

**Submission to the HumeLink, Contingent Project Application – Stage 2, HumeLink Alliance Inc.,  
April 3, 2024**

**1. Introduction**

The Contingent Project Application – Stage 2 (CPA2) has been lodged with AER, without a prior assessment of a material change in circumstance (MCC), in contravention of the national electricity rules (NER). Also, the feedback loop confirmation used assumptions of the Draft 2024 Integrated System Plan (ISP), rather than the 2022 ISP, the “latest ISP”, contrary to NER, clause 5.16A.5(b).<sup>1</sup>

This aside, the material change in circumstance assessment (MCCA) that has now been published, using the Draft 2024 ISP assumptions, is utterly unreliable. The MCCA and Australian Energy Market Operator (AEMO) modelling results are like night and day. The results can’t be relied upon to dismiss a MCC for the HumeLink project, as such the regulatory investment test for transmission (RIT-T) must be reapplied to HumeLink.

Transgrid has a conflict of interest in assessing the capital cost and evaluating the net benefit of the HumeLink project in the MCCA. Comments by the Victoria Energy Policy Centre (VEPC) indicate that Transgrid will increase their regulated asset base and revenues by close to 80% if HumeLink is approved, with commensurate financial benefits for Transgrid executives and foreign and domestic shareholders.<sup>2</sup> Further, consultants who work repeatedly for Transgrid, have a conflict of interest, as their long-term relationship with the client is dependent on their analysis confirming desired outcomes. Therefore, all the analysis presented must be comprehensively and expertly reviewed.

NSW Treasury’s *Economic Appraisal Principles and Procedures Simplified* states:

*‘International research on major infrastructure projects has found evidence of **systemic bias in project appraisals**, ....*

*The research suggests a tendency for the **costs of major projects to be underestimated and for demand forecasts to be inflated**. These conclusions are based on case studies of several hundred major infrastructure projects in over 20 nations and 5 continents.....’*

There is considerable uncertainty about the capital cost presented in the CPA2. Given systemic bias in assessing major infrastructure project with ‘*costs of major projects... underestimated*’, this, in particular, needs to be independently and expertly assessed.

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<sup>1</sup> While the 2022 ISP was updated by the 2024 Draft ISP, the update wasn’t done in accordance with the required consultation under NER, clause 5.22.15(c). Therefore the 2022 ISP is the “latest ISP”, <https://threadreaderapp.com/thread/1775144967377461671.html> .

<sup>2</sup> Mountain, B.R., Woodley, T. and Outhred, H. 2021. “A review of the HumeLink Project Assessment Conclusions Report”. VEPC Working Paper 2109. Victoria Energy Policy Centre, Victoria University, Melbourne.

The issues with the CPA2 are discussed below under the following headings;

- Concern about bias in the assessment of options;
- Flaws with the assessment process;
- Breaches of the Rules
- Review of the MCCA
- Issues from reviewing the CPA2

## **2. Concerns about bias in the assessment of options**

There is concern by the community that there is bias in the assessment of options by Transgrid. Transgrid has a conflict of interest in assessing options, as their regulated asset base and revenues will increase substantially if HumeLink is approved.

Section 3.2.3 discusses clear bias in the assessment of undergrounding HumeLink. Also discussed below are concerns about bias in the assessment of Option 1C-new in the Addendum to the PACR and now in the MCCA, and the MCCA more generally. In the case of Option 1C-new there are significant material inconsistencies in the cost estimate of this option.

There is also bias in the cost-benefit analysis of HumeLink by including all the benefits of Project Energy Connect (PEC), VNI-West and Sydney Ring, but none of their costs. Much of the benefit of HumeLink relies on the construction of PEC, VNI West and Sydney Ring. While PEC may be considered a sunk cost, funding hasn't been approved for VNI West or Sydney Ring, and the costs of these projects should be included in the cost-benefit analysis of HumeLink.

The practice of excluding all the costs of other actionable ISP projects in the assessment of HumeLink is supported by AER guidelines '*AER guidelines make clear that all actionable ISP projects besides the one being assessed should be included in the base case*'. However, we believe these guidelines must be reviewed as they bias the economic assessment of an actionable ISP project. Where funding hasn't been committed, and benefits of a future actionable ISP project are counted, so too should be their costs.

At the very least sensitivity analysis should be undertaken to assess the net benefit of HumeLink without VNI West and Sydney Ring.

Billions of dollars are being invested in actionable ISP projects. It's critical that the cost-benefit analysis is robust.

### 3. Flaws with the assessment process

#### 3.1. Failure of the assessment to satisfy the National Electricity Objective (NEO) of efficiency

Transgrid says in the CPA2, their approach with the HumeLink project is ‘..... consistent with the National Electricity Objective [NEO]’.

The NEO states:

*‘to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity....’*

Therefore, the NEO is to promote dynamic, productive, and allocative efficiency in the national electricity market (NEM).

It is only possible to get productive, allocative and dynamic efficiency<sup>3</sup> in the NEM if you include all costs (first round direct and indirect costs), including externalities.

However, in an inexcusable policy failure, the RIT-T cost-benefit analysis explicitly excludes environmental and social costs.

- Exclude from its analysis, the costs (or negative benefits) of an ISP project’s harm to the environment or to any party that is not prohibited under a law, regulation or other legal instrument.

AER, *Cost benefit analysis guidelines - Guidelines to make the Integrated System Plan actionable*, August 2020, p91.

This is in direct conflict with the objective of efficient outcomes in the NEM.

The RIT-T is therefore a narrow financial assessment for industry, and not an economic assessment of **State benefit**, which means it is inconsistent with not just efficient outcomes, but also the government approval requirements.<sup>4</sup>

NSW Government cost-benefit analysis guidelines, that are used to assess **State benefit**, require ‘*economic, social, environmental and cultural*’ impacts be assessed for projects costing more than \$10 million. And yet in the NEM decisions are being made about transmission projects, worth billions of dollars, without including all the environmental and social costs. It would be one thing if these

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<sup>3</sup> Dynamic efficiency - investing in the least cost, the triple bottom line (financial, environmental, and social) project; Productive efficiency - producing electricity with least cost mix of inputs; and Allocative efficiency - pricing at marginal cost.

<sup>4</sup> An assessment of ‘State benefit’ for the HumeLink project is the key economic requirement of the HumeLink SEARs. The SEARs requires “**an assessment of the benefits of the project for the region and the State as a whole**” (HumeLink transmission project, Planning Secretary’s Environmental Assessment Requirements (Section 5.16 of the Environmental Planning and Assessment Act 1979), p2).

costs were insignificant, confined and short-lived but the impacts are massive, span for kilometres and last for generations – 80 to 100 years.

The serious problem with the RIT-T assessment excluding externalities, can be appreciated from the example below from the AER, *Cost benefit analysis guidelines - Guidelines to make the Integrated System Plan actionable*, August 2020, p36.

**Negative externality**

Assume an ISP project is a local gas-fired peaking generator, planned for development in close proximity to an existing hotel. AEMO expects the development of the generator will reduce the nearby hotel's annual earnings (due to a loss of visual amenity). The present value of this loss is \$15 million.

In this example, the \$15 million cost borne by the hotel's proprietor is a negative externality. While the development of the gas-fired peaking generator drives this cost, the generator's developer will not incur the cost. Nor will the cost be borne as a negative market benefit by the developer or any other NEM party in their capacity as consumers, producers or transporters of electricity in the market. It is therefore not part of the costs or market benefits

While a generator project, at a specific location (spatially confined), might be able to tolerate 1 pub losing \$15 million, with a transmission line (linear infrastructure), like HumeLink which is 365km long, you've got potentially 365 pubs (1 every kilometre – or agricultural operations, or tourism businesses, or forestry, or dwellings) losing \$15 million over the life of the project....\$15 million x 365km = \$5,475 million = \$5.475 billion.

All these costs are left out, and therefore wrong decisions are being made.

If environmental and social cost were taken into account, different energy market investments would be optimal. Instead of:

- thousands of kilometres of overhead transmission lines;
- large water batteries remote from load centres, like Snowy 2.0; and
- renewable energy zones dispersed geographically, long distances from load centres;

there would be:

- underground transmission;
- battery storage close to the urban load centres;
- a concentration of renewables in regions where transmission infrastructure already exists, such as where coal fired power stations are shutting down;
- off-shore windfarms close to coastal urbanisation; and
- more rooftop solar.

As a consequence of omitting environmental and social costs from the RIT-T, the wrong project options are preferred early in the planning process, the environment is left severely damaged, and options like undergrounding with better environmental outcomes, as well as lower risks in severe weather and bushfires, are ignored.

### 3.2. Feasibility of undergrounding is a MCC for the HumeLink project

The feasibility of undergrounding is a MCC for the HumeLink project and this option must be assessed in a reapplication of the RIT-T.

Although the RIT-T explicitly excludes consideration of the harm to the environment of transmission projects, there are legislative requirements to undertake the option with less impact on the environment, under the NSW Environmental Planning and Assessment Regulation and the Environment Protection and Biodiversity Act.

Transgrid gave the community members a commitment, when they agreed to go on the HumeLink undergrounding Steering Committee, that if feasible, Transgrid would reapply the RIT-T to HumeLink and assess undergrounding.

The community demands this commitment be honoured.

#### 3.2.1. The Amplitude Review

The Amplitude Review<sup>5</sup> of the Transgrid/GHD HumeLink undergrounding study presents a feasible option to underground HumeLink for \$5.46 billion, just 1.1 times the cost of the overhead option with significant and enduring environmental benefits.

Details of Amplitude Consultants expertise in assessing HVDC underground options was presented in a second supplementation submission to the NSW Select Committee inquiry into the feasibility of undergrounding transmission by HumeLink Alliance. That submission is included in Appendix B.<sup>6</sup>

The Amplitude underground option has the same transfer capacity as Option 4C, which was considered the most promising option to underground HumeLink in the Transgrid/GHD HumeLink undergrounding study,<sup>7</sup> contrary to the evidence given by Transgrid in the final hearing of Select Committee.

In evidence to the Select Committee, Marie Jordan, Transgrid, Executive General Manager - Network, said in relation to undergrounding: *HVDC, HVAC, all the different components are looked at. It was not feasible for this.*'

Clearly this assessment by Transgrid was wrong. Transgrid engaged GHD to assess the option of undergrounding Humelink in 2022, however, on expert advice, the community position was that the

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<sup>5</sup> Amplitude Review

[https://www.stophumelink.com.au/files/ugd/805824\\_0e929837d10241e28e148cdfdaa30241.pdf](https://www.stophumelink.com.au/files/ugd/805824_0e929837d10241e28e148cdfdaa30241.pdf)

<sup>6</sup> Amplitude Consultants staff have held key technical roles in:

- The world's first VSC interconnector;
- The world's longest HVDC underground cable project (up until recently at least);
- The world's first use of light-triggered thyristors for LCC technology; and
- The world's first MMC VSC HVDC technology project (which is now the standard technology used).

<sup>7</sup> <https://www.transgrid.com.au/media/y0mpqzvw/humelink-project-underground-report-august-2022-final.pdf>

study was flawed and unbalanced, and exaggerated the cost of the undergrounding option, as discussed in section 3.2.3 below.

Despite the exclusion of “harm to the environment” in the RIT-T, evidence in the NSW Select Committee hearing indicates that the AER is open to the option of undergrounding and it’s a matter of weighing the broader costs and benefits.

***‘JIM COX [Deputy Chair, AER]: Yes. Just to clarify, we’re not saying “no undergrounding”. What we’re saying is that the benefits and costs have to be weighed. I think the benefits—the sorts of things you are talking about; the views of the community—are relevant to be taken into account in such an assessment. And, yes, we would obviously like businesses to engage better with the host communities to understand what the community wants and needs.’*** Transcript, Select Committee, February 16, 2024.

Evidence that the AER is open to the option of undergrounding is also supported by the approval of HVDC undergrounding of the Victorian onshore section of Marinus.<sup>8</sup> The Marinus fact sheet says the underground option is to ‘reduce the impacts on any environmental and cultural heritage values’, <https://www.marinuslink.com.au/wp-content/uploads/2023/03/ON-LAND-CONSTRUCTION-Marinus-Link-web-jan23.pdf>.

Governments overseas have come to the conclusion, that when you take into account all the environmental costs of overhead transmission lines for the next 80 years, undergrounding has the highest net benefit. As a result, almost all new transmission links are underground throughout Europe, in fact are mandated in some countries, and much of Asia (*Going underground with the transmission connection for Snowy 2.0*, NPA, January 2021, p5).

Engineers are telling us that there have been major advances in underground cabling technology, it is entirely feasible and the world is looking on in disbelief as Australia builds more overhead transmission lines.

### **3.2.2. Lower environmental impacts (costs) with undergrounding**

By undergrounding transmission, a much smaller easement (around 15 m) is needed, compared to 70 to 100m with the overhead option, with commensurate reductions in loss of habitat and biodiversity. Also, with undergrounding some sections can be horizontal directional drilled, up to 1 km, eliminating impacts on habitat altogether.

