A.1 HumeLink – Stage 2 (Delivery) – Contingent Project Application

Principal application document
21 December 2023

Transgrid

People. Power. Possibilities.

Acknowledgement of Country

In the spirit of reconciliation Transgrid acknowledges the Traditional Custodians of the lands where we work, the lands we travel through and the places in which we live.

We pay respects to the people and the Elders, past, present and emerging and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of NSW and ACT.

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A message from our CEO

I am delighted to provide our Contingent Project Application (Application) for the delivery of Humelink, which will be our largest capital project since construction of our existing network. It involves around 365km of new 500 kV transmission lines connecting the greater Sydney load centre with the Snowy Mountains Hydroelectric Scheme and Project EnergyConnect.

We recognise the urgency of the energy transition and are strongly committed to playing our role in the delivery of transmission infrastructure to achieve AEMO's Optimal Development Path. We stand ready to begin delivery of Humelink, which AEMO considers to be in the long-term interests of Australian energy consumers and critical to secure reliable, renewable energy for more than eight million people across New South Wales as the Australian energy sector adjusts to the inevitable retirement of aged coal-fired power plants.

We acknowledge that HumeLink is a significant investment for NSW consumers. We also appreciate the Government's acknowledgement of the financeability issues facing TNSPs in the development of these nation-critical mega projects and the creation of the Rewiring the Nation fund to support accelerated delivery, while longer-term regulatory reform is undertaken to resolve the financeability challenges of these mega projects.

We also acknowledge the concerns of communities and landowners about the impacts of Humelink. We have been rigorous to ensure that:

- We have undertaken significant community, stakeholder and consumer representative engagement and selected the route that best balances cost, environmental impacts and amenity impacts for local communities;
- Every practicable opportunity has been taken to reduce the cost to consumers, including embedding innovation in the design and technical solutions to deliver the most cost-efficient outcome, locking in long-lead equipment on a program basis to reduce cost and time and engaging reputable delivery partners via a competitive process;
- Our contracting model aligns our objectives with those of our delivery partners and consumers, with in-built incentives to deliver Humelink at the lowest cost; and
- Foreseeable risks have been appropriately accounted for and mitigated wherever possible.

These initiatives and others have resulted in a design, project plan, procurement and contracting model that, based on our many decades of experience, collectively provide, the best solution, to the significant challenges they seek to address, at the lowest possible cost to consumers while meeting the ISP timetable. This approach is also consistent with the National Electricity Objective to promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers. It covers price, quality, safety, reliability, and security of supply of electricity as well as the reliability, safety and security of the national electricity system.

More specifically, these initiatives together with the outcomes from our early works activities, had at the time of contractual commitment, reduced the overall cost for consumers by $322 million comprising:

- $237 million from adopting variable rather than fixed-cost design and construction contracts with our preferred delivery partners, which has allowed them to offer a lower contract price than they otherwise would if they were forced to price in the risk costs through a fixed-price contract, and
- $85 million, from our program approach to securing long-lead equipment, which has enabled us to accelerate the delivery of transmission infrastructure and drive costs down through economies of scale and consistency in scope.

We have received our feedback loop confirmation from AEMO, prior to this submission. AEMO has confirmed the project continues to optimise benefits to consumers and it remains on the Optimal Development Path (ODP). AEMO's Draft 2024 Integrated System Plan takes into account the updated costs of Humelink (as reflected in this Application) and all other major projects as well as the latest expected timing of wider developments in the NEM, including the revised delivery date for Snowy 2.0.

Separately, we are currently updating the Regulatory Investment Test analysis for Humelink to confirm that, notwithstanding the updated delivery cost, there is no change in the preferred option. We intend to publish this analysis as soon as it is completed.

We stand ready to proceed with the delivery of Humelink for the benefit of consumers and to advance Australia's emission reduction targets. However, financeability of Humelink remains a key challenge. We have been working with the Clean Energy Finance Corporation (CEFC) to develop a concessional financing package via the Rewiring the Nation program and are pleased to confirm that we have some initial terms that will greatly assist Transgrid to make the significant financial commitment required to deliver this multi-billion-dollar nation-critical project. Given the current economic conditions however, the Rewiring the Nation fund is limited in its ability to provide a complete resolution to the financeability issue, as such we appreciate the AER's consideration of limited further support to enable the Humelink project to be financed.

To ensure we are best able to commence construction of Humelink, we respectfully request the following:

- approval from the AER for incremental revenue commensurate with the capital and operating costs of Humelink as we have proposed in this Application;
- confirmation from the AER that the CESS regime will not apply in relation to Humelink, given critical differences in the scale and complexity of Humelink relative to the context in which CESS was designed to apply;
- approval from the AER for the establishment of a new asset class for biodiversity offsets to enable depreciation of these costs over the weighted average of the standard lives of all other depreciating assets;
- approval from the AER to adopt as incurred depreciation for all depreciable asset classes.

We have worked closely with our investors in developing this Application. Our investors are well across the equity investment required to deliver Humelink and plan to progress their equity commitments through their internal approval processes based on the risk profile contemplated in our Application and based on the confirmation of Transgrid's Baa2 or equivalent rating. Binding equity commitments will be sought at the time of a final investment decision.

As a pivotal component of AEMO's Optimal Development Path to support the energy transition, Transgrid proudly stands ready to deliver this nation-critical project.

Brett Redman
Chief Executive Officer
December 2023

Gocup Road

Executive summary

Transgrid

Executive summary

Application and timing

We are pleased to provide our Contingent Project Application for delivering (Stage 2 Application or CPA-2) Humelink (Humelink or the Project). This is the Principal Application document, which sets out our proposed expenditure, the associated incremental revenue requirements and the indicative customer bill impacts for Stage 2 delivery activities.

We are committed to meeting the delivery date for Humelink of July 2026 in the Australian Energy Market Operator's (AEMO) 2022 Integrated System Plan (2022 ISP). [1] AEMO recently highlighted the importance of delivering Humelink, and other actionable transmission projects in the 2022 ISP, on time if reliability risks are to be avoided.[2] Delivering Humelink by July 2026 will ensure that its benefits arrive as soon as possible at the lowest sustainable cost to consumers, supporting a reliable supply and facilitating significant access to renewable energy.

As evidence of our strong commitment to delivering this project, we have worked with our stakeholders to publish our draft Stage 2 Application on the 8 December 2023. Our aim was to allow early stakeholder feedback and sufficient time for the AER to make its Determination on our Stage 2 Application by 29 March 2023 and help meet the 2022 ISP time frames.

The AER's approval of our prudent and efficient expenditure forecasts, and the resultant changes in our revenues and prices, as set out in this Principal Application document, are pre-conditions to execute the Notice to Proceed to Stage 2 (or NTP-2) with our design and construction (D&C) contractors (or delivery partners) for the Stage 2 activities. Our contractual arrangements with our D&C contractors require us to execute the contract by July 2024. We will incur significant penalties under the contract for every day the agreement is delayed beyond this date. Receiving the AER's Decision by 29 March 2024 is the latest possible date to enable us to finalise matters, including our funding arrangements, to meet the July 2024 contract execution timeframe. This contractual arrangement reflects the timing we have imposed on our D&C contractors to construct the Project to meet the July 2026 delivery date and lock in contract terms early to avoid cost escalation.

The costs in this Application reflect the Stage 2 activities associated with delivering Humelink, which involves constructing the new 500kV transmission line linking the Greater Sydney load centre with the Snowy Mountains Hydroelectric Scheme and Project EnergyConnect (PEC or EnergyConnect) in southwest New South Wales (NSW).

Our Stage 2 Application is informed by our Stage 1 Early Works

Our Stage 2 forecast expenditure, which reflects the bulk of the Project's costs, is informed by the outcomes of our Stage 1 activities, which we have been progressing in line with the AER's Decisions on our Stage 1 (Part 1) and (Part 2) Applications. In particular, the AER approved:

[1] This document refers to AEMO's 2022 ISP, as it is the most recently completed ISP in accordance with the NER. It should be noted that the Draft 2024 ISP, published on 15 December 2023, confirms AEMO's 2022 ISP conclusions in relation to VNI West, including its proposed timings.

[2] AEMO, *2023 Electricity Statement of Opportunities*, August 2023, p. 11, p. 96-99. AEMO's analysis takes into account a delayed commissioning date for Snowy 2.0 of December 2029.

- $380.83 million in its August 2022 Final Decision on our Stage 1 (Part 1) Application,[3] which is enabling us to undertake a range of Stage 1 activities, including project design, stakeholder engagement, land-use planning and approvals, and acquisition and project management.[4]
- $227.9 million in its August 2023 Final Decision on our Stage 1 (Part 2) Application.[5] This enabled us to procure long-lead equipment (LLE) for transformers, reactors, conductors and steel towers through our Powering Tomorrow Together (PTT) program. We initiated the PTT program to accelerate transmission infrastructure delivery across all the actionable ISP projects we are delivering, while also driving costs down through economies of scale and scope.

We expect to complete our Stage 1 activities by July 2024. We have been keeping the AER and the Transgrid Advisory Council (TAC) updated with our progress on, key learnings from and outcomes of these activities. Our Stage 1 activities have allowed us to invest time in the planning and design phase, continue to consult with stakeholders, identify and quantify project risks and select our D&C contractors through a competitive two-stage Early Contractor Involvement (ECI) process.

Our Stage 1 activities have resulted in a Stage 2 capex forecast in line with an AACE[6] class 2 to 3 cost estimate. This provides cost certainty that consumers will not be over-or-under investing in the Project.

Material change in circumstances assessment

The Regulatory Investment Test for Transmission (RIT-T) Project Assessment Conclusions Report (PACR)[7] identified Humelink (Option 3C) as the preferred option for reinforcing the southern shared network.

Through our early works, we have refined the cost of delivering Humelink. The total cost to deliver Humelink based on our Stage 1 (early works) and Stage 2 (delivery) Applications is $4.92 billion. This is around 29 per cent higher than the cost estimate of $3.82 billion[8] in the PACR, which was published in July 2021 and did not reflect current global supply chain, socio-political events and labour costs. This increase is in line with the overall cost increase of around 30 per cent for energy infrastructure projects across all elements of the supply chain over the last two years.[9]

Humelink is expected to provide significant value to the National Electricity Market (NEM) acting as the 'link' between Project EnergyConnect (PEC), VNI West and the Sydney Ring. This is recognised by the Federal Government, which has supported Humelink through the Rewiring the Nation Fund, acknowledging the Project's key role in strengthening and reconfiguring the NEM to ensure continued reliability through the energy transition.

AEMO's 2022 ISP assessed the net market benefits of the Project at that time to be $1.3 billion, highlighting that it is the only project that could be delivered in the critical period to directly address the risk of limited dispatchable capacity.

Since the 2022 ISP, Humelink has been increasingly recognised as vital to:

- provide resilience to early coal closures

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3 AER, Humelink Early Works Contingent Project Determination (Humelink CPA-1 Part 1 Decision), August 2022
4 The $380.83 million ($Real 2022/23) is equivalent to $321.87 million ($Real 2017/18)
5 AER, Humelink Early Works Stage 1 (Part 2) Contingent Project Determination (Humelink CPA-1 Part 2), August 2023
6 Association for the Advancement of Cost Engineering (AACE) International – cost estimation classification system
7 The PACR was published in July 2021. A subsequent Addendum was published in December 2021.
8 This is equivalent to $3.27 billion in Real 2019-20.
9 Infrastructure Australia, 2022 Infrastructure Market Capacity Report, December 2022. This found that the costs for construction materials have risen by an average of 24 per cent in in the last 12 months and labour demand is more than double the projected available supply.

- support the Government's emissions reduction targets by facilitating the supply of renewables
- support electrification of the economy
- ensure reliable and secure supply in light of rising demand.

AEMO's recently published draft 2024 ISP published is expected to take into account the updated costs of the Project as well as the updated costs and timings of other major developments in the NEM more widely, and the revised delivery timing for Snowy 2.0. We expect the analysis in the draft 2024 ISP to confirm that the Project continues to provide net benefits to the market and remains a key component of the ISP Optimal Development Path (ODP).

Even so, given the increase in estimated costs of the Project since the PACR we are currently updating the RIT-T NPV analysis to confirm that there is no change to the preferred option to meet the Material Change in Circumstances (MCC) requirements as contemplated under NER 5.16A(n) v202. This analysis will use the latest available information from AEMO and will reflect updated cost estimates for all credible options assessed in the PACR addendum. We intend to publish this analysis as soon as it is completed.

AEMO feedback loop confirmation

Positive written feedback loop confirmation from AEMO is required to satisfy the trigger events for actionable ISP projects.[10] These trigger events must be satisfied before we can submit our formal Stage 2 Application to the AER.

The purpose of the feedback loop is to assess whether, at the revised cost in this Stage 2 Application, Humelink remains on the ODP.

We have received our feedback loop response and AEMO has confirmed the project continues to optimise benefits to consumers and remains on the ODP. AEMO undertook its feedback loop assessment using its 2023 IASR and draft 2024 ISP, published on the 15 December 2023.

Pre-lodgement stakeholder engagement and how to provide feedback

We published our draft Stage 2 Application 8 December 2023, where we conducted significant stakeholder engagement. Feedback from the community, landowners and the TAC, supported by deep dives with the AER and TAC, has helped inform our approach to this significant investment on behalf of consumers.

By publishing our draft, we aim to receive early feedback on this Application which may assist to expedite the AER's determination process. A timely decision from the AER is crucial to provide the revenue certainty needed for us to proceed with project delivery and to avoid delay costs under the D&C contracts with our delivery partners.

The AER's formal decision-making process will begin once it receives our final Stage 2 Application in December 2023. The Stage 2 Application will be placed on formal exhibition for the full statutory period of four weeks.

Humelink is a project of national significance

Humelink involves around 365km of new 500kV transmission lines in an electrical 'loop' that links the Greater Sydney load centre with the Snowy Scheme and Project EnergyConnect in south west NSW.[11] This new transmission line is a key component of the energy market transition. It will reinforce the southern shared network, which transports electricity to major population centres from generators across southern

[10] Rule 5.16A.5 Actionable ISP project trigger event.
[11] AER, Humelink Early Works Contingent Project Determination (Humelink CPA-1 Part 1 Decision), August 2022

NSW as well as electricity imported from Victoria and South Australia. The current southern shared network is heavily congested at times of high demand and will become more congested as new renewable generation is connected in southern NSW.

Humelink will create additional capacity for new generation in southern NSW areas with high-quality resources – primarily, wind and solar generation – increase the transfer capacity between Victoria and NSW, and improve wholesale market competition, reducing customers' electricity bills.

The NSW Government has declared Humelink as Critical State Significant Infrastructure for NSW.[12] The Australian Government also identified Humelink in Australia's Long-Term Emissions Reduction Plan, which found that Humelink is needed to strengthen the network in southern NSW and transport renewable energy to consumers from new projects, including Snowy 2.0.[13]

Humelink has been a key project in AEMO's ISPs since 2018. AEMO's 2022 ISP reconfirmed the need for Humelink given its key strategic value for the NEM and the benefits it will provide to consumers.[14] We expect the analysis in the draft 2024 ISP to confirm that the Project continues to provide net benefits to the market and remains a key component of the ODP.

AEMO's 2022 ISP defined Humelink as a staged actionable ISP project, without decision rules.[15] The project stages and target timing identified in the 2022 ISP are:[16]

- Stage 1 – complete the early works by approximately 2024.
- Stage 2 – deliver the Project by July 2026,

AEMO's update to its 2022 Electricity Statement of Opportunities (ESOO) noted that Humelink has 'the potential to significantly reduce the projected reliability risk' for NSW, even accounting for the NSW Electricity Infrastructure Roadmap developments, including the Waratah Super Battery.[17] The 2023 ESOO (which takes into account a delayed commissioning date for Snowy 2.0 of December 2029) highlighted the continuing importance of delivering Humelink and other actionable transmission projects in the 2022 ISP on time if reliability risks are to be avoided.[18]

This Application covers the Stage 2 activities for the Project, which will enable us to complete its construction.

Unless otherwise stated, all expenditure forecasts in this Application are expressed in real 2022/23 dollars. All revenue forecasts are expressed in nominal terms, consistent with our 2023-28 Revenue Determination.

Scope of our Stage 2 activities

Our Stage 2 activities have been carefully scoped and resourced through our Stage 1 activities and PTT program to ensure they are efficient and prudent and will deliver the Project at the lowest sustainable cost. In particular, through our Stage 1 activities:

- We have determined the prudent and efficient Stage 2 capex forecast in this Principal Application by refining the Project scope through further detailed design activities, route selection and the competitive Early Contractor Involvement (ECI) process.

[12] Section 5.3 of the Environmental Planning and Assessment Act 1979 (NSW) on 9 March 2018
[13] Australian Government, Australia's long-term emissions reduction plan – a whole-of-economy plan to achieve net zero emissions by 2050, 2021
[14] AEMO, 2022 ISP, June 2022, p. 13
[15] AEMO, 2022 Integrated System Plan (2022 ISP), June 2022, p.13.
[16] AEMO, 2022 ISP, June 2022, p. 67 and 68
[17] AEMO, Update to 2022 Electricity Statement of Opportunities (2023 ESOO), February 2023, p.12.
[18] AEMO, 2023 ESOO, August 2023, p. 11, p. 96-99.

- We have secured cost savings for consumers from our programmatic approach to the ISP projects we are responsible for delivering. Our PTT program involves the integrated delivery of Humelink, EnergyConnect and VNI West and has been established to accelerate the delivery of transmission infrastructure and reduce costs through economies of scale and scope. The cost saving in this Application for consumers from the PTT program is estimated to be $85 million.
- We have identified, explored and managed risk to mitigate and/or diversify the Project's risks so that the residual risk costs (or 'other construction costs') included in this Stage 2 Application are as low as possible.
- We have progressed activities on the critical path to ensure that construction can begin as soon as possible following the approval of our Stage 2 Application by the AER. [19] These activities include selecting preferred delivery partners through the two-stage competitive ECI process, securing LLE, continuing to engage meaningfully with our stakeholders, preparing the Environmental Impact Statement (EIS) for public exhibition from 30 August 2023.
- We have secured cost savings for consumers from negotiating an Incentivised Target Cost (ITC) D&C contract. An ITC D&C contract enables contractors to offer a lower overall contract price than they otherwise would if they were forced to price in the risk costs (or 'other construction costs') though a fixed price D&C contract. The ITC D&C contract cost of $2,604.13 million included in this Stage 2 Application reflects a variable contract cost. However, if the D&C contractors are required to offer a fixed price contract, then the D&C contract cost is expected to increase by around $237 million or 8 per cent. The variable contract cost in this Revenue Proposal therefore provides consumers with a higher probability of a lower price outcome.

The cost savings for consumers achieved across our Stage 1 and 2 Applications for Humelink is $322 million of the total $500 million achieved through our PTT program to date.

Further cost savings of $787 million are expected via the synergies arising from concurrent investment in Humelink, Project EnergyConnect (PEC) and VNI West. In particular, our VNI West Stage 1 Application, which was published on 1 September 2023, includes D&C work packages for undertaking the:

- PEC enhancement works, which are required to increase the capacity of the transmission line from the Dinawan Substation to Wagga Wagga from 330 kV to 500 kV, saving approximately $697 million
- Gugaa integration works, which are required to connect the enhanced PEC component at the Gugaa substation being constructed as part of Humelink, saving approximately $90 million.

Our bundled approach to delivering the actionable ISP projects for which we are responsible will ensure that, overall, this suite of ISP projects is delivered at the lowest sustainable cost for consumers.

We are seeking the AER's approval for the costs of the following direct and indirect Stage 2 activities:

- design and construction work, including for substations, transmission lines and access tracks
- transportation/mobilisation (i.e., delivery), storage and installation of the LLE, which we secured in Stage 1
- other construction costs to mitigate and manage expected risks during the delivery phase
- biodiversity offset costs for the impact of building Humelink on land known to contain certain plant and/or animal species (i.e., to offset our biodiversity liability under the NSW Biodiversity Conservation Act 2016)

[19] AEMO, 2022 ISP, June 2022, p.13. (See Table 1).

- easement acquisition costs to compensate public and private land holders for acquiring easements over their land as well as costs for stamp duty, the value of timber taken, substitute forest land, disturbance costs, construction camps and laydown areas and overhead costs
- internal labour resources for undertaking project and commercial management, project control, design and construction, and corporate support (legal, regulatory, health safety and environment (HSE) and insurance), environmental and property, community and stakeholder engagement (CSE) and social licence[20] activities
- indirect activities for a wide range of professional and consulting services related to project and commercial management, project control, design and construction, corporate support (legal, regulatory, HSE and insurance), major project initiatives and CSE.

Stage 2 forecast capex

Our total Humelink Stage 2 forecast capex is $4,279.14 million (Table 0.1), excluding equity raising costs. Stage 2 capex is incremental to the capex approved by the AER in its 2023-28 Revenue Determination because it relates to activities that are additional to our normal business activities and would not be incurred other than for undertaking Stage 2 activities for Humelink.

