Submission No 12

INQUIRY INTO FEASIBILITY OF UNDERGROUNDING THE TRANSMISSION INFRASTRUCTURE FOR RENEWABLE ENERGY PROJECTS

Organisation: HumeLink Alliance Incorporated

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HumeLink Alliance Inc.

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The Select Committee on the Feasibility of Undergrounding
Infrastructure for Renewable Energy Projects,
Parliament House,
Macquarie Street,
SYDNEY NSW 2000
By email: undergrounding.infrastructure@parliament.nsw.gov.au

9 November 2023

Dear Select Committee,

Re: Feasibility of undergrounding the transmission infrastructure for renewable energy projects

Thank you for the opportunity to make a submission to this critical inquiry. We write this submission to reiterate our support for undergrounding transmission infrastructure, in particular the undergrounding of the HumeLink project, and we refer the committee to our submission and supplementary submissions to the previous parliamentary inquiry.

We welcome this new inquiry as another important opportunity for the government to understand the feasibility of undergrounding transmission infrastructure, and the significant and enduring benefits to the environment and communities this option brings.

Since the parliamentary inquiry there have been a number of developments and issues with the HumeLink project that raise further questions about the assessment process and the project as an overhead line, including:

1. The release of the Amplitude Consultants Review of the GHD/Transgrid HumeLink undergrounding report and the Stop Rethink HumeLink mini report;
2. The public exhibition of the Humelink Environmental Impact Statement (EIS);
3. A request to the Australian Energy Regulator (AER) for the reapplication of the regulatory investment test for transmission (RIT-T) to the HumeLink project for the material changes in circumstances for the project; and

4. Transgrid continuing to finalise the HumeLink Contingent Project Application – Stage 2 (CPA-2) plus AEMO undertaking the feedback loop on the HumeLink overhead option.

The release of the Amplitude Consultants Review of the GHD/Transgrid HumeLink undergrounding report, *HumeLink Undergrounding Review of Transgrid Report and Costing of HVDC Alternatives* (the Amplitude Review – see attached), shows that undergrounding HumeLink is feasible and that the cost of undergrounding HumeLink was seriously exaggerated in the previous study, while the EIS shows that significant continual negative impacts of the project cannot be mitigated.

These developments and issues further recommend the undergrounding of HumeLink to ensure the project is in the long-term interests of all the people of NSW.

While increasingly the evidence supports undergrounding HumeLink, as the best option for the project, we wish to draw to the attention of the Select Committee the fact that Transgrid and AEMO continue to press ahead with the overhead option – Transgrid finalising the CPA-2, expected early December 2023; plus AEMO undertaking the feedback loop on HumeLink as the overhead option, expected late November 2023.

We are very concerned these actions are disregarding the Select Committee inquiry in progress and may well be inconsistent with the eventual recommendations of the inquiry. Further we have had no response from the AER on reapplying the RIT-T to the HumeLink project for the material changes in circumstance for the project.

It is critical that HumeLink as an overhead option is not allowed to advance until the recommendations of the Select Committee are made. Given the serious delays with Snowy 2.0, as well as the optimal timing of HumeLink - late this decade/mid next decade, as defined by AEMO, there is time to get the decision on the HumeLink project right, based on the facts, and not on misinformation provided by industry participants, who failed to appreciate the feasibility of undergrounding early on.

There is considerable community opposition to HumeLink as an overhead line which risks delaying the project. This will likely increase if the Select Committee inquiry process is not respected by market participants.

Summary

1. **Amplitude Consultants Review of the GHD/Transgrid HumeLink undergrounding study and the Stop Rethink HumeLink mini report**
   The Amplitude Review found that undergrounding HumeLink can be deliver for $5.46 billion (a shorter route) to $7.3 billion (like-for-like), by August 2029, when needed. A comparison of costs for the like-for-like option, shows the GHD/Transgrid study overstated the cost of undergrounding HumeLink by 58%.

2. **The public exhibition of the Humelink Environmental Impact Statement (EIS)**
   The HumeLink EIS is exceedingly poorly done. Transgrid used Input-Output (I-O) analysis to assess the costs and benefits of the HumeLink project to the State as a whole. I-O analysis is described in the NSW government cost-benefit guidelines as not a method to assess the State benefit of a proposal or project.

