reactors, and transmission line materials such as conductor, optical earth wire and overhead earth wire. These estimates have been informed by current Transgrid supplier arrangements and recent market pricing.

Property acquisition and biodiversity offset costs have been informed by specialist advice, including assessment of easement acquisition costs and potential biodiversity impacts associated with any clearing required. These costs remain subject to refinement as route options, easement requirements and environmental impacts are further developed.

6.4. Property acquisition considerations

Transgrid commissioned Jones Lang LaSalle Infrastructure Advisory (JLL) to provide a high-level estimate of property costs for a new 500 kV transmission line between Bannaby in the Southern Tablelands and South Western Sydney.

The estimates of compensation were assessed in accordance with the *Just Terms Act* and the relevant heads of compensation listed under section 55, namely:

a. The market value of the land on the date of its acquisition
b. Any special value of the land to the person on the date of its acquisition
c. Any loss attributable to severance
d. Any loss attributable to disturbance
e. The disadvantage resulting from relocation
f. Any increase or decrease in the value of any other land of the person at the date of acquisition which adjoins or is severed from the acquired land by reason of the carrying out of, or the proposal to carry out, the public purpose for which the land was acquired.

6.5. Biodiversity offset considerations

Indicative estimates of biodiversity offset costs have been prepared using the *Rapid Assessment: Biodiversity Offset Credit Estimation* (BOCE) approach for the purpose of presenting holistic, whole-of-project estimates at this stage of the RIT-T. BOCE is a qualitative assessment, with costs provided as an 'order-of-magnitude'.

To estimate biodiversity offset costs, an indicative 80 m wide easement was applied to a nominal transmission line route. Vegetation clearing and biodiversity impacts associated with potential access tracks or other ancillary infrastructure were not included. The ecosystem credit pricing was based on a range of 30 or 25 credits per hectare, and an assumed 50 per cent of the total cost of ecosystem credits was applied for the species credits. Areas of Category 1 Exempt Land (under the NSW *Local Land Services Act 2013*), and Biodiversity Certified land under the NSW *Biodiversity Conservation Act 2016*, have been excluded from the biodiversity offset costs estimate.

The resulting biodiversity offset cost estimates are included in the Class 5 cost estimates for each of the options outlined in Section 3 of this PADR.

6.6. Contingency and Escalation

Contingency has been estimated on a P50 basis for risks attributable to each option. This approach is consistent with the AER *Cost Benefit Analysis guidelines*,[73] which require cost inputs to reflect reasonable, central estimates appropriate to the stage of project development, supported by transparent and evidence-based estimation methodologies.

Escalation has been applied to the baseline 2025/26 cost estimates using the assumed development and delivery programs for each option. This reflects expected cost movement over time, including escalation during development, procurement and construction.

Risk allowances for Option 5, which includes the later development of the 500 kV transmission line in 2037/38 include consideration of the greater complexity and constructability constraints that we anticipate over time within South Western Sydney as urban development continues.

Further work will be undertaken to improve cost certainty as Sydney Ring South progresses through the RIT-T and subsequent development phases. These activities will progressively improve scope definition and reduce key uncertainties as the project advances from this PADR to the PACR and, pending the outcome of the PACR, into future development and delivery phases.

6.7. Factors that may influence future cost estimates

At this stage of the RIT-T process, the cost estimates for Sydney Ring South are based on the latest available information but are early stage and will undergo further detailed analysis as the project develops. These estimates are based on desktop studies, concept-level scope definition, benchmarked delivery assumptions and AACE Class 5 estimating accuracy.

As the project progresses, future cost estimates may increase or decrease as further information becomes available. The main factors that may influence future cost estimates include:

- Corridor and route refinement, including final line length, terrain, access requirements, constructability constraints and interaction with existing infrastructure.
- Property and easement requirements, including the extent of acquisition, compensation outcomes, land access constraints and stakeholder negotiations.
- Environmental and biodiversity impacts, including the scale of vegetation clearing, access track requirements, species credit obligations and the outcomes of environmental assessment.
- Engineering and design development, including substation layouts, line design, geotechnical conditions, foundation requirements, cut-in arrangements and staging requirements.
- Community and stakeholder considerations, including design responses to community feedback, route refinement, mitigation measures and constructability changes required to reduce social and property impacts.
- Market conditions, including contractor capacity, equipment availability, supply chain constraints, commodity pricing (steel etc.) and long-lead equipment procurement outcomes.
- Delivery program and escalation, including changes to development, approval, procurement or construction timeframes that may alter escalation assumptions.
- Risk and contingency allowances, which may reduce as scope definition improves, or increase where new risks are identified through technical, environmental, property or stakeholder investigations.

Uncertainty in these factors is typical for a project at this stage of development, prior to completion of route selection, detailed design, environmental assessment, property engagement and market testing. This does not indicate that the estimates presented in the PADR are either overstated or understated. Early engagement on key preparatory activities will help improve the accuracy of cost estimates for this project. This will progressively improve the certainty of key inputs in areas of uncertainty and narrow the cost range as project development progresses.

[73] See section 4.3.4A of AER - Cost Benefit Analysis guidelines - 2024 - Version 3 | Australian Energy Regulator (AER).

7. How we assessed market benefits for each option

7. How we assessed market benefits for each option

This section dives deeper into the required economic modelling that underpins Transgrid's assessment of the six credible options identified in this PADR. Transgrid identifies the categories of market benefits that can be achieved by delivery of the Sydney Ring South options and have been estimated consistently across all options using wholesale market modelling.

7.1. Seven categories of market benefit are considered material for this RIT-T

For each scenario described in Section 5.1, the AER *Cost Benefit Analysis guidelines* require categories of market benefits to be calculated by separately comparing the 'state of the world' in the base case where no action is undertaken, with the 'state of the world' in which each of the options has been deployed. The 'state of the world' is essentially a description of the NEM outcomes expected in each case, and includes the type, quantity and timing of future generation and storage investment as well as unrelated future network investment (for example, transmission required to connect REZs).

The specific categories of market benefit under the RIT-T that have been modelled as part of this PADR are:

- changes in costs for parties, other than the RIT-T proponent (that is, changes in investment in generation and storage capital and fixed and variable operating and maintenance costs)
- changes in fuel consumption in the NEM arising through different patterns of generation dispatch
- changes in involuntary load curtailment
- changes in voluntary load curtailment
- differences in timing of other network expenditure
- changes in greenhouse gas emissions
- changes in network losses.

These benefit categories are all assessed in this PADR and have been estimated consistently across all options using wholesale market modelling (as outlined in Section 7.3).

7.1.1. Changes in costs for parties other than the RIT-T proponent

This category of market benefits captures avoided or deferred capital costs, as well as operating and maintenance costs (both variable and fixed), arising from more efficient patterns of investment in generation and large-scale storage across the NEM allowed for by an option, compared to the base case.

This category of market benefits also captures changes in costs of providing system strength services required to support the development of variable renewable generation and storage in the NEM, compared to the base case.

In particular, the market modelling finds these avoided or deferred costs associated with generation and storage to be generally the most material category of market benefit for credible options assessed across the three scenarios. This is largely driven by the avoided need to invest in new generation and storage capacity within the Sydney, Newcastle, and Wollongong region when diverse resources across New South Wales and interstate can be utilised more efficiently.

Market modelling finds that avoided or deferred costs associated with generation and storage to be the most material category of market benefit for options assessed across the three scenarios. This is largely driven by the avoided need to invest in new generation and storage capacity within the Sydney, Newcastle, and Wollongong region when diverse resources across NSW and interstate can be utilised more efficiently.

7.1.2. Changes in fuel consumption in the NEM

This category of market benefits is expected where credible options result in different patterns of generation and storage dispatch across the NEM, compared to the base case. When transfer capacity of the transmission network servicing the Sydney, Newcastle, and Wollongong region is expanded, demand centres can be supplied by lower cost generation than can be expected if no upgrade is undertaken.

In the Step Change and Accelerated Transition scenarios, market modelling finds that better access to firmed renewable generation in regional NSW avoids the need for gas-fired generation in the Newcastle and Illawarra regions to operate as frequently; noting that this generation still plays a crucial role in firming and providing essential power system services to maintain grid security and stability over the outlook period. However, in the Slower Growth scenario, market modelling finds that increased transfer capacity allows remaining coal generators to operate more, leading to higher fuel costs across the system.

7.1.3. Changes in involuntary load curtailment

Increasing the transfer capacity into the Sydney, Newcastle, and Wollongong demand centres from the south allows existing and future generation and storage across NSW to be utilised more efficiently to meet demand. This will provide greater reliability by reducing the potential for supply shortages and the consequent risk of involuntary load shedding.

This market benefit involves quantifying the impact of changes in involuntary load shedding associated with the implementation of each credible option. Specifically, the modelling estimates the total unserved energy (USE) in megawatt-hours (MWh) over the modelling period and then applies a Value of Customer Reliability (VCR, expressed in $/MWh) to quantify the estimated value of avoided USE for each option. Transgrid has adopted the AER's most recent assumptions for the VCR for the purposes of this assessment, as in the *2025 IASR*.

This category of market benefits has been found to be relatively small within the market modelling as new generation and storage capacity is built in all future states of the world, including the base case, if required to meet demand and a reserve margin used as a proxy for the reliability standard. There is therefore no expected material difference in the quantity of involuntary load shedding between each option and the base case, under each of the scenarios.

We note that unlike modelling conducted by AEMO for its *Electricity Statement of Opportunities* (ESOO), the style of modelling required for a RIT-T is not designed to estimate the risks of unserved energy in future states of the world. Many of the reliability benefits of the Sydney Ring South Project are therefore reflected through capital deferral, with less investment in dispatchable capacity required to maintain reliability in an efficient manner.

7.1.4. Changes in voluntary load curtailment

Voluntary load curtailment is when customers agree to reduce their load once wholesale prices in the NEM reach a certain threshold. Sometimes this is also referred to as demand side participation (DSP). Customers usually receive a payment for agreeing to reduce load in these circumstances. AEMO forecasts the amount flexible demand over three price bands, reflecting a range of price sensitivities for different customers. Transgrid has adopted AEMO's most recent assumptions for DSP for the purposes of this assessment, as in the *2025 IASR*.

In the market modelling, voluntary load curtailment is typically deployed only when the cost to supply incremental load is very high, reflecting that there may be periods when paying a customer to reduce their demand is preferred over dispatching a more expensive generation source, like gas or diesel, or over building generation and storage to capture only the most supply-constrained peak periods.

This category of market benefits has also been found to be relatively small within the market modelling, reflecting that generally, sufficient new generation and storage capacity is built in all future states of the world, including the base case, as required to meet demand and a reserve margin.

7.1.5. Differences in timing of other network expenditure

This category of market benefits relates to the costs of transmission and distribution network[74] upgrades unrelated to the Sydney Ring South Project that could be avoided if a credible option is pursued.

AEMO has identified a number of candidate REZs across the NEM that can be unlocked or expanded through the market modelling and has included estimates for the costs of transmission augmentations that it considers would be required to develop those REZs.

The market modelling finds that the credible options being considered in this RIT-T generally don't materially change the development of new or expanded REZs across the NEM, or the need for upgrades to distribution networks, relative to the base case. As a result, this category of market benefits has also been found to be relatively small.

7.1.6. Changes in Australia's greenhouse gas emissions

This category of market benefits relates to the economic value of changes in Australia's greenhouse gas emissions in response to changes in patterns of generation and storage dispatch across the NEM, compared to the base case.

This market benefit involves quantifying the changes in greenhouse gas emissions associated with the implementation of each credible option. Specifically,

[74] The Draft 2026 ISP is the first to consider costs of distribution network upgrades required to accommodate forecast uptake of distributed renewable generation and storage capacity, such as home batteries and rooftop solar.

the modelling estimates the change in greenhouse gas emissions from generation sources over the modelling period and then applies a Value of Emissions Reduction (VER) to these results to calculate the economic value of changes in emissions. Transgrid has adopted the most recent assumptions for the VER for the purposes of this assessment, as in the *2025 IASR*.

Except for the Slower Growth scenario, the market modelling finds that the credible options being considered in this RIT-T generally do not materially change the greenhouse gas emissions from electricity generation. As a result, this category of market benefit has also been found to be relatively small.

7.1.7. Changes in network losses

The market modelling has considered the change in network losses that may occur as a result of the implementation of each of the credible options, compared with the network losses that would occur in the base case, for each scenario.

The benefit of changes to network losses is captured within the wholesale market modelling of dispatch cost benefits of avoided fuel costs and changes to voluntary and involuntary load shedding.

The reduction in network losses between the base case and the options is not considered material for the options considered in this PADR.

7.1.8. 'Option value' is intended to be assessed in the PACR

Option value refers to a market benefit that results from retaining flexibility to avoid negative impacts from taking irreversible actions until new information arises to better guide investment decisions. Option value is likely to arise where there is uncertainty regarding future outcomes, the information that is available in the future is likely to change, and an option being considered is sufficiently flexible to respond to that change. Consideration of option value minimises the likelihood of building assets that are ultimately underutilised or stranded, since network investment decisions are typically partially or fully irreversible.

Of the credible options considered, Option 3 and Option 5 represent inherently 'flexible' options, whereby the delivery of the second stage for each can be timed to adapt to the needs of NSW consumers in future phases of the transition. Our PADR assessment assumes that the second stage for both options occurs in the same year in all scenarios considered, which represents a proportionate assumption for the PADR analysis at this point in time.

We intend to reassess this in the PACR analysis given the closeness of the option rankings in this PADR. The intended assessment will therefore model the 'option value' associated with each of these flexible options.

The expected assessment is proposed to be contained to a scenario-level assessment of option value, as opposed to a more comprehensive real options value modelling exercise. A real options value modelling exercise involves significant modelling resources and is not considered a proportionate undertaking for the PACR, given it is not expected to add any assistance over and above the scenario assessment in terms of identifying the top-ranked option.

7.2. Two categories of market benefits are not considered material

Two categories of market benefits were not considered material for this RIT-T and have not been estimated as part of the PADR assessment.

7.2.1. Competition benefits

Consistent with AEMO's *Draft 2026 ISP*, Transgrid has not considered competition benefits for this RIT-T. Although increasing network capacity could increase competition by expanding the supply pool for loads, competition benefits are not expected to be material as the benefits are unlikely to differ substantially across the credible options (particularly the new transmission line options).

7.2.2. Changes in ancillary services costs

Transgrid does not expect changes to the costs of frequency control ancillary services (FCAS), network support and control ancillary services (NSCAS), and system restart ancillary services (SRAS). These costs are therefore not expected to be material to the outcome of the RIT-T assessment.

7.3. Wholesale market modelling has been undertaken to estimate market benefits

Transgrid has engaged EPEC Engineering to perform wholesale market modelling to assess the market benefits expected under each of the credible options and scenarios.

7.3.1. The wholesale market modelling approach is consistent with the ISP methodology

The RIT-T assessment adopts a wholesale market modelling approach consistent with the ISP methodology applied by AEMO in its most recent *Draft 2026 ISP*.

The Sydney Ring South RIT-T market modelling was conducted using EPEC Engineering's *Integrated PLEXOS and PSSE Model* for a 24-year modelling outlook from 2026-27 to 2049-50, inclusive. PSSE was used to create network constraint equations for each network configuration to be used in PLEXOS, and the PLEXOS Long-Term (LT) model was used to conduct market modelling to calculate whole of system costs and estimate the market benefits under each material category.

Specifically, EPEC Engineering undertook long term investment planning to identify the least-cost generation, storage and unrelated transmission infrastructure development schedule, while meeting demand requirements, policy objectives, and technical generator and network constraints (N and N-1).

The long-term investment planning approach develops forecasts for generation, storage and REZ transmission infrastructure requirements over the assessment period for each of the credible options and base case in each scenario tested. This modelling determines the least-cost development schedule for each credible option and scenario drawing on the latest IASR assumptions regarding demand, supply options, consumer energy resource uptake, electricity and gas network constraints and other underlying assumptions such as energy policy targets and carbon budget constraints over the assessment period.

The market modelling report accompanying this PADR provides additional detail on the assumptions and methodological approaches adopted.

7.3.2. The Sydney, Newcastle, and Wollongong region has been modelled in greater detail

Given the ISP's scope as a long-term, whole-of-system roadmap for the whole National Electricity Market, AEMO made necessary simplifications to its representation of the power system to accommodate the breadth of factors that must be taken into consideration. As a result, the ISP parameters designated may not be sufficiently granular to capture the nuanced wholesale market benefits of different options in a RIT-T assessment. This section outlines the additional detail considered in the market modelling for this PADR.

Representation of the 'Sydney Ring' transmission network

For the ISP, AEMO substantially simplifies representation of the network supplying the Sydney, Newcastle, and Wollongong region to manage the complexity of developing an optimal development path covering all regions of the NEM.

Specifically, the Sydney, Newcastle, and Wollongong region is treated as a single node nominally represented by the regional reference node at Sydney West substation, with flows between the Sydney, Newcastle, and Wollongong and Central NSW sub regions governed by only three constraint equations.

Modelling for the Sydney Ring South RIT-T adopts greater resolution of this transmission network and its nuanced bottlenecks to ensure the benefits of credible options are accurately evaluated. Instead of using the ISP constraint equations, EPEC Engineering has modelled individual elements of this network (e.g. transmission lines and transformers) explicitly as detailed constraint equations that mimic real-world operational constraints.

Each constraint equation considers the direct contribution of existing and future generation sources, including consumer energy resources (CER) to more accurately assess network congestion. These detailed transmission network constraint equations were produced in accordance with *AEMO's Constraint Formulation Guidelines*.[75]

Representation of the CER and DSP in Sydney, Newcastle, and Wollongong

For the ISP, AEMO simplifies the representation of rooftop solar, coordinated consumer energy resources (CER), which includes virtual power plants (VPP) and vehicle-to-grid (V2G) devices, and demand side participation (DSP) in the Sydney, Newcastle, and Wollongong region to manage the complexity of developing an optimal development path covering all regions of the NEM.