Table 0.1 Stage 2 capex ($M, Real 2022/23, excluding equity raising costs)

Humelink	2023/24	2024/25	2025/26	2026/27	Total
Actual	-	-	-	-	-
Forecast	42.79	2,099.61	1,990.42	146.33	4,279.14
Total	**42.79**	**2,099.61**	**1,990.42**	**146.33**	**4,279.14**

Notes: 1. Including overheads, excluding equity raising costs. 2. Totals may not add due to rounding. 3. No actual costs for stage 2 activities have been incurred yet.

Our Stage 2 (implementation) capex of $4,279.14 million includes:

- direct capex of $3,867.55 million (90.38 per cent of Stage 2 capex)
- labour and indirect capex of $411.59 million (9.62 per cent of Stage 2 capex).

Our direct capex forecast of $3,867.55 million comprises:

- $3,232.80 million for tendered works, comprising:
  - $2,604.13 million (or 60.86 per cent of capex) for the preferred D&C contractors selected through the competitive two-stage ECI process to undertake the East and West contract packages to design and construct substation and transmission line works, including access tracks.
  - $29.59 million (or 0.69 per cent of capex) for LLE for transformers, reactors and conductors. These costs relate to transportation/mobilisation (i.e., delivery), storage and installation of the equipment that was secured in Stage 1.
  - $599.07 million (or 14.00 per cent of capex) for the 'other construction costs' associated with the delivery of Humelink within the delivery time and budget. These risks cover the reimbursable component of the D&C contracts, scope changes, project delay, biodiversity costs and inherent risks.

[20] Transgrid Social Licence Framework

- $634.76 million (or 14.83 per cent of capex) for acquiring easements and acquitting biodiversity offsets:
  - $197.29 million (or 4.61 per cent of capex) for acquiring easements. This relates to compensation for public and private land holders and other costs, including stamp duty, the value of timber taken, substitute forest land, disturbance costs, construction camps and laydown areas and overhead costs.
  - $437.47 (or 10.22 per cent of capex) to acquit our biodiversity offsets liabilities at the lowest possible cost. This includes establishing Biodiversity Stewardship Sites from July 2024 to July 2026.

Our labour and indirect capex forecast of $411.59 million (or 9.62 per cent) of capex:

- $204.66 million or 4.78 per cent for labour related to internal resource requirements
- $202.48 million or 4.73 per cent for indirect non-labour capex, relating to a wide range of professional and consulting services, as well as tender payments and associated facilities costs
- $4.44 million or 0.10 per cent for labour escalation.

Basis of capex estimate

Our forecast capex is based on a detailed scope of works using methods that reflect the specific nature of the costs. This includes externally tendered (competitive) D&C contracts, manufacture and supply contracts, pricing from suppliers and independent specialist advice. Our D&C contractor costs have been independently verified by Fission, our independent cost estimator. GHD has independently verified our total capex forecast, by sub-category, as being reasonable. These independent verifications support our belief that we are delivering Humelink at the lowest sustainable cost for consumers, having secured $412 million of cost savings across Stages 1 and 2 of the Project, comprising:

- $85 million for securing LLE through our PTT program (Stage 1 forecast capex)
- $237 million from adopting a variable ITC D&C contract rather than a fixed price D&C contract to deliver the design and construction for substations and transmission lines including access tracks (Stage 2 forecast capex)
- $90 million from undertaking the Gugga integration works as part of VNI West Stage 1 activities.

Table 0.2 summarises our Stage 2 forecast capex and the basis of our forecast capex for each capex subcategory.

Table 0.2: Stage 2 forecast capex – basis of estimate by sub-category of capex ($M, Real 2022/23)

Category of capex	Forecast capex	Basis of capex forecast
Direct costs	3,867.55	
Tendered works	3,232.80	
West – Design, substations and transmission lines including access track	1,347.63	The outcome of the two-stage competitive ECI tender process (i.e., externally tendered D&C contractors' costs).
East – Design, substations and transmission lines including access track	1,256.50	

Category of capex	Forecast capex	Basis of capex forecast
LLE (excluding towers)	29.59	Agreements with suppliers, which were competitively tendered.
Other construction costs[1]	599.07	Detailed probabilistic risk assessment (Monte Carlo analysis) using rates included in the D&C contractors' responses where activities are the same or similar, as confirmed by our independent cost estimator Fission.
Easement and biodiversity offset costs	634.76	
Easement acquisition	197.29	Options agreements and an independent report from Jones Lang LaSalle (JLL).
Biodiversity offset costs	437.47	An independent report from Niche, which has been verified by WSP.
Labour and indirect costs	407.14	
Labour costs	204.66	Bottom-up build of internal resource requirements and market labour rates over the period.
Indirect costs	202.48	Bottom-up build using current available market rates and recent historical data.
Escalators and equity raising costs	37.68	
Equity raising costs	33.14	Forecast capex calculated using the AER's Post Tax Revenue Model.
Real input escalators	4.44	Calculated by multiplying the projected labour components of forecast capex by the real labour cost escalators approved in the AER's 2023-28 Revenue Determination for Transgrid.
Total capex (excluding equity raising costs)	4,279.14	
Total capex	**4,312.28**	

Notes: 1. These costs are the 'other construction costs' expected to be incurred in constructing Humelink that are not included in the tender prices.

Stage 2 forecast opex

Our forecast Stage 2 opex is $23.17 million over the 2023-28 regulatory period, excluding debt raising costs (Table 0.3). Our forecast opex relates to:

- maintenance costs for substations, digital infrastructure and transmission lines
- property-related expenses for council rates, land tax, water and electricity

- compensation for private landholders impacted by the Project, in accordance with the NSW Government's Strategic Benefit Payment scheme
- insurance premiums for industrial special risks and operational third-party liability insurance for the Humelink assets, once they are commissioned
- vegetation integrity rehabilitation costs.

Stage 2 opex for Humelink is incremental to the opex approved by the AER in its 2023-28 Revenue Determination, because it relates to activities that are additional to our normal business activities and would not be incurred other than for undertaking Stage 2 activities for Humelink.

We have also applied the labour escalation rates as set out in our 2023-28 Revenue Determination to account for changes to real labour costs and added benchmark debt raising costs.

Table 0.3: Stage 2 forecast opex ($M, Real 2022/23, excluding debt raising costs)

Opex	2023/24	2024/25	2025/26	2026/27	2027/28	Total
Total opex	-	0.14	0.14	9.58	13.32	**23.17**

We will provide an opex forecasting methodology in our Final Stage 2 Contingent Project Application. Our opex forecast model is also provided as an attachment to this Application.

Incremental Revenue requirement and customer bill impact

On the basis of our Stage 2 capex forecast, from 2025/26 we will be seeking the AER's approval to increase our Maximum Allowed Revenue (MAR) for the 2023-28 regulatory period to reflect the impact of incremental capex and opex from the Project. We have assumed the AER's decision will be made in time to reflect the updated MAR in our tariffs for the 2025/26 pricing year.

Table 0.4: Incremental maximum allowed revenue – MAR (smoothed) ($M, Nominal)

MAR (Smoothed Revenue)	2023/24	2024/25	2025/26	2026/27	2027/28	Total
2023-28 Decision (updated for the Humelink Early Works Parts 1 and 2)	923.99	960.11	995.98	1,033.19	1,071.78	**4,985.05**
Impact of Humelink Stage 2	-	-	115.16	252.74	251.68	**619.58**
Updated MAR	**923.99**	**960.11**	**1,111.14**	**1,285.92**	**1,323.46**	**5,604.63**

Based on the forecast MAR adjustment, the indicative customer bill impact is an annual increase of $20.52 for residential customers and $40.78 for small business customers, starting in 2025/26. These transmission cost increases are expected to be more than offset by savings in wholesale costs.[21] As discussed above, AEMO's updated net market benefits assessment for the Project will be reflected in its draft 2024 ISP, which is due to be published in mid to late December 2023.

Customer consultation and support

Our engagement approach is based on genuine consultation through meaningful and transparent dialogue. Through our Transgrid Engagement Policy, we are committed to understanding the priorities and

[21] AEMO, 2022 ISP, p. 68. We note that the assessment of the market benefits from the Project is being separately updated and confirmed through AEMO's draft 2024 ISP analysis.

preferences of our customers and other stakeholders, keeping them informed and reflecting their feedback to the extent possible in the design of the Project.

The voices of the community and our consumers are at the centre of our decision making:

- We recognise the vital role that landowners and the community have in helping us to plan and deliver our projects and network operations.
- We work with communities in a meaningful, accountable, responsive and equitable way through effective and inclusive engagement practices.
- We are dedicated to continuously improving our engagement to support our decision making and deliver community benefits.
- We listen, seek to understand and act on what matters most to communities, working with them to identify opportunities that benefit them, while striving to minimise the impacts of our operations.

Since March 2021, we have hosted more than 50 in-person and online community information events, attended more than 25 independently chaired Community Consultative Group meetings, held more than 1,100 one-on-one meetings with easement-affected landowners and shared more than 75,000 project newsletters across the regions impacted by Humelink.

During the EIS exhibition period (30 August 2023 to 10 October 2023), we received 154 EIS submissions which we are currently assessing. In the lead up to and during the EIS public exhibition, we briefed key stakeholders, including communities, councils, government agencies and First Nations stakeholders and members of state and Federal parliaments.

During the EIS public exhibition period, we offered communities and stakeholders a suite of channels and materials to help them find out about the Project and the EIS. These included:

- notification to easement-affected landowners (hard copy notification delivered to landowners in line with S.181 EP&A Regulation)
- 20 in-person community information sessions in regional towns across the Project corridor
- 20 stakeholder group briefing presentations
- hard copies of the EIS on display at public libraries along the Project corridor
- a suite of communications materials, available on the Project website and during in-person sessions, to help people navigate the different EIS sections
- Digital EIS – a user-friendly interactive digital platform presenting EIS findings hosted on the Project website
- five community information webinars
- multiple project newsletters
- phone and email access for enquiries.

We captured and shared the information and issues discussed at the engagement events. This information was used to inform project development, route alignment and ongoing engagement. The reports are published on the Project website for those not able to attend an event, as a record of engagement and to ensure transparency.

Capital Expenditure Sharing Scheme (CESS)

As discussed with the AER and other stakeholders, including the TAC, we do not support CESS being applied to AEMO's ISP projects, including Humelink. We believe that, for high-value, complex and specialised projects, the current inflationary and uncertain environment makes it likely that these incentive schemes will introduce asymmetric risk.

The key drivers of this asymmetric risk to cost arise from:

- labour shortages
- increasing materials costs and supply chain disruption
- other and unquantifiable costs that arise in this type of project, given the operating environment and the unique characteristics of ISP Projects, including their significant size and scale.

To safeguard against potential losses (i.e., risk costs or 'other construction costs') D&C contractors require some cost components in their contracts to be variable. This allows contractors to offer a lower contract price than they otherwise would if they were forced to price in the risk costs through a fixed-price contract.

Given the challenging operating environment, with a heated construction market experiencing elevated escalation and contractors not being able or willing to enter into fixed-price D&C contracts, the probability of overspending the AER's capex allowance is greater than the probability of underspending it. This means that the 'other construction costs' included in this Stage 2 Application are critical to enable us to deliver Humelink on time and on budget.

Critically, it would not be in the long-term interest of consumers to apply penalties or rewards based on the CESS for differences between actual and forecast expenditure where these differences are driven by factors other than true efficiency savings or losses. The AER's underlying building block framework already provides an appropriate financial incentive for us to minimise capex. During the regulatory period, revenues are based on forecast capex, ensuring we do not earn a return on any capex overspend for the duration of the regulatory period. Any capex overspend is rolled into our Regulatory Asset Base (RAB) at the start of the subsequent regulatory period, only then enabling us to earn a return on our actual prudent and efficient capex. An independent report from HoustonKemp, provided as an Attachment to this Application, demonstrates that the underlying building block framework already provides an appropriate financial incentive for us to minimise capex.

As explained above, we are delivering Humelink at the lowest sustainable cost for consumers and have secured cost savings of $412 million.[22]

Commercial viability of the Project

We consider that Humelink is in the long-term interests of consumers because it is integral to achieving AEMO's ODP. To attract the capital required to deliver the Project, it must be commercially viable. Specifically, it needs to earn sufficient net cashflows to support the AER's benchmark credit rating and provide the AER's benchmark return on capital. It also needs to do this with the same relative risk profile as afforded to it under the broader business. This will give investors the confidence they require to finance the Project.

Given the risks associated with this type of project, no business could be reasonably expected to pursue a project forecast to generate less than the return market investors would reasonably require.

[22] This cost saving comprises $237 million for adopting a variable ITC rather than a fixed price contract, $85 million for securing LLE through our PTT program, and $90 million from undertaking the Gugga integration works as part of VNI West Stage 1 activities.

The issue of sufficient cashflow arises under the current NER due to the unprecedented size and scale of Actionable ISP projects and the current interest rate environment. These factors mean the cost of financing large scale projects is substantially higher than allowed under the AER's 2022 Rate of Return Instrument (RORI). We have been working with the Clean Energy Finance Corporation (CEFC) to develop a concessional financing package via the Rewiring the Nation program and are pleased to confirm that we have some initial terms that will greatly assist Transgrid in making the significant financial commitment required to deliver this multi-billion-dollar nation-critical project.

Acknowledging that such funding is limited, together with the CEFC we have developed the following in our Application to minimise the funding required from the CEFC:

- approval from the AER for incremental revenue commensurate with the capital and operating costs of Humelink as proposed in this Application
- confirmation from the AER that the CESS regime will not apply in relation to Humelink, given critical differences in the scale and complexity of Humelink relative to the context in which CESS was designed to apply
- approval from the AER to establish a new asset class for biodiversity offsets to enable depreciation of these costs over the weighted average of the standard lives of all other depreciating assets
- approval from the AER to adopt depreciable asset classes as incurred depreciation.

The NER already allows the AER to depreciate transmission assets on an as incurred basis, including for ISP projects. The NER outlines the depreciation framework the AER must apply to distribution and transmission assets and does not specifically provide for or prevent depreciation to be recovered from assets on an as incurred basis.

The importance of investors being able to earn the regulated rate of return on these very large projects, and being able to attract the required debt and equity capital is critical to achieving Australia's net zero vision. The regulated return is calculated assuming a benchmark regulated entity and a defined credit rating. The current CEFC commitment is an extremely helpful step, however still falls somewhat short of providing a complete solution, with financeability remaining a very real challenge to ensure these critical projects are delivered in a timely manner.

We acknowledge the complexities arising from current macro-economic challenges,and see this reflected in the Government's acknowledgement of the need for further regulatory reform to help deliver the clean energy transition as well as recent draft rule changes aimed at a sustainable solution for financeability. To this end, we will continue in good faith to negotiate with the CEFC and the AER to resolve appropriate solutions which will enable these projects to be financed and delivered.

We acknowledge the complexities arising from current macro-economic challenges,and see this reflected in the Government's acknowledgement of the need for further regulatory reform to help deliver the clean energy transition as well as recent draft rule changes aimed at a sustainable solution for financeability. To this end, we will continue in good faith to negotiate with the CEFC and the AER to resolve appropriate solutions which will enable these projects to be financed and delivered.

We consider that a clear, objective, predictable and quantitative process to assessing the financeability of major transmission projects such as VNI West and for addressing any financeability concerns identified, is required to give investors the confidence to commit to such projects. We therefore welcome the AEMC's recent draft determination which seeks to resolve the financeability issues through a prescriptive approach that provides investor confidence.

In response to Transgrid's draft CPA-2, the AER has asked Transgrid to explain its reasons for proposing 'as incurred' depreciation, rather than 'as commissioned' which is the standard approach for transmission regulation. Please refer to appendix A.4a of this document for our detailed response.

500kV tower

1 Introduction

Transgrid

1. Introduction

1.1. Application and timing

We are pleased to provide our Stage 2 Application for Humelink. This is the Principal Application document, which sets out our proposed expenditure, the associated incremental revenue requirements and the indicative consumer bill impacts for Stage 2 delivery activities.

We are committed to meeting the delivery date for Humelink of July 2026 as determined in AEMO's 2022 ISP[23]. In its recent 2023 ESOO, AEMO highlighted the continuing importance of delivering Humelink and other actionable transmission projects in the 2022 ISP on time if reliability risks are to be avoided.[24] Delivering Humelink by July 2026 will ensure that its benefits arrive as soon as possible at the lowest sustainable cost to consumers.

As evidence of our strong commitment to delivering this project, we have worked with our stakeholders to publish our draft Stage 2 Application on the 8 December 2023. Our aim was to allow early stakeholder feedback and sufficient time for the AER to make its Determination on our Stage 2 Application by 29 March 2023 and help meet the 2022 ISP time frames.

The AER's approval of our prudent and efficient expenditure forecasts, and the resultant changes in our revenues and prices as set out in this Principal Application document, is a pre-condition for executing the NTP-2 with our D&C contractors for the Stage 2 activities. Our contractual arrangements with D&C contractors require us to execute the contract by July 2024. We will incur significant penalties under the contract for every day the agreement is delayed beyond this date. Receiving the AER's Decision by 29 March 2024 is the latest possible date to enable us to finalise matters, including funding arrangements, to meet the July 2024 contract execution timeframe. This contractual arrangement reflects the timing we have imposed on our D&C contractors to deliver the Project to meet the July 2026 delivery date.

We therefore require the AER's Determination on our final Stage 2 Application by 29 March 2024 to avoid incurring delay penalties under the D&C contract. Such delays would increase the delivery costs of Humelink, which would be passed on to consumers.

The costs in this Application reflect the Stage 2 activities associated with delivering Humelink, which involves constructing the new 500kV transmission line that links the Greater Sydney load centre with the Snowy Mountains Hydroelectric Scheme and PEC in southwest NSW.

1.2. Our Stage 2 Application is informed by our Stage 1 early works

Our Stage 2 forecast expenditure, which reflects the bulk of the Project's costs, is informed by the outcomes of our Stage 1 activities, which we have been progressing in line with the AER's Decisions on our Stage 1 (Part 1) and (Part 2) Applications. In particular, the AER approved:

[23] This document refers to AEMO's 2022 ISP, as it is the most recently completed ISP in accordance with the NER. It should be noted that the Draft 2024 ISP, published on 15 December 2023, confirms AEMO's 2022 ISP conclusions in relation to VNI West, including its proposed timings.

[24] AEMO, 2023 ESOO, August 2023, p. 11, p. 96-99. AEMO's analysis takes into account a delayed commissioning date for Snowy 2.0 of December 2029.

- $380.83 million in its August 2022 Final Decision on our Stage 1 (Part 1) Application,[25] which is enabling us to undertake a range of Stage 1 activities including project design, stakeholder engagement, land-use planning and approvals and acquisition and project management,[26] and
- $227.9 million in its August 2023 Final Decision on our Stage 1 (Part 2) Application.[27] This enabled us to procure LLE for transformers, reactors, conductors and steel towers through our PTT program, which enables us to accelerate the delivery of transmission infrastructure and reduce costs through economies of scale and scope.

We expect to complete our Stage 1 activities by July 2024. We have been keeping the AER and the TAC updated with our progress on, key learnings from and outcomes of these activities. Our Stage 1 activities have allowed us to invest time in the planning and design phase, continue to consult and engage with stakeholders, identify and quantify project risks, and identify our D&C contractors through a competitive two-stage ECI process.

As a result, our Stage 2 capex forecast is in line with an AACE class 2 to 3 cost estimate, providing the cost certainty that consumers will not be over- or under-investing in the Project.

1.3. Pre-lodgement stakeholder engagement and how to provide feedback

We published our draft Stage 2 Application 8 December 2023, where we conducted significant stakeholder engagement. Feedback from the community, landowners and the TAC, supported by deep dives with the AER and TAC, has helped inform our approach to this significant investment on behalf of consumers.

By publishing our draft, we aim to receive early feedback on this Application which may assist to expedite the AER's determination process. A timely decision from the AER is crucial to provide the revenue certainty needed for us to proceed with project delivery and to avoid delay costs under the D&C contracts with our delivery partners.

The AER's formal decision-making process will begin once it receives our final Stage 2 Application in December 2023. The Stage 2 Application will be placed on formal exhibition for the full statutory period of four weeks.

1.4. This Principal Application

This Principal Application relates to Stage 2 activities required to deliver Humelink by the July 2026 delivery date in AEMO's 2022 ISP. Stage 2 has been carefully scoped and resourced through our Stage 1 activities and our PTT program to ensure it is efficient and prudent and will deliver the Project at the lowest sustainable cost. In particular, through our Stage 1 activities:

- We have determined the prudent and efficient Stage 2 capex forecast in this Principal Application by refining the Project scope through further detailed design activities, route selection and a competitive two-stage ECI process
- Secured cost savings for consumers from our PTT program, which integrates the delivery of Humelink, PEC and VNI West to accelerate transmission infrastructure construction and reduce costs through

[25] AER, Humelink Early Works Contingent Project Determination (Humelink CPA-1 Part 1 Decision), August 2022
[26] The $380.83 million ($Real 2022/23) is equivalent to $321.87 million ($Real 2017/18).
[27] AER, Humelink Early Works Stage 1 (Part 2) Contingent Project Determination (Humelink CPA-1 Part 2), August 2023

economies of scale and scope. The cost saving for consumers from the PTT program in respect of LLE for Humelink is estimated to be $85 million.