   Also the EIS failed to assess the option of undergrounding HumeLink - a feasible option with a lesser impact on the environment, which is inconsistent with statutory obligations.

3. **A request to the Australian Energy Regulator (AER) for the reapplication RIT-T to HumeLink for the material changes in circumstances for the project**
   We have written to the AER requesting that the RIT-T be reapplied to the HumeLink project for material changes in circumstances for the project and two related factors as follows: cost blowout from $1 billion in 2020 to $4.892 billion in 2023 - nearly 5 times the original cost; three-and-a-half-year delay of Snowy 2.0; reduction in transfer capacity; change in assumption about other generators; opex assumptions and capital refresh costs.

   Since the request to the AER to reapply the RIT-T there has been another material change in circumstance – the cost of undergrounding has been found to be overstated by 58%.

4. **Transgrid continuing to finalise the HumeLink Contingent Project Application – Stage 2 (CPA-2) plus AEMO undertaking the feedback loop on the HumeLink overhead line project.**
   At the October 31, 2023 Community Consultative Group (CCG) meeting, Transgrid gave a project update stating that they were working on preparing the CPA-2 which they expect will be published in early December. Before the CPA-2 can be published the project needs to pass the AEMO feedback loop which will occur late November/early December.

   The AER is required to make a decision on the CPA-2 within 30 business days. This decision will be mid-January 2024, based on an application in late December 2023.

   There is concern that these actions are disregarding the Select Committee inquiry and may well be inconsistent with the eventual recommendations of the inquiry.

Main submission - New developments and issues for the HumeLink project since the parliamentary inquiry

The new developments and issues for the HumeLink project since the parliamentary inquiry are discussed in more detail below.

1. Amplitude Consultants Review of the GHD/Transgrid HumeLink undergrounding study and the Stop Rethink HumeLink mini report

1.1. Cost of underground versus overhead

The Amplitude Review considered two options as follows:

I. Option 2A-1: Maragle – Gugaa (Wagga Wagga) – Bannaby, 100% HVDC underground; and
II. Option1C-new: Maragle - Bannaby, 100% HVDC underground,

and provides critical independent expert information that majorly changes the feasibility of undergrounding the HumeLink project.

The Amplitude Review found that HumeLink could be delivered underground for $5.46 billion, close to the cost of the overhead option, currently at $4.892 billion. The $5.46 billion option (option 1C-new), was not considered in the GHD/Transgrid study. However, option 1C-new was defined as a credible option for the HumeLink project by Transgrid in the RIT-T, meaning that it "*achieves the objective that the RIT–T proponent seeks to achieve by investing in the network",* (*Application guidelines - Regulatory investment test for transmission*, Australian Energy Regulator, December 2018, p16).

Comparing the undergrounding cost to an option that was assessed by GHD/Transgrid (option 2A-1), the Amplitude Review found the cost to be $7.3 billion, $4 billion less than the $11.5 billion cost reported by GHD/Transgrid. On the basis of these numbers, the cost of undergrounding HumeLink was overstated by 58% in the GHD/Transgrid report.

At $7.3 billion, undergrounding is 1.5 times the cost of the $4.892 billion overhead option, rather than 10 times the cost, as repeatedly stated by Transgrid. The $5.46 billion option is close to only 1.1 times the cost of the overhead option.

1.2. Deliver timeframe

The Amplitude Review found that the HumeLink project can be delivered underground by August 2029, in line with the revised schedule for Snowy 2.0 and the optimal timing of HumeLink as defined by the Australian Energy Market Operator (AEMO) – 2028-29 step change scenario, and 2035-36 progressive change scenario (AEMO, 2022 ISP, 80).

While the step change scenario was considered the most likely scenario in the 2022 ISP, this position was taken with consultation with stakeholders in 2021, prior to the start of the Ukraine/Russia war

in February 2022, and relies on an assumption of rapidly falling costs of energy production. The progressive change scenario, that doesn't rely on this assumption, with an optimal delivery date for HumeLink of 2035-36, is now probably the more likely scenario.