Specifically, in the ISP, all coordinated CER (VPP and V2G), rooftop solar and DSP in the Sydney, Newcastle, and Wollongong region is represented at the regional reference node (Sydney West).

To understand how these demand-side resources influence network constraints, a more detailed geographical distribution of CER and DSP is adopted for this RIT-T. Instead of representing all CER and DSP at Sydney West, we have allocated these to each of the Sydney, Newcastle, and Wollongong areas proportionately as follows:

- For forecast coordinated CER and rooftop solar in the Sydney, Newcastle, and Wollongong region covered by the Ausgrid network, 60 per cent is allocated to a Sydney node and 40 per cent is allocated to a Newcastle node (which also represents the Central Coast and Lower Hunter regions). This reflects an approximation of the number of dwellings in each of the geographical areas that would likely be able to host rooftop solar, home battery (VPP) or vehicle-to-grid (V2G) connections.
- For forecast coordinated CER and rooftop solar in the Sydney, Newcastle, and Wollongong region covered by the Endeavour Energy network, 80 per cent is allocated to a Sydney node and 20 per cent is allocated to a Wollongong node (which also represents the greater Illawarra region). This reflects an approximation of the number of dwellings in each of the geographical areas that would likely be able to host rooftop solar, home battery (VPP) or vehicle-to-grid (V2G) connections.
- For forecast DSP in the Sydney, Newcastle, and Wollongong region, 50 per cent is allocated to a Sydney node, 25 per cent to a Newcastle node and 25 per cent to a Wollongong node. This reflects the prevalence of industrial and commercial energy users in the Newcastle and Illawarra regions that may be more likely to participate in market-based demand reduction schemes.

[75] Constraint Formulation Guidelines | AEMO.

Since passive CER is embedded in the demand trace data, it is not practical to represent this at a more granular level. It is therefore represented as modelled by AEMO the ISP.

Representation of new generation and storage build options

Since the ISP represents the Sydney, Newcastle, and Wollongong region as a single node, the *Draft 2026 ISP* nominally represents all new generation build options at the sub-regional reference node at Sydney West, except for an option to build new gas-powered generation in the Wollongong region. This limits the ability to understand how potential future generation development patterns will interact with the complex transmission constraints supplying the Sydney, Newcastle, and Wollongong region.

While our market modelling makes all new generation build options for the Sydney, Newcastle, and Wollongong region identified in the latest IASR available to the model, we apply the following geographical granularity not considered in the *Draft 2026 ISP*:

- A subset of the grid-scale battery energy storage system (BESS) build options is mapped to each of the Sydney, Newcastle, and Wollongong nodes. Instead of allowing all storage duration options at each location (the ISP considers 1-, 2-, 4- and 8-hour BESS options), the RIT-T modelling excludes the 8 hour BESS build option from the Sydney node, reflecting land and development constraints for such large-scale developments around viable grid-connection points in the Sydney region. The RIT-T modelling also excludes the 1-hour build option from Newcastle and Wollongong nodes, reflecting the lack of developer interest in very short-duration storage projects.[76]
- Options to build new distribution solar and storage are allocated consistently with CER allocations. For the Ausgrid network, 60 per cent of the IASR hosting capacity for new distributed solar and storage is assigned to the Sydney node and 40 per cent to the Newcastle node. For the Endeavour Energy network, 80 per cent of the IASR hosting capacity for new distributed solar and storage is assigned to the Sydney node, and 20 per cent to the Wollongong node.
- Options to build new gas-fired generation capacity are modelled at the Newcastle and Wollongong nodes and mapped to the respective gas supply zones.
- The option to build new gas-powered generation in the Central NSW region is mapped to Transgrid's Marulan substation, which is considered the most credible location for development of new gas-powered generation within the Central NSW geographical region, given proximity to high-capacity transmission and gas pipeline infrastructure.

7.3.3. Some changes to *Draft 2026 ISP* parameters have been applied

A small number of changes to the assumptions used in the *Draft 2026 ISP* have been made as part of this PADR analysis. In each case, we consider that the change is consistent with the AER guidance regarding there needing to be 'demonstrable reasons' for departing from the ISP parameters.

Delayed closure of the Eraring Power Station

The recent announcement[77] of a delay to the closure date of the Eraring Power Station from April 2027 to April 2029 represents a material change in fact compared to the *Draft 2026 ISP*. It is reasonable to expect that this change will be reflected in the final *2026 ISP*. It is therefore consistent with the AER's CBA guidelines on what constitutes a 'demonstrable reason' to vary the *Draft 2026 ISP* assumption. We consider this departure to be non-controversial.

Representation of the Snowy Hydro scheme

To allow timely modelling to progress for the PADR, Transgrid requested AEMO to issue its *Draft 2026 ISP* PLEXOS model ahead of its public release. To accommodate this, AEMO redacted elements of the model related the representation of the Snowy Hydro hydroelectricity scheme. These redacted modelling elements were substituted with corresponding elements of the *2024 ISP model*. Data for the 2023/24 hydrological reference year was also not provided and was substituted with the median reference year (2017/18). The revised model released with the final *2026 ISP* will be adopted for the market modelling in the PACR.

Non-zero variable operating cost for variable renewable generation and storage

In its *Draft 2026 ISP*, AEMO adopts a zero variable operating cost assumption for variable renewable energy and battery energy storage, including coordinated energy storage. This parameter was found to interact adversely with the detailed constraints implemented to represent the transmission network supplying the Sydney, Newcastle, and Wollongong region, and the enhanced locational resolution of generation resources within this area (as outlined in Section 7.3.2), causing anomalous results.

To ensure that the market modelling results are robust, interpretable and representative of real-world power system operation, a negligible non-zero cost ($0.10 per MWh) has been adopted to variable renewable energy and battery energy storage, including coordinated energy storage. A sensitivity presented in Section 8.5.7 confirms that the adoption of this parameter is not material to the outcome of the PADR.

76 The 8-hour BESS option is available at the Newcastle and Wollongong nodes, and the 1-hour BESS option is available at the Sydney node.
77 Origin Extends Eraring Power Station Operations To 2029 | Origin Energy.

7.4. Cost benefit analysis parameters adopted

7.4.1. Assessment period

The RIT-T analysis considers a 24-year assessment period from 2026-27 to 2049-50, inclusive. This period considers the size, complexity and expected lives of the assets delivered under the credible options assessed and provides for a reasonable indication of the costs and benefits over a long outlook period.

This assessment horizon includes the shorter, medium- and longer-term drivers of the benefits associated with the credible options including growing demand in the Sydney, Newcastle, and Wollongong region, renewable energy targets, consumption of assumed carbon budgets associated with legislated government commitments, and retirement of coal-fired generators in New South Wales.

7.4.2. Annualised capital cost

Consistent with the methodology for the *2026 ISP*, we have converted all capital costs for the options into an equivalent annual annuity. This allows like-for-like comparison on assets with different economic lives and different commissioning dates (and avoids needing to explicitly model benefits beyond the end of the assessment period).

In calculating this annuity, we have adopted the technology-specific real-pre-tax weighted average cost of capital (WACC) estimate for regulated transmission included in AEMO's *2025 IASR*. Specifically, we have adopted an assumed three per cent WACC for regulated transmission investments in the Step Change and Slower Growth scenarios, and 3.5 per cent for the Accelerated Transition scenario.[78]

The market modelling aligns with the methodology used for the *2026 ISP* (with different annualised WACCs applied to different technologies).

7.4.3. Discount rate

The CBA Guidelines require the discount rate used in the NPV analysis to be the commercial discount rate appropriate for the analysis of a private enterprise investment in the electricity sector. A central discount rate of seven per cent (real, pre-tax) has been used in the NPV analysis, consistent with the commercial discount rate in the *2025 IASR*.

The RIT-T also requires that sensitivity testing be conducted on the discount rate. Transgrid has therefore tested the sensitivity of the results to a lower bound discount rate of 3 per cent, and an upper bound discount rate of 10 per cent (being the lower and upper bound in the latest IASR). The outcomes of this sensitivity are outlined in Section 8.5.9.

[78] AEMO 2025 Inputs, Assumptions and Scenarios Report, August 2025, p. 157.

8. Cost-benefit assessment of credible options

8. Cost-benefit assessment of credible options

This Section presents the core outcome of the PADR – the net market benefit assessment that Transgrid has undertaken on each of the six credible options for the Sydney Ring South Project, based on the methodology and inputs and assumptions detailed in sections 5, 6 and 7. The net market benefit demonstrates the relative value of the Sydney Ring South options to the National Electricity Market and to NSW energy consumers. The cost benefit assessment demonstrates the net market benefit of each option across different future scenarios, under a weighted assessment of all scenarios, and under additional sensitivities.

The RIT-T requires Transgrid to identify a set of reasonable scenarios that represent different future states under which the value of project options can be assessed when compared to the base case (in which no option proceeds, also referred to as the counterfactual, or the 'do nothing' case). The scenarios used for this PADR are the scenarios developed for AEMO's *2026 ISP* and documented in AEMO's *2025 Inputs, Assumptions and Scenarios Report* (IASR). Transgrid must then calculate the expected market benefit of each credible option over a probability weighted range of the reasonable scenarios (referred to as a 'weighted basis').

The assessment identifies that Option 6 is currently expected to provide the highest positive net market benefit of $3,205 million, in present value terms, on a weighted basis across the three ISP scenarios assessed.

This very high net market benefit reflects the scale and persistence of the underlying system need identified by AEMO's 2024 and *Draft 2026 ISP*, and this RIT T, as well as the material efficiency gains that arise from improving transfer capability into Australia's largest demand centre.

As set out here, these benefits are consistently observed across multiple scenarios and sensitivities and provide a strong signal that timely investment in additional network capacity is likely to deliver substantial long-term value to the energy system and to energy consumers.

8.1. Step Change scenario

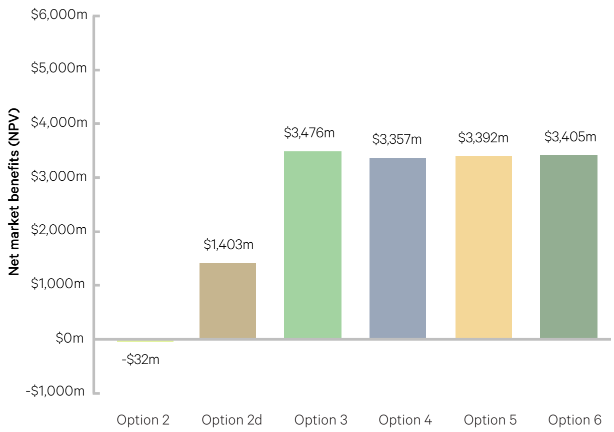
The Step Change scenario is described by AEMO as achieving the objectives of Australia's government policies in transitioning the energy system and reflects a scale of global and domestic action that limits global temperature rise to below 2°C compared to pre-industrial levels.[79]

Options that include a transmission line rank effectively equal in the Step Change scenario

Under the Step Change assumptions, Option 3, which plans the delivery of the transmission line in 2033/34 but initially operating it at 330 kV, is found to deliver significantly positive net market benefits ($3,476 million, in present value terms) and is the top-ranked option.

Figure 8.1 presents the estimated net benefits for each option under the Step Change scenario.

Figure 8.1: Net market benefits, Step Change ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 3	3,476	
2	Option 6	3,405	-2.0%
3	Option 5	3,392	-2.4%
4	Option 4	3,357	-3.4%
5	Option 2d	1,403	-59.6%
6	Option 2	-32	-100.9%

The other options involving a new high-voltage transmission line are expected to provide very similar net market benefits (within 3.4 per cent) and are effectively equally ranked. They compare to Option 3 as follows:

- Option 6, the delivery of series reactors as power flow controllers plus the South Creek substation works in 2030/31 and a new 500 kV line from Bannaby in 2033/34, is estimated to have net market benefits that are within 2.0 per cent of Option 3.

[79] AEMO 2025 Inputs, Assumptions and Scenarios Report, July 2025, p. 5.

- Option 5, adding the power flow control to Option 4 but delaying the transmission line to 2037/38 is found to have net market benefits within 2.4 per cent of Option 3.
- Option 4, commissioning the South Creek substation works and a new 500 kV line from Bannaby (in 2030/31 and 2033/34, respectively) is estimated to have net market benefits that are within 3.4 per cent of Option 3.

For this scenario, adding power flow control to a transmission line option is found to be marginally net beneficial. Option 6 is found to have marginally greater estimated net benefits than Option 5, indicating that the additional cost of adding power flow control is outweighed by the additional benefits. Contrastingly, options that do not include a new high-voltage transmission line would deliver markedly lower or negligible net market benefits:

- Option 2d, which is the candidate option in the *Draft 2026 ISP* and includes only a standalone power flow control solution, is found to deliver significantly lower net market benefits than options including transmission lines.
- Option 2, only undertaking the South Creek substation work, is found to deliver a net cost under this scenario.

A transmission line solution lowers the overall system cost to serve energy consumers

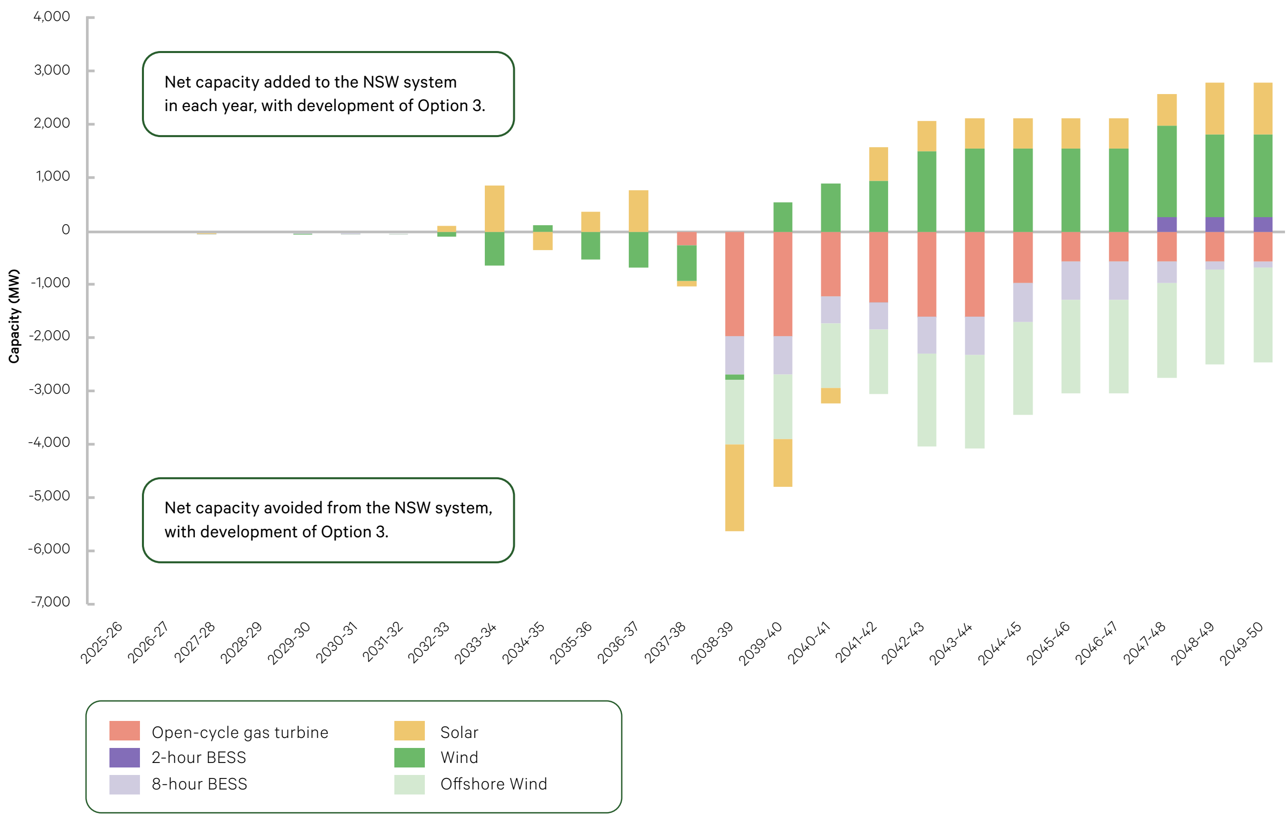
The benefits of a transmission line solution are primarily driven by avoided or deferred capital costs of generation and storage. This category of market benefit accounts for 91 per cent of the total estimated benefits of the top-ranked option.

Accordingly, under the Step Change scenario, the counterfactual system that relies only on an optimised mix of generation and storage investments (no investment in the Sydney Ring South Project) to meet the identified need would cost $3,476 million more to build and operate in present value terms, relative to the cost of the top-ranked option.

The higher cost of this more expensive alternative system would inevitably be passed on to consumers through higher energy bills for homes and businesses and does not represent the long-term interests of NSW energy consumers.

Key to this result is altogether avoiding the future need for 1.8 GW of offshore wind in NSW, since the new transfer capacity achieved by the Sydney Ring South can unlock access to a lower-cost, geographically-diverse mix of on-shore wind and solar under development across NSW for the Sydney, Newcastle, and Wollongong region. Figure 8.2 outlines how development of the top ranked option (Option 3) would change the capacity mix in NSW.