- We have identified, explored and managed risk to mitigate and/or diversify the Project's risks so that the residual risk costs included in this Stage 2 Application are as low as possible.
- We have progressed activities on the critical path to ensure that construction can begin as soon as possible following the approval of our Stage 2 Application by the AER. These activities included selecting preferred delivery partners through the two-stage competitive ECI process, securing LLE, continuing to engage with our stakeholders, preparing the EIS and acquitting our biodiversity offsets liability to enable construction to start.
- We have secured cost savings for consumers from negotiating ITC D&C contracts with our delivery partners. An ITC D&C contract enables our delivery partners to offer a lower overall contract price than they otherwise would if they were forced to price in the risk costs though a fixed price D&C contract. The ITC D&C contract cost of $2,604.13 million included in this Stage 2 Application reflects a variable contract cost. However, if the D&C contractors are required to offer a fixed price contract, then the D&C contract cost is expected to increase by between $237 million to $461 million or 8 to 15 per cent (inclusive of owners' contingency reflected in this Application). The variable contract cost in this Revenue Proposal therefore provides consumers with a higher probability of a lower price outcome.

The cost saving for consumers achieved across our Stage 1 and 2 Applications for Humelink is $322 million of the total $500 million we have achieved through our PTT program. This reflects a conservative estimate of the savings based on the lower bound of the expected costs savings from adopting a D&C rather than a fixed price contract.

In addition, we have estimated further cost savings of $787 million from the investment synergies, which arise from concurrent investment in Humelink, PEC and VNI West. In particular, our VNI West Stage 1 Application includes the:

- PEC enhancement works, which are expected to achieve cost savings of approximately $697 million
- Gugaa integration works, which are expected to achieve cost savings of approximately $90 million.

We are seeking the AER's approval for the costs of direct and indirect Stage 2 activities:

- design and construction work, including for substations, transmission lines and access tracks
- delivering, storing and installing the LLE, which we secured in Stage 1
- other construction costs to mitigate and manage emerging risks during Project delivery
- biodiversity offset costs for the impact of building Humelink on plant and/or animal species (i.e., to offset our biodiversity liability under the NSW Biodiversity Conservation Act 2016)
- compensation to public and private land holders for acquiring easements over their land as well as costs for stamp duty, the value of timber taken, substitute forest land, disturbance costs, construction camps and lay-down areas and overhead costs
- internal labour resources for undertaking project and commercial management, project control, design and construction, and corporate support (legal, regulatory, health safety and environment (HSE) and insurance), environmental and property, CSE and social licence activities
- indirect activities for a wide range of professional and consulting services related to project and commercial management, project control, design and construction, corporate support (legal, regulatory, HSE and insurance), major project initiatives and CSE.

Section 3.2 of this Principal Application explains the relevant trigger events for Stage 2 (delivery) and provides a status update.

1.5. AEMO feedback loop confirmation

Positive written feedback loop confirmation from AEMO is required to satisfy the trigger events for actionable ISP projects. These trigger events must be satisfied before we can submit our formal Stage 2 Application to the AER.

The purpose of the feedback is to assess whether, at the revised cost in this Stage 2 Application, Humelink remains on the ODP.

We have received our feedback loop confirmation from AEMO, prior to this submission. AEMO has confirmed the project continues to optimise benefits to consumers and it remains on the Optimal Development Path (ODP). AEMO's Draft 2024 Integrated System Plan takes into account the updated costs of Humelink (as reflected in this Application) and all other major projects as well as the latest expected timing of wider developments in the NEM, including the revised delivery date for Snowy 2.

1.6. Compliance with the NER

This Stage 2 Application and its supporting documents establish the matters in clause 6A.8.2(f) of the NER, being that the:

- forecast of the total capex for the Project meets the threshold as referred to in clause 6A.8.1(b)(2)(iii)
- amounts of forecast capex and incremental opex reasonably reflect the capex criteria and the opex criteria, taking into account the capex factors and the opex factors respectively, in the context of the contingent project
- estimates of incremental revenue are reasonable
- dates are reasonable.

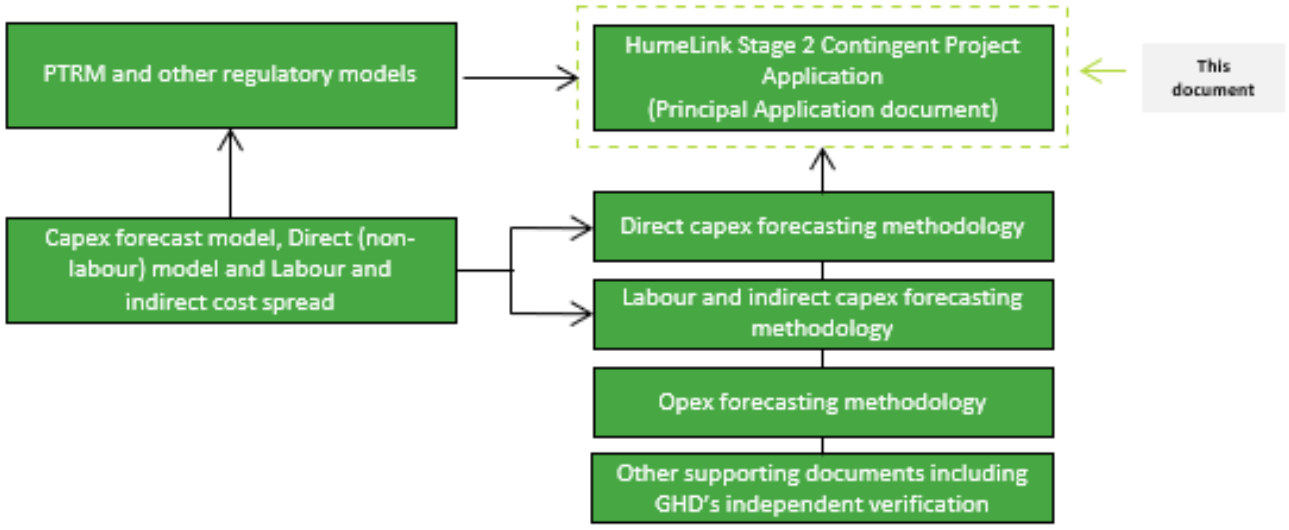
1.7. Structure of this document

- Section 2 describes the Project
- Section 3 sets out the regulatory requirements for this Stage 2 Application
- Section 4 sets out forecast capex for the Stage 2, including our forecasting methodology
- Section 5 sets out forecast opex for the Stage 2, including our forecasting methodology
- Section 6 sets out forecast incremental revenue for the Stage 2 activities and the indicative customer bill impact
- Section 7 sets out how the NER and AER Guidance note requirements have been addressed
- Appendix A is our Revenue Application.

1.8. Structure of the Stage 2 Application for Humelink

Our Stage 2 Application comes with a number of attachments and models (illustrated in Figure 1-1 and detailed in Table 1) as well as other supporting documents. This Principal Application document references these attachments, models and other supporting documents and should be read in conjunction with them.

Figure 1-1: Stage 2 Application document structure for Humelink



The attachments and models are summarised in Table 1.

Table 1: Documents and models comprising this Application (excluding our other supporting documents)

Document /model number	Name	Content/purpose
A.1	Humelink - Stage 2 Contingent Project Application - Principal Application document	Seeks the AER's approval to amend the forecast capex allowance, revenue requirements and MAR in the AER's 2023-28 Revenue Determination based on Stage 2 costs.
A.2	Direct capex forecasting methodology	Explains and justifies our Stage 2 direct capex, including information about: • the nature and scope of Stage 2 activities • the methodologies we have used to determine our forecast capex • how we verified our forecast capex.
A.3	Labour and indirect forecasting methodology	Explains the bottom-up forecast of labour and indirect support costs required to deliver the Project. These include commercial management, project control, design and construction, corporate support (legal, regulatory, HSE and insurance), environmental and property and CSE.
A.4	Opex Forecasting Methodology	Explains key steps to develop and validate our opex forecast.
A.5	GHD Advisory Independent capex Review	An independent assessment of the scope, procurement process and forecast capex for Stage 2 (delivery).

Document /model number	Name	Content/purpose
Capex and opex models		
A.6	Capex forecast model	This model forecasts capex by regulatory asset class and year to 2026/27, sourcing inputs from the Direct Non-Labour Cost Model and the Labour and Overheads Cost Model and applying labour cost escalation and inflation where appropriate.
A.7	Direct non-labour model	This model builds up the delivery partner, LLE, procurement, easement acquisition and biodiversity offset costs that input to the Capex Forecast Model.
A.8	Labour and overhead costs spreadsheet	This model builds up the labour and indirect costs (including commercial management, project control, design and construction, corporate support (legal, regulatory, HSE and insurance), environmental and property and CSE) that inputs to the Capex Forecast Model.
A.9	Opex forecast model	This model forecasts opex by expenditure category to 2027/28, covering operating and maintenance, property, easement establishment, strategic benefit payment, and insurance costs.
PTRM and other regulatory models		
A.1A	Humelink Stage 2 2023-28 Post Tax revenue Model (PTRM)	Demonstrates the calculations of our incremental revenue requirements and MAR for the 2023-28 regulatory period, based on Stage 2 costs.

2. Project Overview

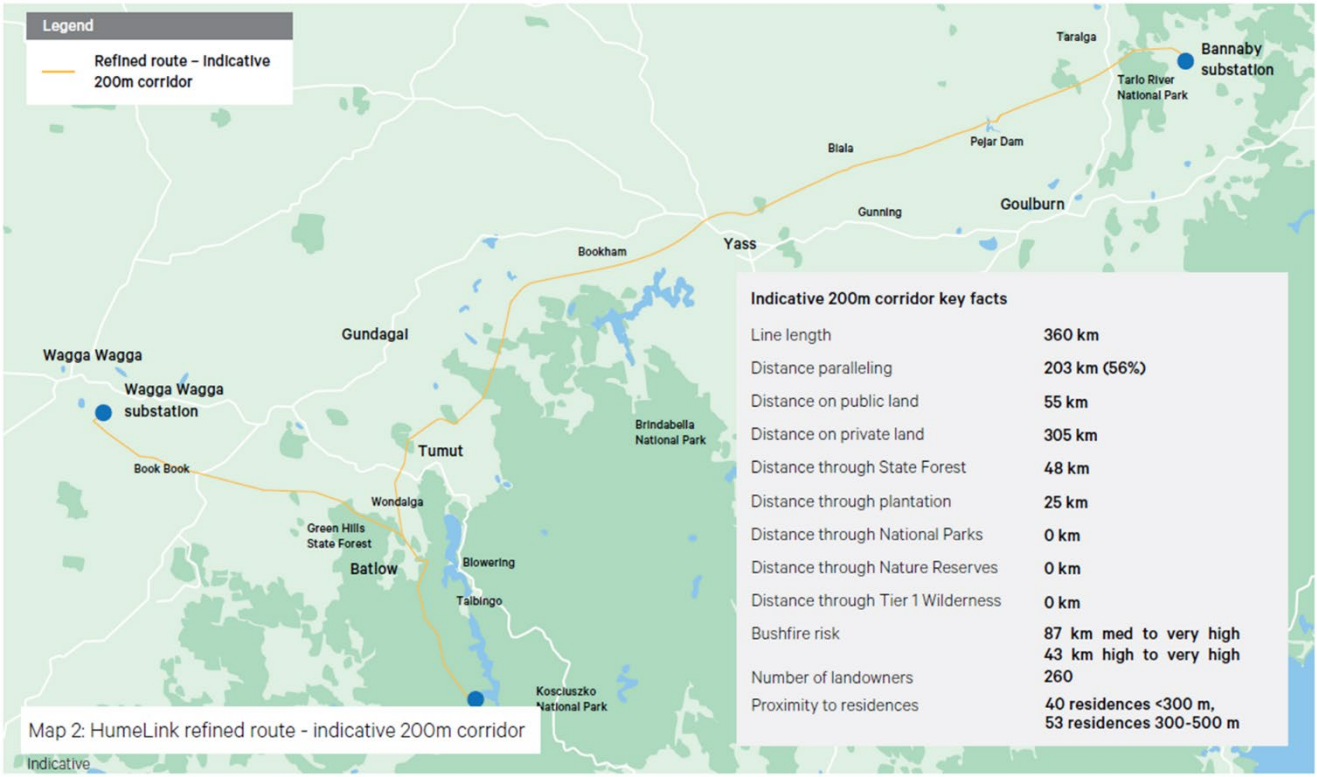
2.1. A project of national significance

Humelink will be our largest capital project since constructing our existing network. Humelink involves around 365km of new 500 kV transmission lines in an electrical 'loop' that links the Greater Sydney load centre with the Snowy Mountains Hydroelectric Scheme and Project EnergyConnect in southwest NSW.[28]

Humelink is a key component of the energy market transition. It will create additional capacity for new generation – primarily renewable wind and solar generation – in southern NSW, increase the transfer capacity between Victoria and NSW and improve wholesale market competition, reducing customers' electricity bills.

Figure 2-1 is a map of the proposed 500kV double circuit transmission line routes.

Figure 2-1: Map of proposed transmission line routes



In March 2018, the NSW Government declared Humelink as Critical State Significant Infrastructure for NSW.[29] The Australian Government has also identified Humelink in Australia's Long Term Emissions Reduction Plan, which finds that Humelink is needed to strengthen the network in southern NSW and transport renewable energy to customers from new projects, including Snowy 2.0.[30]

In June 2022, AEMO published its Final 2022 ISP, which reconfirmed the need for Humelink given its key strategic value for the NEM and the benefits it will provide to consumers.[31] AEMO found that Humelink will

[28] AEMO, 2022 ISP, June 2022, p. 68
[29] Section 5.3 of the Environmental Planning and Assessment Act 1979 (NSW) on 9 March 2018
[30] Australian Government, Australia's long-term emissions reduction plan – a whole-of-economy plan to achieve net zero emissions by 2050, 2021
[31] Humelink has been identified as a key project in AEMO's ISPs since 2018. AEMO, 2022 ISP, June 2022, p. 13

be needed if a third NSW coal-fired power station (including Liddell) retired, noting that, at that time, the closure of two of NSW power stations (Liddell and Eraring) had already been announced as likely to occur by 2025. If these closures were to occur, AEMO commented that Humelink will be needed to maintain power system reliability in NSW, avoiding the need to invest in long-duration storage.[32] The 2022 ISP has assessed that:

> *Humelink is the only actionable ISP project that could be delivered in the critical period that directly addresses this risk.*

In April 2023, the Liddell power station closed. Consistent with the assumptions in AEMO's 2022 ISP, the Eraring power station is still scheduled to close in 2025, although the NSW government recently announced that it will open discussions with Origin to clarify its plans for Eraring.[33] Bayswater power station is scheduled to be retired between 2030 and 2033.[34]

In February 2023, AEMO published an update to its 2022 ESOO. This document stated that Humelink has 'the potential to significantly reduce the projected reliability risk' for NSW, even with the NSW Electricity Infrastructure Roadmap developments, including the Waratah Super Battery.[35]

In August 2023, AEMO's 2023 ESOO highlighted the continuing importance of delivering Humelink and other actionable transmission projects in the 2022 ISP on time if reliability risks are to be avoided.[36] AEMO's analysis took into account a delayed commissioning date for Snowy 2.0 of December 2029.

2.2. Material change in circumstances assessment

We undertook the RIT-T for Humelink over the course of 2019 to 2021. The PACR identified Humelink (Option 3C) as the preferred option for reinforcing the southern shared network.[37]

Through our early works, we refined our estimate of the cost of delivering Humelink. The estimated total cost to deliver Humelink based on our Stage 1 (early works) and Stage 2 (delivery) Applications is now $4.92 billion, which is around 29 per cent higher than the cost estimate of $3.82 billion in the PACR. This cost increase is in line with the overall increase of around 30 per cent for energy infrastructure projects across all elements of the supply chain over the last two years.[38]

Humelink is expected to provide significant value to the NEM by acting as the 'link' between PEC, VNI West and the Sydney Ring. This is recognised by the Federal Government, which has supported Humelink through the Rewiring the Nation Fund, acknowledging the Project's key role in strengthening and reconfiguring the NEM to ensure continued reliability through the energy transition.

AEMO's 2022 ISP assessed the net market benefits of the Project at that time to be $1.3 billion, highlighting it as the only project that could be delivered in the critical period to directly address the risk of limited dispatchable capacity.

Since the 2022 ISP, Humelink has increasingly been recognised as an important investment that can deliver the following benefits:

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32 AEMO, 2022 ISP, June 2022, pp 64-65, 82.
33 Office of Energy and Climate Change, *Electricity Supply and Reliability Check Up, NSW Government response*, September 2023, p.6.
34 Australian Financial Review (AFR), AGL bows to shareholders and hastens coal exit, 29 September 2022
35 AEMO, Update to 2022 Electricity Statement of Opportunities (ESOO), February 2023, p.12
36 AEMO, *2023 Electricity Statement of Opportunities*, August 2023, p. 11, p. 96-99.
37 Transgrid, Reinforcing the NSW Southern Shared Network to increase transfer capacity to demand centers (Humelink), 29 July 2021 and the PACR Addendum, 17 December 2021
38 Infrastructure Australia, 2022 Infrastructure Market Capacity Report, December 2022

- provide resilience to early coal closures
- support Government's emissions reduction targets by supporting renewables
- support electrification of the economy
- ensure reliable and secure supply in light of rising demand.

AEMO's recently published draft 2024 ISP is expected to take into account the updated costs of the Project as well as the updated costs and timings of other major developments in the NEM more widely, and the revised delivery timing for Snowy 2.0. We expect the analysis in the draft 2024 ISP to confirm that the Project continues to provide net benefits to the market and remains a key component of the ISP Optimal Development Path (ODP).

Even so, given the increase in estimated costs of the Project since the PACR, we are currently updating the RIT-T NPV analysis to confirm that Option 3C remains the top ranked option. This would meet the Material Change in Circumstances (MCC) requirements as contemplated under NER 5.16A(n) v202. This analysis will use the latest available information from AEMO and reflect updated cost estimates for all credible options assessed in the PACR addendum. We intend to publish this analysis as soon as it is completed.

Yaven Creek

3

Regulatory requirements

Transgrid

3. Regulatory requirements

The regulatory requirements for actionable ISP projects are contained in:

- clause 6A.8.2 of the NER
- the AER's Process Guideline for Contingent Project Applications[39]
- the AER's Guidance Note for Regulation of actionable ISP projects.[40]

The key requirements are outlined below. Section 6 of this Application shows how we have satisfied the regulatory requirements.

3.1. Regulatory requirements

Clause 6A.8.2 of the NER sets out the requirements for making an application to amend a revenue determination to include a contingent project that is an actionable ISP project. This Application is made in accordance with the requirements of clause 6A.8.2(a), (a1) and (b) of the NER, being:

- during the 2018 to 2023 regulatory period
- to amend the revenue determination that applies to us in respect of a contingent project included in AEMO's ISP as an actionable ISP project[41]
- within the specified time limits.[42]

This Application includes the information specified in clause 6A.8.2(b) of the NER:

(1) an explanation that substantiates the occurrence of the trigger event

(2) a forecast of the total capital expenditure for the contingent project

(3) a forecast of the capital and incremental operating expenditure, for each remaining regulatory year which the Transmission Network Service Provider considers is reasonably required for the purpose of undertaking the contingent project

(4) how the forecast of the total capital expenditure for the contingent project meets the threshold as referred to in clause 6A.8.1(b)(2)(iii)

(5) the intended date for commencing the contingent project (which must be during the regulatory control period)

(6) the anticipated date for completing the contingent project (which may be after the end of the regulatory control period), and

(7) an estimate of the incremental revenue which the Transmission Network Service Provider considers is likely to be required to be earned in each remaining regulatory year of the regulatory control period as a result of the contingent project being undertaken as described in subparagraph (3), which must be calculated:

(i) in accordance with the requirements of the post-tax revenue model referred to in clause 6A.5.2

39 AER, Process Guideline for Contingent Project Applications under the NER, September 2007.
40 AER, Guidance Note for Regulation of actionable ISP projects, March 2021.
41 NER clause 6A.8.2(a)
42 NER clause 6A.8.2(a)

(ii) in accordance with the requirements of the roll forward model referred to in clause 6A.6.1(b)

(iii) using the allowed rate of return for that Transmission Network Service Provider for the regulatory control period as determined in accordance with clause 6A.6.2

(iv) in accordance with the requirements for depreciation referred to in clause 6A.6.3, and

(v) on the basis of the capital expenditure and incremental operating expenditure referred to in subparagraph (b)(3).