1.3. Additional capital cost of the underground options is offset by lower opex and losses

The Amplitude Review also pointed to the fact that the higher capital cost of an underground option would be offset by lower operating and maintenance costs (opex) and lower electrical losses, over the life of the project.

It discusses that the opex of the underground 2A-1 option would be circa $15 million per year[1], while the Stop Rethink HumeLink mini report found that with Transgrid's current operating practice, opex for the HumeLink overhead option would be around $120 million per year – opex 3.4% of capex (lines and substations). The much smaller opex cost with the underground option, can be expected to significantly offset the extra capital cost of undergrounding, over the life of the project.

The extra capital cost of the underground options is further offset by lower electrical losses with HVDC undergrounding versus AC overhead - 13.5% less losses with option 2A-1; and 21.3% less losses with option 1C-new.

1.4. Non-market costs of overhead lines

The Stop Rethink HumeLink mini report *Stop Rethink HumeLink Undergrounding Transmission: the Best Option* (see attached) details the significant and enduring non-market costs (negative externalities) of overhead lines, including:

> *'• The destruction of habitat for more than 90 threatened and endangered species.*
> *• Increased risk of bushfires.*
> *• Life-threatening danger to firefighters from arcing during fires.*
> *• Impossibility of effectively managing and controlling fires in the vicinity of overhead lines and infrastructure due to obstruction.*
> *• Severe impacts on local industries, including agricultural, tourism and plantation forestry.*
> *• Mental health and wellbeing impacts on local communities; and*
> *• The continuing existence and value of natural regional landscapes for current and future generations.'*

Including all the costs - capital, operating and maintenance, losses, the environment (bushfires) and the community, undergrounding is considered the overall least-cost option.

[1] Although not directly addressed by Amplitude in their review of the GHD/Transgrif HumeLink undergrounding study, the opex on the 1C-new underground option with four converter stations, is expected to be circa $10 million per year.

2. The public exhibition of the Humelink Environmental Impact Statement

Since the parliamentary inquiry into the feasibility of undergrounding transmission, the HumeLink EIS has been on public exhibition, with submissions closing on October 10, 2023.

The HumeLink EIS is exceedingly poorly done (see attached the HumeLink submission to the HumeLink EIS). It failed to assess the option of undergrounding HumeLink - a feasible option with a lesser impact on the environment, and it failed to assess the State benefit of the project.

2.1. Failure to assess undergrounding - a feasible alternative

The Environmental Planning and Assessment Regulation 2000 (Clause 7(1)(c) of Schedule 2) requires all EISs to include 'an analysis of any feasible alternatives' for a proposed project:

"7 Content of environmental impact statement

(1) An environmental impact statement must also include …

(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure"

Failure to assess a viable and lower impact underground alternative is not consistent with Transgrid's statutory obligations.

2.2. Failure to assess State benefit

A requirement of the Planning Secretary for the HumeLink EIS was that '*the benefits of the [HumeLink] project for the region and the State as a whole'* be assessed.

Transgrid said their economic impact assessment of HumeLink would be guided by the *TPP17-03 NSW Government Guide to Cost-Benefit Analysis* and would *'quantify the potential significant impacts (costs and benefits)',* (Transgrid, HumeLink - Scoping Report, p91). Instead, Transgrid used Input-Output (I-O) analysis that is described in the NSW government cost-benefit guidelines as not a method to assess the State benefit of a proposal or project.

As the cost-benefit analysis of HumeLink in the RIT-T was done omitting significant and enduring indirect (both market and non-market) costs, a sound, thorough and balanced EIS is critical to address these omissions, and assess the overall State benefit of the project. The HumeLink EIS has failed in this requirement.

Given that the net benefit (excluding competition benefits, and community and environmental costs) of HumeLink in the RIT-T was $39 million, the environmental costs of the project, over the 360 km route, only have to be slightly more than $39 million for the project to have a net cost to the State. The HumeLink Alliance submission to the HumeLink EIS points to the $39 million net benefit of

HumeLink being nullified by the costs to neighbouring agriculture alone, (HumeLink Alliance Inc., EIS Submission, p41).