Murraylink, a 180km HVDC underground transmission line from Victoria to South Australia, won an environmental award, and is renowned for only removing two trees along its route during construction.

There is also significant visual and noise pollution of the environment with overhead transmission, that is eliminated with undergrounding.

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<sup>8</sup> <https://www.aer.gov.au/system/files/2023-12/AER%20-%20Revenue%20Determination%20-%20Marinus%20Link%20Stage%201%20Part%20A%20%28Early%20works%29%20-%20December%202023.pdf>

The HumeLink EIS says that:

- a. the noise from HumeLink, under certain weather conditions, will exceed the EPA noise limit up to 470m either side of the line. That is 34,310 ha impacted by noise ( $365\text{km} \times 2 \times 0.470\text{km} \times 100 = 34,310 \text{ ha}$ ); and
- b. the visual impacts have been assessed up to 2km either side of the line. That is around 146,000 ha potentially impacted visually ( $365\text{km} \times 2 \times 2\text{km} \times 100 = 146,000 \text{ ha}$ ).

In addition, there are other benefits of undergrounding as follows:

- Eliminates the risk of overhead lines causing bushfire;
- Eliminates air and ground fire control hazards;
- Eliminates the risk of interruption to power transmission in severe weather events and/or bushfires and therefore improves transmission security and resilience as required under the [SLACIP Act](#);
- Minimal impact to private or public land after construction is complete;
- No overhead lines impeding agricultural operations, machinery use, irrigation, or aircraft operation;
- No loss of tourism;
- No undermining of regional development;
- Less transmission losses with HVDC;
- Considerably less operations and maintenance; and
- Little to no electromagnetic field impacts.

The considerable enduring environmental and community benefits, plus significantly lower operation and maintenance costs, as well as less losses with HVDC, means that HVDC undergrounding will often be the option with the highest net benefit for the State as a whole.

### **3.2.3. Failure to fairly assess undergrounding**

Transgrid failed to fairly assess the option of undergrounding in the Transgrid/GHD HumeLink undergrounding study. The study involved a Steering Committee made up of community representatives, an independent consultant assisting the community members, and Transgrid.

Initially Transgrid publicly released the undergrounding study report, showing a cost of undergrounding HumeLink at \$18.7 billion:

- without agreement from the Steering Committee;
- contrary to the agreed process of the Steering Committee; and
- despite a pending meeting of the Steering Committee to discuss the disagreement about the costs in the report.

Transgrid retracted the initial report.

To resolve the disagreement about the costs, it was decided to get the opinion of a third independent expert, Transgrid's own HVDC underground expert. That expert agreed with costs of the consultant assisting the community, and not the costs in the initially released report.

Two months later a second report was published with a cost, **\$7 billion lower**, at \$11.5 billion. However, this cost was still 60% above the cost stated by the consultant assisting the community and Transgrid's own HVDC undergrounding expert.

The exaggeration of the costs of undergrounding HumeLink, appeared to the community as a way to put undergrounding "to bed".<sup>9</sup> The community didn't endorse the report, having 52 outstanding issues, and believed it to be flawed and unbalance.<sup>10</sup>

It's one thing for government and regulators to be making decisions based on the facts. It's intolerable for them to be making decisions on misinformation and exaggerated costs.

#### **4. Breaches of the Rules**

##### **4.1. The CPA2 trigger event not met**

The submission of the HumeLink CPA2 application to the Australian Energy Regulator (AER), is a breach in the national electricity rules (NER), as the trigger event hasn't been met.

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<sup>9</sup> In minutes of Transgrid Advisory Council meeting, a question was posed by Craig Memery, Public Interest Advocacy Centre Ltd (PIAC), to Brett Redman Transgrid CEO, '*On Undergrounding, do you have any thoughts on what you could have done in 2022 to put it to bed? Are you disappointed that we are still having conversations on undergrounding after the report was released?*'

<sup>10</sup> [https://www.transgrid.com.au/media/mwafmnb/cgsc-position-on-humelink-undergrounding-study\\_20220824.pdf](https://www.transgrid.com.au/media/mwafmnb/cgsc-position-on-humelink-undergrounding-study_20220824.pdf)



## 5.16A.5 Actionable ISP project trigger event

In order to be eligible to submit a *contingent project* application in relation to an *actionable ISP project* (or a stage of an *actionable ISP project* if the *actionable ISP project* is a staged project) under [clause 6A.8.2](#), all of the following criteria must be satisfied ("**trigger event**"):

- (a) the *RIT-T proponent* must issue a *project assessment conclusions report* that meets the requirements of [clause 5.16A.4](#) and which identifies a project as the *preferred option* (which may be a stage of an *actionable ISP project* if the *actionable ISP project* is a staged project);
- (b) the *RIT-T proponent* must obtain written confirmation from *AEMO* that:
  - (1) the *preferred option* addresses the relevant *identified need* specified in the most recent *Integrated System Plan* and aligns with the *optimal development path* referred to in the most recent *Integrated System Plan*; and
  - (2) the cost of the *preferred option* does not change the status of the *actionable ISP project* as part of the *optimal development path* as updated in accordance with [clause 5.22.15](#) where applicable;
- (c) no *dispute notice* has been given to the *AER* under [rule 5.16B\(c\)](#) or, if a *dispute notice* has been given, then in accordance with [rule 5.16B\(d\)](#), the dispute has been rejected or the *project assessment conclusions report* has been amended and identifies that project as the *preferred option*; and
- (d) the cost of the *preferred option* set out in the *contingent project* application must be no greater than the cost considered in *AEMO's* assessment in subparagraph (b).

A requirement of clause 5.16A.5(a) is that an actionable ISP project meets the requirements of clause 5.16A.4. Clause 5.16A.4 states that:

***NER Clause 5.16A.4: Reapplication of regulatory investment test for transmission***

*(n) If:*

*(1) a RIT-T proponent has published on its website a project assessment conclusions report in respect of a RIT-T project; and*

*(2) there has been either:*

*(i) a material change in circumstances which, in the reasonable opinion of the RIT-T proponent means that the preferred option identified in the project assessment conclusions report is no longer the preferred option; or*

*(ii) AEMO has published an Integrated System Plan or ISP update that shows a change to the identified need in relation to the actionable ISP project the subject of the project assessment conclusions report,*

***then the RIT-T proponent must re-apply the regulatory investment test for transmission, unless otherwise determined by the AER.'***

By any reasonable opinion, a 400% increase in the cost of the HumeLink project since the PADR,<sup>11</sup> is a material change in circumstance (MCC).

Therefore the trigger event to submit the HumeLink CPA2 hasn't been met.

We understand that Transgrid, after submitting the CPA2 on December 21, 2023, has undertaken an assessment of the HumeLink MCC. This was published on February 29, 2024, more than two months after submitting the CPA2 to the AER. However, the assessment of the MCC must be undertaken before submitting the CPA2.

The AER notified Transgrid that an assessment of the MCC was required **before** the CPA2 application, in a letter to the General Manager of Regulation, Community and Policy, dated August 22, 2023, as follows (see full letter Figure 1, below):

In short, in view of the updated costs of the preferred option published by AEMO, we require that Transgrid make an assessment of whether a material change in circumstances has occurred before it submits a future contingent project application. Moreover, we seek

Transgrid hasn't complied with this requirement.

Further the MCCA that has been done for HumeLink, fails to determine there is no MCC as discussed below. A comprehensive expert review of the MCCA needs to be undertake.

#### **4.2. Breach of the Rules by not using assumptions of the "latest ISP" in the feedback loop confirmation**

As the Centre for Independent Studies (CIS) points out, the confirmation feedback loop for the HumeLink project, undertaken by AEMO, has not used assumptions in the "latest ISP" as required under the NER, clause 5.16A.5(b).<sup>12</sup>

The "latest ISP" is the 2022 ISP.

Although the Draft 2024 ISP has been published, the required consultation according to NER, clause 5.22.15(c), has not been done, and so the "latest ISP" is the 2022 ISP.

Similarly, the MCCA has been done with the Draft 2024 ISP assumptions, rather than the 2022 ISP assumptions - the "latest ISP" assumptions.

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<sup>11</sup> The MCC Rule change announced October 22 requires reopening triggers for MCC on project cost to be set at PADR stage:

*'reopening triggers would be outlined in the PADR/DPAR and consulted on as part of the RIT process'*

Although this Rule change doesn't apply to HumeLink, as the HumeLink RIT-T concluded December 2021 with the Addendum to the PACR, and so no 'reopening triggers' have been set for the HumeLink project, it does provide guidance on what initial cost for the project (i.e. the PADR cost) should be considered when assessing MCC.

<sup>12</sup> <https://threadreaderapp.com/thread/1775144967377461671.html>

### 4.3. Apparent breach of the Rules in the HumeLink CPA1 (part 2)

It also seems likely that the Rules were breached in submitting the HumeLink CPA1 (part 2) on 23 May 2023. Clause 5.16A.5(d) says:

(d) the cost of the *preferred option* set out in the *contingent project* application must be no greater than the cost considered in *AEMO's* assessment in subparagraph (b).

This is restated by the AER in the determination of CPA1 (part 2):

‘• The cost of the preferred option set out in the contingent project application must be no greater than the cost considered in AEMO's ISP feedback loop assessment’, page v.

HumeLink CPA1 (Part 2) application states: ‘AEMO’s 2022 ISP defines HumeLink as a staged actionable ISP project, without decision rules, at a total cost of \$3.91 billion, footnote 36, 36 AEMO, 2022 ISP, June 2022, p. 67 and 68. The \$3.91 billion (\$Real 2022-23) is equivalent to \$3.28 billion (\$Real 2017-18) included in AEMO’s Feedback Loop Notice, published on 22 January 2022’, Transgrid, CPA1 (part 2).

However, on **July 18, 2023**, less than two months later, in evidence to the NSW parliamentary inquiry, Brett Redman, CEO of Transgrid, agreed the project cost was now around \$5 billion. On **July 25, 2023**, a week later, Transgrid wrote to the AER asking if this cost increase was a MCC.

The letter response to Transgrid says the following:

Figure 1: Letter from AER to Transgrid August 22, 2023



22 August 2023

Ms Stephanie McDougall  
General Manager of Regulation, Community and Policy  
Transgrid

via email: [stephanie.mcdougall@transgrid.com.au](mailto:stephanie.mcdougall@transgrid.com.au)

Dear Ms McDougall

I am writing to you regarding your inquiry on 25 July 2023 as to whether there has been a 'material change of circumstances' relevant to the completed RIT-T for 'Reinforcing the NSW Southern Shared Network'.

In short, in view of the updated costs of the preferred option published by AEMO, we require that Transgrid make an assessment of whether a material change in circumstances has occurred before it submits a future contingent project application. Moreover, we seek confirmation of whether Transgrid has requested AEMO assess the impact of the updated costs of the preferred option on the optimal development path in the Integrated System Plan (ISP). Our reasons are set out below.

**Material changes in circumstances on completed RIT-T**

The project assessment conclusions report (PACR) for 'Reinforcing the NSW Southern Shared Network' RIT-T was published by Transgrid on 29 July 2021. We note that the PACR estimated the cost of the preferred option of \$3.3 billion and estimated net benefits of \$491 million. AEMO has recently released its Transmission Expansions Options Report on 28 July 2023 as part of its 2024 ISP process. We also observe that this report has provided an updated estimate of the costs of the preferred option in the RIT-T of \$4.9 billion (June \$2023), or a nominal increase of \$1.6 billion.

This letter from AER is saying that the cost of HumeLink in the Transmission Expansion Options Report, 28 July 2023, was \$4.92 billion. It is therefore implausible that the cost of HumeLink, when the CPA1 (part 2) was lodged in 23 May 2023, was \$3.91 billion (\$Real 2022-23). In a bit over two months, the project cost had increased by \$1 billion.

We ask, on what date the \$4.9 billion (June \$2023) HumeLink project cost was provided to AEMO, for the Transmission Expansions Options Report? We also ask what the Transgrid estimated capital cost of HumeLink was on May 23, 2023?

Transgrid say in their CPA1 (part 1):

*'As noted, our Stage 1 (early works) capex will enable us to: • determine the prudent and efficient construction cost for Stage 2 (project implementation)'*

Therefore, a major part of the \$321.87m provided to Transgrid, as a consequence of the CPA1 (part 1) in August 2022, was to firm up the capital cost of the HumeLink project. It seems unlikely therefore that no progress on refining the project cost had been made by 23 May 2023, when the CPA1 (part 2) was lodged.

#### **4.4. A breach of the rules by approving funding for a project with a net economic cost**

Clause 5.15A.1 only allows the preferred option of the RIT-T to have a negative net benefit (a net cost) if the project provides reliability corrective action or the provision of inertia network services.

Clause 5.15A.1 (c):

**(c)**The purpose of the regulatory investment test for transmission in respect of its application to both types of projects is to identify the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the market (the preferred option). For the avoidance of doubt, a preferred option **may, in the relevant circumstances, have a negative net economic benefit (that is, a net economic cost) to the extent the identified need is for reliability corrective action or the provision of inertia network services** required under [clause 5.20B.4](#) or the provision of system strength services required under [clause 5.20C.3](#).