Clause 6A.8.2(f)(2) of the NER requires the AER to accept the relevant amounts in this Final Application if it is satisfied that:

> *the amounts of forecast capital expenditure and incremental operating expenditure reasonably reflect the capital expenditure criteria and operating expenditure criteria, taking into account the capital expenditure factors and operating expenditure factors, in the context of the contingent project.*

In addressing these requirements, we have had regard for the AER's:

- Guidance Note for Regulation of actionable ISP projects
- Process Guideline for Contingent Project Applications.[43]

We have met regularly with the AER in preparing this Application. The AER's feedback has informed the content and structure of this Stage 2 Application and its supporting documentation.

3.2. Trigger events

Under the NER, we can submit a CPA for Stage 2 to the AER if we satisfy the trigger events for actionable ISP projects in clause 5.16A.5.[44] Table 2 shows the trigger events for lodging our Stage 2 Application, and how we expect to meet them.

Table 2: Occurrence of the trigger events

Trigger event	Status
Publish the RIT-T Project Assessment Conclusions Report (PACR), which must identify a preferred option that passes the RIT-T.	**Complete** On 29 July 2021, we published a PACR, which identified the preferred option to be a new 500 kV double circuit transmission lines in an electrical 'loop' between Maragle, Wagga Wagga and Bannaby (Option 3C). We subsequently published an addendum to the PACR (December 2021) in response to the AER's dispute determination. The addendum extended the analysis but confirmed that Option 3C remained the preferred option. We are currently updating the PACR NPV analysis to confirm that the increase in costs of the Project is not a Material Change in Circumstance. We intend to publish this analysis separate to this

[43] AER, *Process Guideline for Contingent Project Applications under the National Electricity Rules*, September 2007 available at: https://www.aer.gov.au/system/files/ac06907-Final%20guideline.pdf.

[44] Rule 5.16A.5 Actionable ISP project trigger event.

Trigger event	Status
	Stage 2 Application, ahead of our final Stage 2 application.
Obtain written feedback loop confirmation from AEMO that: • the preferred option addresses the identified need and is on the optimal development path (ODP) in the most recent ISP, and • at the forecast cost, the Project remains part of the ODP	**Complete** AEMO's feedback loop response confirms that the Project remains on the ODP at the cost in this CPA2 and taking into account current market circumstances. AEMO has advised that it used its 2023 IASR and its draft 2024 ISP, published 15 December 2023 in its feedback loop assessment.
There are no outstanding RIT-T PACR disputes - either no disputes were raised or if a dispute has been raised, it has been rejected by the AER or the PACR has been amended accordingly.	**Complete** On 17 December 2021, we published an addendum to the earlier PACR, in response to the AER's determination of a dispute by Wulnelli Pty Ltd. The PACR addendum extended the analysis to an additional option (Option 1C-new – a full double circuit option between Maragle and Bannab). The analysis confirmed that the preferred option continued to be Option 3C, a new 500 kV double circuit transmission lines in an electrical 'loop' between Maragle, Wagga Wagga and Bannaby.
The cost in the Stage 2 Application must be no more than the cost included in AEMO's written feedback loop confirmation.	**Completed** The total capex (actual and forecast) in this Stage 2 Application is consistent with the capex in our feedback loop request to AEMO. AEMO has advised in our feedback loop confirmation that, at the delivery cost of $4.88[45] billion in this Stage 2 Application, Humelink remains part of the ODP.

3.3. Project timing

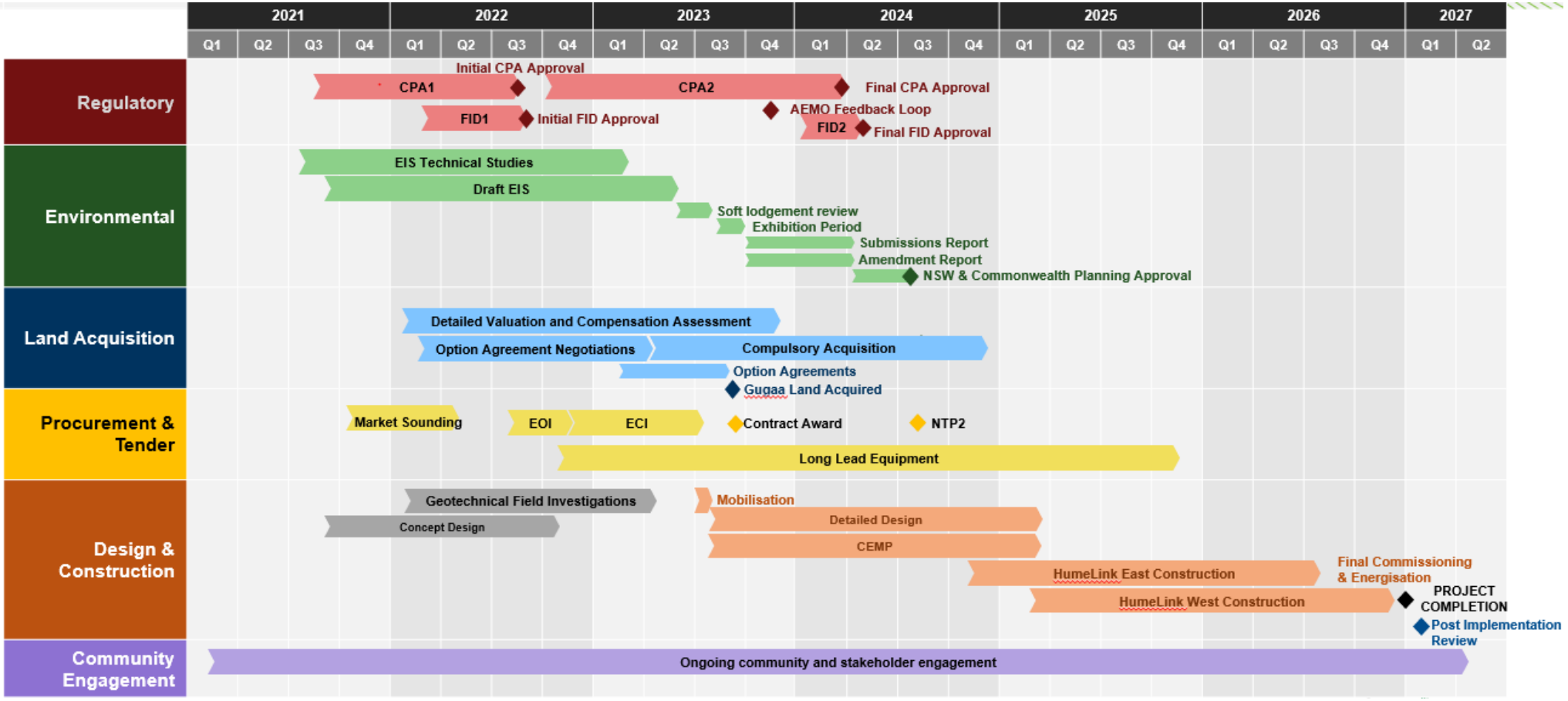
For the purpose of this Stage 2 Application, the applicable dates for starting and completing Stage 2 activities, pending timely approval, are:

- date for commencement – June 2024
- anticipated date for completion – July 2026.

The proposed timing in this Application reflects a realistic assessment of the required dates for the Stage 2 activities to meet the target delivery date of July 2026. The Stage 2 completion date is consistent with the timeframes in AEMO's 2022 ISP.

[45] Excludes equity raising costs

Figure 3-1: HumeLink High Level Delivery Schedule



3.4. Customer and other stakeholder engagement

Our engagement approach is based on genuine consultation through meaningful and transparent dialogue. Underpinned by our Transgrid Engagement Policy, we are committed to understanding the priorities and preferences of our customers and other stakeholders, keeping them informed and reflecting their feedback to the extent possible in the design of the Project.

The voices of the community and consumers are at the centre of our decision making:

- We recognise the vital role of landowners and the community in helping us to plan and deliver our projects and network operations.
- We work with communities in a meaningful, accountable, responsive and equitable way through effective and inclusive practices.
- We are dedicated to continuously improving our engagement to support our decision making and deliver community benefits.
- We listen, seek to understand and act on what matters most to communities, working with them to identify opportunities that benefit them, while striving to minimise the impacts of our operations.

Our aim is to build trusted and beneficial relationships. We strive to build positive and lasting relationships with our local communities and create lasting benefits to our customers, community and the environment as part of our commitment to building a sustainable future.

To maintain our social licence[47], we recognise the community's diverse engagement and information needs and have developed a robust plan of engagement that is inclusive, collaborative and clearly demonstrates our commitment to working with the community and stakeholders through open, transparent dialogue.

Our Stage 1 (early works) engagement objectives included, to:

- provide information on the Project's timeframes, milestones and engagement processes so that stakeholders have the maximum opportunity to be involved in the Project
- ensure that the community understands the benefits and costs of the Project
- support the Project in securing access to and acquiring easements over land.

Our total capex forecast for CSE of $65.13 million across all stages of the Project, comprises:

- Stage 1 forecast capex of $27.25 million
- Stage 2 forecast capex of $37.88 million (reflected in this Stage 2 Application).

This is close to the benchmark range of 1.0-1.3 per cent for Major Infrastructure Projects as identified in prominent research by the Australian National University (ANU) Institute for Infrastructure in Society (I2S).

The CSE investment proposed for Stage 2 of Humelink also responds directly to calls for improved CSE performance from directly impacted Humelink communities and our key stakeholders, including the Commonwealth[48]) and NSW Governments, AEMO, the AEIC and the TAC.

Cost of project delays

[47] Transgrid Social Licence Framework

[48] As evidenced by the Rule Change request from Hon Chris Bowen, 11 April 2023. See: Enhancing community engagement in transmission building | AEMC .

Stakeholder and community concerns can inevitably lead to project delays, which in turn increase costs. This is supported by research from the Crawford School of Public Policy which shows that for any increased infrastructure spend to be successful communities should be at the forefront of proponents' planning and delivery strategies. At the same time, Infrastructure professionals identified stakeholder and community pressure as the equal most important factor determining project delays within the Next Generation Engagement Program's 2019 State of Infrastructure and Engagement Survey. [49]

Any delay has a compound negative impact on consumer energy costs, slowing access to cheaper wholesale energy. Delays also increase uncertainty in the electricity market, potentially discouraging commitment of new generation projects in the south and southwest of the State. The cost of these delays has been estimated at $846,000 per day.[50]

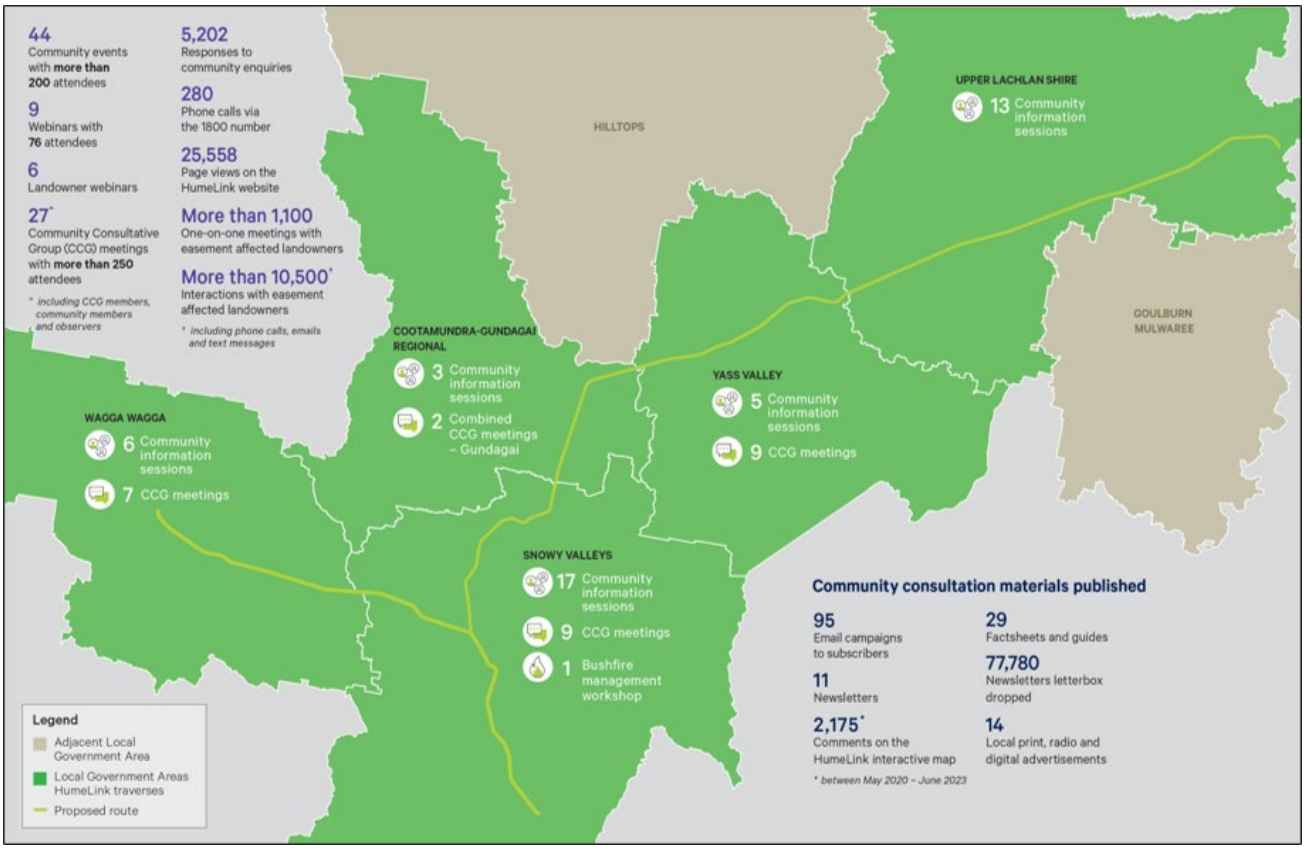
To address issues at the heart of these delays, Transgrid has transformed its CSE activities, including implementing all recommendations from the Independent Review undertaken by Dr Rod Stowe. These actions have been audited and the resulting improvements acknowledged by the Australian Energy Infrastructure Commissioner, Andrew Dyer and the Transgrid Advisory Committee. Transgrid's current approach to CSE complies with and even goes beyond the requirements recommended in the current rule change proposal on Community Engagement proposed by the Federal Minister for Energy and Climate Change, the Hon Chris Bowen.[51]

[49] Crawford School of Public Policy, Delivering Australia's $600 billion infrastructure need? Communities must be front-and-centre, 21 August 2019

[50] Transgrid, Risk and Contingency Report, 21 December 2023[51] AEMC, Rule Determination, National Electricity Amendment (enhancing community engagement in transmission building) Rule, 10 August 2023

[51] AEMC, Rule Determination, National Electricity Amendment (enhancing community engagement in transmission building) Rule, 10 August 2023

Our engagement activities



Since March 2021, we have hosted more than 50 in-person and online community information events, held and attended more than 25 independently chaired Community Consultative Group meetings, held more than 1,100 one-on-one meetings with easement-affected landowners and shared over 75,000 project newsletters across the regions impacted by Humelink.

During the EIS exhibition period (30 August 2023 to 10 October 2023), we received 154 EIS submissions which we are currently assessing. In the lead up to the public exhibition of the EIS we briefed key stakeholders including councils, government agencies and First Nations stakeholders and members of state and Federal parliament.

During EIS public exhibition period we provided communities and stakeholders with a suite of channels and materials to find out more about the Project and the EIS. These include:

- notification to easement-affected landowners (hard copy notification delivered to landowners in line with S.181 EP&A Regulation)
- 20 in-person community information sessions in regional towns across the Project corridor
- 20 stakeholder group briefing presentations
- hard copies of the EIS on display at public libraries along the Project corridor
- a suite of communications materials, available on the Project website and during in-person sessions, to help people navigate the different EIS sections
- Digital EIS – a user-friendly interactive digital platform to present key EIS findings hosted on the Project website
- five community information webinars

- multiple project newsletters
- phone and email access for enquiries.

We captured and shared information and issues discussed at the engagement events. This information was used to inform our design development, route selection and ongoing engagement. The reports are published on the Project website for those not able to attend an engagement event, as a record of engagement and to ensure transparency.

Table 3 sets out the feedback we received and how we have responded or are responding.

Table 3: Issues, concerns and opportunities identified through consultation and engagement to date

Area of Interest / who	Issues / Concerns / Opportunities	Actions in response
Route options • Easement impacted landowners and neighbours • Action groups • Local members • Local government • Local Aboriginal Land Council (LALCs) • Media • Government	• Route selection process appears unclear and inconsistent • Opportunities for stakeholder input on route selection is unclear • More regular updates for community groups, individual landowners are needed	• Continue to seek input from landowners on property specific alignment • Undertake targeted consultation sessions with communities to seek their input • Provide visual aids and maps allowing input into concept designs where possible • Provide detailed information on the route alignment planning process. • Explain how feedback on alternative route options has been considered • Result: 17 out of 22 route refinements carried out in 2023; the option proposed by the landowner was accepted by the Project.
City vs. Country • Easement impacted landowners and neighbours • Action groups • Community • Community Consultative Groups (CCGs) • Media • Government	• Impact of the Project borne by landowners whereas benefits accrue to the broader “city” community • Lack of engagement with regional communities on their preference for undergrounding	• Provide project information via multiple channels • Embed Place Managers to regularly check in with their communities • Establish dedicated project website with detailed project information including on project benefits and social legacy program • Provide FAQs, regular project briefings and newsletters with detailed project information to address specific areas of concern • Provide access to independent specialist to provide information on technical matters. • Established Undergrounding Feasibility Steering Committee to investigate option with the community.

Area of Interest / who	Issues / Concerns / Opportunities	Actions in response
Consultation process not delivering community-preferred outcomes. • Easement impacted landowners and neighbours • Action groups • Local members • Media • Government	• Engagement not consistent with best practice • Implement use of hybrid consultation opportunities to minimise consultation fatigue • CCGs, community groups and Councils should have greater input in designing our engagement approach • Transgrid should advocate for the community preferred outcomes	• Work with local champions and CCGs to identify preferred consultation methods and opportunities • Offer a broader range of engagement methods to cater for different stakeholder interest and availability (i.e., website, phone, email, letter, interactive map, face-to-face, meetings) • Provide information on how to contact the engagement team • Record feedback received • Provide regular updates on how feedback received has been addressed • Publish regular media updates on digital channels aligned to planning milestones
Land use impacts • Easement impacted landowners and neighbours • Action groups • CCGs • Represented groups • Local members • Local government • LALCs • Government	Key concerns raised include the Project's impact on: • cultural heritage • biosecurity • bushfire risk • industrialisation of the local region • land clearing and degradation • agricultural land use activities (e.g., disruption of aerial spraying, use of access tracks and vehicle access) Social legacy program should be co-designed with the community so that it addresses their issues.[52]	• Keep the community updated on our investigations into issues of concern • Provide information on our environmental assessment and approval process, and how the community / stakeholders can provide input and escalate concerns. • Embed Place Managers to regularly check in with their communities • Provide information on project benefits • Collaborate with representative groups on solutions • Refine messaging about project impacts so it is clear and accessible • Advocate on behalf of the landowner where appropriate
Public v's private land use • Easement impacted landowners and neighbours • Action groups • CCGs • Represented groups • Local members • Local government • LALCs	Further discussion on the pros and cons of using public or private land is needed regarding: • biosecurity • bushfire risk • industrialisation of the local region • land clearing and degradation • agricultural land use activities (e.g., disruption of aerial spraying, use of access tracks and vehicle access)	• Provide information on our environmental assessment and approval process, and how the community / stakeholders can provide input and escalate concerns. • Embed Place Managers to regularly check in with their communities • Provide information on project benefits • Collaborate with representative groups on solutions • Refine messaging on project impacts so it is clear and accessible

[52] These include bushfire, cultural heritage, regional development.

Area of Interest / who	Issues / Concerns / Opportunities	Actions in response
• Government		

Compensation
• Easement impacted landowners and neighbours
• Action groups
• Local members
	• Delays to identifying the corridor has prolonged landowner uncertainty
	• Opportunities for stakeholder input and feedback to the Minister on land and easement compensation is unclear
	• Compensation for land and easement acquisition is unfair and does not:
	  • compensate for visual impacts
	  • provide royalties or annualised payment
	  • provide equal compensation to landholders and renewable developers
		• Provide information on our environmental assessment and approval process, and how the community / stakeholders can provide input and escalate concerns.
		• Embed Place Managers to regularly check in with their communities
		• Provide information on project benefits
		• Collaborate with representative groups on solutions
		• Refine messaging on project impacts so it is clear and accessible
		• Advocacy on behalf of the landowner resulted in the implementation of the Strategic Benefits Payments.

Visual impact • Easement impacted landowners and neighbours • Action groups • Local members • Local government	Concerned about a range of visual impact issues including: • the height and material of tower design • the impact on their property value • the industrialisation of the local region • the proximity of towers to residential homes Provide opportunities for directly affected landowners to discuss options to mitigate impacts on a case-by-case basis.	• Provide information on our environmental assessment and approval process, and how the community / stakeholders can provide input and escalate concerns. • Embed Place Managers to regularly check in with their communities • Provide information on project benefits • Collaborate with representative groups on solutions • Refine messaging on project impacts so it is clear and accessible.