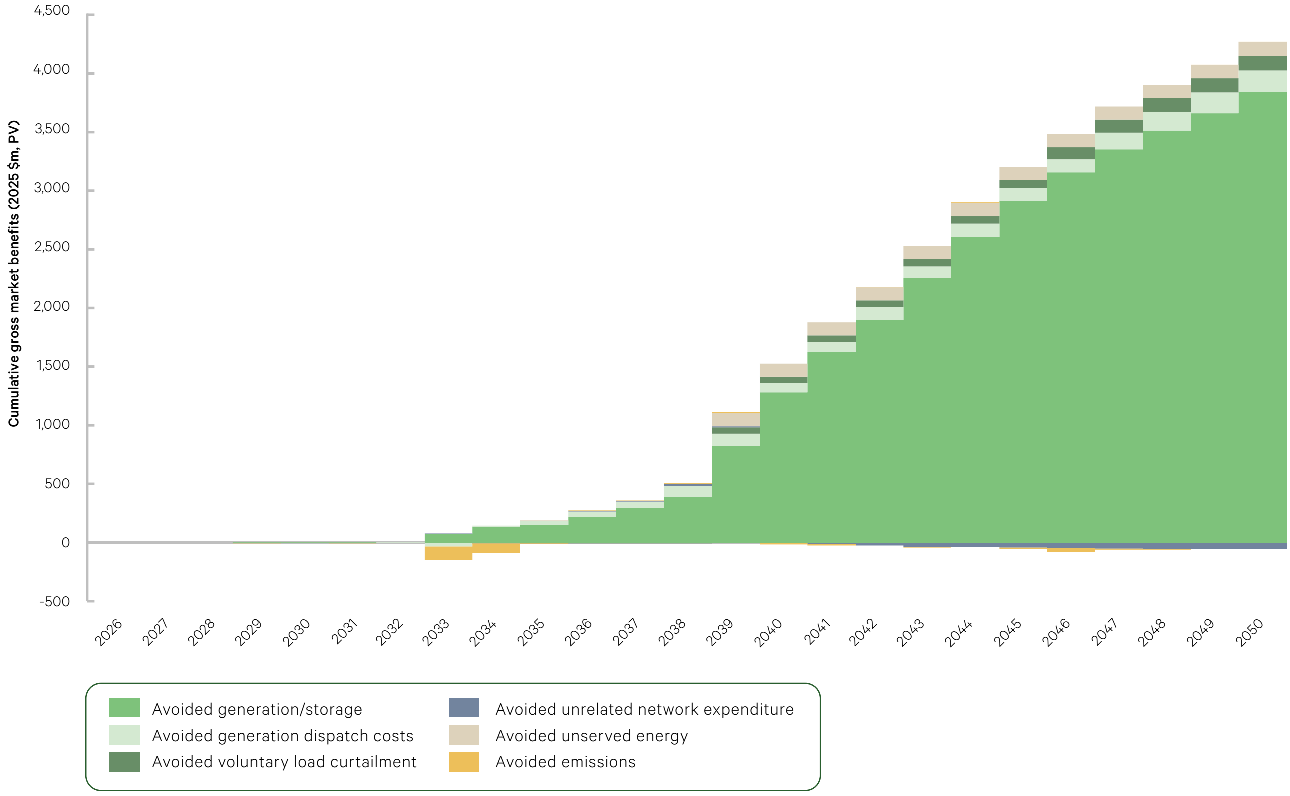
Figure 8.2: Impact of developing Option 3 on the optimal generation mix in NSW vs counterfactual base case, Step Change scenario



The benefits derived from avoiding generation dispatch costs, including avoided costs for fuels like coal, gas and diesel, voluntary load curtailment, and unserved energy are less material and contribute a broadly similar share of total net benefits at approximately 4.4, 3.0, and 2.7 per cent, respectively.[80]

Figure 8.3 shows how each of the categories of market benefit accrue for Option 3 over the assessment period under the Step Change scenario.[81]

Figure 8.3: Cumulative gross market benefits of Option 3, Step Change scenario



8.2. Accelerated Transition scenario

The Accelerated Transition scenario is described by AEMO as a future defined by rapid transformation of Australia's energy sectors at a rate greater than that required by current domestic and global decarbonisation commitments, to limit temperature rise to 1.5°C above pre-industrial levels.[82]

Compared to the Step Change scenario, key differences in the Accelerated Transition assumptions include:

- Higher electricity demand driven by deeper and more rapid electrification of homes, businesses and industry. A large driver of this higher electricity demand is the production of hydrogen primarily for domestic consumption by heavy industry, including the in the commodities sector for products like green steel.
- Stricter limits on carbon emissions from electricity production for the National Electricity Market to meet a target of limiting global temperature rise to 1.5°C above pre-industrial levels, resulting in faster coal retirements in all regions.
- Reductions in the capital costs of some new generation technologies, particularly solar and storage, reflecting stronger cost learning curves and efficiencies due to greater global adoption of these technologies in this scenario.
- Higher uptake of distributed and consumer energy resources such as home batteries and rooftop solar.

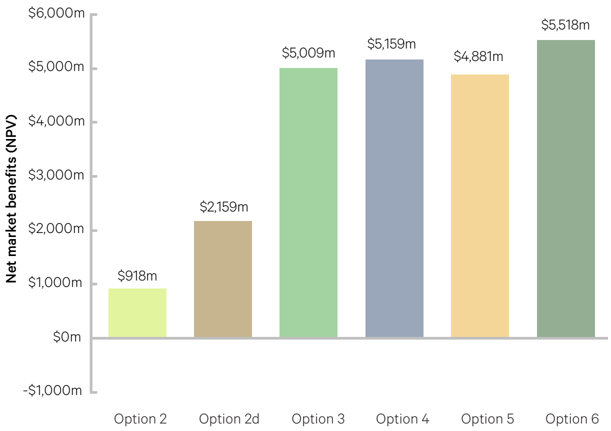
Option 6 is the top-ranked option in the Accelerated Transition scenario

Under the Accelerated Transition assumptions, Option 6 – power flow control plus 2033/34 delivery of a new 500 kV transmission line – is found to deliver significantly positive net market benefits of $5,518 million, in present value terms.

Figure 8.4 presents the estimated net benefits for each option under the Accelerated Transition scenario.

80 The sum exceeds 100 per cent as some categories of market benefits are negative and made up by other positive categories of market benefits.
81 This figure only presents the annual breakdown of estimated gross benefits for the top-ranked option. Since this figure shows the cumulative gross benefits in present value terms, the height of the bar in the last year (less any 'negative market benefits', i.e., those below the zero-line) equates to the gross benefit breakdown for the option shown over the entire assessment period. This applies to all figures of this type in this PADR document.
82 AEMO 2025 Inputs, Assumptions and Scenarios Report, July 2025, p. 6.

Figure 8.4: Net market benefits, Accelerated Transition ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 6	5,518	
2	Option 4	5,159	-6.5%
3	Option 3	5,009	-9.2%
4	Option 5	4,881	-11.5%
5	Option 2d	2,159	-60.9%
6	Option 2	918	-83.4%

The other options also involving a new high-voltage transmission line compare to Option 6 as follows:

- Option 4, commissioning the South Creek substation works and a new 500 kV line from Bannaby (in 2030/31 and 2033/34, respectively) is estimated to have net market benefits within 6.5 per cent of Option 6.
- Option 3, which plans the delivery of the transmission line in 2033/34 but initially operating it at 330 kV is estimated to have net market benefits that are within 9.2 per cent of Option 6.
- Option 5, adding the power flow control to Option 4 but delaying the transmission line to 2037/38 is found to have net market benefits within 11.5 per cent of Option 6.

For this scenario, adding power flow control to a transmission line option is found to be more net beneficial than in the Step Change scenario. Option 6 is found to have 6.5 per cent greater estimated net benefits than Option 4, indicating that the additional cost of adding power flow control is more likely to be outweighed by the additional benefits.

Contrastingly, options that do not include a new high-voltage transmission line are found to deliver markedly lower net market benefits. Option 2d, which includes only a standalone power flow control solution, and Option 2, which includes only the South Creek substation work, are respectively both found to deliver 60.9 per cent and 83.4 per cent fewer net market benefits than Option 6.

A transmission line solution lowers the overall system cost to serve consumers.

As with the Step Change scenario, the benefits of a transmission line solution are primarily driven by avoided or deferred capital costs of generation and storage, accounting for 97 per cent of the total estimated benefits of the top-ranked option.

Accordingly, under the Accelerated Transition scenario, the counterfactual system that relies only on an optimised mix of generation and storage investments (no investment in the Sydney Ring South Project) to meet the identified need would cost $5,518 million more to build and operate in present value terms, relative to the cost of the top-ranked option.

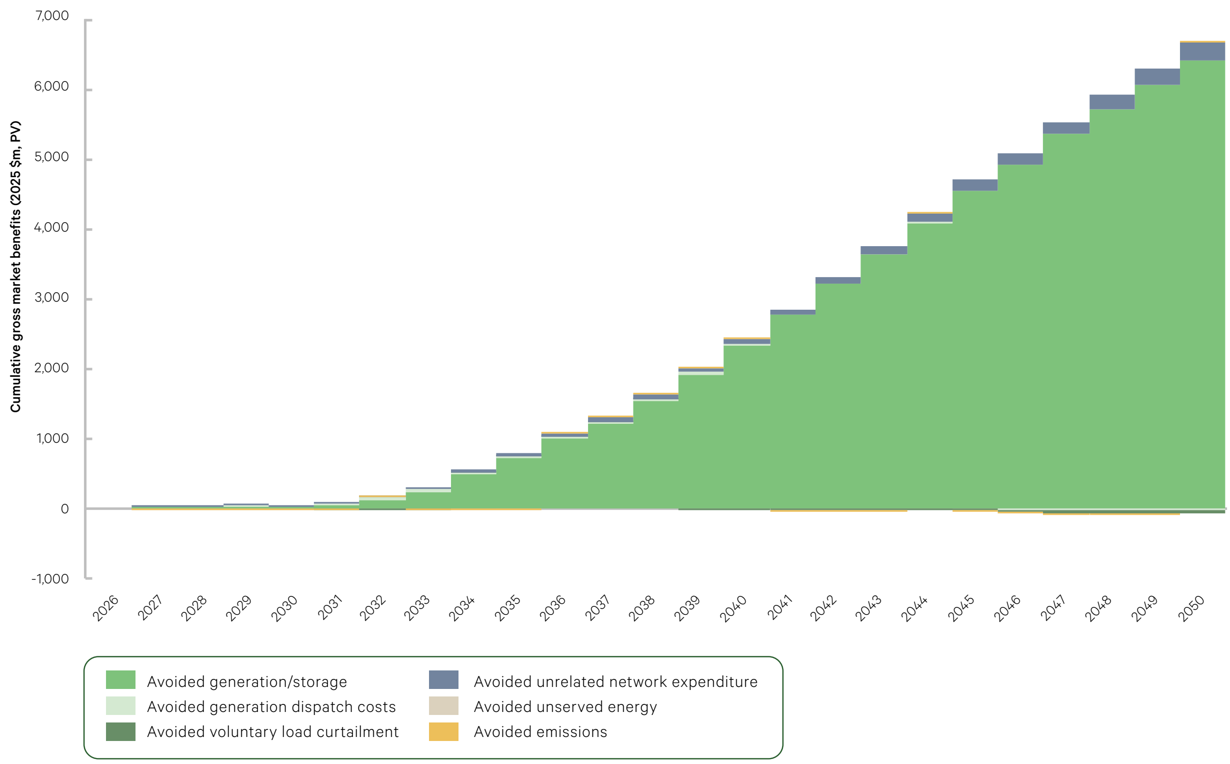
The higher cost of this more expensive alternative system would inevitably be passed on to consumers through higher energy bills for homes and businesses and does not represent the long-term interests of NSW energy consumers.

Unlike in the Step Change scenario, where over the long term, an investment in the Sydney Ring South transmission solution replaces costly offshore wind and gas-fired generation capacity with a similar capacity of lower-cost and more efficient on-shore wind and solar generation capacity, in the Accelerated Transition scenario, an investment in the transmission line is found to avoid a total of approximately 8 GW of new generation build across NSW. This avoided capacity comprises primarily 1.8 GW of offshore wind, 4.9 GW of battery storage and 1.2 GW of peaking gas generation, all of which would be required within the Sydney, Newcastle, and Wollongong region.

Figure 8.5: Impact of developing Option 6 on the optimal generation mix in NSW vs counterfactual base case, Accelerated Transition scenario

Figure 8.6 below shows how each of the categories of market benefit accrue for Option 6 over the assessment period under the Accelerated Transition scenario. It shows that, the main drivers of the net positive results are avoided/deferred generation and storage capital costs, accounting for 97 per cent of gross market benefits. Avoided unrelated network expenditure accounts for approximately 4 per cent of gross market benefits, with the remaining categories making negligible or negative contributions.[83]

Figure 8.6: Cumulative gross market benefits of Option 6, Accelerated Transition scenario



[83] The sum exceeds 100 per cent as avoided voluntary load curtailment and avoided generation dispatch costs are negative, indicating these are more costly under the project case than the base case.

8.3. Slower Growth scenario

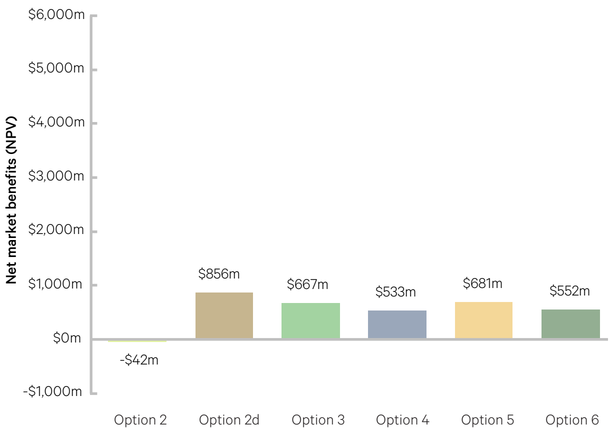
The Slower Growth scenario is described by AEMO as achieving the objectives of Australia's government policies in transitioning the energy system, despite challenges posed by slower economic growth and lesser continued action beyond current commitments. In this scenario, weaker domestic and international economic conditions mean Australia's energy-intensive industry and businesses are at greater operating risk, causing a proportion of the business sector to close in the short to medium term. Investments in energy efficiency, consumer energy resources such as rooftop solar and home batteries are also naturally lower due to the weaker economic circumstances.[84]

Option 2d is the top-ranked option in the Slower Growth scenario

Under the Slower Growth assumptions, Option 2d, which includes a power flow control solution, is found to deliver greater net market benefits than the options that include a transmission line and is the top-ranked option. Option 2d is estimated to deliver $856 million of net benefits, in present value terms.

Figure 8.7 presents the estimated net benefits for each option under the Slower Growth scenario.

Figure 8.7: Net market benefits, Slower Growth ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 2d	856	
2	Option 5	681	-20.4%
3	Option 3	667	-22.1%
4	Option 6	552	-35.5%
5	Option 4	533	-37.7%
6	Option 2	-42	-104.9%

While the four options that include scope for a transmission line still deliver positive net benefits in the Slower Growth scenario, these are between 20.4 per cent and 37.7 per cent lower than the net market benefits for Option 2d.

Option 2, which only includes undertaking the South Creek substation work, is found to deliver a net cost under this scenario.

A power flow control solution is found to provide sufficient relief to network bottlenecks under low economic and electricity demand growth

Since the Slower Growth scenario is defined by lower demand growth (and the closure of some energy-intensive industries), less investment in new generation capacity would be required (relative to the other two scenarios) to meet the long-term energy needs of consumers in Sydney, Newcastle, and Wollongong to replace coal power stations as they retire.

While the market benefit of the options considered is still predominantly driven by avoided or deferred capital costs of generation and storage, the scale of this benefit in this scenario is materially lower than in the Step Change and Accelerated Transition scenarios, reflecting a lesser need to invest in new transmission capacity.

Under this scenario, avoided or deferred capital costs accounts for 95 per cent of the total estimated benefits of the top-ranked option, indicating that the counterfactual system that relies only on an optimised mix of generation and storage investments (no investment in the Sydney Ring South Project) to meet the identified need would cost approximately $860 million more to build and operate in present value terms, relative to the cost of the top-ranked option.

The higher cost of this more expensive alternative system would inevitably be passed on to consumers through higher energy bills for homes and businesses and does not represent the long-term interests of NSW energy consumers.

Key to this result is that, over the long term, investment in a power flow control solution allows nearly 300 MW of new gas-powered generation to be avoided in NSW, and the overall capacity of onshore wind and solar to be reduced. As in other scenarios, we find that the transmission line solutions still materially improve the efficiency of the power system, allowing a more effective mix of renewable generation and storage to be developed, particularly in South West NSW, however the incremental benefit this provides is less valuable in a low growth scenario. Figure 8.8 outlines how development of the top-ranked option (Option 2d) would change the capacity mix in NSW.