The preferred option 3C for the HumeLink project, isn't for 'reliability corrective action' or 'provision of inertia', but had a net cost, after correcting for errors.

At least **five** errors in the PACR cost-benefit analysis are responsible for the miscalculation of a net benefit for HumeLink. They include:

4.4.1. Failures in sensitivity analysis in relation to:

4.4.1.1. Delays with Snowy 2.0;

4.4.1.2. Commitment of both Kurri Kurri and Tallawarra B gas fired generators and VNI West delayed;

4.4.1.3. Discount rate;

4.4.2. Opex assumptions;

4.4.3. Escalation used;

4.4.4. Assumption that VNI West and Sydney Ring were sunk costs

4.4.5. The assumption that the cost of Snowy 2.0 was sunk in July 2021.

These are discussed in turn below.

#### 4.4.1. Failure in the sensitivity analysis

##### 4.4.1.1. Delays with Snowy 2.0

Sensitivity of the net benefit of HumeLink with Snowy 2.0 delayed should have been considered, but wasn't. In the PACR analysis Snowy 2.0 was included from 1 July 2025. It is now delayed until at least December 2028, with many commentators saying this is optimistic. This was foreseeable before July 2021, when the PACR was being prepared, and sensitivity analysis should have been undertaken on this key assumption.

In consultation with Transgrid, we asked that they assess the impact of the delay in Snowy 2.0 on the net benefits of HumeLink. They responded that this scenario was considered in the PADR in the slow change scenario of 'no Snowy 2.0'. The slow change scenario in the PADR had a net benefit (excluding competition benefits) of \$380m<sup>13</sup> but omitted biodiversity offset costs. Taking biodiversity costs into account, HumeLink had a significant net cost of \$555m without Snowy 2.0 (\$380m slow change - \$935m biodiversity offsets = -\$555m).

##### 4.4.1.2. Commitment of both Kurri Kurri and Tallawarra B and delay of VNI West

Tallawarra B and Kurri Kurri are now both committed, and VNI West being delayed, is now described by commentators as "practically certain".

The RIT-T Guidelines states "*Sensitivity analysis entails varying one or multiple inputs to test how robust the output of an analysis or model is to its input assumptions*".

Given the likelihood of these events occurring together, as has turned out to be the case, sensitivity to varying multiple inputs should have been investigated to test the robustness of the modelling outcomes.

Table 1 below summarises the impact of changes in these market events to HumeLink's net benefit.

With VNI-West delayed, Option 1C-new and Option 3C are ranked equal first. This means the preferred option is dependent on assumptions, and not robust.

The yellow highlighted figures are the net benefit (excluding competition benefits) of the three options assuming **both** Tallawarra B and Kurri Kurri gas power stations proceed and VNI West is delayed. Combining the impacts on net benefits from these "practically certain"

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<sup>13</sup> Transgrid, January 2023, humelink-rit-t-padr-houstonkemp-npv-model.xlsx

market events, means that Option 1C-new is the top-ranked option with the highest net benefit of -\$101 million<sup>14</sup>.

**Table 1: Sensitivity analysis of HumeLink net benefit calculations to market events (\$m)**

	1C-new	2C	3C
<b>No competition benefits</b>	-\$11	-\$33	\$39
<b>Adjust for KKPS, Tallawarra B and VNI-West delay</b>	-\$101	-\$292	-\$209
<b>Include competition benefits</b>	\$335	\$399	\$491
Adjust for KKPS and Tallawarra B	\$180	\$250	\$334
Impact of KKPS and Tallawarra B	-\$155	-\$149	-\$157
Adjust for VNI-West delay	\$400	\$300	\$400
Impact of VNI-West delay	\$65	-\$99	-\$91
Impact of KKPS, Tallawarra B and VNI-West delay	-\$90	-\$248	-\$248
Adjust for KKPS, Tallawarra B and VNI-West delay	\$245	\$151	\$243

Source: “Submission to the Australian Energy Market Operator on its 2022 Draft Integrated System Plan”. Victoria Energy Policy Centre, Victoria University, Melbourne, February 2022, Table 1, p33 – **modified to show the weighted net benefit (excluding competition benefits)**.

#### 4.4.1.3. Discount rate

The base discount rate in the PACR was 5.9% with sensitivity tested on 2.23% and 7.90%.

The results presented on the sensitivity analysis in the PACR report, only showed the net benefits (including competition benefits). Table 2 below shows the sensitivity of the net benefits (excluding competition benefit) of the options to discount rates.

<sup>14</sup> (((\$180m-\$335m) + (\$400m-\$335m) + -\$11m=-\$101m): \$180m-\$335m is the difference due to Tallawarra B and Kurri Kurri proceeding + \$400m-\$335m is the difference due to VNI West delayed + -\$11m weighted net benefit (excluding competition benefits) of Option 1C-new.

**Table 2: Sensitivity analysis of the PACR net benefit (excluding competition benefits) to discount rate**

	Net Benefit (excluding competition benefits)		
	Option		
Discount rate	1C-new	2C	3C
	\$m	\$m	\$m
5.90%	-11.0	-44.1	39.4
7.90%	-290.5	-398.2	-324.5
7.00%	-180.7	-259.4	-181.5

This analysis shows that the net benefit of HumeLink is sensitive to a change in discount rate. Option 3C has a higher net cost of \$324.5m, than option 1C-new with a net cost of \$290.5, with a discount rate of 7.9%. Neither option should have been progressed to the CPA1 stage.

Also the impact of a 7% discount rate (the discount rate used in the Draft 2024 ISP and the Transgrid MCCA) on net benefits (excluding competition benefits) of options in the PACR is shown in Table 2 above, with Option 1C-new and Option 3C showing the same net cost.

#### 4.4.2. Opex assumptions

Opex is underestimated at 0.5% of Capex in the July 2021 PACR. AEMO assumes Opex is 1% of Capex, VNI West assumes Opex is 1%, and Transgrid’s current operating performance is 3.4%. We assume that this “refinement” of the Opex estimate in the PACR is a change to ensure the project has a net benefit (excluding competition benefits) because Opex at 1% of Capex would add a \$103 million present value (PV) cost to the project, and mean instead of a \$39 million net benefit, the project had a \$64 million net cost ( $\$39m - \$103m = -\$64m$ ). Assuming opex of 3.4%, Transgrid’s current performance, the project had a \$558 million net cost ( $\$39m - (\$103m/0.5 \times 3.4 - \$103m) = -\$558.4m$ ).

In consultation on the PADR EnergyAustralia asked if the opex assumption was consistent with AER’s view. Transgrid confirmed that opex in the PADR was 1% consistent with AER, but in a following paragraph said they had “refined” this assumption in the PACR.



EnergyAustralia requested confirmation that the transmission asset economic lives used and the one per cent of capex per annum opex assumption are consistent with AER views when approving expenditure allowances.<sup>64</sup>

The economic NPV model released with the PADR states the asset lives used in the RIT-T assessment, which are 40 years for substation equipment and 50 years for transmission lines. These are consistent with our current revenue determination made by the AER (please refer to the 'PTRM input' tab of our current Post Tax Revenue Model<sup>65</sup>).

We have also refined the assumption regarding annual operating costs based on more detail cost assessment. We now assume this to be 0.5 per cent of each option's capital costs each year (excluding capital costs relating to biodiversity costs since these are one-off and do not require ongoing operating costs).

Transgrid, PACR, July 2021, p24.

This presents as an example of systemic bias in underestimating costs of major infrastructure projects, in cost-benefit analysis. A remedy for this systemic bias, is the use of standard assumptions. In the case of HumeLink opex, Transgrid's current practice of 3.4% should be assumed.

#### 4.4.3. Escalation used

The escalation in the PACR was not consistent with the ABS published CPI (see Table 3 below). Transgrid used what they defined as a COVID adjusted index. If the official CPI was used, the capital cost of Option 3C would have been around \$75m higher (PV cost \$46m) and the project would have had a net cost of \$7m.

\$3.27 billion in Real June 2020\$ escalated to June 2021\$ with COVID adjusted CPI of 1.01567 = \$3.321 billion.

\$3.27 billion in Real June 2020\$ escalated to June 2021\$ with official CPI of 1.03846 = \$3.396 billion.

**Table 3: Escalation used in the PACR versus ABS official series**

Escalation of inputs			All groups CPI ; Australia ;	
			Index Numbers	
			Original	
			INDEX	
			Quarter	
Unit	Index Numbers ; All groups CPI ;		Original	
Series Type	Index Numbers		3	
Data Type	Original		INDEXT	
Frequency	INDEXT		Sep-1348	
Collection Month	Quarter		Sep-2023	
Series Start	3		301	
Series End	01/09/1948		A2325846C	
No. Obs	01/03/2021			
Series ID	291			
	A2325846C			
			Dec-2018	114.1
Mar-19		114.10	Mar-2019	114.1
Jun-19		114.80	Jun-2019	114.8
Sep-19		115.40	Sep-2019	115.4
Dec-19		116.20	Dec-2019	116.2
Mar-20		116.60	Mar-2020	116.6
Jun-20	▶	116.80	Jun-2020	114.4
Sep-20	▶	117.00	Sep-2020	116.2
Dec-20		117.20	Dec-2020	117.2
Mar-21		117.90	Mar-2021	117.9
Jun-21	▶	118.63	Jun-2021	118.8
			Sep-2021	119.7
			Dec-2021	121.3
<b>June 2021 quarter assumption</b>			Mar-2022	123.9
Assumed annual inflation		2.5%	Jun-2022	126.1
Quarterly rate	▶	0.62%		
<b>Escalation factor from FY2020 to FY2021</b>				
Jun-20		116.80		114.40
Jun-21		118.63		118.80
Escalation factor		1.01566837		1.03846154

**4.4.4. Assumption that VNI West and Sydney Ring are sunk costs**

The HumeLink PACR says:

*The RIT-T must demonstrate that there is an overall net market benefit to the NEM from increasing the transfer capacity of the transmission network – the Southern Shared Network between southern NSW and the major demand centres of Sydney, Newcastle and Wollongong.*

*The analysis in this PACR shows that the investments considered in this RIT-T are expected to:*

- *allow the additional transfer capacity between South Australia and NSW provided by EnergyConnect and the additional transfer capacity between Victoria and NSW provided by the VNI Minor upgrade to flow to major demand centres;*

As discussed above much of the benefit of HumeLink relies on the construction of PEC, VNI West and Sydney Ring. While PEC may be considered a sunk cost, funding hasn't been approved for VNI West and Sydney Ring.

Transgrid argue that ‘AER guidelines make clear that all actionable ISP projects besides the one being assessed should be included in the base case’. We believe these guidelines must be reviewed to ensure bias isn’t occurring, and correct (efficient) investment decisions are being made.

#### 4.4.5. Assumption that Snowy 2.0 was a sunk cost

The cost of HumeLink should have been included in the cost-benefit analysis of Snowy 2.0 and it wasn’t. And the “unsunk” cost of Snowy 2.0 should have been included in the PACR cost-benefit analysis of HumeLink. Building projects worth billions of dollars and not correctly assessing the cost and benefits is leading to wrong investment decisions and is doing considerable harm to the nation. In a commercial environment this would be seen as false and misleading behaviour.

#### 4.5. Expected breach of the rules in failing to identify Option 1C-new as the preferred option in the Addendum of the PACR

Consistent with NER clause 5.15A.1(c), the preferred option is the credible option that maximises the net economic benefit across the market, compared to all other credible options. Transgrid selected Option 3C as the option with the highest net benefit in the Addendum to the PACR, but this was disputed by HumeLink Alliance.

In the comparison of the two options, the cost per kilometre for Option 1C-new was implausibly higher than the cost per kilometre for the Option 3C (see Table 4 below).

**Table 4: Addendum transmission lines and biodiversity costs for Options 1C-new and 3C**

Option	Length <sup>1</sup>	Biodiversity offsets lines	Biodiversity offsets lines	Capital cost lines	Capital cost lines
	km	\$m	\$m/km	\$m	\$m/km
<b>1C-new</b>	272	821	3.02	1,569	5.77
<b>3C</b>	366	894	2.44	1,824	4.98
<b>Tee-off to Wagga</b>	94	73	0.78	255	2.71
<b>Percentage higher cost applied to 1C-new relative to Tee-off Wagga</b>			289%		113%

The reason given for the much higher cost of 1C-new, relative to 3C, was that there was more difficult terrain and high value biodiversity along the 1C-new route. However, as 1C-new follows exactly the same route as 3C, from Maragle to Bannaby, the explanation was improbable. This excessive difference was also inconsistent with the landowners understanding of the terrain and vegetation along the two routes.

The biodiversity offset cost of 1C-new was close four times higher than the section to Wagga Wagga, while the line cost of 1C-new was double that of the section to Wagga Wagga.

Despite requests, Transgrid failed to provide evidence to the community of the topography and vegetation differences between the options.