Tumut Lookout

4

Capex forecast

Transgrid

4. Capex forecast

This section describes:

- our Stage 2 capex forecast
- our procurement process and outcomes for the D&C works
- the basis for our capex forecasts by sub-category
- the independent verification and validation of our Stage 2 forecast capex
- why we consider the CESS should not apply to Humelink.

4.1. Our Stage 2 forecast capex

Humelink will be the single largest project that we have delivered and will form an integral part of the NEM once completed. It involves the design, construction and operation of approximately 365 kilometres of new high voltage transmission lines and connection to:

- a new Wagga Wagga substation
- upgraded infrastructure at Transgrid's Bannaby substation
- upgraded infrastructure at Transgrid's Maragle substation, which will be constructed as part of the Snowy 2.0 project
- augmentation of the existing substation at Wagga Wagga.

Our Stage 2 forecast capex, which reflects the bulk of the Project's costs, has been carefully scoped and resourced through our Stage 1 activities, which we have been progressing in line with the AER's Decisions on our Stage 1 (Part 1) and (Part 2) Applications. More than 61 per cent of our Stage 2 forecast capex is based on market prices obtained through competitive tender processes. We have also relied on pricing from suppliers and independent specialists. Our Stage 1 activities have resulted in a Stage 2 capex forecast in line with an AACE class 2 to 3 cost estimate, providing cost certainty that consumers will not be over- or under-investing in the Project.

This provides confidence to the AER, our customers and other stakeholders that the stage 2 forecast capex in this Application is prudent and efficient and will deliver the Project at the lowest sustainable cost for consumers. Our forecast capex for Humelink reflects $412 million of cost savings across Stage 1 and 2 of the Project, comprising:

- $85 million in savings for securing LLE through our PTT program (Stage 1 forecast capex)
- $237 million in savings from adopting a variable ITC D&C contract rather than a fixed price D&C contract to deliver the design and construction of substations and transmission lines, including access tracks (Stage 2 forecast capex)
- $90 million in savings for undertaking the Gugaa integration as part of VNI West Stage 1 activities.

The AER's approval of other construction costs included in this Stage 2 Application are critical to enable us to deliver Humelink on time and on budget, given:

- The operating environment is uncertain and challenging. The construction market is grappling with materials inflation, strained global supply chains, local labour market shortages, and unprecedented local demand for local civil construction and high voltage expertise. This is discussed in Section 4.2.1.2.

- Contractors are not able or willing to enter into fixed price D&C contracts. We have therefore adopted an ITC D&C contract model for the D&C component of delivery. This is discussed in Section 4.2.1.3.

Our total Humelink Stage 2 forecast capex is $4,279.14 million (Table 4), excluding equity raising costs.

Table 4: Stage 2 capex ($M, Real 2022/23, excluding equity raising costs)

Humelink	2023/24	2024/25	2025/26	2026/27	Total
Actual	-	-	-	-	-
Forecast	42.79	2,099.61	1,990.42	146.33	**4,279.14**
Total	**42.79**	**2,099.61**	**1,990.42**	**146.33**	**4,279.14**

Notes: 1. Including overheads, excluding equity raising costs. 2. Totals may not add due to rounding.

Our Stage 2 (implementation) capex of $4,279.14 million includes:

- direct capex of $3,867.55 million (90.38 per cent of Stage 2 capex)
- labour and indirect capex of $411.59 million (9.62 per cent of Stage 2 capex).

Our direct capex forecast of $3,867.55 million comprises:

- $3,232.80 million for tendered works, comprising:
  - $2,604.13 million (or 60.86 per cent of capex) for the preferred D&C contractors selected through the competitive two-stage ECI process to undertake the East and West contract packages to design and construct substation and transmission line works, including access tracks. Section 4.2.1 explains the ECI process and outcomes though which our D&C contractors have been selected.
  - $29.59 million (or 0.69 per cent of capex) for LLE for transformers, reactors and conductors. These costs relate to delivering, storing and installing the equipment, which was secured in Stage 1.
  - $599.07 million (or 14.00 per cent of capex) for the 'other construction costs' associated with delivering Humelink. These costs cover the reimbursable component of the D&C contracts, scope changes, project delay, biodiversity offset costs and inherent risks.
- $634.76 million (or 14.83 per cent of capex) for acquiring easements and acquitting our biodiversity offsets liability:
  - $197.29 million (or 4.61 per cent of capex) for acquiring easements. This relates to compensating public and private land holders and other costs, including stamp duty, the value of timber taken, substitute forest land, disturbance costs, construction camps and laydown areas and overhead costs.
  - $437.47 (or 10.22 per cent of capex) to acquit our biodiversity offsets liabilities at the lowest possible cost. This includes establishing Biodiversity Stewardship Sites from July 2024 to July 2026.

Our labour and indirect capex forecast of $411.59 million (or 9.62 per cent of total capex):

- $204.66 million or 4.78 per cent for labour related to internal resource requirements
- $202.48 million or 4.73 per cent for indirect non-labour capex, relating to a wide range of professional and consulting services, as well as tender payments and associated facilities costs
- $4.44 million or 0.10 per cent for labour escalation.

Table 5 details our Stage 2 total capex by sub-category of capex.

Table 5 Stage 2 Capex by sub-category of capex ($M, Real 2022/23)

Category of capex	Forecast capex	% of total capex
Direct costs	3,867.55	90.38%
Tendered works	3,232.80	75.55%
West – Design, substations and transmission lines including access track	1,347.63	31.49%
East – Design, substations and transmission lines including access track	1,256.50	29.36%
Long-lead equipment (excluding towers)	29.59	0.69%
Other construction costs[1]	599.07	14.00%
Easements and biodiversity offsets	634.76	14.83%
Easement acquisition	197.29	4.61%
Biodiversity offset costs	437.47	10.22%
Labour and indirect costs	407.14	9.51%
Labour costs	204.66	4.78%
Indirect costs	202.48	4.73%
Labour escalation and equity raising costs	37.68	0.88%
Equity raising costs	33.14	0.78%
Labour escalation	4.44	0.10%
Total capex (excluding equity raising costs)	4,279.14	100.00%
Total capex	**4,312.28**	**N/A**

Note that these are costs we expect to incur in the construction of Humelink, but that are not included in the tender prices.

4.2. Basis for capex forecast

We have developed our Stage 2 forecast capex based on a detailed scope of works using methods that reflect the specific nature of the costs, as shown in Table 6.

Table 6: Forecast Stage 2 capex by key category ($M, Real 2022/23)

Category of capex	Forecast capex	Basis of capex forecast
Direct costs	3,867.55	
Tendered works	3,232.80	
West – Design, substations and transmission lines including access track	1,347.63	The outcome of the competitive two-stage ECI tender process (i.e., the successful D&C contractors' tender prices).

Category of capex	Forecast capex	Basis of capex forecast
East – Design, substations and transmission lines including access track	1,256.50	
Long-lead equipment (excluding towers)	29.59	Agreements with suppliers.
Other construction costs[1]	599.07	Detailed probabilistic risk assessment (Monte Carlo analysis) using rates included in the D&C contractors' responses where activities are the same or similar, and our independent cost estimator Fission.
Easements and biodiversity offsets	634.76	
Easement acquisition	197.29	Options agreements and an independent report from JLL.
Biodiversity offset costs	437.47	An independent report from Niche, which has been verified by WSP.
Labour and indirect costs	407.14	
Labour costs	204.66	Internal resource requirements and market labour rates.
Indirect costs	202.48	Current available market rates and recent historical data.
Escalators and equity raising costs	37.68	
Equity raising costs	33.14	Calculated using the AER's Post Tax Revenue Model (PTRM).
Real input escalators	4.44	Calculated by multiplying the projected labour components of forecast capex by the real labour cost escalators approved in the AER's 2023-28 Revenue Determination for Transgrid.
Total capex (excluding equity raising costs)	**4,279.14**	
Total capex	**4,312.28**	

Notes: 1. These are costs expected to be incurred in constructing Humelink that are not included in the tender prices.

Sections 4.2.1 to 4.2.6describe the basis on which we have derived our Stage 2 forecast capex. Further information is contained in the following attachments, which form part of this Application:

- Direct Capex Forecasting Methodology
- Labour and Indirect Capex Forecasting Methodology.

Our Stage 2 forecast capex for Humelink is prudent and efficient. This is demonstrated by:

- our rigorous, well-defined and transparent capex forecasting methodology set out in Sections 4.2.1 to 4.2.6, our Direct Capex Forecasting Methodology and Labour and Indirect Capex Forecasting Methodology and accompanying models, which are provided as attachments.
- our delivery contract model, as discussed in Section 4.2.1
- our reliance on market testing and expert reports, as discussed in Sections 4.2.1 to 4.2.6
- capex being externally validated, as discussed in Section 4.3.

4.2.1. Our approach to design and construction activities and costs

This section explains our approach to the D&C component of capex, including the ITC contract model adopted in the face of the uncertain operating environment, and our procurement process. Forecast capex for the D&C activities comprises $2,604.13 million or 60.86 per cent (Table 5), which is the largest single component of our total Stage 2 forecast capex.

4.2.1.1. East and West contract packages

We have adopted a packaged approach to deliver Humelink, splitting the Project into two geographic packages of similar sizes that will be delivered by two separate delivery contractors. This approach:

- provides a more manageable scope for contractors, aligned with market sounding feedback
- allows us to select contractors with capabilities best suited to the varied works required.

The D&C contractors will be responsible for designing, constructing and pre-commissioning the works under the relevant contract package. We will be responsible for obtaining the planning approvals, obtaining access to the site, and (after completion) energising, operating and maintaining the asset. Construction is expected to begin in 2024 and take 2.5 years to complete.

The two contract packages are:

- Humelink East: consists primarily of the transmission line works from the interface point to the eastern Humelink terminus at Bannaby. This package spans a greater geographical area, with double the length of HV transmission lines (compared to the Humelink West package), while the substation works are relatively small (and predominately civil works rather than electrical works).
- Humelink West: consists of the lines from the interface point south to the Snowy 2.0 connection at Maragle, and west to the Humelink western terminus at Wagga Wagga. This package involves more substation works, including interfaces at brownfield sites and constructing a new substation near Wagga Wagga, named Gugaa. The route involves more works within alpine regions, state forests and national parks.

Figure 4-1 identifies the indicative scope and interface point between the contract packages.

Figure 4-1: Overview of the Humelink alignment and contract packages

4.2.1.2. Uncertain operating environment

The current market has shown that complex, large-scale infrastructure projects such as Humelink face uncertain and inflationary operating environments, resourcing and supply chain challenges, and intense global competition for capital and financeability.

Since mid-2021, increases in the cost of construction in Australia have outpaced those in the Consumer Price Index (CPI). This recent divergence is particularly evident with the change in the Input to Manufacturing Producer Price Indexes (PPIs). Over the 12 months ending June 2022:

- headline CPI increased by 6.1 per cent over the 12 months ending June 2022, the highest year-ended CPI inflation since the early 1990s (since then, annual inflation has remained high, with the ABS reporting a 6.0 per cent annual increase [all groups, non-adjusted] to end June 2023)
- the inputs PPI for the manufacturing sector increased by 17.7 per cent over the 12 months ending June 2022, and
- the outputs PPI for heavy and civil engineering construction increased by 9.0 per cent.

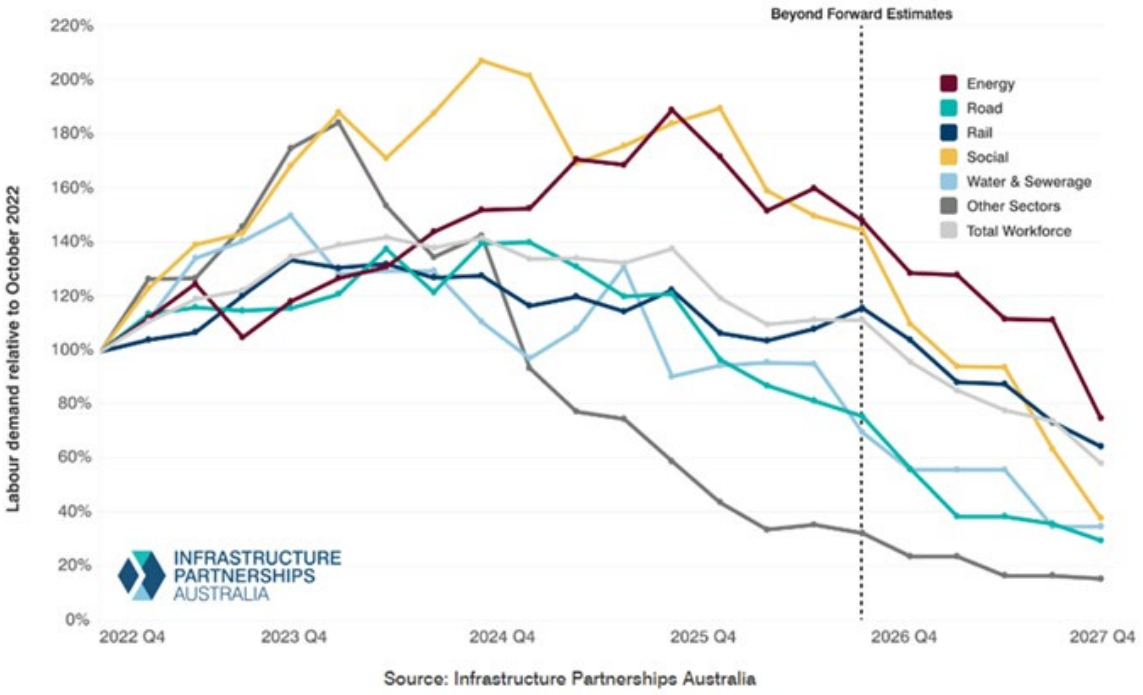
Increases in real construction costs are likely to intensify due to a surge in committed projects, which will compete for increasingly scarce resources. The pipeline of transmission line projects in the 2022 ISP alone, which are needed to deliver the energy transition, currently exceeds $20 billion, comprising Actionable projects totaling $13 billion and several Renewable Energy Zones (REZs). The number and size of committed energy projects presents a significant challenge to industry capacity, driving up labour costs. Demand for construction workers, engineers and other skilled professionals will only continue to increase as Australia seeks to deliver:

- Commonwealth and State Government infrastructure investment programs, including hospitals, road upgrades, bridge construction, and water infrastructure projects

- large transmission projects on AEMO's OPD, the NSW Electricity Infrastructure Roadmap and other state governments agendas, including:
  - Project EnergyConnect, VNI West, Marinus Link, Sydney Ring
  - NSW Government REZs, such as Central-West Orana REZ, New England REZ or Hunter-Central Coast REZ
  - CopperString, which is supported by the Queensland Government and is being built by Powerlink in north Queensland.

The IPA forecasts that the infrastructure labour force in NSW will be required to grow by 56 per cent by 2024 to deliver the pipeline of infrastructure projects across NSW and Australia.[53]

Figure 3: Forecast Labour Demand of the Australian infrastructure pipeline over the next five years



Source: Infrastructure Partnerships Australia

The cost of materials required to build AEMO's actionable ISP projects is also soaring and volatile due to:

- the surge in surge in construction activity globally
- supply chain disruptions resulting in materials shortages
- the war in Ukraine driving up fuel costs
- fluctuations in global commodity market prices for raw materials, such as steel, concrete, copper and aluminium due to geopolitical factors, trade policies and supply disruptions.

As discussed in Section 4.2.1.3, in response to the uncertain operating market, contractors are presently offering contracts with flexible pricing and risk-sharing arrangements to accommodate changes and unforeseen circumstances and safeguard against potential losses. This will assist to mitigate their own risk exposure given the significant uncertain operating environment.

[53] Infrastructure Partnerships Australia (IPA), Infrastructure Election Monitor NSW – Red Book, Figure 3

4.2.1.3. ITC D&C contracts

In light of the operating environment described above, we carefully considered contract options for the D&C works required to deliver Humelink.

Given contractors are not able or willing to enter into traditional fixed price D&C contracts, we have adopted an ITC D&C contracting model to deliver the East and West packages for Humelink. The ITC D&C commercial model achieves an appropriate balance between:

- fixed pricing, for components that are well defined and have high cost certainty
- reimbursable pricing with shared risk, for components with scope and cost uncertainty.

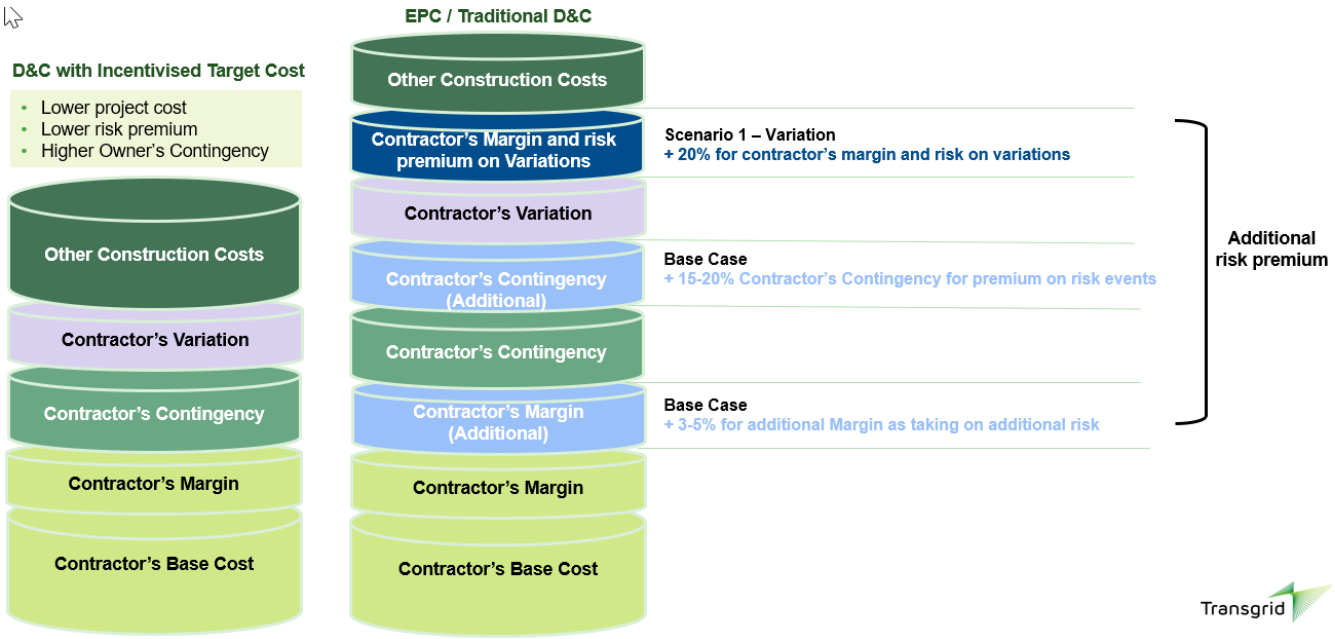
The reimbursable components under the ITC approach safeguard D&C contractors against potential losses (i.e., risk costs) caused by costs or elements of scope that are subject to high levels of uncertainty, such as labour shortages, increasing materials costs or supply chain disruption. Otherwise, the significant 'unknowns' relating to materials cost inflation, inflation pressures on other costs and skills shortages would result in contractors adopting very high-risk premiums in fixed price contracts.

This approach is in the long-term interests of consumers because it enables the contractor to offer a lower contract price than they otherwise would if they were forced to price in the risk costs though a fixed price D&C contract. The ITC D&C model balances our focus on affordability with the need to give contractors a sustainable level of revenue to match their costs, ensuring the safe delivery of Humelink.

In an uncertain operating environment, a contractor's risk and contingency premiums are higher to protect them against the likelihood of potential risk costs emerging. In the case of a fixed price D&C contract, the line item 'other construction costs' is expected to be relatively lower. However, the total project cost is higher to account for contractor risk premiums, as illustrated in Figure 4-2.

As noted above, the expected cost saving to consumers is $237 million from adopting a variable ITC D&C contract rather than a fixed price D&C contract to deliver the design and construction works for Humelink.