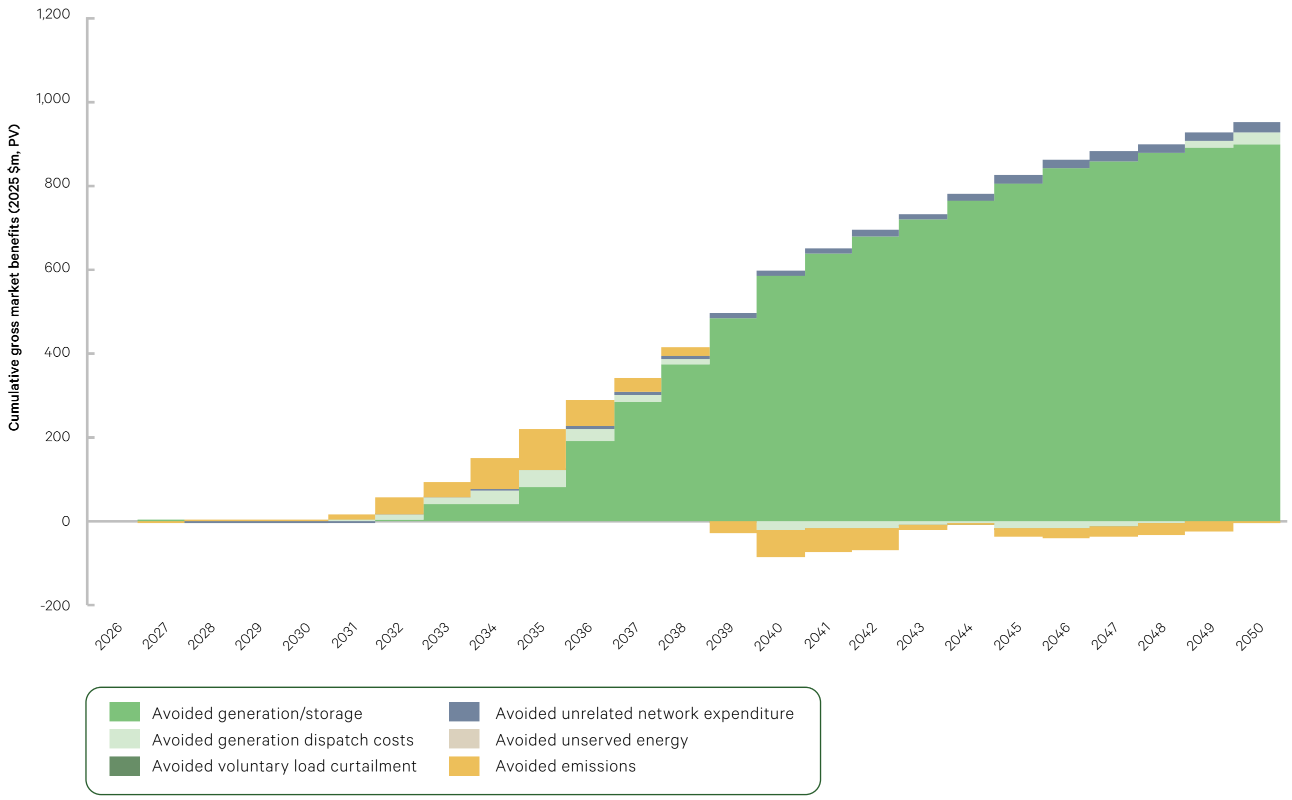
[84] AEMO 2025 Inputs, Assumptions and Scenarios Report, July 2025, p. 5.

Figure 8.8: Impact of developing Option 2d on the optimal generation mix in NSW vs counterfactual base case, Slower Growth scenario

The benefits derived from avoiding generation dispatch costs, including avoided costs for fuels like coal, gas and diesel, and avoided or deferred investments in unrelated network upgrades are less material and contribute 3.4 per cent and 2.6 per cent[85] of market benefits respectively.

Figure 8.9 shows how each of the categories of market benefit accrue for Option 2d over the assessment period under the Slow Growth scenario.

Figure 8.9: Cumulative gross market benefits of Option 2d under the Slower Growth scenario



[85] The sum exceeds 100 per cent as some categories of market benefits are negative and made up by other positive categories of market benefits.

Since the Slower Growth scenario sees coal power stations retiring later and has fewer restrictions on carbon emissions, we see that the preferred option also changes how fossil fuel power stations operate, marginally changing new carbon emissions relative to the counterfactual.

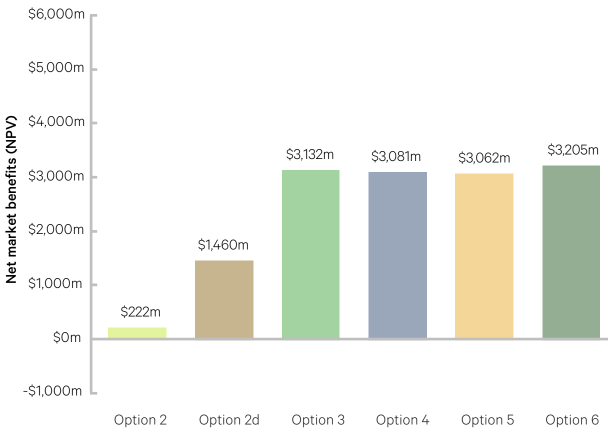
8.4. Weighted net market benefits across the three scenarios

Option 6 is the top-ranked option on a weighted net market benefits basis

Adopting the weights that AEMO specifies in the *Draft 2026 ISP* (outlined in Section 5.2), Option 6 is found to have the highest net market benefits, delivering a weighted net market benefit of $3,205 million in present value terms.

This result signals that on a probability weighted basis, building and operating the counterfactual system that relies only on an optimised mix of generation and storage investments (no investment in the Sydney Ring South Project) to meet the identified need would cost $3,205 million more in present value terms, relative to the cost of the top-ranked option.

Figure 8.10: Net market benefits, weighted across ISP scenarios ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 6	3,205	
2	Option 3	3,132	-2.3%
3	Option 4	3,081	-3.9%
4	Option 5	3,062	-4.5%
5	Option 2d	1,460	-54.5%
6	Option 2	222	-93.1%

This result signals that on a probability weighted basis, building and operating the counterfactual system that relies only on an optimised mix of generation and storage investments (no investment in the Sydney Ring South Project) to meet the identified need would cost about $3,200 million more in present value terms, relative to the cost of the top-ranked option.

The higher cost of this more expensive alternative system would inevitably be passed on to consumers through higher energy bills for homes and businesses and does not represent the long-term interests of NSW energy consumers.

On a weighted market benefits basis, options that do not include a new high-voltage transmission line are found to deliver markedly lower net market benefits. Option 2d, which includes only a standalone power flow control solution, and Option 2, which includes only the South Creek substation work, are respectively found to deliver 54.5 per cent and 93.1 per cent fewer net market benefits than the top-ranked option.

Net market benefits will be assessed further in the PACR

While the weighted net market benefits assessment indicates that installing series reactors as power flow controllers on the 330 kV network will deliver the energy system incremental value when a 500 kV transmission line is planned for 2033/34, Transgrid intends to undertake further analysis to determine the potential option value of proceeding with a power flow control solution. This analysis will be undertaken for the PACR and confirm whether this investment can be avoided, or whether it is indeed net-beneficial when combined with a longer-term, high-capacity transmission line solution.

In addition, given the closeness of the results, Transgrid intends to further investigate (and confirm in the PACR) the optimal timing of the transmission line in staged options (Option 3 and Option 5) under each scenario to compare them to Option 6 and Option 4. A proportionate approach has been taken in this PADR where the timing of the second stage of these options has been fixed in all scenarios.

Given the closeness of the results, Transgrid intends to further investigate (and confirm in the PACR) the optimal timing of the transmission line in staged options (Option 3 and Option 5) under each scenario to compare them to Option 6 and Option 4. A proportionate approach has been taken in this PADR where the timing of the second stage of these options has been fixed in all scenarios.

The option to deliver the South Creek substation work alone (Option 2) is not proposed to be assessed further as part of this RIT-T given the PADR outcome, which finds that this option is expected to generate negligible net market benefits on a weighted basis (and net costs in the Step Change and Slower Growth scenarios).

8.5. Sensitivity analysis results

In addition to the scenario analysis, we have tested the robustness of the PADR outcome by considering a range of sensitivities that reflect credible trajectories of the NSW energy transition over the next decade. The set of sensitivities that have been tested in this PADR, and the factors varied relative to the core cost benefit assessment are summarised in Table 5.4 in Section 5.3.

Sensitivities requiring electricity market modelling to be undertaken have only been performed relative to the Step Change scenario, being the central (highest weighted) scenario assessed. The options including scope for a transmission line (Options 3, 4, 5 and 6) are tested in all sensitivities, given the closeness of the results on a weighted net market benefits basis, and Option 2d is tested in cases where it has reasonable potential to become preferred. This is considered a proportionate approach considering the resource intensive nature of the modelling, and the number of options that must be considered in the sensitivity analysis at this stage.

Sensitivities that required only amendments to cost-benefit analysis parameters (such as costs, discount rates or the weighted average cost of capital) have been performed on a weighted net market benefits basis for all options.

8.5.1. Alignment with NSW Electricity Infrastructure Roadmap developments

Transgrid has engaged with AEMO in response to the *Draft 2026 ISP* regarding alignment with the development pathway of the *NSW Electricity Infrastructure Roadmap for the Final 2026 ISP*.[86] We have therefore investigated a sensitivity that aligns with aspects of the NSW Energy Infrastructure Roadmap that have not been considered by AEMO in the *Draft 2026 ISP*.

Specifically, this sensitivity assumes:

- Generation projects that have been awarded Access Rights to connect within the South West REZ and Central West Orana REZ will progress and are treated as 'anticipated' projects.
- Stage 2 of the New England REZ transmission project proceeds as intended by the Energy Corporation of NSW and is therefore treated as an actionable project progressing under the *NSW Electricity Infrastructure Roadmap* framework.

In this sensitivity, we find that the estimated net market benefits of all options increase compared to the core Step Change scenario, and that Option 3 remains the top-ranked option but not by a material margin, with Option 6, Option 4 and Option 5 being found to have net market benefits that are 0.6 per cent, 2.0 per cent and 3.3 per cent lower than Option 3, respectively. Option 6 and Option 4 improve relative to Option 5 under this sensitivity compared to the core Step Change scenario.

A driver of this increase in benefits is the more efficient utilisation of generation capacity in the South West REZ and Central West Orana REZ. In the counterfactual we find that some of the generation capacity in the REZs (which is assumed to be developed regardless of the outcome of the Sydney Ring South Project) is under-utilised due to the bottleneck on the southern corridor of the Sydney Ring network and must be compensated for by building additional generation and storage capacity elsewhere. With investment to overcome this bottleneck, this REZ generation capacity can be utilised more efficiently, displacing the need for other investment in generation and storage capacity.

These results indicate that the need for a Sydney Ring South transmission line is amplified when the development plan set out by the *NSW Electricity Infrastructure Roadmap* is considered.

These results indicate that the need for a Sydney Ring South transmission line is amplified when the development plan set out by the NSW Electricity Infrastructure Roadmap is considered.

[86] Submission to the Draft 2026 Integrated System Plan, 13 February 2026 | Transgrid, pp. 5-7.

Under this sensitivity, building and operating the counterfactual system that relies only on an optimised mix of generation and storage investments (no investment in the Sydney Ring South Project) to meet the identified need would become even more costly relative to the top-ranked transmission line option, increasing from $3,476 million (present value of net benefits of top-ranked Option 3 in the Step Change scenario), to $4,120 million (present value of net benefits of Option 3 in this sensitivity).

Figure 8.11 shows the estimated net market benefits, in present value terms, for this sensitivity.

Figure 8.11: Net market benefits sensitivity – Alignment with NSW Roadmap projects, Step Change scenario ($2024/25)

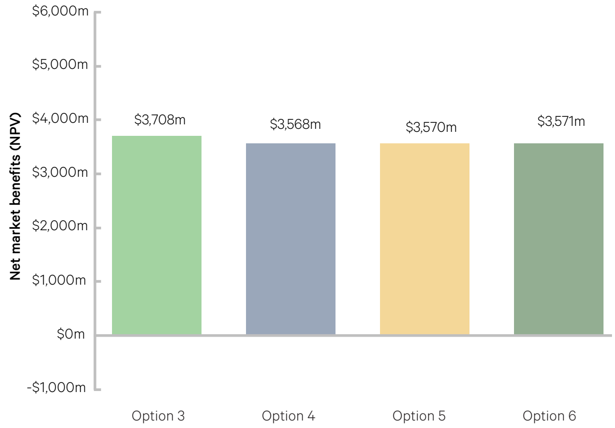
Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 3	4,120	
2	Option 6	4,097	-0.6%
3	Option 4	4,037	-2.0%
4	Option 5	3,985	-3.3%

8.5.2. Constrained use of diesel as a backup fuel for electricity generation

Transgrid has engaged with AEMO in response to the *Draft 2026 ISP* regarding the ability of gas-powered generators to run on liquid fuels like diesel during periods that supply of natural gas is constrained by pipeline capacity.

We consider this to be particularly important in the Sydney, Newcastle, and Wollongong region, where the interaction of reciprocal transmission and gas network constraints have material implications for planning new gas-powered generation to support reliability as coal power stations retire.[87] High reliance on diesel may not be logistically feasible, or consistent with community expectations regarding air pollution, emissions and local amenity.

Figure 8.12: Net market benefits sensitivity – Constrained diesel-powered operation of gas generators in the Newcastle region, Step Change scenario ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 3	3,708	
2	Option 6	3,571	-3.7%
3	Option 5	3,570	-3.7%
4	Option 4	3,568	-3.8%

Reflecting our view that sensible limits should be applied to the use of back up diesel to reflect real-world operating constraints, we have investigated a sensitivity that constrains the ability for existing gas fired generators in the Hunter and Central Coast regions to run on diesel as a backup fuel. We assume that diesel operation at existing facilities would be limited to the conditions of relevant environmental and planning permits, and that future facilities are required to meet equivalent standards.

The interaction of reciprocal transmission and gas network constraints have material implications for planning new gas-powered generation to support reliability as coal power stations retire. High reliance on diesel may not be logistically feasible, or consistent with community expectations regarding air pollution, emissions and local amenity.

[87] Submission to the Draft 2026 Integrated System Plan, 13 February 2026 | Transgrid, pp. 8.

In this sensitivity, we find that the estimated net market benefits of all options increase compared to the core Step Change scenario, and that Option 3 remains the top-ranked option, but not by a material margin, with Option 5, Option 6 and Option 4 being found to have net market benefits that are 3.7 per cent, 3.7 per cent and 3.8 per cent lower than Option 3, respectively.

The higher benefits are largely driven by the ability for network investments to avoid or defer more generation and storage capacity (including additional offshore wind), which needs to be developed in the counterfactual in response to the dual pressures of transmission constraints on the Sydney Ring network, and constraints on the availability of natural gas and diesel as fuel to reliably supply the electricity needs of Sydney, Newcastle, and Wollongong.

These results show that in this credible, fuel-constrained future state of the NSW power system, the benefits of investment in a high voltage transmission line in the 2030s as part of the Sydney Ring South Project are amplified compared with the baseline Step Change scenario.

Figure 8.12 below shows the estimated net market benefits, in present value terms, for this sensitivity.

8.5.3. Alignment with NSW Electricity Infrastructure Roadmap developments & constrained use of diesel as a backup fuel

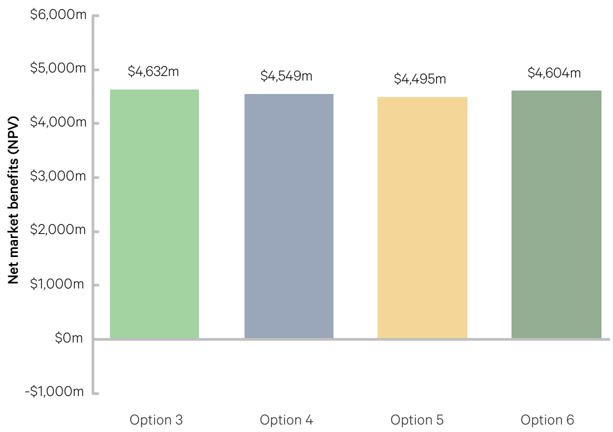
Given that the inputs and assumptions adopted separately by the two sensitivities outlined above are not mutually exclusive, and are each representative of credible features of the future NSW power system not represented by AEMO in the *Draft 2026 ISP* (upon which the core modelling in this PADR is based), we have also investigated a sensitivity that combines these factors.

That is, we have tested a case that both better aligns AEMO's Step Change scenario with the *NSW Energy Infrastructure Roadmap* and applies limits on the ability of gas-powered generators to run on liquid fuels like diesel during periods that supply to natural gas is constrained by pipeline capacity.

In this sensitivity, we find that the estimated net market benefits of all options increase compared to the core Step Change scenario, and that Option 3 remains the top-ranked option, but not by a material margin, with Option 6, Option 4 and Option 5 being found to have net market benefits that are 0.6 per cent, 1.8% per cent and 3.0 per cent lower than Option 3, respectively.

While the increase in estimated net benefits relative to the Step Change baseline is not same as the two separate sensitivities added together, the increased benefits seen under this option can be attributable in part to each of the drivers discussed previously.

Figure 8.13: Net market benefits sensitivity – Alignment with NSW Roadmap projects and assumed diesel generation constraints, Step Change scenario ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 3	4,632	
2	Option 6	4,604	-0.6%
3	Option 4	4,549	-1.8%
4	Option 5	4,495	-3.0%

8.5.4. Higher data centre demand growth trajectories

We are currently engaging with AEMO in response to the *Draft 2026 ISP* regarding the acceleration of NSW data centre growth. Specifically, we have recommended that AEMO update the data centre demand forecasts for the final *2026 ISP* to reflect current sectoral growth and acceleration, which has shifted materially since the forecast prepared for the *Draft 2026 ISP*.[88]

In light of this engagement, we have included two sensitivities that investigate the effects of assuming higher-than-forecast data centre demand in the Sydney region. Specifically, these sensitivities look at scenarios in which AEMO's data centre demand forecast for the Greater Sydney region is exceeded by 1 GW and 2 GW respectively, with the latter representing approximately a doubling of AEMO's demand data centre demand forecast.

For the higher scenario, the resulting forecast sees a total of approximately 2.3 GW of realised data centre demand in the Greater Sydney region by 2035, 3.2 GW by 2040 and 4.1 GW by 2050. Transgrid considers these scenarios to be credible based on the large volumes of data centre connection applications currently progressing at pace within the transmission and distribution networks in Greater Sydney.