It is unclear whether evidence, substantiating the considerably higher cost applied to 1C-new, was provided to the AER and independently verified.

Even with the much higher per kilometre biodiversity and line costs, Table 2 above actually shows that with the higher discount rate of 7.9%, Option 3C has a higher net cost (excluding competition benefits) of \$324.5m, than Option 1C-new with a net cost of \$290.5, and so Option 3C wasn't robustly established as optimal.

## 5. Review of the MCCA

Our review of Transgrid's MCCA is attached. It is our position that Transgrid has failed to show there has been no MCC and therefore the trigger event at clause 5.16A.5(a), to submit the CPA2, has not occurred.

## 6. Issues from reviewing of the CPA2

### 6.4. Route refinement and failure to consult

Transgrid says:

*'• 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', p1;*

In the May 2023 CCG meeting, Transgrid committed to meeting face-to-face with the 4,322 indirectly impacted landowners.

- *'Joel [Transgrid] noted that for landowners who are impacted by the easement, they are going beyond the newsletters and community information sessions to directly and proactively engage with those people within 2km of the route corridor to talk about the impacts of the project.*
- *A CCG member asked if the project team are doorknocking.*
- *Joel [Transgrid] confirmed that they are going directly to landowners and seeking face-to-face meetings....*
- *A CCG member noted that the project is already three years in and Transgrid should have been engaging with neighbours from the beginning.*

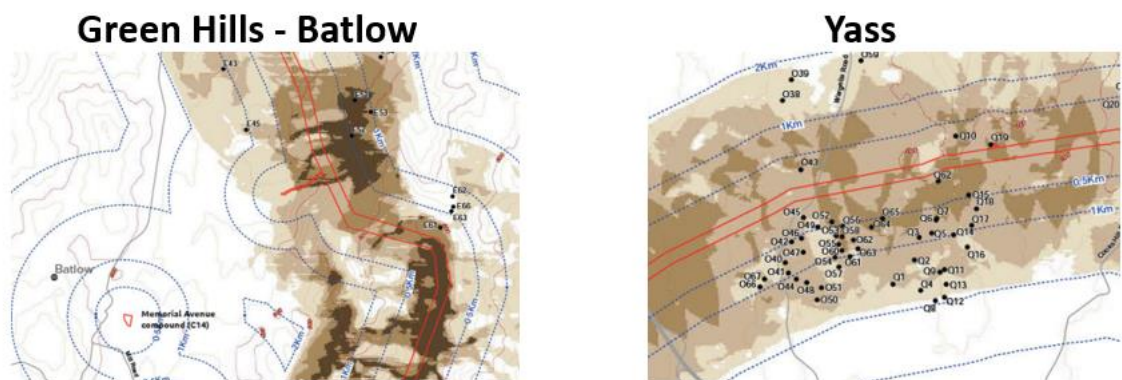
- Another CCG member commented that it is a failure from Transgrid that from their understanding 4322 residences have been identified as being impacted and they are only being engaged with now.
- Joel [Transgrid] responded that **there is still adequate time for engagement with landowners prior to the EIS process.**

Submissions to the EIS closed October 10, 2023, and yet Transgrid is still to contact the 4,322 indirectly impacted landowners. Members of the community have been doorknocking Yass residents shown in map below in Figure 2. Not one had been contacted directly by Transgrid, and most knew nothing about the HumeLink project, which will devalue their properties by hundreds of thousands of dollars. This is a major failure of Transgrid’s consultation.

Further, contrary to the assertion that Transgrid has ‘undertaken significant community ...engagement’, despite repeated requests by directly impacted landowners in 2022 to reassess the HumeLink route at Yass, Transgrid has refused to do so.

With the Green Hills State Forest refinement announced in November 2023, Transgrid are improving the visual amenity for 10 landowners, whereas in the Yass region, no attempt has been made to reduce the impacts on around 50 residents (see Figure 2).

**Figure 2: Number of residences impacted by HumeLink in the Green Hills and Yass regions**



The Green Hill’s route also increases the risk of bushfires for the broader community by running the line through forest country highly prone to bushfires, as evidenced by the devastation of this area by the Dunns Road fire.

Undergrounding HumeLink would reduce the impact on the Yass region and reduce bushfire risk in the Green Hills region.

AEMO defined a criterion in the 2020 ISP of ‘do no harm’.

‘• *Do no harm – ensuring that any new infrastructure does not lead to unsustainable deterioration in grid resilience. Building additional transmission lines along a bushfire prone transmission corridor would be an example of resilience deterioration*’, AEMO 2020 | 2020 ISP Appendix 8. Resilience and Climate Change, p14-15.

The HumeLink Fact Sheet, March 2022 stated that HumeLink is traversing through 87 km of medium to high bushfire risk areas and 43 km through high to very high. This is over a third of the route in bushfire prone land.

Distance traverssing bushfire risk area	87 km med to very high 43 km high to very high
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As a significant proportion of the HumeLink corridor is in bushfire prone land, not undergrounding is leading to ‘resilience deterioration’.

#### 6.5. HumeLink is not designed for reliability, safety and security

Transgrid says:

*‘These initiatives and others have resulted in a design, ....to collectively provide, the best solution [for] safety, reliability, and security of supply of electricity as well as the reliability, safety and security of the national electricity system.*

The overhead line option for HumeLink reduces system security. Undergrounding increases system security as underground cables are not vulnerable to increasing incidents of severe weather and bushfires.

#### 6.6. AEMO’s feedback loop is not appropriate for assessing material changes in circumstance

As discussed in section 4.2 above, AEMOs feedback loop for HumeLink has not been applied using assumptions of the “latest ISP”, the 2022 ISP.

This aside, AEMO’s feedback loop is not a robust means of assessing the economic merit of HumeLink, given the MCC for the project. For a MCC the NER require the reapplication of the RIT-T, not AEMO’s feedback loop.

In the determination of the MCC rule change the AEMC stated: *As highlighted by stakeholders in submissions to the consultation paper, there are other mechanisms that may help address the impacts of cost impacts, the form of the CPA process and the ‘feedback loop’.* While these mechanisms are important safeguards, they **do not fully address the specific issue that the current MCC provisions seek to address** – ensuring that the preferred option identified through the RIT process remains the most net beneficial option after a

*material change in circumstances. Consequently, the Commission concluded that there is a need to revise the current MCC provisions*

Also in a submission to the NSW parliamentary Standing Committee inquiry it was stated: *'The Contingent Project Application Process is deeply flawed. It requires AEMO to run a TOOT process meaning Take One project Out at a Time. What they do is just remove Humelink from their economic analysis and observe the reduction in benefits and compare that with the increased cost of the project. This is exactly like removing one link from a bicycle chain and observe what that does to the value of the bicycle. Of course, the whole chain falls off and the bicycle won't work. So, the value of that one link is calculated to be the value of the whole bicycle'*,

<https://www.parliament.nsw.gov.au/lcdocs/submissions/80679/0029b%20Prof%20Simon%20OBartlett.pdf>.

### **6.7. Percentage increase in capital cost of the HumeLink project**

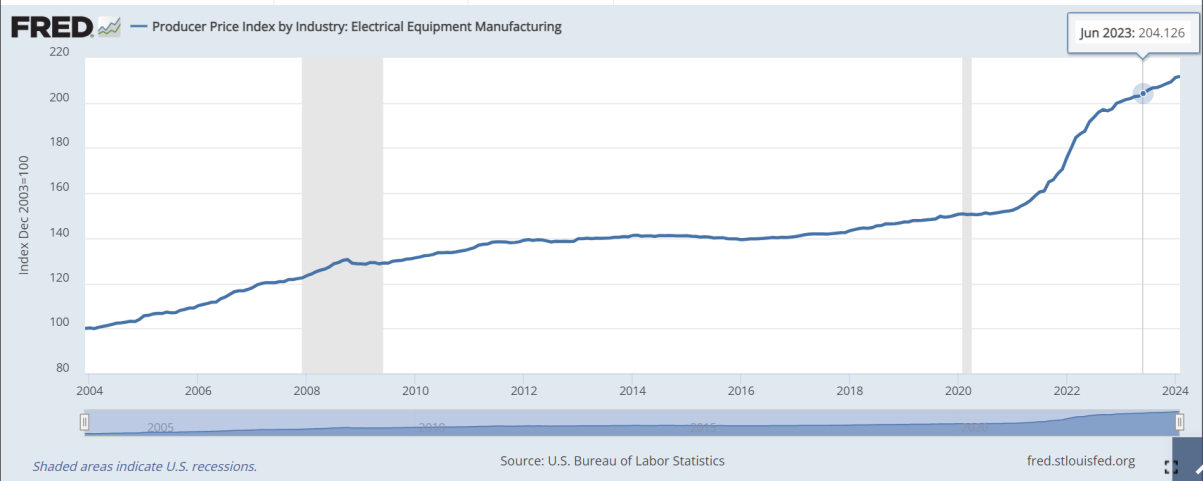
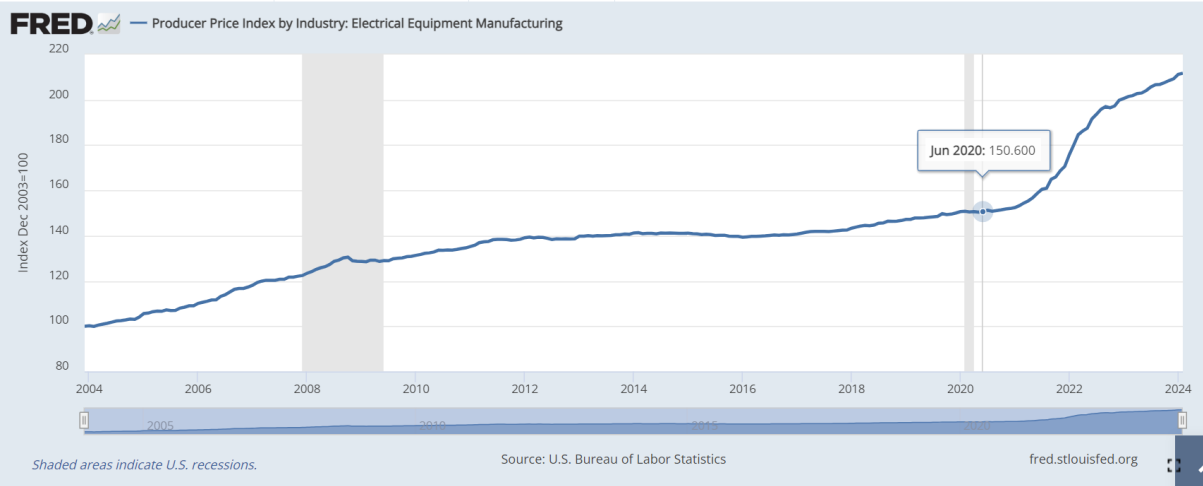
The Rule change in 2022 for a material change in circumstance now requires the proponent to develop reopening triggers at the PADR stage of the project. The near 400 per cent increase in the cost of the project since the HumeLink PADR, by any 'reasonable opinion', represents a material change in circumstance.

Transgrid says:

*'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 (footnote 7) 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. (footnote 8)'*

Can Transgrid please clarify:

- a. Is the 30 per cent increase in energy infrastructure projects referred to, a real or a nominal increase? Can you please provide the producer price index series that is being referred to here, for the 30 per cent increase in *energy infrastructure projects*?



The US FRED index shows a nominal increase in electrical manufacturing prices from June 2020 to June 2023 of 35.5%. The nominal increase for HumeLink is 50.5% (\$4.92b/\$3.27b) this is 42% above the industry average ( $50.5/35.3=1.42$ ).

The cost increase to \$4.92 billion includes a reduction in biodiversity offset cost from \$935 million to \$437 million (see Table 4-2 below). Therefore, the real increase in the infrastructure cost component is much more than 30 per cent – more like 63 per cent and therefore considerably above the industry average ( $(\$4.92 - \$0.437)/((\$3.27 - 0.923) \times 1.1687) = 1.63$ ).

Looking at the nominal increase of the line and substation costs, without biodiversity, the line and substation costs have increased around 91%, more than double the industry average ( $(\$4.92 - \$0.437)/(\$3.27 - 0.923) = 1.91$ ).



Table 4-2 details our Stage 2 total capex by sub-category of capex.

Table 4-2 Stage 2 Capex by sub-category of capex (\$M, Real 2023-23)

Category of capex	Forecast capex	% of total capex
<b>Direct costs</b>	3,867.55	90.38%
Tendered works	3,232.80	75.55%
West – Design, substations and transmission lines including access track	██████████	██████████
East – Design, substations and transmission lines including access track	██████████	██████████
Long-lead equipment (excluding towers)	██████████	██████████
Other Construction costs <sup>1</sup>	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%

### 6.8. Substantial reduction in biodiversity offsets

Can Transgrid please provide a detailed reconciliation of the biodiversity offset cost estimated in the PACR of \$935 million and that estimated in the CPA2 of \$437 million. In particular, can Transgrid provide maps of the route from the PACR and the CPA2 comparing the value of biodiversity offset costs by route segment, and so identifying where the \$498 million decline in biodiversity offset costs has occurred.