Figure 4-2: D&C ITC vs traditional D&C contract model

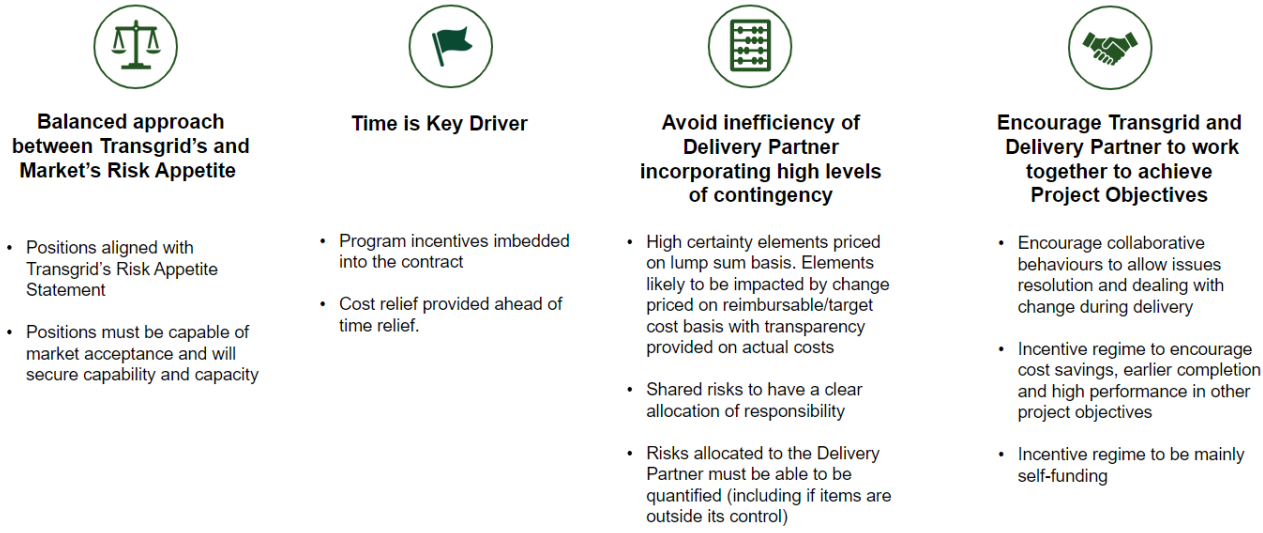


The ITC D&C contracting approach that we have adopted allows for fair risk allocation between us and the D&C contractors and is consistent with:

- feedback from our extensive market sounding and early contractor involvement (ECI) process,
- lessons learned from past project experience, in particular from PEC
- our focus on affordability and ensuring Humelink is delivered at the lowest sustainable cost for consumers.

Box 4-1 summarises the key principles for the commercial contracting framework and risk allocation.

Box 4-1: Key principles for commercial contracting and risk allocation

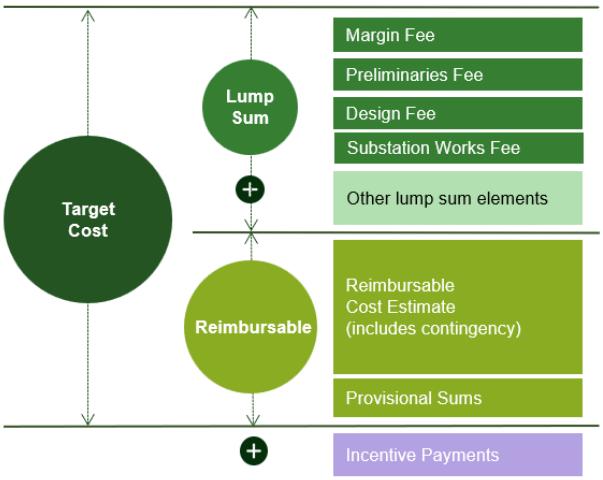


The ITC D&C contracting approach includes fixed and reimbursable components combined with incentives to motivate delivery. The fixed and variable cost components are structured as follows:

- The fixed cost component (i.e., lump sum) relates to the scope elements for which cost certainty is relatively high. Specifically, it relates to design, preliminaries and substations, which comprise 50 per cent of the contract cost.
- The reimbursable cost component relates to the scope elements for which there is less cost certainty. For Humelink, this relates to the cost of constructing the transmission lines, which comprises 50 per cent of the contract costs. The reimbursable component includes an agreed target cost with incentive arrangements to encourage collaborative behaviours to drive contractor performance and ensure the successful delivery of the Project. The incentive structure includes:
  - a cost incentive, known as a pain-share/gain-share mechanism whereby the contractor shares with us the risk of total costs being lower (gain-share) or higher (pain-share) than the total target cost, with the contractor risk capped at its margin fee
  - a program incentive up to 2.5 per cent of the total contract cost, payable where practical completion is achieved ahead of the target date
  - Key Result Area (KRA) incentives up to 1 per cent of the total contract cost for achievement of key performance indicators in safety, retention of key personnel, and community/stakeholder outcomes
  - standardised design, contract and commercial structures to achieve efficiencies across the program that are internationally recognised and used in Australia.

Figure 4-3 illustrates the structure of the ITC contract model.

Figure 4-3: ITC D&C contract model



The key components of the ITC D&C contract model are:

- The target cost, which comprises the lump sums and the estimate of reimbursable costs to deliver the entire scope of work for each contract package, based on the information available at the time of entering into the contract.
- The lump sum component, which is the largest component of the cost, including the following fees:
  - margin fee, which includes margins and overhead costs
  - preliminary fee, which includes management and supervision staff costs, survey work, personnel, site vehicles, site facilities establishment, IT and communication systems, finance, management system and plans
  - design fee, which includes costs for the work required to meet the contractors' design obligations, including the independent verification
  - substation work fee, which relates to substation and all related temporary works, including labour, construction plant and equipment, materials, consumables, commissioning spares and instruments.
- The reimbursable component, which relates to:
  - transmission line works – the costs for labour, plant and equipment associated with access tracks, clearing, tower foundations, steel towers and stringing
  - provisional sum items – the cost for unknown contamination, substation noise mitigation, architecture acoustic treatment works, post-practical completion support, unforeseen landholder costs, cultural heritage works, registered Aboriginal party costs, community options, local area works and insurance top ups.
- The incentive regime, which relates to the reimbursable component only (not the lump sum component) and is intended to adjust the value of contractor's payments against the target cost based on three incentives:
  - Cost incentive – this applies where the contractors' actual cost is higher or lower than the target cost and is known as the pain-share/gain-share regime

- Program incentive – this applies where the practical completion date occurs before or after the target practical completion date
- KRA incentive – this applies where the works are completed in accordance with various safety, cultural, environmental, CSE and other objectives.

4.2.1.4. Overview of our procurement process

Our process for procuring delivery contractors for each work package was based on a collaborative procurement approach. Our tender process began with preparatory work in 2021, ahead of the formal competitive tender process, which started with formal market sounding in April 2022. The formal tender process involved four phases:

- Phase 1 – Market sounding from April 2022 to July 2022
- Phase 2 – Expression of Interest (EOI) from August 2022 to October 2022
- Phase 3 – Early Contractor Involvement (ECI) Stage 1 October 2022 to February 2023, and
- Phase 4 – ECI Stage 2 March 2023 to August 2023.

The collaborative procurement process mitigates delivery risk by addressing upfront points of commercial engineering and operational tension between us and the D&C contractors.

The ECI phase ensured that the Project scope was refined, key project risks and opportunities addressed, and commercial and technical requirements optimised, before contracts were awarded. This in turn has resulted in better project outcomes and increased value-for-money. It has also promoted the development of innovative solutions and provided a higher degree of program and cost certainty. ECI stage 2 resulted in delivery contracts being awarded for Humelink East and Humelink West in December 2023.

Box 4-2 Overview of our procurement approach for D&C contractors

Overview

Our competitive approach to appointing Delivery Partners for the D&C of Humelink was to:

1. Establish a Transaction Team, including engaging a Transaction Team Manager (Connell Griffin) to manage the transaction process from formal Market Sounding through to awarding the major contract package(s)
2. Engage an external probity adviser, O'Connor Marsden & Associates, to ensure the integrity of the process
3. Develop a Tender Evaluation Plan to ensure that tenders were evaluated fairly, in accordance with Transgrid's requirements and objectives and the Humelink probity framework
4. Set up a tender evaluation team, comprising a Review Panel, Evaluation Panel and external evaluation advisors and specialist reviewers (including financial, legal, engineering and delivery)
5. Undertake formal market sounding from April 2022 to July 2022 to:
   - inform the market about key aspects of Humelink, including the proposed project program, delivery strategy, regulatory approval strategy and planning status
   - obtain industry feedback to validate the packaging and delivery strategy for the Project
   - identify bona-fide delivery contractors, capable of undertaking the Project to participate in the next stage of the procurement process.

   Eighteen entities participated in the early market sounding, with nine registering to participate in the Expression of Interest (EoI) Phase of the procurement process.

Overview

6. Undertake EOI Phase, from August to October 2022, to identify the shortlist of suitably qualified and experienced applicants to participant in the two-stage ECI Phase. The EOI Phase began with an invitation for Expressions of Interest. Five compliant EOI Applications were received and in October 2022, three EOI applications were shortlisted to participate in the ECI Phase as ECI Tenderers.
7. Undertake ECI Stage 1, from October 2022 to February 2023, to give the three ECI applicants Project information, including the design and scope, innovation, statutory approvals, land access technical and commercial requirements as well as the tender submission and evaluation process. The three ECI applicants submitted initial tender responses in December 2022. In February 2023, the two ECI Tenderers, who best responded to the Evaluation Criteria (i.e., demonstrated the ability deliver the best value for money), were selected to become the Preferred ECI Tenderers (one for each of the East and West Contract Packages) and proceed to ECI Stage 2.
8. Undertake ECI Stage 2, from February to August 2023, to ascertain the preferred ECI Tenderers' commitment to achieve the agreed outcomes for the Project and program, optimise their offers for one construction package only – either the East or the West – and finalise delivery contracts. At the conclusion of this stage, we received their final bids and undertook a detailed final tender evaluation

In parallel, our independent external cost estimator, Fission, independently verified our D&C contractor costs. Fission has assessed the quantities and pricing of these contractor costs against the ECI stage 1 bids and has developed its own independent cost build up based on the delivery scope.

4.2.2. LLE

Our Stage 2 forecast capex for LLE is $29.59 million comprising [redacted] million for reactors, [redacted] million transformers and [redacted] million for conductors. Our stage 2 capex is additional to $249.70 million approved by the AER for LLE in its Stage 1 Decisions, which covered the bulk of LLE costs that we expect to incur for Humelink. Our Stage 2 forecast capex relates to:

- For reactors and transformer – storage, transportation/mobilisation (i.e., delivery) and installation costs
- For conductors – procurement and transportation of earth-wire and securing land for a lay-down facility location for all conductors.

The forecast capex for these activities is based on the agreement with suppliers.

4.2.3. Other construction costs

Our Stage 2 forecast capex for 'other construction costs' of $599.07 million is, to the extent possible, based on advice from external parties, the rates included in the contractors' responses where activities are the same or similar, and our independent cost estimator, Fission.

Our forecast 'other construction costs' for Humelink appropriately reflect the complexity, uncertainty, contract model selection and large variety of risks the Project is exposed to and are necessary to ensure the successful delivery of the Project within the delivery timeframes and budget. These matters are discussed in Section 4.2.1.

The AER's guidance note on regulating actionable ISP projects (Guidance Note on ISP Projects)[54] states that it can accept a project risk allowance for a contingent project where:[55]

- residual risks have been identified

[54] AER, Guidance Note, Regulation of actionable ISP project, March 2021
[55] AER, *Regulation of actionable ISP projects*, Guidance note, March 2021, pp 16-17.

- the associated cost estimates of the residual risk are efficient (i.e., the consequential cost has been adjusted to reflect the likelihood of occurrence).

We have well-developed risk management procedures, which align with AS ISO 31000:2018 Risk Management Guidelines. To determine our forecast capex for 'other construction costs', we have developed a robust risk register. We have also used Monte Carlo probability analysis to quantify our risk costs, focusing on those risks expected to materially impact the Project's delivery cost or schedule.

Our top 25 risks in the register total $537.14 million of forecast capex. They account for 90 per cent of total 'other construction costs', broken down as follows:

- **$57.11 million reimbursable risk costs** relating to the reimbursable component of the D&C contract described in Section 4.2.1.3. We are required to adjust the contractor's payment against the target cost based on the incentive arrangements that apply under the contract.
- [redacted] **million variation risk costs** relating to scope changes that may emerge during the delivery phase. These costs are not related to the reimbursable component of the Project and are wholly our risk costs.
- **$234.73 million time risk costs** relating to delays during the delivery phase as a result of planning or secondary approval delays and construction delays, which result in additional labour resources and corporate overhead costs. These costs are not related to the reimbursable component of the Project and are wholly our risk costs.
- [redacted] **million inherent risks costs** relating to activities for which there is cost uncertainty due to the lack of information available at this stage of the Project. These costs are not related to the reimbursable component of the Project and are wholly our risk costs.

Table 7 breaks down these 'other construction costs'. Further detail is contained in our Direct Capex Forecasting Methodology and our Humelink Risk Report, provided as attachments to this Application.

Table 7: Other construction costs for Humelink ($M, Real 2022/23)

Risk name	Description	Forecast capex (M)
Reimbursable		
ID47 – productivity	Lower productivity levels than planned and increased rework required in tower foundations and stringing. The Project is within a specialised sector where the current workforce is less experienced and plagued by skills shortages.	[redacted]
ID42 – Increase in Plant	Reimbursable plant and equipment costs above estimate for Transmission Line Works.	[redacted]
ID57 – Tower Design Growth	Design refinement and growth of towers occurs during detailed design.	[redacted]
ID40 – Increase in labour	Increase in contractor reimbursable labour costs above EBA for Transmission Line Works.	[redacted]
ID41 – Local Area Works	Additional Local Area Works during construction increases reimbursable costs. High construction road use could result in	[redacted]

Risk name	Description	Forecast capex (M)
	damage and repair requirements and issues in dealing with councils and non-project contractors.	
Total reimbursable		**57.11**
Inherent		
ID71 – Uncertainty in the estimate of Owner's non-labour costs for support, travel, legal, etc.	Owner's non-labour costs that vary substantially depending on events or time of year.	[redacted]
ID70 – Uncertainty in the estimate of Owner's cost for labour and consultants	Uncertainty of the rates, numbers and employment ramp up and down rates.	[redacted]
ID72 – Uncertainty in the cost of OEM Transformers, reactors and conductor	Orders were placed for the transformers but not for reactors or conductors. Modifications to design may increase the costs of each unit and transportation costs may be incurred due to changed directions from Transgrid	[redacted]
ID74 – Uncertainty of final biodiversity offset cost	Many variables in the Delivery Strategy and market can vary the biodiversity offset cost substantially.	[redacted]
Total inherent risk		[redacted]
Variation		
ID68 – Delay Escalation	Contractor repricing arising from an employer driven delay to NTP2.	[redacted]
ID13 – Inclement Weather	Claims for delay due to exceeding the inclement weather allowance in contracts, plus disputes over what is inclement weather and impacted sites.	[redacted]
ID65 – Tower Foundations	Increase in costs associated tower footings if geotechnical conditions are substantially different from the conditions expected following investigation works, leading to an adjustment event under the delivery contract.	[redacted]
ID19 – Variations	Claims for variations due to scope variations due to changes in design and construction manuals or our requirements.	[redacted]

Risk name	Description	Forecast capex (M)
ID33 – Interface Contractor	Lack of coordination with interface contractors (OEM, East/West) resulting in design delays, construction delays, scope gaps, responsibility gaps and additional costs.	[redacted]
ID59 – Condition of Approval	Conditions of Approval from the baseline conditions are more onerous.	[redacted]
ID22 – Fabricated Steel	Increase in supply cost for fabricated steel (Evaluated as an inherent risk with a range from possible cost reduction to cost increases).	[redacted]
Total variation risk		[redacted]
Total variation and inherent risk		**245.30**
Time		
ID2 – EIS Delay	Delay and cost claims from contractors due to delays in receiving planning approval.	[redacted]
ID49 – Owner's Cost	Transgrid Owner's Costs increase due to project duration extension. Note: contractor costs dealt with in specific risks.	[redacted]
ID5 – Site Access	Delays to and claims by the contractor due to being unable to access the Site.	[redacted]
ID35 – Reactor / Transformer Delays	Delays to Transgrid-supplied reactors and transformers due to delayed overseas manufacturing and shipping timeframes.	[redacted]
ID56 – Conductor Delay	Delays to Transgrid-supplied conductor and OPGW from delayed overseas manufacturing and shipping timeframes.	[redacted]
ID37 – Social License	Project loses community and/or council support (social licence), resulting in disruptions such as blockades, protests, legal challenges and other means of obstruction.	[redacted]
ID27 – Exceptional Events	Exceptional Events such as lockdowns, war, terrorism or natural disaster.	[redacted]
ID6 – Reliance Info	Variation claims by contractors due to changes in substation reliance information included in the contract (e.g., general arrangements, single line diagrams, existing assets, geotech substation sites UGL).	[redacted]
ID80 – Insolvency of a JV member	Insolvency of one of the JV members of the delivery partner	[redacted]
Total time risk		**234.73**

Risk name	Description	Forecast capex (M)
Total top 25 risks		**537.14**
Other 43 risks (Combined)	These remaining risks account for 10% of the contingency value.	61.93
Total 'other construction costs'		**599.07**

4.2.4. Easement acquisition

Our $197.29 million Stage 2 forecast capex for easement acquisition relates to the cost of acquiring easements over a substantial amount of land across many landholders' properties. Land access and acquisition is a critical predecessor step to project construction.

Our easement negotiation and acquisition process is consistent with the Land Acquisition (Just Terms Compensation) Act 1991 (NSW) (JTC Act). We began activities to secure land and easements as part of our Stage 1 activities, which were approved by the AER in Stage 1 (Part 1) Decision. Our Stage 1 activities focused on undertaking valuations and establishing options agreements with 280 impacted private landholders as well as acquiring land for the Gugaa substation.

Our Stage 2 capex forecast for property and easements is based on an independent expert report from Jones Lang LaSalle. Our Stage 2 capex relates to compensating public and private land holders and other costs including stamp duty, the value of timber taken, substitute forest land, disturbance costs, construction camps and lay-down areas and overhead costs.

Our Stage 2 forecast capex reflects the route through the Green Hills State Forest (Green Hill deviation), which was chosen through the route selection process that concluded in August 2023. This route was selected after consultation with landowners and Forestry Corporation NSW (FC NSW) and uses public land where possible.

This route also best addresses our social, environmental and land use considerations as well as network resilience and cost. Based on this alignment, the route affects approximately 270 private landowners and 50 public land parcels, involving government and local authorities.

4.2.5. Biodiversity offset costs

Our $437.47 million Stage 2 forecast capex for biodiversity offset costs covers the residual impact on plant communities and threatened species, and comprises both ecosystem and species offset credit liabilities.

Typically, the credit liability for a project needs to be retired after planning approval and before construction begins. However, due to the complexity of large linear infrastructure projects, in consultation with the NSW Department of Planning and Environment (DPE), we are planning to adopt the same approach as for other major projects, namely:

- obtain planning approval conditions that will allow us to defer our offset obligation for two years from the date of planning approval
- provide a bank guarantee to meet our offset obligations based on the upper limit of our offset liabilities to enable construction to commerce to meet the delivery timeframe.

This approach was adopted in planning approval conditions for other Critical State Significant Infrastructure projects, including PEC and Snowy 2.0, and supports the delivery of Humelink at the lowest sustainable cost to consumers.

Our Stage 2 forecast capex is based on an independent expert cost estimation report from Niche (scenario 2). Scenario 2 assumes successful implementation of the key initiatives in our Biodiversity Offset Delivery Strategy, including to:

- first reduce the offset requirement, then establish Biodiversity Stewardship Agreement sites (BSAs) from July 2024 to July 2026
- use offset acquittal options to retire our credit liability where certainty or time constraints means that this would be the cheapest option.

4.2.6. Labour and indirect costs

Our $407.14 million Stage 2 forecast capex for labour and indirect costs is bottom-up build of costs from 1 June 2024 to April 2027, which fall into six streams of labour and indirect costs:

- **$80.07 million for commercial, project management and project controls** relating to labour and related costs for commercial oversight of the D&C contracts and LLE as well as project management and oversight required to successfully achieve the Projects' objectives. The activities include integration management, governance, cost control and risk management and mitigations.
- **$37.88 million for Community Stakeholder and Engagement (CSE)** relating to labour and related costs to consult with the community and our stakeholders about the Project. The activities will be guided by our Humelink Engagement Strategy. CSE activities are crucial to gain and maintain our social licence, undertake media and communications management, deliver community partnership programs and lead the community strategy and activities.
- **$8.05 million for land and property** relating to the labour and related costs required to process the compulsory acquisitions, negotiate landowner settlements, settle disputes and ensure ongoing compliance with option deed terms.
- **$97.73 million for design and construction** relating to the labour and related costs needed to manage contractor design as well as pre-construction and construction activities. These activities include on site investigations, assessing claims and site supervision. Indirect costs include heavy haulage, road remediation and drone technology investment.
- **$142.23 million for corporate support** relating to HSE, regulatory, insurance and legal functions. Key activities include safety and environmental project assurance, obtaining environmental planning approvals, legal advice in relation to environmental, property, commercial matters and disputes and insurance coverage for construction risk up to commissioning.
- **$41.17 million for major projects initiatives** relating to labour supporting our PTT program, which been established to accelerate the delivery of transmission infrastructure and reduce costs through economies of scale and scope.