In addition to the higher demand growth from data centres outlined above, each of these sensitivities also

[88] Submission to the Draft 2026 Integrated System Plan, 13 February 2026 | Transgrid, pp. 7.

includes a range of supply-side adjustments to the inputs and assumptions of the *Draft 2026 ISP* Step Change scenario. We've done this to ensure that the addition of this demand does not overly strain the system, ensuring that the estimated market benefits are based on a realistic development trajectory for the NSW power system. These demand-side adjustments are:

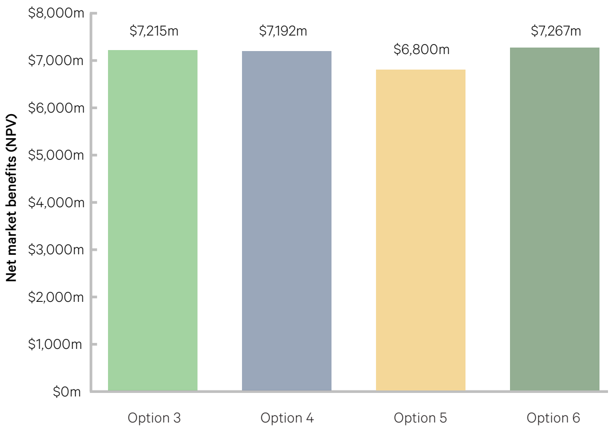
- Matching growing data centre demand with equivalent local demand management mechanisms such as demand flexibility agreements or local generation or storage.
- Aligning with *NSW Electricity Infrastructure Roadmap* developments (as outlined in previous sensitivities above).
- Constrained use of diesel as a backup fuel (as outlined in previous sensitivities above).
- Inclusion of LTESA Tender 6 outcomes, consistent with treatment of other policy supported projects.
- Disabling modelled target set by the 2025 *NSW Infrastructure Investment Objective (IIO) Report* and the target to achieve 82 per cent of electricity generation from renewable energy sources under the Commonwealth Government's *Powering Australia* plan. These adjustments do not impact obligations to achieve the longer-term carbon reduction objectives defined under the Step Change scenario.

In both of these sensitivities, we find that the estimated net market benefits of all options increase materially compared to the core Step Change scenario, with net market benefits for all options including a transmission line exceeding $6,800 million and $8,200 million (in present value terms) for the +1 GW and +2 GW sensitivities respectively. In both cases Option 6 becomes the top-ranked option (instead of Option 3), but not by a material margin, with Option 3 and Option 4 found to have net market benefits that are within 1.9 per cent of Option 6 in both cases.

Option 5, which delivers the transmission line scope in the late 2030s, is found to deliver fewer net market benefits relative to the other options that deliver the transmission line earlier. This is particularly evident in the very high data centre demand sensitivity, in which Option 5 found to have net market benefits that are 15.9 per cent lower than the top-ranked option.

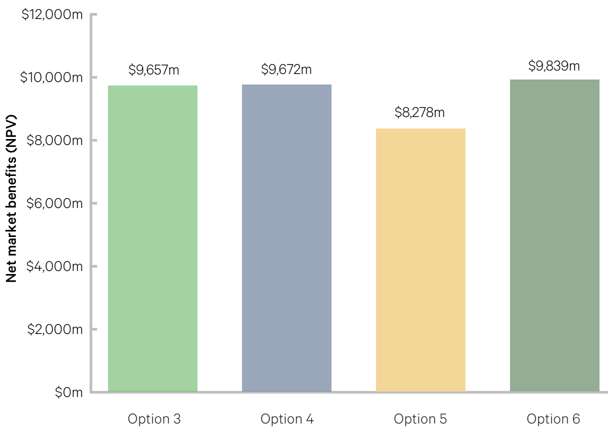
Figure 8.14 and Figure 8.15 below show the estimated net market benefits, in present value terms, for each of the two sensitivities.

Figure 8.14: Net market benefits sensitivity – High data centre growth (+1 GW), Step Change scenario ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 6	7,267	
2	Option 3	7,215	-0.7%
3	Option 4	7,192	-1.0%
4	Option 5	6,800	-6.4%

Figure 8.15: Net market benefits sensitivity – Very high data centre growth (+ 2 GW), Step Change scenario ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 6	9,839	
2	Option 4	9,672	-1.7%
3	Option 3	9,657	-1.9%
4	Option 5	8,278	-15.9%

The net market benefits of all Sydney Ring South options that deliver a new transmission line are very high under these high-demand growth sensitivities. This reflects that the counterfactual system that relies only on an optimised mix of generation and storage investments to meet growing demand in Sydney, Newcastle, and Wollongong (no investment in the Sydney Ring South Project) will become increasingly strained as existing network infrastructure is pushed to frequently operate at its limits.

In these cases, very large volumes of local energy generation and storage would need to be developed within the Sydney, Newcastle, and Wollongong region, including over 1.8 GW of offshore wind and a three-fold increase in peaking gas-powered generation capacity to 5 GW by the late-2030s, to keep pace with growing electricity demand. By contrast, Sydney Ring South provides capacity that leverages renewable generation and storage developed across regional NSW to meet growing demand more efficiently and at much lower cost.

Transgrid recognises that energy policymakers in NSW and nationally are progressing regulatory reforms to ensure that the data centres underpinning digital industries meaningfully contribute to network investments supporting their connection, and that they support the build out of firmed renewable generation.

Growth in demand from new data centres would amplify the need for Sydney Ring South, and Transgrid will work with all stakeholders to implement timely reforms that ensure consumers are no worse off due to the integration of data centres to our network.

The net market benefits of all Sydney Ring South options that deliver a new transmission line are very high under high demand growth sensitivities. This reflects that the counterfactual system that relies only on an optimised mix of generation and storage investments to meet growing electricity demand in Sydney, Newcastle, and Wollongong will become increasingly strained as existing network infrastructure is pushed to frequently operate at its limits.

Growth in demand from new data centres would amplify the need for Sydney Ring South, and Transgrid will work with all stakeholders to implement timely reforms that ensure consumers are no worse off due to the integration of data centres to our network.

8.5.5. A low data centre demand growth trajectory

We have also investigated a sensitivity that tests the net market benefits of Sydney Ring South options under a scenario where no new data centres are built, and the only growth in data centre electricity demand comes from existing facilities that are already connected to distribution networks, but which have not reached full utilisation.

In this scenario, we model that data centre demand plateaus at approximately 0.9 GW by the late 2030s, compared with the Step Change scenario, where data centre demand in Greater Sydney reaches over 2 GW by the end of the assessment period.

While Transgrid does not consider this to be a credible scenario, this sensitivity has been included to isolate and assess whether new data centre connections are a driver of the net market benefits and a key factor when considering the scope and timing of the Sydney Ring South Project. We consider this may be of interest to stakeholders in the context of recent energy policy proposals to require new data centres to contribute to enabling energy infrastructure and protect the broader consumer base from higher energy costs.

As seen for the Slower Growth scenario, with lower electricity demand, the estimated net market benefits of all options decrease significantly compared to the core Step Change scenario. However, unlike in Slower Growth, the options that include a transmission line continue to deliver greater net market benefits than a standalone power flow control option. Option 3 remains the top-ranked option, followed by Option 5, which is found to have net market benefits that are 8.4 per cent lower than Option 3. Option 2d, which does not include a transmission line, is found to have net market benefits that are 27.6 per cent lower than Option 3.

Importantly, all options featuring the 500 kV transmission line demonstrate positive net market benefits and rank higher than the option that delivers only a power flow control solution, indicating that the need for Sydney Ring South is strengthened and amplified, rather than caused, by data centre growth in Greater Sydney.

Figure 8.16 below shows the estimated net market benefits, in present value terms, for this sensitivity.

Figure 8.16: Net market benefits sensitivity – low data centre growth, Step Change scenario ($2024/25)

Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 3	1,062	
2	Option 5	973	-8.4%
3	Option 4	896	-15.6%
4	Option 6	873	-17.8%
5	Option 2d	769	-27.6%

8.5.6. Higher adoption of distributed and consumer energy resources

Since the launch of the Commonwealth Government's *Cheaper Home Batteries Program* from mid 2025, consumers have taken up home batteries at record rates, with some analysts now pointing to a potential divergence between the real-world of uptake of consumer energy resources and the forecasts adopted by AEMO in its *Draft 2026 ISP*.[89] We recognise that as the maturity and sophistication of the consumer energy resources segment evolves, it will become an increasingly important part of the energy supply mix that must be considered when assessing long-term, large-scale network investments like the Sydney Ring South Project.

In addition to this, in 2025, the NSW Distribution Network Service Providers jointly published the *NSW Distribution Network System Plan*,[90] which sets out a range of opportunities to better leverage distribution networks to connect large amounts of renewable generation and storage closer to urban centres.

In response to these developments, we have tested the net market benefits of Sydney Ring South options under a sensitivity where there is higher than forecast uptake of consumer batteries across Sydney, Newcastle, and Wollongong and opportunities to build out small and medium scale solar well in excess of what AEMO forecasts. Specifically, this sensitivity tests:

- Year-on-year uptake of home batteries increasing by approximately 50 per cent for the next 10 years to 2035/36,[91] relative to the AEMO forecast adopted in the *Draft 2026 ISP* Step Change scenario. This results in an additional 760 MW (1,490 MWh) of behind-the-meter storage installed in the Sydney, Newcastle, and Wollongong region by 2035/36, in addition to the forecast 2,000 MW (3,960 MWh) forecast by this date.
- Distribution network generation hosting capacity in the Sydney, Newcastle, and Wollongong region from 0.9 GW to 5.3 GW, consistent with the *2025 Distribution System Plan*.[92] For this scenario, we assume that this capacity would be available to solar generation only, reflecting the unique challenges to developing alternative generation types, such as onshore wind, close to urban centres.

In this sensitivity, we find that the estimated net market benefits of all options tested decrease compared to the core Step Change scenario, and that Option 3 remains the top-ranked option, but not by a material margin, with Option 4 found to have net market benefits that are 6.1 per cent lower than Option 3. Option 2d, which does not include scope for the transmission line, is found to have net market benefits that are 42.9 per cent lower than Option 3.

Importantly, all options featuring the 500 kV transmission line demonstrate positive net market benefits and rank higher than the option that delivers only a power flow control solution, indicating that under the Step Change scenario, the identified need is not met by the higher uptake

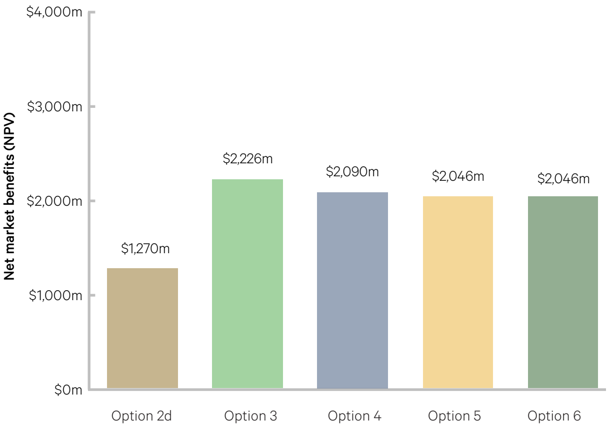
> Even with much higher uptake of consumer and distribution energy resources, all options featuring the 500 kV transmission line demonstrate positive net market benefits over $2,000 million in present value terms, and rank higher than only a power flow control solution.

[89] Is our next energy plan already out of date? | IEEFA.
[90] Opportunities Report | NSW DSP.
[91] This was modelled as a 100% increase to the forecast year-on-year uptake of 'aggregated' (coordinated) embedded energy storage capacity in the Sydney, Newcastle, and Wollongong region.
[92] The 2025 Distribution System Plan reports 3.3 GW of renewables hosting capacity for the Endeavour Energy network, and 4.7 GW of hosting capacity for the Ausgrid network, from which we have netted the 1.8 GW to be hosted in the Hunter Central Coast REZ and the 890 MW of hosting capacity reflected in AEMO's Draft 2026 ISP, resulting in a total hosting capacity of 5.31 GW.

of consumer and distribution energy resources tested in this sensitivity.

Figure 8.17 below shows the estimated net market benefits, in present value terms, for this sensitivity.

Figure 8.17: Net market benefits sensitivity – Higher adoption of distributed PV and CER, Step Change scenario ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 3	2,226	
2	Option 4	2,090	-6.1%
3	Option 5	2,046	-8.1%
4	Option 6	2,046	-8.1%
5	Option 2d	1,270	-42.9%

8.5.7. Negligible non-zero variable cost for renewable generation and storage

In Section 7.3.3 we outlined that a negligible non-zero cost ($0.10 per MWh) has been adopted for variable renewable energy and battery energy storage (including coordinated energy storage) to improve the robustness and interpretability of the market modelling results and ensure that they are representative of real-world power system operation.

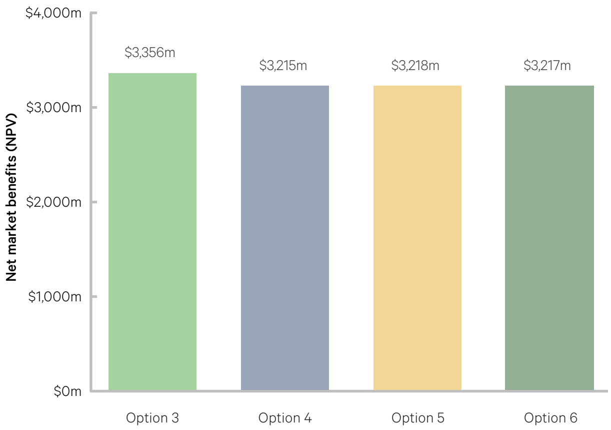
This sensitivity tests the materiality of reverting to the zero variable cost assumption used by AEMO for renewable energy and battery energy storage, including coordinated energy storage in its *Draft 2026 ISP*.

This sensitivity shows that a transmission line solution is likely to deliver positive net market benefits and remain the preferred option and under plausible high-cost scenarios.

Under these assumptions, the outcome remains the same as under the Step Change base case, with Option 3 remaining the top-ranked option, followed by Option 5, Option 4 and Option 6, which found to have net market benefits that are within 4.2 per cent of Option 3. Compared to the results in the Step Change base case, the net market benefits for each option are between 3.5 per cent and 5.5 per cent lower in the sensitivity. As a result, we consider the change made to the ISP parameters regarding variable cost for renewable generation and storage to not be material to the outcome of the PADR.

Figure 8.18 below shows the estimated net market benefits, in present value terms, for this sensitivity.

Figure 8.18: Net market benefits sensitivity – Negligible non-zero variable cost for renewable generation and storage, Step Change scenario ($2024/25)



Ranking	Option	Net benefit ($m PV)	Difference from first ranked
1	Option 3	3,356	
2	Option 5	3,218	-4.1%
3	Option 4	3,217	-4.1%
4	Option 6	3,215	-4.2%

8.5.8. Higher and lower option costs

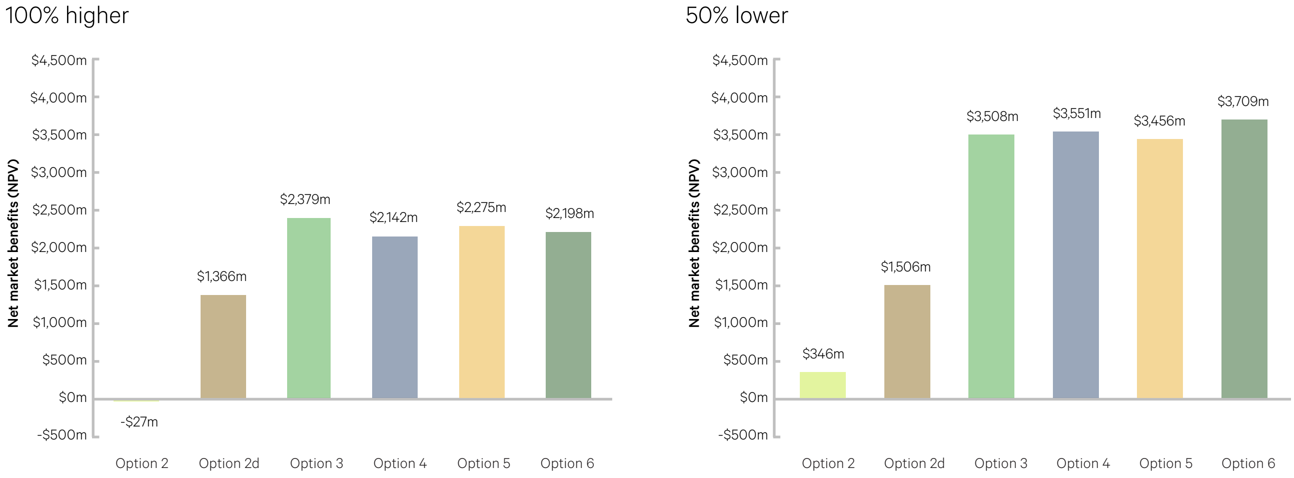
Previous experience demonstrates that transmission cost estimates can change as projects move beyond early concept, as scope, constructability and market conditions became clearer. At this early stage of the project, all option costs are considered to be 'Class 5' estimates with an expected accuracy of -50 per cent and +100 per cent.

To test whether the outcome of the PADR would be different if options estimates shift over time within this range, we have investigated sensitivities at the upper (+100 per cent) and lower (-50 per cent) bounds of the expected accuracy range for the Class 5 cost estimates. For this sensitivity, we assume that the estimates for all options change by the same factor.

Since this sensitivity does not involve electricity market modelling, it has been performed across all options and scenarios, with results presented on a weighted net market benefits basis.

Figure 8.19 below presents the estimated net benefits under these sensitivities.

Figure 8.19: Net market benefits sensitivity – 100% higher (LHS) and 50% lower (RHS) capital costs, ISP scenario-weighted ($2024/25)



Under an assumption that the costs reported in this PADR double, we find that the net market benefits for all options decrease but generally remain strongly positive (except for Option 2). In this sensitivity, Option 6 (the top ranked option on a scenario weighted net market benefits basis) is tested at a cost of $7,038 million (nominal), and is found to still deliver strongly positive net market benefits of $2,198 million, which is within 8 per cent of the top-ranked option (Option 3) in this high-cost sensitivity.