### 6.9. The PACR RIT-T indicates that HumeLink is not critical

Transgrid says:

*‘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.’*

And

*‘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.**’*

In the PACR HumeLink was determined to have a net benefit (excluding competition benefits, and environmental and community costs) of \$39 million when the project was costing \$3.3 billion. It’s now costing \$4.92 billion. According to the PACR modelling, this project is not critical.

And as identified above, a number of questionable assumptions and errors mean, in the PACR, HumeLink had a net cost.

#### **6.10. HumeLink is needed without Snowy 2.0**

Politicians have commented to the community, that Transgrid has repeatedly told them HumeLink is needed without Snowy 2.0.

In the CPA2 Transgrid states:

*'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.'*, p6.

Can Transgrid please model the scenario to assess the economic merit and optimal timing of HumeLink with no Snowy 2.0, given the claims by Transgrid that HumeLink is critical, even without Snowy 2.0?

#### **6.11. HumeLink will be at maximum transfer capacity when Snowy 2.0 is operating at full capacity**

Transgrid says:

*'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.'*

However the transfer capacity of HumeLink is 2,200 MW, equivalent to the capacity of Snowy 2.0. HumeLink will have no additional capacity to transport renewable energy, when Snowy 2.0 is operating at full capacity. This makes clear that a second HumeLink, HumeLink 2.0, will be needed very soon as indicated in AEMO's 2023 Transmission Expansion Options Report (TEOR).

AEMO and Transgrid should be in consultation with landowners who are expected to be impacted by HumeLink 2.0, now. Consideration must be given to building HumeLink 1.0 underground and expandable, with additional conduits for future cables, as has been assessed for Marinus as a HVDC underground option.

## **6.12. Requests by Transgrid to the AER**

### **6.12.1. CESS regime will not apply**

Please explain what incentives to improve efficiency will be lost if the CESS regime is not applied.

### **6.12.2. Establishment of a new class of assets for biodiversity offsets**

Please explain the purpose of this request. Is this for modelling the net benefit of HumeLink or for passing biodiversity offset costs onto customer bills?

Unlike depreciable assets that have a flow of services overtime, biodiversity is lost forever at construction - at the point in time when the bulldozers remove the critically endangered box woodland, etc.

### **6.12.3. Adopt as incurred depreciation**

Please explain the purpose of this request. Is this for modelling the net benefit of HumeLink or for passing this cost onto customer bills?

## **6.13. Pressuring AER to approve HumeLink by March 29, 2024 because of costs that will be incurred by Transgrid**

Transgrid points to costs that will be incurred if the project is not approved by AER by March 29, 2024. However these costs and outrageous deadlines are self-imposed by Transgrid – the result of the mismanagement of agreements that Transgrid has entered into. Pressuring the AER into rushing the decision on a billion-dollar project, Transgrid's largest project since the construction of their existing network, with questionable economic merit and certain unaccounted for harm to communities and the environment, comes with serious risks for the people of NSW and Australia.

The Draft 2024 ISP says the optimal timing of HumeLink is 2029-30 for the Step Change scenario and 2030-31 for the Progressive Change scenario, (AEMO 2023 | Appendix 5. Network Investments, p23).

There is an optimal delivery time for HumeLink. Delivering it in 2026, before it is needed, will substantially reduce the net benefit. It also means, in a cost-of-living crisis, electricity consumers of NSW will be paying for HumeLink before it is needed – unnecessarily paying money to Transgrid's foreign and domestic shareholders.

It is important not to rush the decision on the HumeLink project as an overhead line that is strongly opposed by landowners, communities along the line, and environmentalists, which as a consequence, risks causing considerable delays. Given there is time, it is important to

carefully assess the underground option. Landowners have said *'if you go underground, you can start tomorrow'*.

A recent poll by the Guardian said that 70 per cent of people believed the transition to net zero shouldn't be at the expense of communities and the environment. Also 65 per cent of people are against overhead transmission lines. It is important to take the opinions of the people of Australia into account when making project decisions.

NSW Planning & Environment are not expected to make a decision to deny or approve the HumeLink project until later in 2024 with Transgrid's EIS Submission and Amendment Reports not expected until April 2024. As the planning approval for HumeLink is not expected until later in 2024, it is important to make the right decision, and not be intimidated into a rushed decision.

#### 6.14. Opex inconsistent with AEMO's assumptions and Transgrid's performance

The opex estimate in Table 0.3 for HumeLink when the project is assumed to be complete in 2027-28 is very, very low – \$13.32 m, 0.3% of capex ( $0.01332/(\$4.92 - \$0.437 \text{ biodiversity offsets}) = 0.3\%$ ). AEMO assumes opex is 1% of capex, and Transgrid's current operating practise is 3.4%. An accurate opex estimate is necessary when assessing the net benefit of HumeLink.

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	<b>23.17</b>

We ask that Transgrid model the net benefits of HumeLink with Transgrid's current opex practice of 3.4%. Given that HumeLink is being constructed in bushfire prone land, opex is likely to be higher than average.

#### 6.15. No mention of capital refresh for HumeLink in the cost-benefit analysis

Engineers have said:

Power electronic components, such as telecommunications, protection, inverters FACTS devices, must be completely replaced every 15 to 25 years.

Substation transformers and reactors have paper/oil insulation that deteriorates over time due to heat, and typically last 40 years but may fail earlier, requiring complete replacement. They cannot be economically or practically refurbished.

Switchgear, and other substation equipment typically lasts 40 years, but must be totally replaced.

Transmission lines should last 50 years (or more) but depending on the climate (humid and hot is much worse) will corrode. This weakens the towers as metal corrodes. Painting slows this process but is very expensive and not practiced in Australia until it's too late. The conductors in NSW and Victoria traditionally have steel core that corrodes, and depending on the environment may have to be totally replaced. The earth wires at the top are made of steel and also corrode and may need to be replaced.

With the increasing severity of high winds, it is possible that the lines will have inadequate physical strength and get flattened by extreme winds, especially during El Nino years. The insulators supporting the conductors may need to be totally replaced half way through the lines life and this is a very difficult and expensive process especially if it has to be done live - without turning off the line.

Refurbishing and strengthening transmission lines is very, very expensive.

The required work and costs must be assessed on a case-by-case basis and depends on the environment. However, the AER's benchmark statistics show that the typical annual costs, over the asset's life cycle average 3.3% pa for the east coast TNSPs and that Transgrid's costs are higher than the average.

Easement maintenance with overhead lines is a significant cost requiring inspections of the easement for fire risks and rogue trees, to manage these risks. In La Niña years there is high vegetation growth that must be controlled, and excess fire load must be removed.

All of these costs of overhead lines must be fully taken into account, with reference to Transgrid's current higher operations cost performance, in assessing the net benefit of HumeLink.

#### **6.16. Uncertain savings going with a variable contract for HumeLink**

Transgrid says they have saved \$237 million by going with a variable contract cost.

*'• \$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.'*

There are two reasons why going with a variable contract cost might cause problems.

Firstly, there are considerable inflationary pressures in the economy at the moment. Footnote 8 states:

*'Infrastructure Australia, 2022 Infrastructure Market Capacity Report, December 2022. This found that the costs for construction materials has risen by an average of 24 per cent in the last 12 months and **labour demand is more than double the projected available supply**.'*

Secondly, the NSW government, with the Light Rail Project, had serious cost overrun issues with Acciona, one on the contractors that Transgrid has signed with for the HumeLink project.

<https://www.abc.net.au/news/2019-06-03/sydney-light-rail-bill-passes3-billion-as-compo-settled/11172434>

<https://www.theguardian.com/australia-news/2019/jun/03/nsw-government-to-pay-576m-extra-to-sydney-light-rail-subcontractors>

<https://www.smh.com.au/national/nsw/spanish-company-accused-of-using-light-rail-lawsuit-to-duck-damages-bill-20180730-p4zugx.html>

The troubled light rail project was initially costed at \$1.6bn in 2012, and rose to \$2.1bn when Transport signed the main work contract in 2014. The final cost was \$3.1 billion, a billion dollars more than the signed contract cost.

The upfront cost reduction of going with a variable contract, needs to be balanced with the risk of cost increases. While seemingly reducing the cost of HumeLink at this point in time, when the economic merit of HumeLink is being assessed, this decision may ultimately lead to unprecedented cost overruns.

In essence, a variable contract cost is an almost certain guarantee of a significant increase in the total real cost of the project. As such sensitivity analysis needs to be undertaken to assess the sensitivity of the HumeLink net benefit to the assumption about capital cost, by considering increases in the capital cost of 10%, 20% and 50%. (The light rail project increased in cost close to 50%).

## 6.17. Consultation

A moving address on the failings of Transgrid consultation was made by a community member in the last HumeLink CCG, March 19, 2024, and subsequently lodged as a supplementary submission to the NSW Select Committee inquiry into the feasibility of undergrounding transmission. The submission is contained in Appendix A.

Transgrid says about consultation:

*'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 the planning and delivery of our projects and network operations*
- *we work with the communities in which we operate 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, and*
- *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.'*

And yet Transgrid has been:

- a. **Inequitable** - failing to fairly consider undergrounding for all communities and recently refining the route at Batlow for the benefit of only 10 landowners;
- b. **Ineffective** – as they refused to share vital visual impact NEARA images with impacted communities and neglected to inform communities that the noise from HumeLink when operating will exceed EPA noise limits at over 60 dwellings for the next 80 to 100 years; and
- c. **Misrepresenting the costs of undergrounding and engaging in deliberate delaying tactics on what matters most to communities** – on the advice of independent undergrounding experts, we understand that Transgrid misrepresented the cost, feasibility and environmental impacts of undergrounding HumeLink to government. Also, Transgrid appears to have engaged in deliberate delaying tactics. After the community consultative group representatives on steering committee (CCGSC) didn't endorse the GHD/Transgrid Humelink undergrounding study, Transgrid took nearly six months to issue a response. Rather than working to minimise impacts on communities, Transgrid's actions are causing considerable harm to communities and the environment.
- d. **Failed to provide even rudimentary details of the exact construction process they propose and the likely impact on operating farms in the path of HumeLink, should it go ahead.**

#### 6.18. Costs shifted to other projects

Transgrid says:

*'In addition, we have estimated further cost savings of \$787 million from the investment synergies, which arise from concurrent investment in Humelink, Project EnergyConnect (PEC) and VNI West. In particular, our draft VNI West Stage 1 Application, which was published on 1 September 2023 includes D&C work packages for undertaking the Project EnergyConnect (PEC) enhancement and Gugaa integration:*

- *the PEC enhancement works are required to increase the capacity of the transmission line from the Dinawan Substation to Wagga Wagga from 330 kV to 500 kV, and 18 AEMO, 2022 ISP, June 2022, p.13. (See Table 1).*
- *the Gugaa integration works are required to connect the enhanced PEC component at the Gugaa substation, which is being constructed as part of Humelink.*

*Of the total cost saving of \$787 million, approximately \$697 million relates to the PEC enhancement and \$90 million relates to the Gugaa integration works.'*

These are not cost saving rather they appear to be shifting costs from HumeLink to PEC and VNI West. There are four questions:

- a. Objectively, should these costs sit with HumeLink, PEC or VNI West?

- b. If HumeLink, then does HumeLink have a net benefit with these additional costs?
- c. If PEC, does PEC have a net benefit with these substantial extra costs? and
- d. If VNI West, does VNI West have a net benefit with these substantial extra costs?

#### **6.19. Commercial viability of the project**

Transgrid says:

*'No business could be reasonably expected to pursue a project that is forecast to generate less than the return that investors in the market would reasonably require, given the risks associated with that project.'*

Transgrid will receive a regulated rate of return on the capital invested, whether HumeLink is used or not. Unlike a competitive market where the owners of the company bear the cost if a wrong investment decision is made, Transgrid will earn its regulated return whether HumeLink is a good or bad investment.

Therefore, the commercial viability of the project must be assessed by rigorous, thorough cost-benefit modelling. For this reason: the RIT-T must be reapplied given the material changes in circumstance for the HumeLink project; and the EIS must carefully assess the triple bottom line, to confirm a benefit to the people of NSW and Australia, from the HumeLink project.

There is a real risk that the government and regulators will collectively provide Transgrid with a blank cheque to invest and profit from the construction of an environmentally damaging and dangerous piece of infrastructure.

### **7. Conclusion**

Both Minister Chris Bowen and Andrew Dyer, the Australian Energy Infrastructure Commissioner say the regulations of the NEM are *'not fit for purpose'*. The RIT-T doesn't take into account all the environmental costs (the visual impact, increased risk of bushfires, noise, productive efficiency impacts on neighbouring agricultural operations, impacts on regional development, impacts on tourism, impacts on health from EMF, etc.). As a result, the nation is left with energy projects that are highly damaging to the environment. The balance between the environment and essential infrastructure is lost. Projects aren't developed in environmentally sensitive ways, such as underground transmission.