4.3. Independent engineering verification of our Stage 2 Capex (delivery)

We engaged GHD to undertake an independent engineering verification and assessment of the scope of our Stage 2 activities and our Stage 2 capex forecast. GHD's assessment:

- verified the scope of our Stage 2 activities is realistic to meet the investment need and that our forecast capex is efficient and is consistent with that which would be incurred by a prudent and efficient business
- found that our overall Project timeline is reasonable to meet the July 2026 project completion date
- confirmed that our procurement process and outcomes are reasonable
- found that our indirect and external labour costs are reasonable and are supported by tender outcomes, quotations and benchmarking
- found that our actual and forecast internal labour costs are reasonable, noting that our actual labour costs are generated by our enterprise resource planning solution, Ellipse, and our forecast labour costs benchmark in line with other ISP projects.

Overall, GHD's independent review concluded that our Stage 2 (delivery) costs are within a reasonable margin of its comparative estimates. In other words, our forecast capex is consistent with that of a prudent and efficient business. GHD's report is provided as an attachment to our Application.

4.4. Capex threshold

The proposed capex for a contingent project is required to exceed either $30 million, or 5 per cent of the MAR for the first year of the regulatory control period, whichever is the greater.

Table 8 shows that the forecast capex satisfies the relevant threshold. This means that the forecast capex is covered by the contingent project requirements of the NER.

Table 8: Contingent project thresholds ($M, Nominal)

AER Decision - First year MAR	5% of MAR	Contingent Project Threshold	Pass / Fail
897.78	44.89	44.89	Pass (as capex > $44.89 million)

Notes: NER clause 6A.8.1(b)(2)(iii) that expected capex is higher than the greater of $30 million or 5% of MAR. The threshold is $44.89 million (being 5% of MAR).

4.5. Application of the CESS

As discussed with the AER and our other key stakeholders, including the TAC, we do not support the CESS being applied to ISP projects. We believe that, for high-value, complex and specialised projects, the current inflationary and uncertain operating environment makes it likely that these incentive schemes will introduce asymmetric risk.

As discussed in Section 4.2.1.2, the key drivers of this asymmetric risk costs arise from:

- labour shortages
- increasing materials costs and supply chain disruption
- other unforeseeable and unquantifiable costs that will arise in this type of project, given the operating environment and the unique characteristics of ISP Projects, including their size and scale.

To safeguard against potential losses (i.e., risk costs) D&C contractors require some cost components in their contracts to be variable. This allows them to offer a lower contract price than they otherwise would if they were forced to price in the risk costs though a fixed price contract.

As discussed in Section 4.2.1.3, we have adopted an ITC D&C contract in our Stage 2 Application, where some components of the contract are fixed and others are variable. Accordingly, the AER's approval of 'other construction costs' included in this Stage 2 Application is critical to enable us to deliver Humelink on time and on budget.

Given the uncertain and challenging operating environment, where contractors are not able or willing to enter into fixed price D&C contracts, the probability of overspending the AER's capex allowance is greater than the probability of underspending it.

The NER currently has no provision for adjusting the capex allowance approved by the AER for ISP projects, like Humelink, to deal with costs arising from the uncertain operating environment in a way that is fair to all market participants, including customers and TNSPs. As the rules stand, we would need to fund the gap in financing the investment for the remainder of the period and would be penalised under the CESS for any overspend, even when the higher levels of expenditure are efficient. The result could remove our opportunity to recover the efficient costs of delivering the Project. In fact, if the CESS applies, these projects are expected to generate less than the benchmark rate of return. Investors may therefore not be willing to commit capital to these projects, which is not in the long-term interest of consumers. These projects are critical to:

- the urgent energy transition, which in turn will drive down energy prices
- support the Australian and NSW Government's commitment to a net-zero future
- ensure consumers continue to receive access to cheaper, more reliable and secure clean electricity.

It would therefore not be in the long-term interest of consumers to apply penalties or rewards for differences between actual and forecast expenditure where these differences are driven by factors other than true efficiency savings or losses.

Importantly, the AER's underlying building block framework already provides an appropriate financial incentive for us to minimise capex. This is because, during the regulatory period, revenues are based on forecast capex. We do not earn a return on any capex overspend for the duration of the regulatory period. Any capex overspend is rolled into our RAB at the start of the subsequent regulatory period, only then enabling us to earn a return on our actual prudent and efficient capex. This is demonstrated in a report from HoustonKemp, which is provided as an attachment to this Application.

Stone ruin at Gregadoo Road

5

Opex forecast

Transgrid

5. Opex forecast

This section details our Stage 2 opex forecast for Humelink for the 2023-28 regulatory period.

5.1. Our Stage 2 opex forecast

Forecast incremental opex required for Humelink for the 2023-28 regulatory period is $28.49 million, including debt raising costs, or $23.17 million, excluding debt raising costs. Our forecast opex relates to:

- maintenance costs for substations, digital infrastructure and transmission lines
- property related expenses for council rates, land tax, water and electricity
- strategic benefit payments to compensate private landholders impacted by the Project, in accordance with the NSW Government's strategic benefit payment scheme
- insurance expenses for premiums for industrial special risks and operational third-party liability insurance for the Humelink assets, once they are commissioned
- vegetation integrity rehabilitation costs.

We have also applied the labour escalation rates as set out in our 2023-28 Revenue Determination to account for changes to real labour costs and added benchmark debt raising costs.

Our Stage 2 opex for Humelink is incremental to the opex approved by the AER in its 2023-28 Revenue Determination. This is because it relates to activities that are additional to our normal business activities and would not be incurred other than for undertaking Stage 2 activities for Humelink.

Table 9: Incremental forecast opex for Humelink ($M, Real 2022/23)

Sub-category	2023/24	2024/25	2025/26	2026/27	2027/28	Total
Maintenance costs (excluding labour escalation)	-	-	-	2.33	5.98	**8.31**
Property	-	0.14	0.14	0.15	0.15	**0.58**
Strategic Benefits Payments	-	-	-	3.12	3.12	**6.23**
Insurance	-	-	-	3.59	3.59	**7.19**
Vegetation Integrity Rehabilitation Costs	-	-	-	0.36	0.36	**0.71**
Real input cost escalation	-	-	-	0.03	0.12	**0.15**
Total excluding debt raising costs	-	0.14	0.14	9.58	13.32	**23.17**
Debt raising costs	-	0.04	1.09	2.08	2.10	**5.31**
Total including debt raising costs	**-**	**0.17**	**1.23**	**11.65**	**15.43**	**28.49**

5.2. Basis of opex forecast

Table 10 sets out forecast incremental opex for Humelink by component, together with a summary of the basis of the forecast. We have applied a bottom-up build approach to forecast incremental opex. The bottom-up build approach reflects the AER's preferred approach for preparing an opex forecast. It is also consistent with the approach accepted by the AER for all contingent projects to-date.

Table 10: Forecast incremental opex for Humelink by category ($M, Real 2022/23)

Opex item	Value	Basis for forecast expenditure
Maintenance costs (excluding labour escalation)	8.31	Current and proposed maintenance activity unit rates multiplied by projected volumes of activities
Property	0.58	Land tax based on estimated land value and estimated council and utility rates
Strategic Benefits Payments	6.23	Calculated in accordance with NSW Government's Strategic Benefit Payments scheme
Insurance	7.19	Based on an independent report from Aon see artefact Transgrid Humelink Insurance report.
Vegetation Integrity Rehabilitation costs	0.71	Based on works required within Humelink Easement Clearance Zone
Real input cost escalation	0.15	Labour escalators as set out in our 2023-28 Revenue Determination
Debt raising costs	5.31	Calculated using the same approach applied by the AER in its 2023-28 Revenue Determination, as reflected in the PTRM
Total incremental opex	**28.49**	

Our Humelink opex forecasting methodology, provided as an attachment to this Application, explains and justifies the incremental opex forecast. Our opex forecast model is also provided as an attachment to this Application.

6

Forecast revenue and impact on customers' bills

Transgrid

6. Forecast revenue and impact on customers' bills

This section sets out the incremental revenue forecast for Stage 1 (early works), our updated MAR and the indicative impact on the transmission component of customers' bills.

We have determined our incremental revenue forecast using the same assumptions and approaches recently adopted by the AER in its CPA decisions for Humelink Stage 1 (early works). Table 11SEQ Table * ARABIC \s 1 summarises the incremental revenue forecast of $619.58 million ($Nominal) over the 2023-28 regulatory period, broken down by building block component, and briefly explains how we have calculated each component. Further detail is provided in Appendix A.

Table 11: 2023-28 incremental revenue forecast from Stage 2 (delivery) ($M, Nominal)

Building block	$ Million, Nominal	Approach
Return on capital	692.22	Calculated by multiplying the forecast opening capital base (updated to include expenditure on Stage 1 (early works) for a given year by the allowed rate of return adopted by the AER.
Return of capital	(81.44)	Calculated as forecast straight line depreciation for each asset class less indexation of the capital base. The value is negative because indexation is higher than depreciation over the 2023-28 regulatory period.
Opex	32.41	We are not seeking to adjust our current opex allowance as part of this Application, other than adjusting our allowance for debt raising cost as a consequence of the revised capex allowance. Debt raising costs have been calculated using the AER's standard approach.
Revenue adjustments	-	None
Corporate income tax	(23.16)	Calculated as forecast pre-tax income multiplied by the corporate tax rate, less the assumed value of imputation credits.
Annual revenue requirement (i.e., unsmoothed)	**620.03**	
Impact of smoothing	(0.45)	Calculated by resolving the year 3 to 5 X-factors, so the NPV of the MAR for the 2023-28 regulatory period matched that of the forecast annual revenue requirement for the same period.
Maximum allowed revenue (i.e., smoothed)	**619.58**	

Table 12 details the 2023-28 incremental revenue forecast of Stage 2 (delivery) by year.

Table 12 – Incremental revenue forecast (smoothed) ($M, Nominal)

MAR (Smoothed Revenue)	2023/24	2024/25	2025/26	2026/27	2027/28	Total
AER 2023-28 determination (updated for Humelink Early Works Parts 1 and 2)	923.99	960.11	995.98	1,033.19	1,071.78	**4,985.05**
Impact of Stage 2 (delivery)	-	55.92	121.25	195.33	239.31	**611.80**
Updated MAR	**923.99**	**1,016.03**	**1,117.23**	**1,228.51**	**1,311.09**	**5,596.85**

The indicative customer bill impact (Table 13) will be an annual average increase of $20.52 for residential customers and $40.78 for small business customers, starting in 2024/25. These transmission cost increases are expected to be more than offset by savings in wholesale costs.[56] As discussed above, AEMO's updated net market benefits assessment for the Project will be reflected its draft 2024 ISP, which is due to be published in December 2023.

We have applied the same approach to estimating the indicative impact on customer bills over the 2023-28 period that the AER used in its revenue determination for the same period. We converted our proposed MAR into indicative household and small business bills using forecast energy throughput and typical household and small business bill information, so the typical bill size and the share of NSW residential and small business bills attributed to transmission charges.

Table 13: Impact of Stage 2 on the transmission component of customers' bills ($ per customer per year, Real 2022/23)

	2023/24	2024/25	2025/26	2026/27	2027/28
Residential Bills					
AER 2023-28 determination (updated for the Humelink Early Works Parts 1 and 2)	2,076.15	2,076.88	2,076.65	2,076.79	2,077.52
Impact of Stage 2 (delivery)	-	-	11.92	25.24	24.40
Updated typical customer bill	**2,076.15**	**2,076.88**	**2,088.57**	**2,102.03**	**2,101.92**
Small Business Bills					
AER 2023-28 determination (updated for the Humelink Early Works Parts 1 and 2)	5,105.28	5,106.74	5,106.28	5,106.55	5,108.01
Impact of Stage 2 (delivery)	-	-	23.68	50.16	48.49

[56] AEMO, 2022 ISP, p. 68. We note that the assessment of the market benefits from the Project is being separately updated and confirmed through AEMO's draft 2024 ISP analysis.

	2023/24	2024/25	2025/26	2026/27	2027/28
Updated typical customer bill	**5,105.28**	**5,106.74**	**5,129.96**	**5,156.71**	**5,156.50**

7

Guide to compliance

Transgrid

7. Guide to compliance

Table 14 list the NER requirements for a CPA, and where we have addressed these in our Application.

Table 14: Compliance with NER requirements

NER, clause 6A.8.2(b) requirements	Reference in Application
1. An explanation that substantiates the occurrence of the trigger event	Section 3
2. A forecast of the total capex for the contingent project	Section 4
3. A forecast of the capital and incremental opex, for each remaining regulatory year which the Transmission Network Service Provider considers is reasonably required for the purpose of undertaking the contingent project	Section 4 and 5
4. How the forecast of the total capex for the contingent project meets the threshold as referred to in clause 6A.8.1(b)(2)(iii)	Section 4
5. The intended date for commencing the contingent project (which must be during the regulatory control period)	Section 3
6. The anticipated date for completing the contingent project (which may be after the end of the regulatory control period) and	Section 3
7. An estimate of the incremental revenue which the Transmission Network Service Provider considers is likely to be required to be earned in each remaining regulatory year of the regulatory control period as a result of the contingent project being undertaken as described in subparagraph (3), which must be calculated: (i) in accordance with the requirements of the post-tax revenue model referred to in clause 6A.5.2 (ii) in accordance with the requirements of the roll forward model referred to in clause 6A.6.1(b) (iii) using the allowed rate of return for that Transmission Network Service Provider for the regulatory control period as determined in accordance with clause 6A.6.2 (iv) in accordance with the requirements for depreciation referred to in clause 6A.6.3, and (v) on the basis of the capex and incremental opex referred to in subparagraph (b)(3).	Section 6 and Appendix A

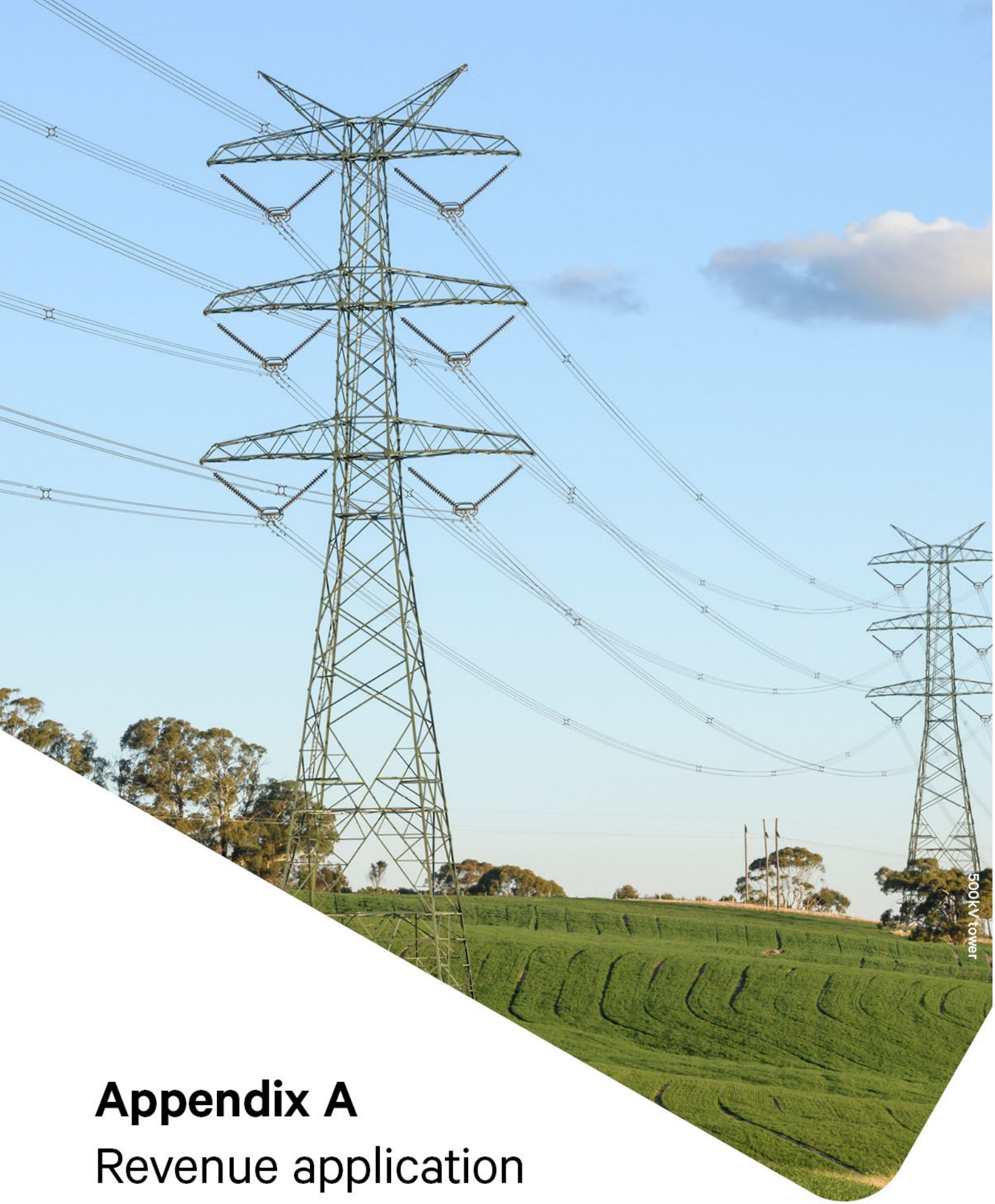
Table 15 lists the CPA requirements in the AER's Guidance Note and where we have addressed these in our Stage 2 Application.

Table 15: Compliance to AER Guidelines

AER Guideline requirement	Reference in Application
Stakeholder engagement (Section 2.2)	
Overview of stakeholder engagement approach and feedback received	Section 3.4
Project governance (Section 2.4)	

AER Guideline requirement	Reference in Application
Project governance framework and processes, including key roles, accountabilities and responsibilities	Refer to Humelink Governance and Assurance Plan
Project (including risk) reporting, monitoring and evaluation arrangements	
Any supporting assurance arrangements	
Project Plans (Section 2.4.2)	
High level delivery schedule, with key milestones and timeframes	Refer to Section 3.3 HumeLink High Level delivery schedule describing key milestones, dependencies, and decision points.
Key dependencies and decision points for the Project	
Project resourcing and capability arrangements	Refer to A.3 Labour and indirect forecasting methodology
Risk management framework and plan (see also Section 2.6.3 - 'Risk management')	Refer to HumeLink CPA2 Risk Report.
Established arrangements for post completion project review	Transgrid's Project Management Manual outlines the process for post completion project reviews.
Procurement strategy, processes, and outcomes (Section 2.5)	
Overview of procurement strategy, including scope of work packages	Our procurement process is outlined in our Capex Forecasting Methodology.
Tender Evaluation Plan(s), including roles and responsibilities of evaluation team	
Overview of procurement process(es), including summary of activities and timeline	
Outcomes of procurement activities	
Tender Evaluation and Probity Report(s)	
Risk assessment (Section 2.6)	
Detailed risk register containing identifiable projects risks, and	Section 4, Direct Capex Forecasting Method and our Humelink Risk Report. Risk costs in this Stage 2 Application have been considered for each activity and the associated costs are
A summary of the efficient mitigation steps taken for the relevant risks	
An assessment for each residual risk	

AER Guideline requirement	Reference in Application
	based on a qualitative approach.



Appendix A

Revenue application

Transgrid

A. Revenue Application

A.1 Appendix A Revenue Application

Appendix A sets out our incremental revenue forecast for the Stage 2 (delivery) in the context of clause 6A.8.2(b)(9) of the NER.

As discussed in Section 4, on the basis of our Stage 2 capex and opex forecasts, we are seeking the AER's approval to increase our allowed 2023-28 MAR and tariffs. Appendix A shows the impact over the 2023-28 regulatory period to:

- *unsmoothed* revenue, i.e., the Aggregate Building Block Revenue Requirement (ABBRR))
- MAR (or *smoothed* revenue).

Table A-1 sets out the incremental MAR for Stage 2 activities for the 2023-28 regulatory period. This has been calculated using the PTRM adopted by the AER in its recent decision on the Humelink Stage 1 (Part 2) CPA.[57]

Table A-1: Incremental MAR ($M, Nominal)

MAR (Smoothed Revenue)	2023/24	2024/25	2025/26	2026/27	2027/28	Total
AER 2023-28 determination (updated for Humelink Early Works Parts 1 and 2)	923.99	960.11	995.98	1,033.19	1,071.78	**4,985.05**
Impact of Stage 2 (delivery)	-	-	115.16	252.74	251.68	**619.58**
Updated MAR	**923.99**	**960.11**	**1,111.14**	**1,285.92**	**1,323.46**	**5,604.63**

The rest of this Appendix A:

- identifies the weighted average cost of capital (WACC) and standard asset life assumptions adopted for the 2023-28 regulatory period
- sets out projected regulatory depreciation, tax allowance, debt and equity raising costs, unsmoothed revenue requirements and MAR for the 2023-28 regulatory period
- details the potential customer bill impact from the incremental revenue requirements resulting from the Project for the 2023-28 regulatory period.