We note that the high-cost scenario tested by this sensitivity covers the cost presented in this PADR for a concept to reduce community impacts which includes the undergrounding of approximately 20 km of the transmission line, that is estimated to increase costs of the options that include a 500 kV transmission line by $2,700 million (nominal).

This sensitivity shows that a transmission line solution is likely to deliver positive net market benefits and remain the preferred option under plausible high-cost scenarios.

Conversely, under a scenario where costs for the credible options were 50 per cent lower, the net market benefits for all options increase and Option 6 remains the top-ranked option on a scenario weighted net market benefits basis.

8.5.9. Higher and lower discount rates

As outlined in Section 7.4.3, the cost-benefit analysis performed in this PADR adopts the same discount rate as AEMO uses in its *Draft 2026 ISP* to convert future costs and benefits to present value terms. To understand the materiality of the commercial discount rate to the PADR outcome, we have tested the sensitivity of the results to a lower bound discount rate of 3 per cent, and an upper bound discount rate of 10 per cent (being the upper bound in the latest IASR).

The outcomes of this sensitivity are shown in Figure 8.20 below.

Figure 8.20: Net market benefits sensitivity – 10% discount rate (LHS) and 3% discount rate (RHS), ISP scenario-weighted ($2024/25)

When we adopt the upper-bound discount rate of 10 per cent, we find that the net market benefits for all options decrease but generally remain strongly positive (with Option 2 being the only exception). In this sensitivity, Option 6 (the top ranked option on a scenario weighted net market benefits basis) remains the top-ranked option, but not by a material margin. Extending this sensitivity finds that the discount rate would need to increase to 63 per cent for Option 6 to not have positive net benefits, or to 21 per cent for Option 5 to have net benefits that are at least 5 per cent greater than Option 6.

Conversely, when we adopt the lower-bound discount rate of 3 per cent, the net market benefits for all options increase and Option 6 remains the top-ranked option on a scenario weighted net market benefits basis.

There is no positive discount rate that would cause Option 6 to no longer be the top-ranked option on a weighted net market benefits basis.

8.5.10. Alternative approach to annualising and discounting option costs

Transgrid has recently been engaging with consumer advocates regarding possible approaches that could be applied for the discounting of costs and benefits in NPV assessments. Transgrid acknowledges that stakeholders hold a range of views as to which method may be most appropriate.

The NER 5.15A.3(b)(7)(iv), requires the RIT–T proponent for an actionable ISP project to adopt "the most recent ISP parameters, or if the RIT-T proponent decides to vary or omit an ISP parameter, then the RIT proponent must… provide demonstrable reasons why the addition, omission or variation is necessary".

The ISP parameters are then defined in the NER 5.10.2 with one specific call out being *"the inputs, assumptions and scenarios in the most recent IASR"*, being the *2025 IASR* for the purposes of this PADR.

It is therefore a requirement to ensure the core assessment in this PADR is aligned to the methodology used by AEMO and the assumptions outlined in the IASR. Specifically, the approach adopted uses an annualised cost approach with a real pre-tax WACC of three per cent and a discount rate of seven per cent which is applied to both benefits and costs.

During our stakeholder discussions, Transgrid noted that we consider:

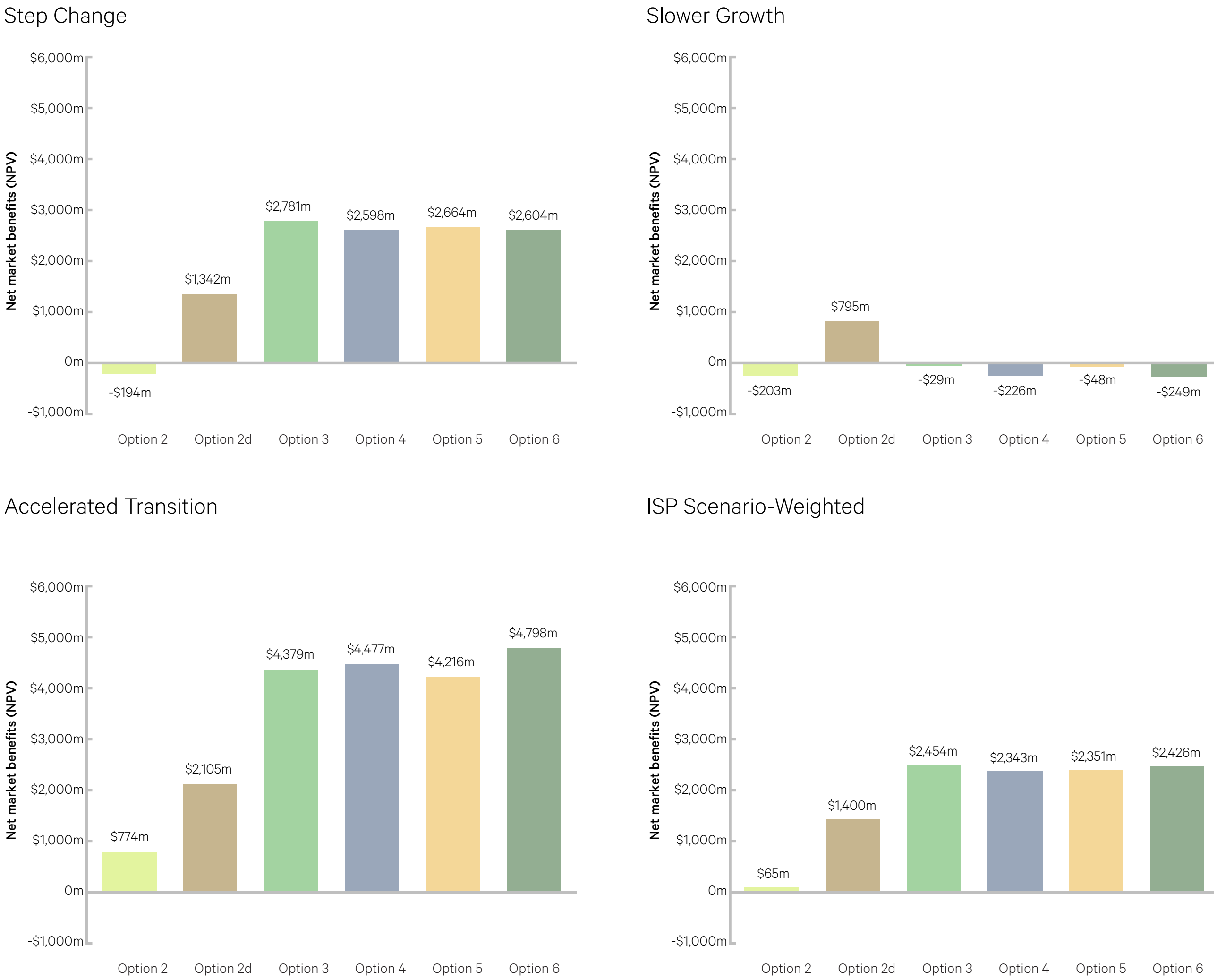
- A regulated transmission WACC should be benchmarked at the time a project is being assessed. The three per cent WACC assumed within the IASR reflects the historical average across TNSPs however, based on current market conditions this will be closer to 4.90 per cent.
- When adopting an annualised cost approach, there should be no difference between the WACC and discount rate for costs as to not unintentionally understate, or overstate the present value.

Transgrid has adopted these revisions in the following sensitivity. While net market benefits of options are lower overall, this change does not result in a material change to the key findings of the PADR core analysis and the options ranking. Specifically:

- On a weighted basis, Option 3 becomes the preferred option (but not by a material margin over Option 6, Option 5 and Option 4).
- Under the Step Change scenario, Option 3 remains the preferred option (but not by a material margin over Option 5, Option 6 and Option 4).
- Under the Slower Growth scenario, Option 2d is still the preferred option (although all other options are now found to result in net costs).
- Under the Accelerated Transition scenario, Option 6 is still the preferred option.

The outcomes of this sensitivity are shown in Figure 8.21 below.

Figure 8.21: Net market benefits sensitivity – Alternate approach to annualising and discounting costs, by ISP scenario and scenario-weighted ($2024/25)



9. Benefits of Sydney Ring South

9. Benefits of Sydney Ring South

This section describes the benefits of the Sydney Ring South Project, to all who produce, consume and transport electricity in the market in NSW. The benefits discussed here include net market benefits identified by this RIT-T assessment and the broader benefits of the Sydney Ring South to NSW energy consumers and the NSW economy. These include placing downward pressure on electricity bills, increased access to reliable, lower-cost renewable energy, increased system resilience, and supporting growth in NSW's largest economic regions.

This PADR demonstrates that delivery of a 500 kV transmission line from Bannaby in the Southern Tablelands to South Western Sydney by the mid 2030s is the most efficient solution to meet the long-term electricity supply needs of the Sydney, Newcastle, and Wollongong region.

In all but one assessment (when an alternate approach to including and discounting costs is applied as a sensitivity to the Slower Growth scenario), a 500 kV transmission line delivers strong economic benefits. The preferred option (Option 6) is estimated to provide net market benefits of between $552 million and $5,520 million under the three core scenarios tested, providing an estimated $3,200 million of net market benefits estimated over the assessment period on a scenario-weighted basis, in present value terms.

The benefits are greatest in futures with faster growth in electricity demand, including stronger uptake of electrification and data centres. In this future, the project is required as early as possible to maintain reliable supply and estimated net market benefits increase to as much as $9,800 million. The results also demonstrate that the preferred option is robust to uncertainty. Even if the project's capital cost were 100 per cent higher than assumed in this PADR, it would still be expected to deliver approximately $2,000 million in net market benefits.

These findings provide strong evidence that the preferred option, including a 500 kV transmission line, is a prudent and economically efficient investment that will deliver substantial and enduring benefits to NSW electricity consumers. Specifically, the project is expected to deliver broader benefits to NSW consumers and the economy by:

- Replacing retiring coal generation with a lower-cost mix of generation and storage
- Placing downward pressure on energy prices
- Enabling growth in the NSW economy
- Boosting investment confidence in the NSW energy transition
- Enhancing the energy system's resilience, operability and security.

9.1. Replacing retiring coal generation with an efficient mix of generation and storage from across NSW

Sydney Ring South will enable the Sydney, Newcastle, and Wollongong region to access a larger and more diverse portfolio of lower-cost renewable generation and storage resources as coal-fired power stations retire. Without this project, the southern transmission corridor into Sydney becomes a material constraint.

In the counterfactual energy system design, meeting demand in the Sydney, Newcastle, and Wollongong region would require greater reliance on new gas-fired peaking generation, offshore wind and other higher-cost generation located within metropolitan demand centres, as well as additional storage and firming capacity within or near Sydney. These alternatives are forecast to be more expensive overall and, in the case of gas-fired generation, would result in higher emissions.

A new 500 kV line between Bannaby and South Western Sydney would increase the amount of electricity that can be delivered to energy consumers along this southern corridor of the Sydney Ring network from around 2.7 GW to approximately 6.3 GW.

> Strengthening the southern corridor of the Sydney Ring network increases access to resources with different generation profiles, reducing the risk that low renewable output occurring in different regions, seasons and weather systems impacts the overall reliability of supply to our largest demand centres.

This additional capacity would unlock greater access to wind, solar, batteries and pumped hydro in southern, central and western NSW; increase access to interstate supply from Victoria and South Australia through existing and planned interconnectors, reduce reliance on higher-cost local generation, and support more efficient utilisation of REZs. In the Step Change scenario, the preferred option avoids the need for significant higher-cost investment close to Sydney, including approximately 1.8 GW of offshore wind and 1.4 GW of new gas-fired generation.

Importantly, strengthening the southern corridor of the Sydney Ring network increases access to resources with different generation profiles, reducing the risk that low renewable output occurring in different regions, seasons and weather systems impacts the overall reliability of supply to our largest demand centres.

> Sensitivity testing confirms that even under high distributed energy uptake scenarios, Sydney Ring South continues to deliver substantial net benefits. Replacing the capability of a 500 kV transmission line would require very large volumes of additional distributed solar and storage beyond the already significant levels forecast by AEMO.

Transgrid's planning analysis shows that renewable resources in Southern NSW, Victoria and South Australia provide valuable diversity relative to the Central-West Orana and New England REZs. This geographic diversity improves reliability during periods of low renewable output, reduces reliance on peaking generation and lowers the amount of storage and firming required to reduce overall system costs.

Distributed energy resources complement, but do not replace, transmission

Rooftop solar, household batteries and other consumer energy resources will play an increasingly important role in the future power system.

However, sensitivity testing confirms that even under high distributed energy uptake scenarios, Sydney Ring South continues to deliver substantial net benefits. Replacing the capability of a 500 kV transmission line would require very large volumes of additional distributed solar and storage beyond the already significant levels forecast by AEMO.

These findings are consistent with the *NSW Distribution System Plan Opportunities Report*,[93] which identifies distributed energy as an important complement to transmission, rather than a substitute for major network augmentation.

Power flow control technologies are not a standalone substitute

Power flow control technologies can improve utilisation of existing assets and may defer some augmentation requirements. They do not, however, materially increase the ability to transport the large volumes of electricity needed to meet long-term demand growth or replace retiring coal generation. Sydney Ring South addresses the underlying structural constraint by providing new capacity, increased redundancy and greater operational flexibility.

[93] Distribution System Plan Opportunities Report.

9.2. Sydney Ring South is expected to place significant and sustained downward pressure on NSW wholesale electricity prices and consumer bills

Increasing transmission capacity into the Sydney, Newcastle, and Wollongong region improves the efficiency of the electricity market by expanding the range of lower-cost generation options available to meet consumer demand. When network bottlenecks constrain the movement of electricity into this important region, the market operator must rely more on higher-cost generation located closer to demand centres, including gas-fired power stations or battery storage, during periods of peak demand or system stress.

Wholesale electricity prices in NSW are set for every five-minute trading interval at the Regional Reference Node, which is located in Western Sydney. When higher-priced supply options are required to supply electricity demand at this location, all electricity consumed across NSW is settled in the wholesale market at this marginal price, even if lower-priced supplies are available in other locations.

The cost of electricity generation (primarily driven by wholesale market prices) comprises around one third[94] of a typical household bill in NSW, representing the largest component of the bill stack. Increasing the transfer capability of the southern corridor of the Sydney Ring can therefore play a particularly important role in moderating bills for NSW electricity consumers.

> Sydney Ring South is forecast to reduce average NSW wholesale prices by $14/MWh in the period to 2040 (real $2024/25). The project can help to mitigate wholesale price spikes following the retirement of Bayswater Power Station, as well as reducing dispatch of peaking generation and enabling a more efficient mix of renewable generation from regional NSW and interstate.

Sydney Ring South provides the system operator greater flexibility to meet demand using lower-cost generation more of the time, which places downward pressure on wholesale electricity prices in two ways:

- **Displacing high-cost resources:** it allows lower-cost renewable generation to displace higher-cost gas generation and storage more frequently
- **Reducing price spikes:** it reduces the frequency and severity of extreme price events that occur when supply becomes scarce.

Wholesale market price forecasts prepared by Endgame Analytics for Transgrid confirm that development of the 500 kV Sydney Ring South transmission line is expected, upon commissioning, to place significant and sustained downward pressure on NSW wholesale electricity prices when compared to a counterfactual without the Sydney Ring South Project.

The preferred Sydney Ring South option identified in this PADR (Option 6) is forecast to reduce wholesale prices by $8/MWh to $22/MWh between 2033/34 and 2049/50 ($real 2024/25 on an annual, load-weighted average basis), averaging $14/MWh in the period to 2040.

The analysis finds that Sydney Ring South can help to mitigate wholesale price spikes that may otherwise occur upon the retirement of Bayswater Power Station, as well as reducing dispatch of peaking generation in the Sydney, Newcastle, and Wollongong region and enabling a more efficient mix of renewable generation from regional NSW and interstate.

These forecasts largely adopt modelling inputs and assumptions from the *Draft 2026 ISP* Step Change scenario, however in some cases these have been adjusted to account for current policy and market conditions.

This includes delays to the retirement of some coal generators, annual build limits for new generation (particularly wind and pumped hydro), adoption of Endgame Analytics' proprietary fuel cost forecasts, and delaying (or removing) carbon and renewable generation targets (besides those with established delivery mechanisms such as the *Capacity Investment Scheme* and *NSW Electricity Infrastructure Roadmap* LTESA program). These adjustments are considered essential for preparing realistic wholesale price forecasts.

[94] Based on Draft FY27 AER Default Market Offer | Australian Energy Regulator.

When considering both the savings in wholesale energy (generation) costs and the additional network charges associated with developing Sydney Ring South, we anticipate the project will deliver significant (net) bill savings to NSW energy consumers. Once fully commissioned, Option 6 is forecast to lower average household bills by $51 per year between between 2034 and 2043, and lower average small business bills by $110 per year (real $2024/25).

This savings benefit to households and small businesses will be even higher if demand for electricity grows faster than expected and the cost is shared by all users connected to the grid.

If the 500 kV line is delivered later in 2037/38 (Option 5), it will deliver similar wholesale market impacts once in-service, but over the intervening period (2034 to 2038), average households would pay an estimated $160 more for electricity, and average small businesses would pay an estimated $269 more for electricity.[95]

9.3. Enabling growth in the NSW economy

Reliable access to large volumes of affordable electricity is essential to support NSW's population growth, industrial development and decarbonisation. Electricity demand in NSW is expected to increase significantly over coming decades due to population growth, electrification of transport, buildings and industry, expansion of data centres, development of Western Sydney and Bradfield City Centre and industrial transformation in regions such as the Illawarra.