During consultation with the community Transgrid committed to reapply the RIT-T to HumeLink if undergrounding was feasible. Amplitude Consultants shows there is a feasible option to underground HumeLink for \$5.46 billion, as such we demand that Transgrid honours this commitment. This is critical for the social licence of the project.



Transgrid has said:

*'The Department of Planning, Industry and Environment (DPIE) requires projects to avoid, minimize or offset environmental impacts and Transgrid is required to demonstrate that no other feasible options with lesser impact are available as part of the environmental planning approvals' (Transgrid response to Kyeamba Concerned Landowners Group, October 2021)*

Therefore undergrounding HumeLink must be assessed to meet the project's legislative requirements.

Transgrid has a conflict of interest in assessing HumeLink, as approval of the project will financially benefit the corporation significantly. Therefore all analysis must be independently and expertly reviewed.

There are a number issues with the HumeLink assessment process to date.

- A. It appears that a number of NER have been breached with the Humelink project, including that:
  - i. The CPA2 was lodged without a MCCA;
  - ii. The assumptions of the "latest ISP", 2022 ISP, weren't used in AEMOs feedback loop;
  - iii. The assumptions of the "latest ISP", 2022 ISP, weren't used in Transgrid's MCCA that was submitted late;
  - iv. The CPA1 (part 2) was lodged when the project cost was likely higher than that used in the feedback loop;
  - v. The preferred option, Option 3C, in the PACR had a net cost, after correcting for errors; and
  - vi. The preferred option, Option 3C, didn't robustly have the highest net benefits in the Addendum to the PACR, after correcting for bias and given sensitivity analysis.
  
- B. The CPA2 that has been lodged, also has a number of issues, as follows:
  - i. Underestimation of HumeLink capital cost;
  - ii. There is a major failure with consultation as almost all of the 4,322 indirectly impacted landowners, many of whose properties will be significantly devalued, by hundreds of thousands of dollars, have NOT been contacted and informed about the project;
  - iii. The preferred option is NOT the efficient, least cost option, as the assessment has failed to account for costs to communities and the environment;
  - iv. The preferred option is NOT designed for reliability, safety and security as it is being constructed as an overhead line, through bushfire prone land and is also vulnerable to severe weather;
  - v. The significant reduction in biodiversity costs needs to be independently verified. Impacts on biodiversity are difficult to predict pre-construction and need to be conservatively estimated. Recent advice from Transgrid suggest that clearing for access tracks has been significantly underestimated;
  - vi. Given that all the transfer capacity of HumeLink 1.0 will be utilised by Snowy 2.0 when it's operating at full capacity, consultation should be happening on HumeLink

- 2.0 NOW, and consideration should be given to constructing HumeLink 1.0 as **expandable** HVDC underground; and
- vii. Unacceptable behaviour in pressuring AER to approve HumeLink, a multibillion-dollar project, by March 29, 2024, when it has questionable economic merit and certain significant and enduring harm for communities and the environment.

C. Further the MCCA has raised a number of issues, including:

- i. The key changes to modelling assumptions represent another MCC;
- ii. The limit on the capacity of Snowy 2.0 without HumeLink means that the base case has been mis-specified and the remaining cost to construct Snowy 2.0 must be included in the cost of HumeLink options;
- iii. The limit on the capacity of Snowy 2.0 without HumeLink means HumeLink is a connection asset, and not a shared asset;
- iv. A failure to assess undergrounding as an option;
- v. Underestimation of project capital cost in the MCCA;
- vi. Bias is the assessment of Option 1C-new;
- vii. Night and day differences on the modelling results for the PACR, MCCA and AEMO;
- viii. A 3.4% opex in AEMO's cost-benefit analysis shows HumeLink is marginal; and
- ix. Sensitivity analysis is needed to assess net benefit of HumeLink if Snowy 2.0 is not completed, and VNI West and Sydney Ring are not progressed.

In short, breaches of the Rules in combination with serious problems with the CPA2 and the MCCA, mean that the RIT-T must be reapplied to the HumeLink project and undergrounding **must** be assessed. This further assessment **must** be independently and expertly reviewed, and **must** include all first round direct and indirect costs.

Efficient outcomes are not occurring in the electricity market because of bias in assessments, and the omission of environmental externalities in cost-benefit analysis. Excluding the harm to the environment and communities, when assessing different transmission options, is a critical policy failure, and the cause of the lack of social licence.

## Appendix A

### Submission from HumeLink Alliance to the NSW Select Committee inquiry into the feasibility of undergrounding transmission, 22 March 2024

Dear Select Committee,

#### Re: **Supplementary submission to the Select Committee inquiry into the feasibility of undergrounding the transmission infrastructure for renewable energy projects**

Please enter this address as a supplementary submission to the inquiry. This address was made to Transgrid at the concluding Community Consultative Group meeting, it is imperative that this address is considered for review.

#### **Address to the Community Consultative Group Meeting by Rebecca Tobin, Gundagai, March 19, 2024**

### 1. CONSULTATION

Public Consultation is defined as ‘a process by which members of the public are asked for input on public issues.’

The CCG is characterised by Transgrid dictating to the community rather than genuine consulting. Consultation should go both ways, but here it does not.

As a member of the CCG since its inception we joined in hope that this would provide a platform for us and our communities to be heard. However, there is no genuine consideration for people, the communities impacted or the environment. There is failure to listen, failure to respond positively to communities, to better the project as is the requirements of consultation. Therefore, Transgrid has failed in its requirements to consult.

In the EIS Transgrid says that ‘success looks like:

- gaining community and stakeholder acceptance to develop and operate Transgrid’s electricity network;
- fair, reasonable and timely consultation processes;
- fair robust and transparent route selection; and
- fair and equitable compensation for landowners.’

Based on these statements, there is NO evidence of success.

As we look at the last four years, there is no fairness across the board. All that is seen is the path of Transgrid’s destruction even before you build - emotionally, personally, financially,

and physically, impacting all in its path. For all those years, we have been agreeable to an undergrounding solution, but the path Transgrid chooses is to defy and subsequently deny communities.

Transgrid has failed to present the facts to the public, hiding the reality, for instance by not using NEARA as a '3D visualisation' tool. Our community has asked to 'see' the destruction of construction and operation, but we are denied any 'real' imagery.

As CCG members, the EIS had us presented with new information that we had never been provided before. As a very recent example, I innocently asked what appears to have been a loaded question, in relation to the EIS stating in some places there would be 110-130m easements. Where would these be? Would this occur on our property? What I did not bank on was these larger easements are where Transpositions occur. As you can see by Figure 1(a) a Transposition is an even greater burden, and industrial impact that has until now been hidden, and quite possibly would have stayed that way until the question was asked. Seven Transpositions will be placed along the 365 km route. At seven locations landowners will be getting two sets of towers, two transmission lines, on their properties. This admission is the last straw and it is certain that this further warrants the need to underground Humelink.

The explanation I was given for the use of Transpositions is ... 'a process of changing the order of conductors along the towers to balance transmission losses over the length of the line'. Interestingly, a strategy to manage the 'losses' that plague overhead AC infrastructure, when in fact experts in HVDC underground have stated all along, and have well documented that undergrounding via HVDC substantially minimises the losses in comparison to overhead. So underground it!

Figure 1(a): Representative Diagram of a Transposition

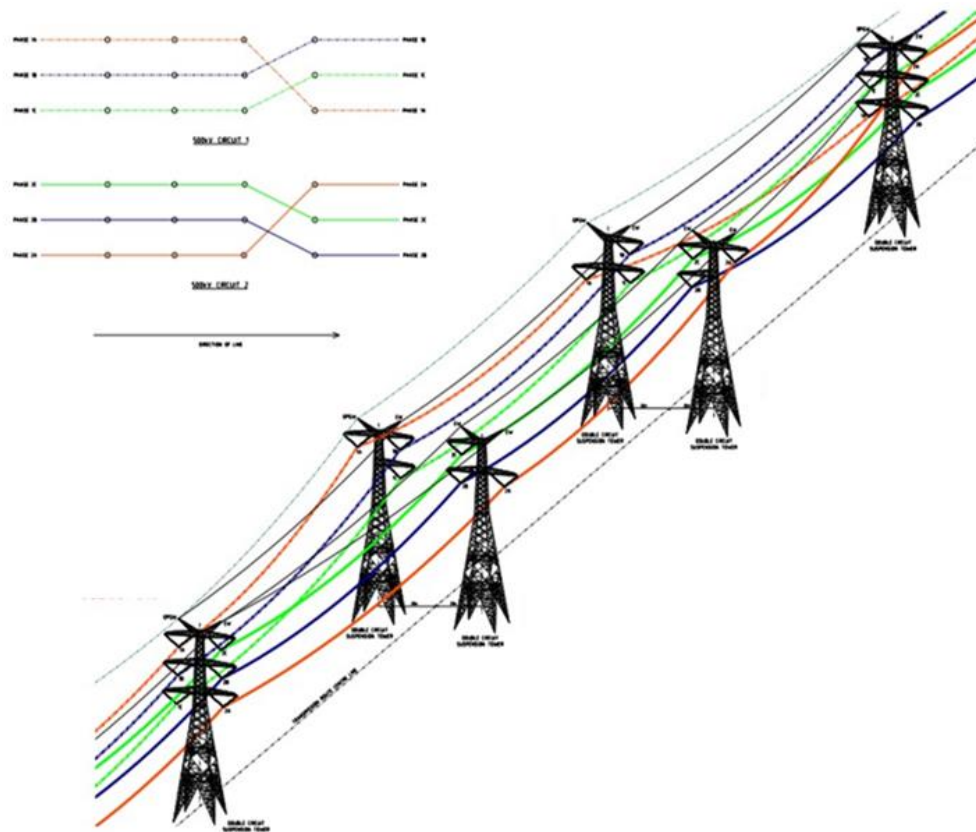
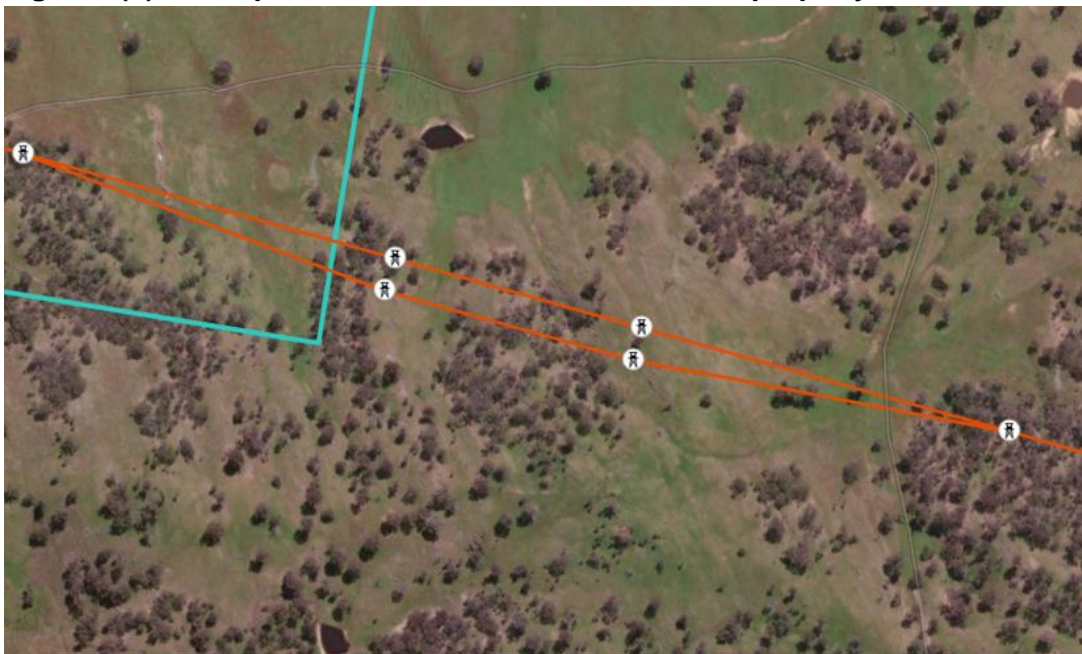
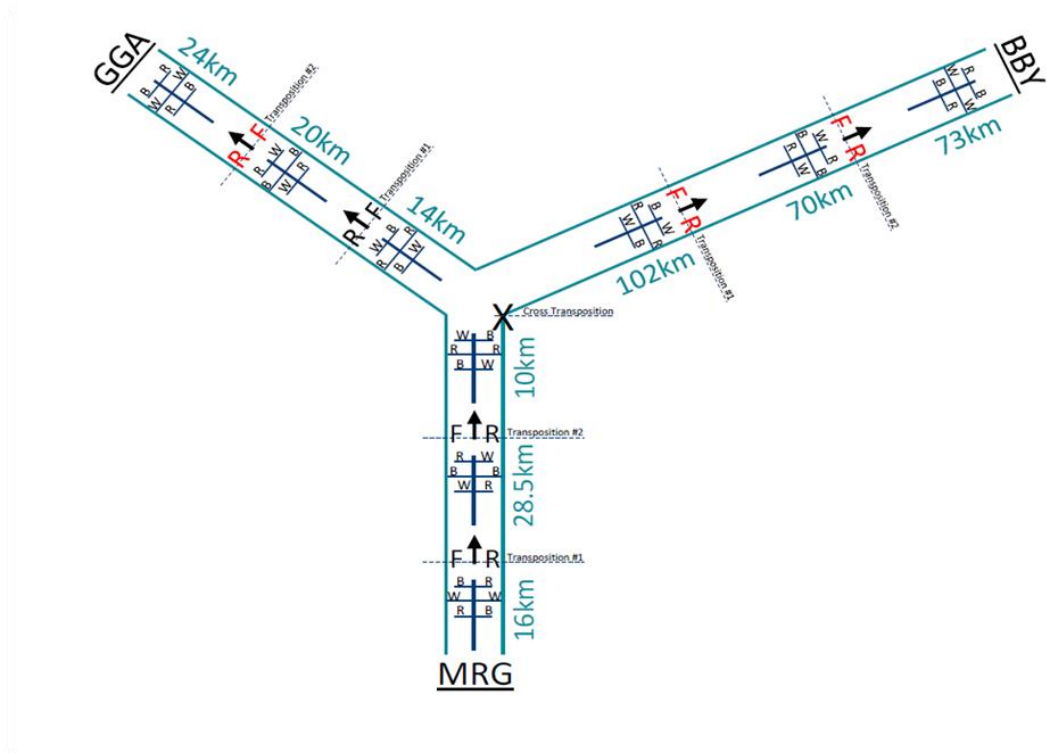


Figure 1(b): Transpositions located on a landowner's property



**Figure 1(c): Location of Transpositions along HumeLink route**



In the Select Committee Inquiry Yolandes Strengers, Associate Dean (Equity, Diversity, and Inclusion) Monash University said, when asked if a community understands the issues and the options and they've almost universally come to the conclusion they want a transmission line underground, should undergrounding occur? The response: 'Yes, in that situation, if it's at all possible, I would be attempting to support the community's wishes.'