A.2 Weighted average cost of capital (WACC)

We have calculated the incremental revenue for Stage 2 activities using the same WACC assumptions as those adopted by the AER in its 2023-28 Revenue Determination. This is consistent with the requirements of clause 6A.8.2(b)(4)(ii) of the NER.

[57] Throughout this Appendix A we have presented any revenue forecasts in end of year nominal terms.

Table A-2: WACC parameters

Parameter	AER Approved Value	
Forecast inflation	2.92%	
Value of imputation credits	57.00%	
Gearing	60.00%	
Nominal pre-tax return on debt	4.63%	for 2023/24
	4.59%	for 2024/25
	4.72%	for 2025/26
	4.82%	for 2026/27
	4.97%	for 2027/28
Nominal post-tax return on equity	7.48%	
Nominal vanilla WACC	5.77%	for 2023/24
	5.75%	for 2024/25
	5.82%	for 2025/26
	5.88%	for 2026/27
	5.97%	for 2027/28

A.3 Asset lives

We have allocated our forecast capex for Stage 2 activities across regulatory asset classes. Capex is depreciated in the PTRM using the standard asset lives used in the AER's 2023-28 Revenue Determination, with two exceptions:

- For equity raising costs, we have updated the standard life for this asset class to 44.73 years using the approach adopted by the AER in its recent determinations.
- We have added a new asset class for Biodiversity offset liabilities to enable us to depreciate these costs over the weighted average of the standard lives of all other depreciating assets. This will assist to ensure that the Project is financeable.

The applicable standard asset lives are set out inTable A-3.

Table A-3: Asset lives

Asset Category	Standard Life (years)	Explanation
Transmission lines	50.00	As per the AER's 2023-28 Revenue Determination.
Substations	40.00	
Land and easements	n/a	
Biodiversity offsets	47.68	Calculated as the weighted average of the standard lives of all other depreciating assets for

Asset Category	Standard Life (years)	Explanation
		the Humelink Stage 2 activities using the same approach as that used to determine the standard life for equity raising costs.
Equity raising costs	44.75	As per recent AER decisions, this is calculated as the weighted average standard life for forecast net commission capex.

Note: Only asset classes that attract the Project capex are shown.

A.4 Incremental regulatory depreciation

Table sets out our forecast incremental regulatory depreciation for the 2023-28 regulatory period for Stage 2 activities, consistent with clause 6A.8.2(b)(7)(iv) of the NER. This forecast has been calculated using the AER's most recent PTRM for the 2023-28 period, projected incremental capex and the asset lives in SectionA.2.

As discussed above, to help improve the financeability of the Humelink project we have set forecast as commissioned capex for all asset class to match forecast as incurred capex. In effect, this leads to forecast capex on all depreciable assets being depreciated on an as incurred rather than as commissioned basis, bringing forward the timing of when depreciation is allowed.

Incremental regulatory depreciation is negative over the 2023-28 regulatory period. This is because the long-lived nature of the assets leads to indexation being higher than real straight-line depreciation earlier in the lives of those assets. This relationship will reverse later in the assets' lives, leading to positive regulatory depreciation.

Table A-4: Incremental regulatory depreciation ($M, Nominal)

	2023/24	2024/25	2025/26	2026/27	2027/28	Total
AER 2023-28 determination (updated for Humelink Early Works Parts 1 and 2)	89.91	102.92	137.24	165.97	156.38	652.41
Impact of Stage 2 (Delivery)	-	(0.53)	(19.15)	(31.73)	(30.03)	(81.44)
Updated regulatory depreciation	**89.91**	**102.39**	**118.08**	**134.24**	**126.35**	**570.97**

A.4a AER Information Request – As incurred depreciation

In response to Transgrid's draft CPA-2, the AER has asked Transgrid to explain its reasons for proposing 'as incurred' depreciation, rather than 'as commissioned' which is the standard approach for transmission regulation.

In addressing this information request, the AER asked Transgrid to address four questions which relate to different aspects of the regulatory framework, including: the National Electricity Rules (**NER**) requirements; regulatory incentives; financeability considerations; and the National Electricity Objective.

In this response, we address each of these questions in turn. It should be noted that we have separately addressed these questions in relation to 'early works' expenditure, which is the subject of our CPA-1 submission for VNI West.

Q1. Please explain how the change proposed is consistent with the NER requirement for depreciating the value of the ISP assets in the RAB using a profile that reflects the nature of the assets over their economic life? This should take into account the nature of the transmission assets, which are very different to distribution assets.

The NER already allows the AER to depreciate transmission assets on an as incurred basis, including for ISP projects. The NER outlines the depreciation framework the AER must apply to distribution and transmission assets and does not specifically provide for or prevent depreciation to be recovered from assets on an as incurred basis.

This observation was recently made by the Australian Energy Market Commission (the Commission) in its draft determination on financeability, in which it considered a Rule change request from the Hon Chris Bowen, Commonwealth Minister for Climate Change and Energy which proposed an amendment to allow biodiversity costs to be depreciated on an 'as incurred' basis:[58]

> "The Commission considers that the NER already allows the AER to depreciate transmission assets on an as incurred basis, including for ISP projects. Therefore, there is no need to amend the NER specifically to allow depreciation of biodiversity assets on an as incurred basis."

In making this observation, the Commission is aware that:

- the depreciation provisions in the NER are identical for transmission and distribution network; and
- the AER has adopted an 'as incurred' depreciation approach for distribution assets.

It is therefore open for the AER to adopt an 'as incurred' depreciation approach for transmission assets. In considering whether the AER should adopt an 'as incurred' approach, it is important to consider the requirements of clause 6A.6.3(b)(1) of the NER, which requires that:

> "The depreciation schedules must [….use] a profile that reflects the nature of the assets or category of assets over the economic life of that asset or category of assets"

While 'depreciation schedule' is not defined in the NER, Transgrid considers it reasonable to interpret this clause as referring only to the profile of depreciation, rather than the start date. On this interpretation, this provision is only addressing the type of depreciation (e.g. straight-line or annuity depreciation) and the economic life of the asset (e.g. whether it is shorter than the technical life of the asset), rather than when depreciation should commence (i.e., whether it is 'as incurred' or 'as commissioned').

If, however, clause 6A.6.3(b)(1) of the NER is interpreted more broadly to include the start date for depreciation, it is important to consider whether it is reasonable to commence depreciation prior to the commissioning of the actionable ISP project. In considering this issue, it is reasonable to have regard to:

- the desirability of matching the profile of the project costs and benefits from the perspective of electricity consumers; and

[58] AEMC, Draft rule determination, National Electricity Amendment (Accommodating financeability in the regulatory framework) Rule 2024, 14 December 2023, p.36

- the importance of ensuring that ISP projects are financeable, so that the net benefits identified in AEMO's ISP can be achieved.

The Commission has recently commented on how these matters should be weighed in its draft determination on financeability. In discussing the impact of changing the depreciation allowance to address financeability concerns, the Commission made the following observations in discussing the related topic of inter-generational equity:[59]

> "Delivering those projects in line with the timeframe set out in the ISP will minimise costs to consumers and support emissions reduction and security and reliability, all of which will benefit current as well as future consumers. The Commission considers that the benefits of timely delivery outweigh consideration of whether revenues are exactly aligned with benefit realisation.
>
> In addition, it is not clear whether the current economic regulatory framework is delivering an optimal allocation of costs and benefits between current and future consumers, and therefore whether it represents an appropriate starting point on which to base future allocations. […] Rather, the regulatory framework is intended to deliver outcomes that are in the long term interests of all consumers by delivering efficient operational and investment decisions."

The Commission's draft Rule proposes that 'as incurred' depreciation is a tool at the AER's disposal to address financeability issues. In this regard, our CPA-2 submission is aligned with the Commission's current thinking:[60]

> "If a TNSP has a financeability issue, the AER must address this issue by bringing forward cashflows through one or more of the following tools:
>
> […]
>
> Existing mechanisms available under the current arrangements:
>
> - allow as incurred recovery of depreciation for assets that form part of the actionable ISP project; and/or
> - smooth revenue within a regulatory control period, if this is available."

We acknowledge that the matching of project costs and benefits during the construction phase of the project will be reduced under an 'as incurred' approach. However, as noted by the Commission, this observation needs to be weighed against the broader issue of how best to promote the timely delivery of actionable ISP projects. The positive impact of 'as incurred' depreciation in terms of achieving financeability should be given significant weight in that regard.

It is also worth noting that large distribution projects will also have a mismatch between the costs recovered from customers during the planning and construction phase and the benefits that the project provides. As noted by the Commission, therefore, it is important to recognise that the regulatory framework is not delivering an optimal allocation of costs and benefits.

In summary, our view is that 'as incurred' depreciation is permissible under the NER and has been identified by the Commission as a mechanism that may be used by the AER to address financeability

[59] AEMC, Draft rule determination, National Electricity Amendment (Accommodating financeability in the regulatory framework) Rule 2024, 14 December 2023, p.6

[60] AEMC, Draft rule determination, National Electricity Amendment (Accommodating financeability in the regulatory framework) Rule 2024, 14 December 2023, p.10

issues. In this regard, our CPA-2 submission is aligned with the latest views on these matters and is therefore reasonable.

Q2. Please explain how the change would provide incentives for the efficient provision of the assets, including efficient completion

Transgrid is aware that it has been argued that 'as incurred' depreciation provides weaker incentives to complete a project compared to 'as commissioned' depreciation. In practice, any such incentive provided by the regulatory framework (which is likely to be small) will be outweighed by much stronger incentives relating to project governance and contractual arrangements, including.

- We have been directed to by the AEMO in its Draft 2024 ISP to deliver these projects urgently without delay.
- We have contractual penalties with our delivery partners of approximately $80m per month, which creates strong incentives to complete the project as soon as possible.

Should we abandon the project, our concessional benefit ceases, we need to repay the concessional benefit received to the point of abandonment, and all concessional loans become due for repayment. In addition, both the concessional and hybrid facilities are only available for a defined period with minimum equity to be invested to enable access to the hybrids and a backstop date of when the full 40% equity commitment needs to be invested to avoid the concessional loan becoming due for repayment. All of these arrangements provide significant protection against non-delivery by Transgrid.

Q3. Please explain why the change is needed from a financeability perspective taking into account any government assistance it has received from the CEFC

The importance of investors being able to earn the regulated rate of return on these very large projects, and being able to attract the required debt and equity capital is critical to achieving Australia's net zero vision. The regulated return is calculated assuming a benchmark regulated entity and a defined credit rating. The current CEFC commitment is an extremely helpful step, however still falls somewhat short of providing a complete solution, with financeability remaining a very real challenge to ensure these critical projects are delivered in a timely manner.

We acknowledge the complexities arising from current macro-economic challenges,and see this reflected in the Government's acknowledgement of the need for further regulatory reform to help deliver the clean energy transition as well as recent draft rule changes aimed at a sustainable solution for financeability. To this end, we will continue in good faith to negotiate with the CEFC and the AER to resolve appropriate solutions which will enable these projects to be financed and delivered.

For completeness, appropriate adjustment mechanisms have been included in the concessional arrangements that protect consumers, via reduction in the concessional loan to ensure there is no over-recovery resulting in Transgrid earning more than the regulated return.

Q4. Please explain why the change is in the long term interest of consumers and best promotes the NEO.

We are currently in a fast-paced and urgent transition to provide consumers with a reliable source of renewable energy. Humelink has been identified as an actionable ISP project and should progress as urgently as possible.[61]

[61] AEMO Draft 2024 ISP p.56

Adapting the regulatory framework to be more flexible would support the ability of TNSPs to access finance at an efficient cost. In doing so, allowing as incurred depreciation would promote the NEO by supporting timely delivery of Humelink thus unlocking cheaper renewable energy sources, reducing emissions and wholesale prices and promoting reliability and security.[62] Noting, this project forms part of the backbone for renewable infrastructure between Victoria and NSW.

The Commission commented on how its draft determination on financeability would promote the NEO:[63]

> "The draft rule would, or would be likely to, contribute to the achievement of the NEO by addressing challenges that TNSPs may have in efficiently raising finance to proceed with actionable ISP projects. This would improve outcomes for consumers by facilitating timely investment in and delivery of transmission that the ISP has determined as necessary to support emissions reductions and security and reliability. In supporting timely investment in transmission infrastructure, the draft rule would also benefit both near-term and future customers by unlocking low-cost renewable generation."

For the reasons outlined above, we consider that proposing 'as incurred' depreciation in our CPA-2 is consistent with the Commission's reasoning and therefore would also promote the NEO. We also note that the proposal is being made in advance of the Rule change being finalised. As such, it is the best approach to promote the NEO, absent the finalisation of the financeability rule change.

A.5 Tax allowance

Table A-5 sets out the incremental forecast net tax allowance for the 2023-28 regulatory period attributed to Stage 2 activities. This has been calculated using the PTRM and projected incremental capex.

We have not made any other changes to the net tax calculation from that used in the AER's 2023-28 Revenue Determination.

Table A-5: Incremental net tax allowance ($M, Nominal)

	2023/24	2024/25	2025/26	2026/27	2027/28	Total
AER 2023-28 determination (updated for Humelink Early Works Parts 1 and 2)	24.15	20.37	16.00	22.30	25.02	107.84
Impact of Stage 2 (delivery)	-	(0.98)	(5.46)	(9.13)	(7.59)	(23.16)
Updated net tax allowance	**24.15**	**19.38**	**10.54**	**13.18**	**17.42**	**84.68**

A.6 Debt and equity raising costs

Our forecast incremental revenue includes allowances for debt and equity-raising costs, consistent with the AER's 2023-28 Revenue Determination. Both costs are calculated automatically within the PTRM.

Debt-raising costs are included within the opex building block and are calculated as follows:

- Projected opening RAB at the start of each regulatory year is multiplied by assumed gearing (of 60 per cent) and the debt-raising cost benchmark (of 0.083 per cent).

[62] AEMC Financeability of ISP projects p.14

[63] AEMC, Draft rule determination, National Electricity Amendment (Accommodating financeability in the regulatory framework) Rule 2024, 14 December 2023, p.3

- Equity-raising costs are included within the capex forecast and recovered via the return on and of capital building blocks. These costs are calculated as follows:
  - retained cash flows are projected by subtracting opex, interest payments, revenue adjustments, tax payable, and dividends from projected smoothed (i.e., MAR) revenue
  - equity raising is projected by subtracting retained cash flows from the equity funding component of projected capex (assuming 60 per cent gearing), and split between distribution reinvestment and external equity raising sources
  - equity raising costs are calculated by multiplying the two sources by assumed benchmark equity raising cost rates.

Table A- 6: Incremental debt and equity raising costs ($M, Real 2022-/23)

	2023/24	2024/25	2025/26	2026/27	2027/28	Total
Debt raising costs						
AER 2023-28 determination (updated for Humelink Early Works Parts 1 and 2)	4.53	5.03	5.17	5.08	4.99	24.79
Impact of Stage 2 (delivery)	-	0.04	1.09	2.08	2.10	5.31
Updated debt raising costs	**4.53**	**5.07**	**6.26**	**7.16**	**7.09**	**30.10**
Equity raising costs						
AER 2023-28 determination (updated for the Humelink Early Works Parts 1 and 2)	-	-	-	-	-	-
Impact of Stage 2 (delivery)	33.14	-	-	-	-	**33.14**
Updated equity raising costs	**33.14**	**-**	**-**	**-**	**-**	**33.14**

A.7 Incremental revenue requirements for each year to end of period

Table A-7 details the incremental ABBRR for Stage 2 for the 2023-28 period based on the forecasts provided above and using the PTRM.

Table A-7: Incremental revenue requirements ($M, Nominal)

	2023/24	2024/25	2025/26	2026/27	2027/28	Total
AER 2023-28 determination updated for Humelink CPA-1 (Parts 1 and 2))						
Return on capital	525.35	599.12	641.29	655.99	672.42	**3,094.18**
Regulatory depreciation	89.91	102.92	137.24	165.97	156.38	**652.41**
Opex	212.59	235.17	243.76	251.85	260.28	**1,203.65**
Revenue adjustments	12.42	(8.44)	(19.51)	(19.15)	(26.45)	**(61.13)**
Net tax allowance	24.15	20.37	16.00	22.30	25.02	**107.84**
Unsmoothed revenue requirement	**864.41**	**949.13**	**1,018.78**	**1,076.96**	**1,087.65**	**4,996.94**
Impact of Stage 2 (delivery)						
Return on capital	-	4.55	135.90	267.96	283.80	**692.22**
Regulatory depreciation	-	(0.53)	(19.15)	(31.73)	(30.03)	**(81.44)**
Opex allowance	-	0.18	1.34	13.08	17.81	**32.41**
Revenue adjustments	-	-	-	-	-	**-**
Net tax allowance	-	(0.98)	(5.46)	(9.13)	(7.59)	**(23.16)**
Unsmoothed revenue requirements	**-**	**3.22**	**112.64**	**240.19**	**263.99**	**620.03**
Updated						
Return on capital	525.35	603.67	777.19	923.96	956.22	**3,786.40**
Regulatory depreciation	89.91	102.39	118.08	134.24	126.35	**570.97**
Opex allowance	212.59	235.35	245.10	264.93	278.09	**1,236.06**
Revenue adjustments	12.42	(8.44)	(19.51)	(19.15)	(26.45)	**(61.13)**
Net tax allowance	24.15	19.38	10.54	13.18	17.42	**84.68**
Unsmoothed revenue requirements	**864.41**	**952.36**	**1,131.42**	**1,317.15**	**1,351.64**	**5,616.97**

A.8 Amended ABBRR and MAR

Table A-8 sets out the updated ABBRR for the current regulatory period.

Table A-8: ABBRR ($M, Nominal)

	2023/24	2024/25	2025/26	2026/27	2027/28	Total
AER 2023-28 determination (updated for Humelink Early Works Parts 1 and 2)	864.41	949.13	1,018.78	1,076.96	1,087.65	**4,996.94**
Impact of Stage 2 (delivery)	-	3.22	112.64	240.19	263.99	**620.03**
Updated annual revenue requirement	**864.41**	**952.36**	**1,131.42**	**1,317.15**	**1,351.64**	**5,616.97**

Table A-9 sets out the updated MAR for the current regulatory period.

Table A-9: Amended MAR for the 2023-28 regulatory period ($M, Nominal)

MAR (Smoothed Revenue)	2023/24	2024/25	2025/26	2026/27	2027/28	Total
AER 2023-28 determination (updated for Humelink Early Works Parts 1 and 2)	923.99	960.11	995.98	1,033.19	1,071.78	**4,985.05**
Impact of Stage 2 (delivery)	-	-	115.16	252.74	251.68	**619.58**
Updated MAR	**923.99**	**960.11**	**1,111.14**	**1,285.92**	**1,323.46**	**5,604.63**

Temporary construction compounds

8

Abbreviations

Transgrid

8. Abbreviations

The following abbreviations are used in this Stage 2 Application.

Abbreviation	Definition
AACE	Association for the Advancement of Cost Engineering
ABBRR	Annual Building Block Revenue Requirement
AEIC	Australian Energy Infrastructure Commissioner
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AVP	AEMO Victoria Planning
BC Act	NSW Biodiversity Conservation Act 2016
BCF	Biodiversity Conservation Fund
BSA	Biodiversity Stewardship Agreement
CCG	Community Consultation Group
CEFC	Clean Energy Finance Corporation
CESS	Capital Expenditure Sharing Scheme
CPA or Application	Contingent Project Application
D&A	Development and approvals
D&C	Design and construction
DISER	Department of Industry Science Energy and Research
EIS	Environmental Impact Statement
ENA	Energy Networks Australia
EP&A	Environmental Planning and Assessment
FID	Final Investment Decision
ISP	Integrated System Plan
kV	kilovolt
LALC	Local Aboriginal Land Council
LLE	Long Lead Equipment
MAR	Maximum allowed revenue
MCHPA	Moorabool and Central Highlands Power Alliance Inc.
NEM	National Electricity Market
NER or Rules	National Electricity Rules

Abbreviation	Definition
NEVA	National Electricity (Victoria) Act 2005
NPV	Net present value
NSW	New South Wales
ODP	Optimal Development Path
PACR	Project Assessment Conclusions Report
EnergyConnect or PEC	Project EnergyConnect
PTRM	Post tax revenue model
PTT	Powering Tomorrow Together
RAB	Regulatory Asset Base
REZ	Renewable energy zone
RFM	Roll forward model
RIT-T	Regulatory Investment Test for Transmission
RRG	Regional Reference Group
Stage 1 Application or CPA-1	Contingent Project Application for early works
Stage 2 Application or CPA-2	Stage 2 Contingent Project Application for delivery
TAB	Tax Asset Base
TAC	Transgrid Advisory Committee
VNI PACR	VNI West Project Assessment Conclusions Report
VNI West or the Project	Victorian to New South Wales (NSW) Interconnector West
VRE	Variable renewable energy
WACC	Weighted Average Cost of Capital
WRL	Western Renewables Link