This is before the billion-dollar costs of increased risk of bushfires, costs of reduced biodiversity, costs of lost tourism, costs of undermined regional development, costs of reduced system security due to vulnerability to increasingly severe weather and costs of lost landscapes of great natural beauty for generations.

While it is easy to dismiss the costs to biodiversity of the HumeLink project – as just another project clearing habitat (670 ha more habitat) of threatened species, it is important to note that the value of biodiversity globally has been put at USD 125-140 trillion per year, more than one and a half times the size of global GDP.

> '*Biodiversity loss is among the top global risks to society. The planet is now facing its sixth mass extinction, with consequences that will affect all life on Earth, both now and for millions of years to come. Humans have destroyed or degraded vast areas of the world's terrestrial, marine and other aquatic ecosystems. Natural forests declined by 6.5 million hectares per year between 2010 and 2015…*
>
> *Human pressures are undermining the biodiversity that underpins all life on land and below water. Ecosystem services delivered by biodiversity, such as crop pollination, water purification, flood protection and carbon sequestration, are vital to human well-being. Globally, these services are worth an estimated* ***USD 125-140 trillion (US dollars) per year, i.e. more than one and a half times the size of global GDP'*****,** OECD, Biodiversity: Finance and the Economic and Business Case for Action**.**

Many projects cannot be put underground to reduce impacts on biodiversity, for example housing developments, solar farms and wind farms. But transmission lines can be. While the biodiversity impacts of HumeLink are being addressed with biodiversity offsets, this is contrary to the biodiversity offset policy. Only unavoidable impact can be offset. In the case of HumeLink the biodiversity impacts can be largely avoided by undergrounding, *(Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy, October 2012,* p7*).*

One impact of the HumeLink project, identified in the EIS, not previously discussed in consultation with the community by Transgrid, is ongoing noise to neighbouring dwellings. Up to 65 dwellings, in certain weather conditions, are expected to have noise exceeding the noise limit enforced by the NSW Environmental Protection Authority (Noise Policy for Industry (EPA, 2017)). All these operational noise impacts, for the next 50 to 80 years, are avoided with undergrounding.

Further the net benefit (excluding competition benefits and community and environmental costs) of $39 million was when the project was costing $3.3 billion. Now the cost of the project has blown out to $4.892 billion. At this cost, even before taking into account indirect community and environmental costs, the project can be expected to have a net cost to electricity consumers and the State as a whole.

3. A request to the Australian Energy Regulator (AER) for the reapplication RIT-T to HumeLink for the material changes in circumstances for the project

We have written to the AER requesting that the RIT-T be reapplied to the HumeLink project for material changes in circumstances for the project and two related factors as follows (see attached letter to the AER):

- The material changes in circumstance are:
  - **Cost blowout**. From $1 billion in the January 2020 to $4.892 billion August 2023;
  - **Further delays**. Snowy 2.0 delayed three-and-a-half years;
  - **Reduction in capacity**. Humelink's transfer capacity has been reduced from 2,570 MW to 2,200 MW; and
  - **Change in assumption about other generators**. Kurri Kurri and Tallawarra B gas fired power stations are now committed.

- The related factors are:
  - **Underestimation of Opex**. Opex is underestimated at 0.5% of Capex when Transgrid's current operating performance is 3.4%
  - **Lack of clarity about capital refresh.** The July 2021 PACR did not include a capital refresh cost, as a percentage of Capex, after 15 to 20 years.

In the Draft 2022 ISP, when the cost of HumeLink was $3.3 billion, AEMO said '*To ensure the benefits are robust, the project costs cannot materially increase from the current estimate of $3.3 billion. Further work to drive down costs should be undertaken urgently'* (p65).

Instead of the cost of HumeLink being driven down, it has blown out by 48%. By any objective measure a 48% increase in cost, combined with a 14% fall in transfer capacity, is a fundamental material change in circumstance.

3.1. A new material change in circumstance

Since writing to the AER, requesting that the RIT-T be reapplied to HumeLink, there has been another material change in circumstance for the HumeLink project circumstance, specifically that the cost to underground HumeLink has been significantly overstated, by at least 58%, by Transgrid in the previous HumeLink undergrounding study. Therefore, the decision to reject undergrounding HumeLink by Transgrid and government has been made on wrong information. It is now clear, from the Amplitude Review, that undergrounding HumeLink is a feasible option with a lesser impact on the environment. As such there is a statutory obligation to consider it as part of the NSW planning approval process.