There are 365 kms of stories, each and every one different, each and every one important. Generational, heritage, dreams, new beginnings, love and legacy, all with sentiment that cannot be replaced. All in the path of Humelink. We matter and we shouldn't have had to fight this hard to matter. And we are still fighting.

If your so-called consultation was as it should be, we would matter in this equation, and undergrounding would see us matter.

It isn't just those that are directly impacted, but also those indirectly impacted. Like the 4,322 indirectly impacted landowners (as well as many, many more who Transgrid has not correctly identified on their map), 4,322 people who Transgrid indicated they would door knock - and yet most still do not know about the project. Or the neighbours who are only aware because of our own advocacy, and in some cases are even more visually impacted than those deemed directly impacted. Yet these people are not considered. If these people were compensated, as they should be, this would deem undergrounding an even more viable option than it already is.

This project is failing regional people. Transgrid, you are failing us, as we seemingly are made to feel as though we are meaningless, irrelevant, and not considered. This is NOT the expected outcome of consultation, and is a result of poor consultation.

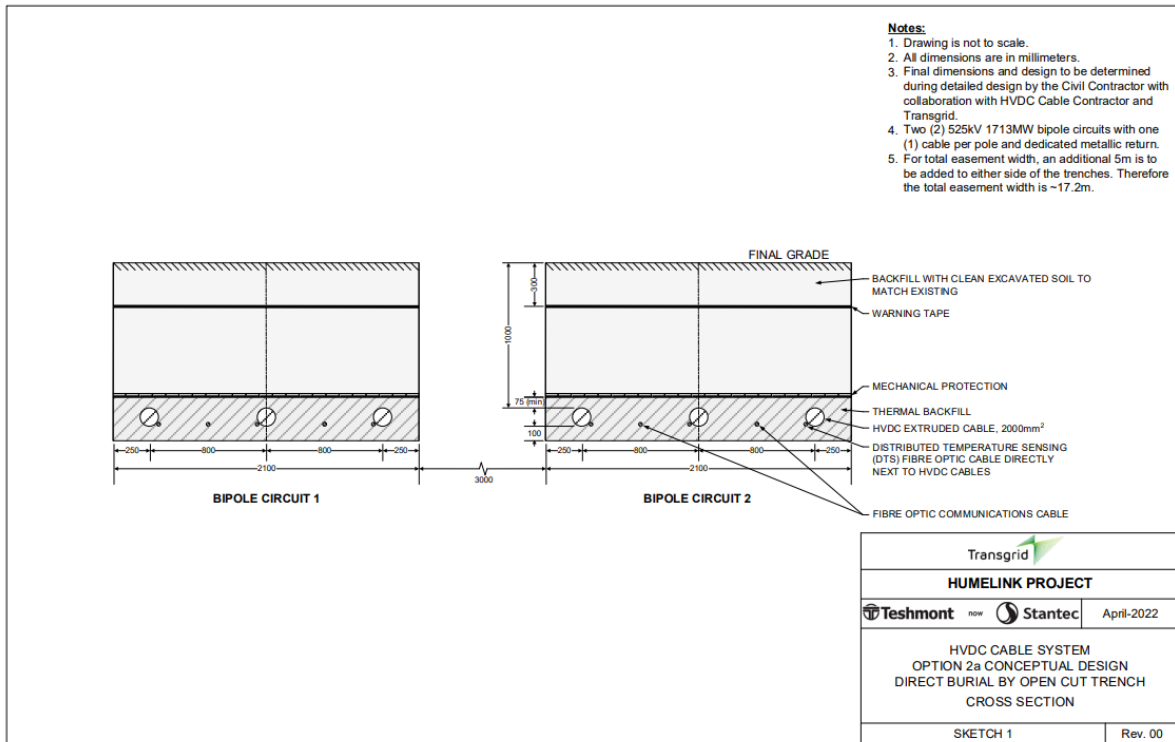
## **2. EVIDENCE GIVEN BY TRANSGRID TO NSW GOVERNMENT AND SELECT COMMITTEE INQUIRIES**

I, along with Peter Lawson and Andrea Strong dedicated 13 long months as community representatives on Transgrid's GHD undergrounding study, privy to the mistakes, the learnings, concern that Transgrid was delaying process and in turn delaying positive outcomes and more poignantly the infuriating misinformation and misrepresentations made by Transgrid in both inquiries.

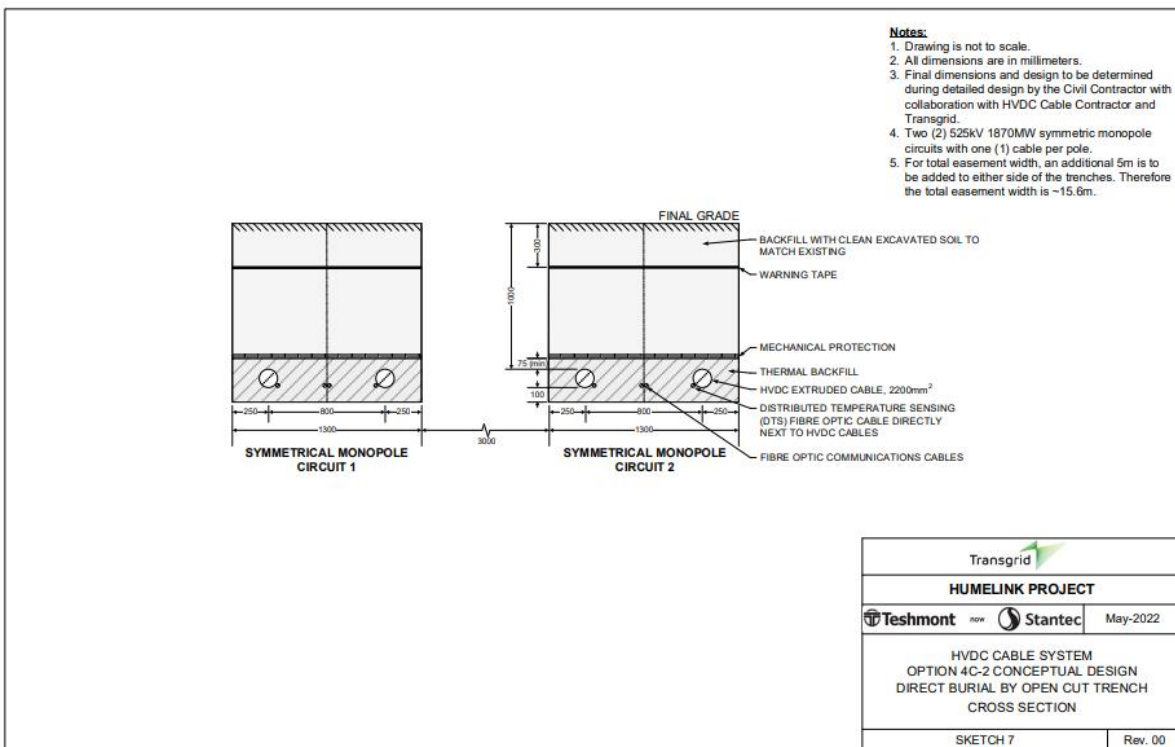
In the Select Committee inquiry Transgrid stated that with undergrounding they seek advice from experts and mentioned GHD as one of the leading experts they seek out. If this is the case, a HumeLink undergrounding study by GHD in conjunction with STANTEC, worth in excess of \$300,000 should be particularly meaningful to Transgrid. However, Transgrid continue to ignore the study by GHD and spruik misinformation, misrepresenting undergrounding.

Let's compare the facts GHD has given to Transgrid, shall we. The GHD study has the trench sizes of Humelink at 2.1m each, with some examples even smaller (See Figures 2(a) and (b)). But Transgrid stated under oath in the inquiry that a 50m trench will be required.

**Figure 2(a): GHD solution, option 2A: 2 x 2.1m trench, 3m separation, total width 7.2m**



**Figure 2(b): GHD solution, option 4C: 2 x 1.3m trench, 3m separation, total width 5.6m**



In the Standing Committee inquiry, Transgrid claim that there is no risk of overhead lines starting a Bushfire, yet GHD’s report states that : ‘Overhead lines increase the risk for



bushfire ignition. Overhead lines can restrict access for bushfire fighting as opposed to underground lines, which would have no or negligible impact.’ and go on to state ‘Whilst it is very rare for overhead 500kV lines to experience faults causing bushfire ignition, the risk is not zero. Whilst rare, 330kV overhead lines are known to have caused bushfire ignition.’ But yet Transgrid continues today to state that these lines don’t cause fires, even when our own community has witnessed this occur. Furthermore, when in the latest inquiry Transgrid was asked about the damage to the 330kV assets in the Black Summer Fires, in your GHD report it states the very reason we should be putting these assets underground... ‘Full undergrounding of all circuits results in there being negligible potential for above ground bushfire to impact and damage undergrounded assets.’

Transgrid continues to use ‘cost’ to consumers as the key reason to put "undergrounding to bed", but undergrounding is actually considering consumers, protecting them from the long term recuperation costs of damage to overhead assets which is a certain risk in every weather and fire event. Undergrounding is safeguarding the grid by protecting the assets. Also undergrounding is likely the quickest way to deliver the HumeLink project, as strong community opposition threatens lengthy delays to the overhead option.

Transgrid argues that difficult terrain is problematic for undergrounding. However at no point does GHD’s study suggest this. It states the terrain to be easy to medium in topography, with no reference to ‘difficult’ as a measure.

Transgrid are headstrong in only quoting the costs of undergrounding found in this report, and even go further to suggest that the GHD’s costs are under what they should be. Yet we know due to an independent review by Amplitude Consultants that the costs are severely inflated and flawed, and the cost of undergrounding is a mere 1.1 to 1.5 times the cost of the overhead option.

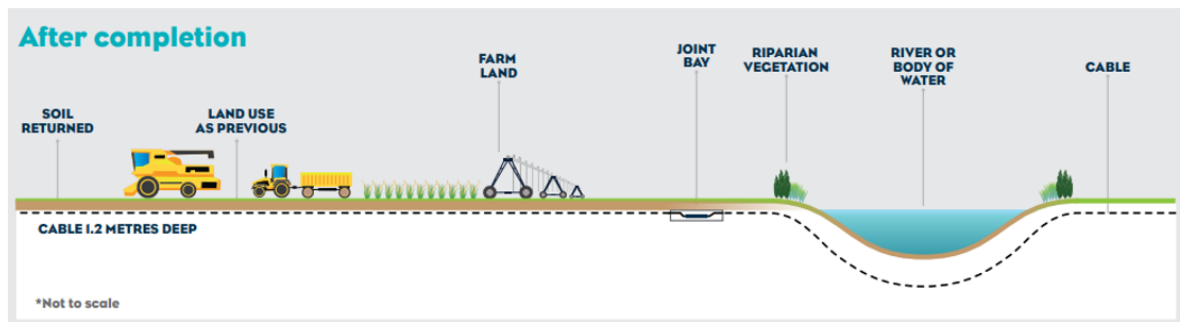
The detail in the report completely contradicts Transgrid’s statements. Yes, there are 52 outstanding issues still remaining outstanding. Yes we as a community didn’t endorse the report based on these outstanding issues and maintain the report is unbalanced. But when Transgrid is blatantly ignoring their own 'expert' GHD, not only does it make a mockery of the time the community spent on this study, but it seems quite an aggressive slap in the face to GHD and STANTEC themselves.