The RIT-T counterfactual analysis demonstrates that, in very high-demand scenarios, there is no credible pathway to meet forecast electricity demand without Sydney Ring South. Without the project, meeting demand would require rapid deployment of multiple, novel or high-cost technologies at a scale and pace that is uncertain. Sydney Ring South provides a scalable and credible network solution that supports both generation development and efficient connection of large new loads.

> In very high-demand scenarios, there is no credible pathway to meet forecast electricity demand in Sydney, Newcastle, and Wollongong without Sydney Ring South. Without the project, meeting demand would require rapid deployment of multiple, novel or high-cost technologies at scale.

The project will help support investment in emerging industries such as data centres and digital infrastructure, advanced manufacturing, hydrogen and clean industrial processes, Western Sydney International Airport and Bradfield City Centre, and industrial decarbonisation in the Illawarra.

By increasing network capacity and maintaining system reliability, the project helps unlock private investment, employment and long-term economic growth.

[95] Based on average residential and small business consumption of 4.4 MWh and 10 MWh per year, respectively. Includes consideration of changes in wholesale electricity prices, LTESA scheme costs and transmission charges associated with the Sydney Ring South Project, but excludes changes that may occur in other bill components.

9.4. Boosting investment confidence in the NSW energy transition

The project strengthens the investment case for new renewable generation, storage and large electricity users by providing a credible and efficient pathway to the NSW market.

As increasing volumes of wind, solar and storage connect to the grid, transmission congestion is becoming a more significant source of risk for investors. When network constraints prevent electricity from reaching consumers, generators may be curtailed, reducing output, lowering revenues and increasing uncertainty over project returns. This can raise financing costs and delay investment decisions.

Sydney Ring South complements the NSW Government's energy policies, including the development of Renewable Energy Zones and long-duration storage under the NSW Electricity Infrastructure Roadmap. By increasing the amount of electricity that can be delivered into Sydney, the project enables generation and storage developed under these initiatives to access the State's largest demand centre more efficiently and with greater certainty.

> Sydney Ring South complements the NSW Electricity Infrastructure Roadmap. By increasing the amount of electricity that can be delivered into Sydney, generation and storage can access the State's largest load centre more efficiently and with greater certainty.

By relieving a major transmission bottleneck into Sydney, this project reduces these risks. It lowers the likelihood of curtailment, improves utilisation of renewable and storage assets, increases revenue certainty and supports lower financing costs. In doing so, the Sydney Ring South Project helps unlock investment in the generation and storage capacity needed to replace retiring coal-fired power stations and meet growing demand.

The PADR sensitivity analysis indicates that the value of Sydney Ring South increases as more renewable generation, storage and electricity demand connect to the grid. This demonstrates that the project becomes even more important in futures where NSW successfully delivers its clean energy transition and experiences stronger growth in demand.

The project also supports investment in Southern NSW, where there is already significant interest in new energy developments. By increasing the network's capacity to export electricity from this region, the project improves confidence that these projects will be able to connect and operate efficiently, supporting timely investment in lower-cost energy resources and the investment certainty needed to underpin NSW's future electricity system.

9.5. Enhancing system resilience, operability and security and operability

Stengthening the Sydney Ring will significantly improve the resilience, flexibility and operability of the NSW transmission network. It will provide multiple pathways for electricity to flow into Sydney, Newcastle, and Wollongong, reducing reliance on any single corridor and enabling the system to continue operating securely following major equipment outages or delays in new generation development.

Over several decades, Transgrid has progressively developed this network to create multiple high-capacity pathways connecting major generation sources to NSW's largest demand centres. The eastern and western segments of the ring are already in place, and the northern segment is being strengthened through the Hunter Transmission Project.

Sydney Ring South would complete the southern segment, creating a continuous 500 kV loop around the state's major demand centre, providing a highly efficient and flexible pathway to move large volumes of electricity to the critical demand hubs of Sydney, Newcastle, and Wollongong.

9.5.1. Reducing reliance on a single high-capacity supply corridor

Supplying Sydney, Newcastle, and Wollongong through the northern transmission corridor upgraded by the Hunter Transmission Project relies on the timely development of generation capacity in the New England REZ in the early-to-mid 2030s, particularly to replace generation from the Bayswater Power Station when it is expected to retire in 2033.[96]

Development delays in this generation (or service outages) would increase strain in meeting demand in the state's largest demand centre. In such circumstances, greater reliance would fall on generation located in Southern and Central NSW. However, without the Sydney Ring South Project, transfers from these regions would be constrained by existing bottlenecks in the southern corridor of the Sydney Ring.

If delays occur in the development of generation in Northern NSW, the Sydney Ring South Project would allow generation from Southern and Central NSW (including the Central West Orana and South West REZs, and Snowy Hydro), as well as

[96] Forecast retirement of the final Bayswater unit in AEMO's Draft 2026 ISP (Step Change scenario).

interstate supply via the NSW-South Australia interconnector (EnergyConnect), and the NSW-Victoria interconnector (existing plus VNI West), to increase supply capacity servicing the state's major urban centres.

9.5.2. The Sydney Ring network enables access to diverse renewable generation profiles

The variable nature of renewable generation means that a flexible and resilient transmission backbone is essential to move energy from where it is being generated at any given time to where it is needed. Effective system planning must therefore consider how renewable generation profiles across different regions, particularly wind and solar, can complement one another to deliver a reliable and efficient power system.

Figure 9.1 below summarises analysis from Transgrid's *2024 Transmission Annual Planning Report* (TAPR), which demonstrates that wind generation profiles in the Central-West Orana and New England REZs are closely correlated: periods of low wind conditions are likely to occur simultaneously across these regions. During such periods, the system will need to rely on generation from other regions with diversified renewable energy generation profiles, and storage including batteries and pumped hydro.

By contrast, wind generation in southern and far-western NSW, which takes in the South West REZ, shows much lower correlation with the Central West Orana and New England REZs. The same is true for interstate wind generation that can be transferred from South Australia and Victoria. These regions therefore provide valuable, complementary supply that can strengthen overall system reliability and resilience.

Strengthening the Sydney Ring unlocks access to a broader and more diverse portfolio of renewable generation and storage assets across the system. This diversity improves reliability and system resilience, enabling more efficient utilisation of generation resources that ultimately reduces the overall investment required to deliver a secure renewable energy system.

Without strengthening the southern corridor of the Sydney Ring, however, network bottlenecks south of Sydney would limit the system's ability to fully utilise these complementary renewable resources. This could result in periods where strong renewable generation in South West NSW or interstate in South Australia and Victoria cannot be effectively transported to Sydney, Newcastle and Wollongong.

Strengthening the Sydney Ring unlocks access to a broader and more diverse portfolio of renewable generation and storage assets across the system. This diversity improves reliability and system resilience, enabling more efficient utilisation of generation resources that ultimately reduces the overall investment required to deliver a secure renewable energy system.

Figure 9.1: Correlation of wind generation across key NSW Renewable Energy Zones (REZ)[97]

	Central West Orana REZ	New England REZ	South West REZ
Central West Orana REZ		**Low diversity** (high correlation, >65%)	**High diversity** (low correlation, ≤45%)
New England REZ	**Low diversity** (high correlation, >65%)		**High diversity** (low correlation, ≤45%)
South West REZ	**High diversity** (low correlation, ≤45%)	**High diversity** (low correlation, ≤45%)	

[97] Source: Transgrid 2024 Transmission Annual Planning Report (TAPR).

9.5.3. An incomplete 500 kV ring creates operational challenges for system security

Transgrid is required to operate the transmission network to an 'N-1 secure' standard, in which the system must be able to withstand credible disturbances (like the unexpected trip of a transmission line due to a lightning strike), and still be ready to safely cater for the next disturbance soon thereafter (for example, another lightning strike elsewhere).

In technical terms, this means the power system must remain in 'satisfactory' and 'secure' operating states under normal conditions (prior to the first disturbance); land in a satisfactory state immediately following the loss of any single credible network element (such as a transmission line or high voltage transformer); and be secured against the next disturbance as soon as possible and within 30 minutes of the first disturbance.

In practice, this means that after a credible contingency (such as the loss of one of the two 500 kV circuits in the northern corridor of the Sydney Ring network after the Hunter Transmission Project is complete), system operators must be able to redispatch generation such that the power system can withstand a further credible contingency (the loss of the second circuit) and remain in a 'satisfactory' operating state without requiring load shedding.

Without local coal-fired generation on the Central Coast (such as Eraring and Vales Point) or a mix of significant new storage and gas-fired generation located close to the Sydney, Newcastle, and Wollongong demand centres, operating the power system to an 'N-1 secure' standard with only a single high-capacity supply corridor will become increasingly challenging. In some circumstances, operators may need to implement precautionary reductions in supply to maintain system security.

Operational benefits of the Sydney Ring South transmission line project:

Power system modelling highlights the operational benefits of developing the southern segment of the 500 kV Sydney Ring.

Scenario A

Hunter Transmission Project only:

We consider a future scenario with a moderate evening peak demand of approximately 13.6 GW, with only the northern corridor of the Sydney Ring upgraded by the Hunter Transmission Project (HTP), and 1.1 GW of generation needs to be dispatched within the Sydney, Newcastle, and Wollongong region to support supply under system intact conditions.

The loss of one HTP circuit significantly increases flows on the remaining circuit and pushes flows on key 330 kV lines (including southern corridor of the Sydney Ring) close to their thermal limits. Securing the system for the potential loss of the second HTP circuit becomes highly challenging, requiring around 1.8 GW of additional generation dispatch and/or load shedding within Sydney, Newcastle, and Wollongong

.Scenario B

Hunter Transmission Project and Sydney Ring South in service:

In a scenario where both HTP and a 500 kV Sydney Ring South transmission line are in service, no generation needs to be dispatched within Sydney, Newcastle, and Wollongong under system-intact conditions. Following the loss of a single HTP circuit, power flows readily redistribute across both the remaining HTP circuit and the southern corridor of the Sydney Ring, keeping flows on key 330 kV lines within their thermal limits.

Securing the system for the loss of the second HTP circuit can be achieved with significantly less operational intervention, requiring approximately 0.8 GW of generation redispatch, which would be readily available without load shedding, given this system did not rely on any local dispatch prior to the disturbance, and has the flexibility to access generation from regional NSW via diverse transmission pathways.

9.5.4. An incomplete ring exposes urban centres to high-impact system events

While transmission system planning typically focuses on managing single network contingencies, like unexpected outages due lightning strikes, the National Electricity Rules also require network planners to assess the impact of multiple contingency events, such as the simultaneous loss of both circuits on a double-circuit transmission line like the one being delivered by the Hunter Transmission Project to reinforce the northern corridor of the Sydney Ring network.

A network configuration that relies heavily on a single high-capacity transfer corridor to supply critical demand centres like Sydney, Newcastle, and Wollongong is inherently vulnerable to rare but high-impact events. Events like powerful lightning strikes, severe storms or bushfires could potentially cause the loss of both circuits within a double-circuit transmission line corridor. An event of this nature could remove a substantial share of supply to NSW's largest urban centres, potentially destabilising the power system. To manage this risk, system operators may be required to implement protective measures that could involve curtailing supply to customers to preserve system security.

Strengthening the 500 kV ring provides a robust and resilient transmission backbone capable of maintaining supply pathways even in the event of rare but high-impact disruptions. Importantly, these resilience benefits cannot be achieved through power flow control solutions alone, they require the structural redundancy and flexibility provided by a strong high-capacity transmission ring.

Strengthening the 500 kV ring provides a robust and resilient transmission backbone capable of maintaining supply pathways even in the event of rare but high-impact disruptions. Importantly, these resilience benefits cannot be achieved through power flow control solutions alone, they require the structural redundancy and flexibility provided by a strong high-capacity transmission ring.

10. Conclusion

10. Conclusion

This section summarises the conclusions of this PADR, and identifies the preferred option for the Sydney Ring South Project at this stage of the RIT-T. It calls on interested parties to make submissions, advises on next steps, and reminds stakeholders of how they can participate in consultation regarding the outcomes of this PADR and the remainder of the RIT-T process for the Sydney Ring South.

10.1. The preferred option at this draft stage of the RIT-T

This PADR finds that a new 500 kV link between Bannaby in the Southern Tablelands and South Western Sydney is the best option to address the identified need of increasing the NSW energy system's capacity to meet the long-term needs of NSW energy consumers, including meeting increasing peak demand.

Specifically, the assessment identifies that Option 6, which plans the delivery of a 500 kV transmission line (2033/34) and a power flow control solution in the existing 330 kV network (2030/31), delivers the greatest expected net market benefit of all credible options assessed.

Overall, Option 6 is estimated to deliver $3,205 million of net market benefits over the assessment period on a present value scenario-weighted basis. As the top-ranked option at this stage of the RIT-T, Option 6 is currently considered the preferred option.[98]

For all those who produce, consume and transport electricity in the market, the Sydney Ring South Project would cost $3,205 million less than building and operating an alternative (or counterfactual) energy system that instead only relies on a mix of generation and storage investments that would otherwise be required within the Sydney Basin to meet their long-term needs.

This very high net market benefit reflects the scale and persistence of the underlying system need, which is identified by AEMO's 2024 and *Draft 2026 ISP*, reinforced by this RIT-T assessment, and reflected in increasing support from diverse market participants for an expedited delivery of a 500 kV transmission line to more urgently achieve the material efficiency gains achieved by improving transfer capability into Australia's largest demand centre.

> This PADR finds that a new 500 kV link between Bannaby in the Southern Tablelands and South Western Sydney is the best option to meet the long-term needs of NSW energy consumers. As the preferred option, Option 6 is expected to deliver over $3,200 million in net market benefits in present value terms.

[98] Section 3.1.8 provides details of the technical characteristics, and the estimated construction timetable and commissioning date for Option 6.

An important outcome of the PADR is the closeness of results in the cost-benefit assessment. All other options that plan for the delivery of a new high-capacity transmission line (Option 3, Option 4, Option 5) can be considered effectively equally preferred to Option 6, given they each achieve net benefits exceeding $3,000 million over the assessment period, and are within 4.5 per cent of Option 6 on a scenario-weighted basis:

- **Option 3** – a new 500 kV transmission line planned for 2033/34 that is initially operated at 330 kV and upgraded to 500 kV at a later date
- **Option 4** – a new 500 kV transmission line planned for 2033/34 (without the additional power flow controllers delivered in 2030/31 included in Option 6)
- **Option 5** - a new 500 kV transmission line planned for 2037/38 (with the additional power flow controllers delivered in 2030/31 included in Option 6).

Specifically, in present value terms, Option 3 has estimated net market benefits that are 2.3 per cent ($73 million) lower than Option 6; Option 4 has estimated net market benefits that are 3.9 per cent ($124 million) lower than Option 6; and Option 5 has estimated net market benefits that are 4.5 per cent ($143 million) lower than Option 6.

We have investigated a range of sensitivities that reflect credible trajectories of the NSW energy transition over the next decade to test the robustness of the outcomes of the cost benefit assessment. The sensitivity analysis shows that over the assessment period and on a scenario-weighted basis, Option 6 and Option 3 remain the top-ranked options, supporting earlier delivery of the 500 kV line in 2033/34 compared to later delivery under Option 5.

The sensitivities applied also demonstrate that regardless of variances in staging between Option 6, Option 3, Option 4 or Option 5, a new 500 kV transmission line still provides the greatest level of expected net market benefits.

Even under sensitivities for a higher adoption of consumer and distribution-connected solar and storage resources, or lower growth in electricity demand from data centres; and under sensitivities relating to assumed capital costs, commercial discount rate and assumed transmission WACC, the analysis shows that a new high-capacity transmission line planned for 2033/34 will maximise net-benefits in the long-term interests of consumers.

In this PADR, Transgrid has presented a preliminary assessment of a concept to reduce community impacts including the undergrounding of approximately 20 km of transmission line, which would increase costs by up to $2,700 million (nominal), increasing the cost of the line by 80 per cent. We note that this is within the range considered in this sensitivity analysis, and that even at this higher capital cost, the development of a new transmission line by 2033/34 remains the preferred solution.

Given the closeness of the results, Transgrid intends to further investigate (and confirm in the PACR) the optimal timing of the transmission line in staged options (Option 3 and Option 5) under each scenario to compare them to Option 6 and Option 4.

Furthermore, while the weighted net market benefits assessment indicates that installing series reactors as power flow controllers on the 330 kV network will deliver the energy system incremental value when a 500 kV transmission line is planned for 2033/34, Transgrid intends to undertake further analysis to determine the potential option value of proceeding with a power flow control solution. This analysis will be also undertaken for the PACR and confirm whether this investment can be avoided, or whether it is indeed net-beneficial when combined with a longer-term, high-capacity transmission line solution.

Transgrid considers this further analysis beneficial in determining the option that delivers the highest benefit with maximum system resilience and optionality for all who produce, consume and transport electricity in the market.

All sensitivity tests will be reassessed in the PACR and take account of the two key intended updates to the options assessment; specifically further consideration of proceeding with a power flow control solution, and further investigation into the optimal timing of the other transmission line options (Option 3 and Option 5) under each scenario.

Transgrid proposes that Option 2 (South Creek substation work as a standalone investment) will not be assessed further as part of this RIT-T given the above PADR results where it is found to generate negligible net market benefits on a weighted basis (and net costs in the Step Change and Slower Growth scenarios).

Given the closeness of the results, Transgrid intends to further investigate (and confirm in the PACR) the optimal timing of the transmission line in staged options (Option 3 and Option 5) under each scenario to compare them to Option 6 and Option 4.

10.2. Proposed RIT-T re-opening triggers

Under Rules relating to a Material Change in Circumstance (MCC), Transgrid is required to include the re-opening triggers for this RIT-T in the PADR, enabling stakeholders to consult on them before they are confirmed in the PACR.