4. Transgrid continuing to finalise the HumeLink Contingent Project Application – Stage 2 (CPA-2) plus AEMO undertaking the feedback loop on the HumeLink overhead line project.

At the October 31, 2023 Community Consultative Group meeting, Transgrid gave a project update stating that:

'Transgrid are undergoing preparation of Contingent Project Application Stage 2 which is the submission to the regulator for the approval of the project. This is well advanced and will be published in early December. The project needs to pass the Australian Energy Market Operator (AEMO) feedback loop first. This is where AEMO does an assessment of the value of the project vs. the cost of the project. That is a go/no go process which will occur in late November or early December'.

Major flaws have been identified in the AEMO feedback loop by expert industry commentators[2]. It is not a replacement for a reapplication of the RIT-T. In fact, the AER requires the reapplication of the RIT-T for material changes in circumstances, not the AEMO feedback loop.

As the AER is required to make a decision on the CPA-2 within 30 business days, it is expected this decision will be made by mid-January 2024, based on an application in late December 2023.

We, as the people of NSW, are very concerned that while this important inquiry into the feasibility of undergrounding transmission is in progress:

- Transgrid is not declaring to the AER that there have been material changes in circumstances for the HumeLink project and reapplying the RIT-T;
- AEMO is applying a flawed feedback loop on the HumeLink overhead option; and
- Transgrid is pressing ahead with the CPA-2 for the overhead option.

We call for all actions to progress HumeLink as an overhead option be stopped while the Select Committee is in progress.

Conclusion

As discussed in our previous submissions, for **efficient outcomes** in the national electricity market (NEM), **all environmental and community costs** of transmission lines need to be factored into the cost of projects. The current rules of the NEM specifically exclude indirect costs, including environmental externalities, when assessing project options, which means opportunities to consider environmentally responsible transmission, like undergrounding, are lost.

While the capital cost of underground cables is more, there are offsetting operating and maintenance benefits, as well as significant and enduring non-market benefits. Governments overseas have come to the conclusion that when you take into account all the environmental costs of overhead transmission lines, undergrounding is the least-cost long run solution.

[2] '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%20Bartlett.pdf
Supplementary submission Professor Simon Bartlett.

Failures with the planning and assessment of the HumeLink project are ongoing. As a feasible option with a lesser impact on the environment, undergrounding HumeLink should have been assessed in the HumeLink EIS.

Transgrid said in 2021 that:

> *'The Department of Planning, Industry and Environment (DPIE) requires projects to avoid, minimise 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'.*

The biodiversity offsets policy under the Environment Protection and Biodiversity Conservation Act (EPBC Act) also requires that all avoidance and mitigation measures be undertaken before offsets will be considered. The HumeLink project is **significantly** impacting *matters of national environmental significance*. As a feasible alternative with a lesser impact, HumeLink must be constructed underground, to be comply with the EPBC Act.

As such, the EIS assessment must be redone to consider undergrounding, a feasible option with a lesser environmental impact, consistent with statutory obligations. Moreover, the assessment must adhere to the NSW government guidelines on cost-benefit analysis of projects, to ensure the economic merit and environmental consequences of the project are correctly and accurately assessed.

Given the ongoing Select Committee inquiry and the fact that the decision to dismiss undergrounding has been based on seriously exaggerated costs and misinformation, we ask that market participants cease and desist from further actions to progress HumeLink as an overhead line. The significant delays to Snowy 2.0 mean there is time to deliver the HumeLink project underground, when it is needed.

In addition to the loss of biodiversity and increased risk of bushfires, today many regions of NSW are closely settled, and the prospect of towers up to 80 m tall every 300 to 400 metres along a 360 km route is unacceptable, when there is another option with a lesser impact that is widely adopted overseas. The 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.

We urge the Select Committee to considered all the costs of HumeLink as an overhead line over its 50-to-80-year life, and recommend undergrounding the HumeLink project.

Yours sincerely,

Andrea Strong
HumeLink Alliance Incorporated