Transgrid has continued pushing its 'sterilisation' spiel, when scientific studies overseas say there is NO reduction in crop yields above underground cables, and experts in the inquiry denied sterilisation claims. See below Figure 3 that shows the impact of transmission lines and underground cables on land use. The image on the right shows a crop growing unimpeded above underground cables. Experts state that you can plough to a depth, that no ploughing implement is capable of. See Figure 4 below showing land use impacts of undergrounding post laying underground cables detailed for the Marinus project. Ask any cropping farmer or grazier here, having overhead lines impedes aerial spraying, and fertilising, restricts access under the lines for large machinery which is a massive concern. For safety reasons and uninterrupted operations, underground is a better option for our agricultural operations.

**Figure 3: Landscape character and land use impacts of overhead lines and underground cables**



**Figure 4: Land use impacts of undergrounding post laying underground cables**



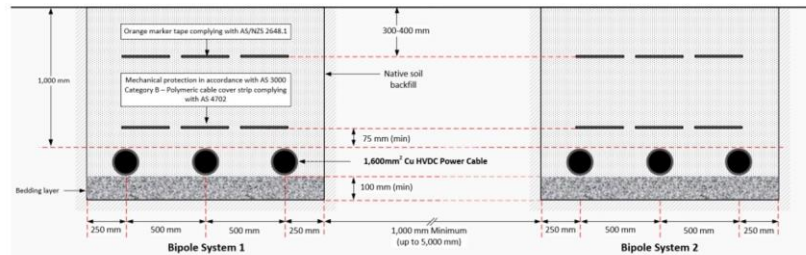
Source: MARINUS LINK Victorian land access and easement acquisition PROCESS - NOVEMBER 2021

Murraylink is a 180km HVDC underground system that has won Environmental Awards, and is known for managing to only remove two trees in its wake. Transgrid consistently suggests that undergrounding is more environmentally damaging, yet we are comparing a 70m easement overhead, to a probable 12m easement for undergrounding. As per the Amplitude Review, we are talking 2 x 1.5m wide trenches, to a depth of 1.25m (see Figure 5 below), in comparison to the clear felling 70m wide easements, 50m X 70m crane pads, massive cement tower pads, and footings buried in concrete to a depth of up to 25m, and towers up to 80m tall - a visual and physical impediment to the environment for 80 years.

**Figure 5: Amplitude Review modified option 2A, 2 x 1.5m trench, 1m separation, total width 4m**

**Amplitude solution: 2 x 1.5m trench, minimum 1m separation, total 4m**

*Figure 5 – Cable Trench Profile*



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Transgrid discusses the use of 'Slurry'. May we put this in more technical terms, 'thermal stable backfill'. Whilst the GHD report makes reference to thermal stable backfill, the Amplitude report states that this is not necessary, and a direct burial is possible.

We even heard in the latest inquiry reference to SuedLink, and certainly refer away, but be accurate in doing so. SuedLink was originally an overhead proposal, but after 6 years of fighting, there was a win for the rural communities that this was destined to impact. Now it is going underground via HVDC for 750km at 525kV. SuedLink will be close to double the size and capacity of HumeLink. So when Marie Jordan seeks to suggest SuedLink as a comparison to Humelink, this is not correct. Humelink is 2200MW. SuedLink is a massive 4000MW.

It was stated in the Transgrid Advisory Council meeting minutes, where a question was posed by Craig Memery from PIAC to Brett Redman Transgrid CEO, 'On Undergrounding, do you have any thoughts on what you could have done in 2022 to put it to bed? Are you disappointed that we are still having conversations on undergrounding after the report was released?'... Undoubtedly this was exactly the agenda and premise of the undergrounding study, in colloquial terms to 'shut up the community'. We aren't going anywhere!

Transgrid have stated to the community that you are advocating for undergrounding, but have shown no evidence of this, and have gone as far in the inquiry to only seek to disengage and disingenuously plague undergrounding. In front of our very eyes we have witnessed you working against the community rather than 'with' the community, and trust lost.

Transgrid has failed in its role to consult. Transgrid has failed in its role to seek better alternatives. Transgrid has failed to advocate for our communities. Transgrid have failed to

allow undergrounding a fair go and have sought to only negatively plague it to protect their flawed overhead agenda, Transgrid cannot be trusted to assess, re-assess or determine what is best for Humelink, but more importantly what is best for regional Australia.

But I guess what should I know. I am just a community member that should not need to know this, should not have had to research this, should not have had to invest my own time in this, and should not have to point out Transgrid's failings, or attempt to make them see. Transgrid are supposed to be the experts, but because of their ignorance to the validity and feasibility of undergrounding, we as a community have had to rise to the challenge put before us.

I ask, will Transgrid admit fault, and apologise for what you have, are and continue to inflict on us all?

## Appendix B:

### Submission from HumeLink Alliance to the NSW Select Committee inquiry into the feasibility of undergrounding transmission, 25 March 2024

Dear Select Committee,

#### Second supplementary submission to the Select Committee inquiry into the feasibility of undergrounding the transmission infrastructure for renewable energy projects

Following the final hearing of the Select Committee inquiry, February 16, 2024, into *Feasibility of undergrounding the transmission infrastructure for renewable energy projects* (the Inquiry), we have further comments as follows.

#### 1. Cost of living pressures

##### 1.1. Excerpt from the transcript of the inquiry

**The Hon. EMILY SUVAAL:** It's fair to say that we have to build a lot of new infrastructure to enable the energy transition and electricity consumers will bear these costs over time. Can you outline the role of the AER in seeking to protect consumers from inappropriate cost increases?

**JIM COX:** Yes, you're right to say that a lot of transmission is required to be built for the energy transition to occur. That's certainly true. Our concern is that consumers should pay no more than they need to. Our roles, as we were explaining, are to supervise the ISP and RIT processes to ensure that they are open, transparent and based on good information. We have a responsibility in passing costs on to consumers to ensure they don't pay any more than is necessary. **We obviously do take a lot of effort and trouble to ensure that no more than is necessary is passed on to consumers.** I agree: That is our responsibility and we take it seriously.

**The Hon. EMILY SUVAAL:** Yes. **Well, within a cost-of-living crisis** like we're in—

**JIM COX:** We are very much aware of cost-of-living pressures.

##### 1.2. Comments on the excerpt

As the capital cost of undergrounding transmission is more, it is implied that undergrounding transmission will add to electricity bills, and so cost-of-living pressures.<sup>15</sup>

NSW and Australia are currently facing two crises:

- a. The cost-of-living crisis; and
- b. An environment crisis.

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<sup>15</sup> Although we argue that: lower losses; lower operation and maintenance costs; less risk with severe weather; less risk with bushfires; etc, over the life of the project, will offset the higher capital cost of the undergrounding option.

Yes, we have a cost-of-living crisis, but we also have an environmental crisis. The 2021 Australia State of the Environment report said ‘Overall, the state and trend of the environment of Australia are poor and deteriorating.’

It is therefore critical for our governments to be advocating for projects with less impact on the environment. This is consistent with legislative requirements of the NSW Environmental Planning and Assessment Regulation and the Environment Protection and Biodiversity Act that mean proponents are required to construct the option with less impact on the environment.

If the overriding objective of government was to ‘ease’ cost-of-living pressures, would they go as far as recommending that manufacturing goes back to pumping waste into our rivers, as that would be cheaper, and so lower the cost of manufacturing goods to consumers? I think not.

The State of the Environment report found that Australia is failing the environment on almost every measure. An important measure is loss of habitat. Humelink as an overhead line will have a significant and enduring impact on this measure, with a required easement of 70 m to 100 m, for the 365 km length of the project.

The referral to the Environment Protection and Biodiversity Conservation Act (EPBC Act) states Humelink has an action area of 48,332 ha and will significantly impact Matters of National Environmental Significance including 82 threatened species and six threatened ecological communities. Initial assessments identified that 1862 ha of critically endangered woodland would be directly impacted.

An obvious means of avoiding and mitigating environmental impacts of the HumeLink project is to underground the transmission. By undergrounding transmission, a much smaller easement (around 15 m) is needed with commensurate reductions in loss of habitat and biodiversity. Also, with undergrounding some sections can be horizontal directional drilled, up to 1 km, eliminating impacts on habitat altogether.

Murraylink, a 180km HVDC underground transmission line from Victoria to South Australia, won an environmental award, and is renowned for only removing two trees along its route during construction.

There is also significant visual and noise pollution of the environment with overhead transmission.

The HumeLink EIS says that:

- a. the noise from HumeLink, under certain weather conditions, will exceed the EPA noise limit up to 470m either side of the line. That is 34,310 ha impacted by noise ( $365\text{km} \times 2 \times 0.470\text{km} = 34,310 \text{ ha}$ ); and
- b. the visual impacts have been assessed up to 2km either side of the line. That is around 146,000 ha potentially impacted visually ( $365\text{km} \times 2 \times 2\text{km} = 146,000 \text{ ha}$ );

These massive impacts can be eliminated, completely, with undergrounding the transmission.

## 2. Expertise in undergrounding

### 2.1. Excerpt from the transcript of the inquiry

**The Hon. WES FANG:** Because part of what we heard last time Transgrid appeared before the Committee is that there isn't a great amount of expertise in HVDC within your organisation. Would that be a fair assessment?

**MARIE JORDAN:** That is correct.....

**The Hon. WES FANG:** I often criticise the Hon. Emily Suvaal for asking these sorts of questions but I will ask it of you just so that I'm aware. How many HVDC lines have you been involved in the construction of?

**MARIE JORDAN: In the construction? None.** But understanding and the engineering process in the UK, yes—National Grid; the UK grid. I was the senior executive there. I spent a lot of time in the UK looking at their projects and they do have HVDC. Physically in the construction, no. Going out and watching the construction, yes.

**The Hon. WES FANG: And doing technical assessments?**

**MARIE JORDAN: No. I was an executive,** I have a senior vice-president on the executive leadership team for National Grid and I did not do any physical engineering for National Grid.

### 2.2. Comments on the excerpt

Much of the evidence given by Transgrid about the cost and feasibility of undergrounding transmission in the two inquiries, is inconsistent with HVDC undergrounding experts. In questioning, in the latest inquiry, Transgrid indicates that Transgrid has little, if any, in-house HVDC expertise.

This is in stark contrast to Amplitude Consultants, whose experience includes:

- All HVDC projects in Australia and New Zealand.
- HVDC projects in the USA, Canada, China and South Africa.
- All European HVDC suppliers (ABB/Hitachi, Siemens and GE).
- Many HVDC cable suppliers (Prysmian, ABB/NKT, Nexans, ZTT).
- Both key HVDC technologies – LCC and VSC.
- All HVDC cable technologies currently used – mass impregnated cable and polymer cables.

From these experiences, Amplitude Consultants staff have held key roles, in:

- The world's first VSC interconnector.
- The world's longest HVDC underground cable project (up until recently at least).
- The world's first use of light-triggered thyristors for LCC technology.

- The world's first MMC VSC HVDC technology project (which is now the standard technology used).

In addition, Les Brand, the lead author of the Amplitude Review of the GHD/Transgrid HumeLink undergrounding study, is heavily involved in HVDC International Council on Large Electric Systems (CIGRE) activities.

In 2020 and 2021, Les Brand was the CIGRE "Special Reporter" for HVDC and flexible alternating current transmission system (FACTS). Only two engineers are selected globally for this role. In this role, Les Brand reviewed all papers on recent technological developments, new projects, projects under development and worked with the authors, questioning their conclusions. He also co-hosted the 2020 and 2021 HVDC and FACTS e-sessions for CIGRE.

As a result of the above work, he was awarded the CIGRE "2020 e-Session Pioneer Award". Only three were awarded globally for HVDC and FACTS – one other in Canada and another in China.

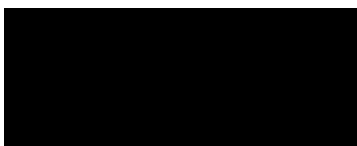
Further Les Brand was a recipient of the National Professional Electrical Engineer of the Year award with Engineers Australia for 2020.

Amplitude Consultants therefore are nationally and internationally respected HVDC undergrounding engineers, with extensive up-to-date knowledge of the trends and developments in undergrounding transmission around the world. As such the Amplitude Review of the GHD/Transgrid HumeLink undergrounding study can be relied upon to provide a fair and balanced assessment of the option to underground HumeLink.

We urge the Select Committee to:

- a. Rely on evidence given by independent HVDC undergrounding experts on the cost and feasibility of undergrounding transmission, in particular the HumeLink project, and not Transgrid; and
- b. Recommend undergrounding HumeLink to address the worsening environment crisis in NSW and Australia.

Yours sincerely,

A solid black rectangular box used to redact the signature of the sender.

Andrea Strong

HumeLink Alliance Incorporated