Consistent with these requirements and drawing on the results of the sensitivity testing in this PADR, Transgrid has considered the impact of changes in key underlying assumptions to identify reopening triggers. Specifically, we consider that the following are expected to form re-opening triggers for this RIT-T:

- Real total capital cost increases of more than the amount determined in the PACR threshold tests for changing the preferred option;[99]
- Commercial discount rates or regulated transmission WACC, as determined by AEMO in a future draft or final ISP or IASR, being above the amount determined in the PACR threshold test for changing the preferred option.

Should any of these events occur, Transgrid will update its analysis to identify whether the preferred option in this RIT-T has changed or is no longer expected to provide positive net market benefits and will propose a course of action to the AER. Additionally, if the *2026 ISP* includes any change to the ODP from the *Draft 2026 ISP*, Transgrid will reflect this change (which does not constitute an MCC) in the PACR.

10.3. Submissions and next steps

Transgrid welcomes written submissions from stakeholders on the analysis and conclusion presented in this PADR.

Submissions are due on or before 28 August 2026 and should be emailed to srs@transgrid.com.au. Unless clearly requested otherwise at the time of lodgement, submissions will be published on the Sydney Ring South Project page and on AEMO's website.

To provide stakeholders the opportunity to address questions to Transgrid prior to the close of submissions, a series of briefings will be held in early July 2026. Information on the program of stakeholder engagement activities and additional information regarding the submission process has been published on the Transgrid's Sydney Ring South Project page and will be published on AEMO's Sydney Ring South Project page.

The publication of a PACR represents the next formal stage of this RIT-T. The PACR will address submissions and feedback received on PADR and determine the final preferred option. The PACR will also take into account any updated analysis contained in AEMO's final *2026 ISP*, due to be published in June 2026.

Transgrid acknowledges that while the RIT-T framework focuses on the economic assessment of net market benefits, consumer concerns about energy affordability, reliability and equitable access to the benefits of the energy transition, as well as environmental, social, cultural, and community matters remain important. Stakeholder feedback on any project-related matters is welcome. Issues outside the scope of the RIT-T will be addressed following the PACR as part of subsequent consultation, design development and environmental and planning approval processes.

[99] We have not included this proposed percentage (nor the equivalent for the commercial discount rate trigger) in the proposed re-opening trigger in this PADR given the uncertainty affecting the assessment of the preferred option for this RIT-T. We propose to provide these percentages in the PACR.

Appendix A: Compliance Tables

Appendix A: Compliance Tables

This appendix sets out a checklist which demonstrates the compliance of this PADR with the requirements of the NER version 247.

Table A.1. Compliance checklist of PADR with NER

Option	Description	Relevant section(s)
5.16A.4(d)	A RIT-T proponent must prepare a PADR, which must include:	
	(1) include the matters required by the CBA Guidelines;	Table A.2
	(2) adopt the identified need set out in the ISP (including, in the case of proposed reliability corrective action, why the RIT-T proponent considers reliability corrective action is necessary)	Section 2
	(3) describe each credible option assessed	Section 3.1
	(4) include a quantification of the costs, including a breakdown of operating and capital expenditure for each credible option;	Section 3.1
	(5) assess market benefits with and without each credible option and provide accompanying explanatory statements regarding the results;	Section 8 & the accompanying market modelling report
	(6) if the RIT-T proponent has varied the ISP parameters, provide demonstrable reasons in accordance with 5.15A.3(b)(7)(iv);[100]	Section 7.3
	(7) identify the proposed preferred option that the RIT-T proponent proposes to adopt	Section 10
	(8) for the proposed preferred option identified under subparagraph (7), the RIT-T proponent must provide: (a) details of the technical characteristics; and (b) the estimated construction timetable and commissioning date.	Section 10 & Section 3.1.8
	(9) if each of the following apply to the RIT-T project: (a) the estimated capital cost of the proposed preferred option is greater than $100 million (as varied in accordance with a cost threshold determination);[102] and (b) AEMO is not the sole RIT-T proponent, include the RIT reopening triggers applying to the RIT-T project;	Section 10.2
	(10) if applicable, set out the costs of early works incurred but not included under clause 5.16A.7(c).	NA

[100] 5.15A.3(b)(7)(iv) details that the RIT-T proponent must adopt the most recent ISP parameters. Where the RIT-T proponent varies, omits or adds an ISP parameter, it must specify which parameter has been changed and provide clear reasons why the change is necessary.

[101] The current threshold determination is $103 million. See: 2024 cost thresholds review for the Regulatory Investment Test | Australian Energy Regulator, accessed on 18 July 2025.

The table below outlines a separate compliance checklist demonstrating compliance with the binding guidance in the latest AER CBA guidelines.

Table A.2. Compliance checklist of PADR with AER CBA Guidelines

Binding element	Provision	Classification	Relevant section(s)	Section of guidelines
Complying with the CBA guidelines				**2.1**
Compliance reporting				**2.1.2**
1	RIT-T proponents are required to provide the AER with a compliance report when applying the RIT-T to an actionable ISP project, which must be submitted no later than 20 business days after the publication of the PACR.	Requirement	Appendix A	
2	In its compliance reports, RIT-T proponents are required to identify where they: • have complied with applicable requirements • have had regard to applicable considerations (including the reasons for the weight they have attached to each consideration) • have resolved key issues raised by the AER through the issues register	Requirement	Appendix A However, Transgrid considers that it did not comply with NER clause 5.16A.4(c) as it did not receive written confirmation from the AER on its extension from 30 April 2026 to 29 May 2026	
3	RIT-T proponents are required to identify breaches of the CBA guidelines, if any, in their compliance reports and provide an explanation for the breach.	Requirement	Appendix A Transgrid considers there are no breaches of the CBA Guidelines	
4	If a compliance report contains confidential information, RIT-T proponents are required to provide another non- confidential version of the report in a form suitable for publication.	Requirement	This compliance report does not contain confidential information	
Interaction and alignment with the RIT-T				**3.5**
Feedback loop				**3.5.3**
5	RIT-T proponents are required to inform the AER within one business day of the outcome of a feedback loop assessment in the event the proponent has elected to use the concurrent pathway and AEMO has made a decision not to provide written confirmation	Requirement	NA	
6	If AEMO has extended the time for making a decision on a feedback loop request, RIT-T proponents are required to notify the AER of that extension within one business day of receiving notice of extension from AEMO.	Requirement	NA	

Binding element	Provision	Classification	Relevant section(s)	Section of guidelines
Operation and application of the RIT-T				**4.3**
Credible options				**4.3.1**
7	When a RIT-T proponent is considering whether to include new credible options that AEMO did not consider in the ISP, it must have regard to the guidance in Section 4.3.1 of the CBA guidelines on what constitutes a credible option when justifying its decision. When identifying new credible options, the RIT-T proponent must consider all options it could reasonably classify as credible options, taking into account factors that the RIT-T proponent reasonably considers it should take into account. In considering what it should take into account, the RIT-T proponent must have regard to the following: • if the identified need in the ISP entails meeting a service standard, the degree of flexibility offered by that service standard • the advantages of constructing credible options with option value • the benefits of constructing new credible options to meet the identified need in the ISP over broadly similar timeframes to the ISP candidate option	Consideration	Section 3	
8	RIT-T proponents must consider social licence issues in the identification of credible options	Consideration	Section 4	
Selecting the base case				**4.3.2**
9	The base case is required to be where the RIT-T proponent does not implement a credible option to meet the identified need, but rather continues its business as usual activities, including for where reliability corrective action is driving the identified need.	Requirement	Section 7.1	
Selecting inputs				**4.3.3**
10	'Demonstrable reasons' for departing from ISP parameters are required to be limited to where there has been a material change that AEMO would, but is yet to reflect in, a subsequent IASR, ISP or an ISP update. For example, this might include a material change in circumstances, such as where the AER has published updated VCR values that AEMO is yet to incorporate in the IASR. Where a material change is not a change in circumstances or facts (for example, a change in the RIT-T proponent's understanding or assessment of the facts, rather than a change in the facts themselves), the RIT-T proponent might choose to attain written confirmation of the change from AEMO.	Requirement	Section 7.3	

Binding element	Provision	Classification	Relevant section(s)	Section of guidelines
Valuing costs				**4.3.4**
11	If the modelling period is shorter than the life of the credible option, the RIT-T proponent is required to incorporate the operating and maintenance costs (if any) for the remaining years of the credible option into the terminal value.	Requirement	NA – an annualised cost approach has been taken (as opposed to using terminal values)	
12	When valuing the costs of compliance, there may be cases where a RIT-T proponent can lawfully pay a financial amount rather than undertake some other action for compliance. In such cases, the RIT-T proponent must consider whether the financial amount is smaller than the costs of undertaking some other action before determining whether it should treat the financial amount as part of that credible option's costs.	Consideration	NA	
Market benefit classes				**4.3.5**
13	RIT-T proponents are required to apply classes of market benefits consistently across all credible options.	Requirement	Section 7.1	
Methodology for valuing market benefits				**4.3.6**
14	For any RIT-T application where AEMO has not specified which scenario/s or weightings to apply, the RIT-T proponent must consider the AER's guidance on estimating probability-based weightings as set out in the previous RIT-T application guidelines that applied to all RIT-T projects.	Consideration	NA – weightings have been set out in the ISP	
15	Where calculating the benefit from changes in Australia's greenhouse gas emissions, a RIT-T proponent is required to: • include the following emissions scopes, unless the change relative to the base case can be demonstrated to be immaterial to the RIT outcome – direct emissions from generation – direct emissions other than from generation, e.g. sulphur hexafluoride. • estimate the change in annual emissions (once identified in accordance with this Guideline) between the base case and the credible option, and multiplying this change by the annual VER to arrive at the annual benefit from changes in Australia's greenhouse gas emissions.	Requirement	See external market modelling report.	

Binding element	Provision	Classification	Relevant section(s)	Section of guidelines
Sensitivity testing				**4.3.8**
16	RIT-T proponents must perform sensitivity testing on all credible options by varying one or multiple inputs/assumptions. In considering whether or how to perform sensitivity testing, the RIT-T proponent must have regard to any relevant risks identified in stakeholder submissions, and whether sensitivity testing would build on the analysis already undertaken in the ISP and be proportionate and relevant to the RIT-T assessment.	Requirement	Section 8.5	
Suitable modelling periods				**4.3.9**
17	The RIT-T proponent must consider using the ISP modelling period (also known as the planning horizon) of 20+ years as the default when assessing credible options to meet identified needs arising out of the ISP. If the expected profile of the market benefits and costs of the ISP candidate option are longer than the modelling period used in the ISP, the RIT-T proponent must consider whether it might be valuable to adopt a longer modelling period, whilst also considering the need for alignment with the ISP. For relatively incremental ISP candidate options, the RIT-T proponent must consider whether a shorter period would reduce the computational burden without compromising the quality of the CBA or undermining alignment with the ISP.s.	Requirement	Section 7.4	
18	Where the modelling period is shorter than the expected life of a credible option, the RIT-T proponent is required to include any relevant and material terminal values in its discounted cash flow analysis. The RIT-T proponent is required to explain and justify the assumptions underpinning its approach to calculating the terminal value, which represents the credible option's expected cost and benefits over the remaining years of its economic life.	Requirement	NA – an annualised cost approach has been taken (as opposed to using terminal values)	

Binding element	Provision	Classification	Relevant section(s)	Section of guidelines
Concessional finance agreements				**4.3.11**
19	The RIT-T proponent is required to only include the part of the benefit of a concessional finance agreement that is passed on to consumers in the RIT-T assessment. For a proposed concessional finance agreement to be included in the RIT stage of a project, a proponent is required to have, and provide, reasons and evidence to explain why they are confident the agreement is likely to be executed. The proponent is required to also provide details about the benefit to be shared with consumers, including about how the sharing of that benefit will occur, along with supporting evidence and information to substantiate these matters. If a proponent seeks to include an unexecuted concessional finance agreement in the RIT T, proponent is required to undertake sensitivity testing for the scenario the agreement doesn't eventuate.	Requirement	NA	
Staged projects under the ISP framework				**4.4**
20	For the purposes of clause 5.16A.5(b) of the NER, the relevant cost is the cost for the particular stage. However, AEMO also must have regard to the full cost of the project in providing its written confirmation, under clause 5.16A.5(b) of the NER, that the status of the actionable ISP project remains unchanged.	Consideration	NA	
Consumer and non-network engagement				**4.5.1**
21	The RIT-T proponent is required to use reasonable endeavours to ensure they meet 'community engagement expectations' as defined in the NER.	Requirement	Section 4	
22	The RIT-T proponent is required to publish a stakeholder engagement plan as soon as practicable before publication of the PADR. The RIT-T proponent is required to report against this engagement plan in each RIT-T report.	Requirement	Section 4	
23	The RIT-T proponent must consider publishing an update to their engagement plan if the approach to engagement has changed.	Consideration	NA	
24	The RIT-T proponent is required to engage with stakeholders who are reasonably expected to affected by the project's development.	Requirement	Section 4	

Binding element	Provision	Classification	Relevant section(s)	Section of guidelines
Consumer and non-network engagement				**4.5.1**
25	The RIT-T proponent must consider describing in each RIT-T report how it has engaged with consumers, as well as other stakeholders; and sought to address any relevant concerns identified as a result of that engagement. The RIT-T proponent must consider undertaking early engagement with consumers, non-network businesses and other key stakeholders to the extent that doing so complements rather than duplicates or hinders AEMO's engagement work in developing the ISP. The RIT-T proponent also must have regard to how it can adopt best practice consumer engagement in line with our 'consumer engagement guideline for network service providers'.	Consideration	Section 4	
26	The RIT-T proponent is required to provide transparent, user-friendly data to stakeholders, to the extent this protects commercially sensitive information and is not already provided by the ISP.	Requirement	Section 4 and the additional material released alongside this PADR.	
27	In providing transparent, user-friendly data to stakeholders, the RIT-T proponent must have regard to how it can present information in line with stakeholder preferences.	Consideration	Section 4 and the additional material released alongside this PADR.	
Project assessment draft report				**4.5.2**
28	The Draft Report is required to include, if applicable: • Demonstrable reasons for adopting different modelling techniques to what AEMO used in the ISP. • An explanation as to why any non-network options proposed in response to new actionable ISP projects in the final ISP are not credible options.	Requirement	Section 7.3 Section 3	
Project assessment Conclusions Report				**4.5.3**
29	When publishing the Conclusions Report, RIT-T proponents are required to: • Publish, in addition to a summary of submissions, any submissions received in response to the Draft Report, unless marked confidential. • Date the Conclusions Report to inform potential disputing parties of the timeframes for lodging a dispute notice with the AER.	Requirement	NA	
30	If a RIT-T proponent receives any confidential submissions on its Draft Report, it must consider working with submitting parties to make a redacted or non- confidential version public.	Consideration	NA	

The table below outlines a separate compliance checklist demonstrating compliance with the binding guidance in the latest AER CBA guidelines.

Table A.3. Additional RIT-T requirements not included in the list of binding elements in the CBA guidelines

Section in the CBA guidelines	Summary of the requirements	Relevant section(s)
Treatment of early works costs		
4.3.4	In conducting a RIT-T for an actionable ISP project, the proponent must include only: • the outstanding costs not yet incurred (at the time of the PADR or PACR, as the case may be) for each credible option, and • costs already incurred, if the assets acquired through incurring those costs can be sold or utilised to support other projects. Where the activities funded via an early works contingent project application have not yet been fully completed, the RIT-T proponent should specify the amount that has been incurred so far and the remaining amount expect, or forecast, to be incurred. For amounts of early works costs that have already been incurred, the RIT-T proponent should specify the amounts that the proponent considers relate to assets that can be sold or utilised to support other projects, and the facts and reasons on which its view is based.	NA
Cost estimation accuracy		
4.3.4A	Where the estimated capital costs of the preferred option exceed $100 million (as varied in accordance with a cost threshold determination as contemplated by clause 5.16.4(k)(10)(i) of the NER), a RIT-T proponent must, in a RIT-T application: • outline the process it has applied, or intends to apply, to ensure that the estimated costs are accurate to the extent practicable having regard to the purpose of that stage of the RIT-T • for all credible options (including the preferred option), either – apply the cost estimate classification system published by the Association for the Advancement of Cost Engineering (AACE), or – if it does not apply the AACE cost estimate classification system, identify the alternative cost estimation system or cost estimation arrangements it intends to apply, and provide reasons to explain why applying that alternative system or arrangements is more appropriate or suitable than applying the AACE cost estimate classification system in producing an accurate cost estimate.	Section 6
Additional cost estimation information and contingency allowances		
4.3.4A	For each credible option, a RIT-T proponent must specify, to the extent practicable and in a manner which is fit for purpose for that stage of the RIT-T: • all key inputs and assumptions adopted in deriving the cost estimate • a breakdown of the main components of the cost estimate • the methodologies and processes applied in deriving the cost estimate (e.g. market testing, unit costs from recent projects, and engineering-based cost estimates) • the reasons in support of the key inputs and assumptions adopted and methodologies and processes applied • the level of any contingency allowance that have been included in the cost estimate, and the reasons for that level of contingency allowance.	Section 3.1 and Section 6

Section in the CBA guidelines	Summary of the requirements	Relevant section(s)
Additional cost estimation information and contingency allowances		
4.3.4A	Contingency allowances are often included in cost estimates to allow a RIT-T proponent to take into account uncertainty in the costs of a credible option. If a contingency allowance is included in a cost estimate for a credible option, the RIT-T proponent must explain: • the reasons and basis for the contingency allowance, including the particular costs that the contingency allowance may relate to, and • how the level or quantum of the contingency allowance was determined	Section 6.6

Transgrid

Contact details

For all inquiries regarding the Sydney Ring South Project, contact srs@transgrid.com.au

transgrid.com.au