

Submission
No 198

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

Organisation: Stop Rethink HumeLink Campaign

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STOP, RETHINK HUMELINK

Michael Katz,
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The Hon Emily Suvaal,
Committee Chair,
Standing Committee on State Development
Parliament House
6 Macquarie Street
SYDNEY NSW 2000

14 July 2023,

Dear Committee Members,

The case for Undergrounding HumeLink: *A safe and sustainable way to transmit renewable energy*

Thank you for the opportunity to make a submission to this important inquiry into the feasibility of undergrounding the transmission infrastructure for renewable energy projects on behalf of the Stop, Rethink HumeLink campaign.

Stop, Rethink, HumeLink is a community organisation established to campaign for HumeLink to be undergrounded. We strongly believe that undergrounding future transmission projects like HumeLink will bring long-term cost benefits and better environmental outcomes for NSW.

Undergrounding will also significantly reduce growing community opposition that could see the current proposal delayed indefinitely.

Our comments largely relate to the costs and benefits of undergrounding and impacts to delivery timeframes, as set out in the Terms of Reference.

I make this submission based on the impact HumeLink will have to my community and my extensive experience from advising on and funding a range of large scale infrastructure projects locally and internationally, including Hong Kong Airport, Melbourne City Link and Brisbane Airport.

Executive summary

With unprecedented multi-billion-dollar investments being made across the country as Australia races to become a global leader in renewable energy, it is essential that we also build sustainable transmission infrastructure to support our national ambitions.

This submission looks at why undergrounding transmission is a superior economic and environmental option for HumeLink, and how the current proposal to build 360km of above ground towers relies on flawed economics at the expense of the environment, regional communities and local business.

Previous analysis of the costs of undergrounding HumeLink have been misstated and exaggerated, while the benefits of have been underestimated. When costs and benefits are properly assessed we believe the undergrounding option becomes compelling.

The costs of above ground transmission put forward by the proponents do not cover significant externalities like bushfires, habitat destruction and severe business impacts. These types of externalities are critical to the understanding of the relative benefits of undergrounding, and the shortcomings of above ground transmission.

In addition to the costs benefit analysis, we reinforce that only by going underground can HumeLink achieve a true social license for construction and operation. The current above ground proposal for HumeLink will:

1. Unnecessarily destroy large areas of habitat for threatened species,
2. Create entrenched community opposition and corresponding project delays;
3. Expose the community, the Government and the network to unnecessary risk; and
4. Leave many businesses and primary producers uninsurable and thus excluded from access to normal bank finance.

Regulatory and funding rules for electrical infrastructure in NSW are driving Transgrid to pursue the flawed above ground option. These rules need to be re-examined in the light of current demand for renewable energy and new engineering solutions.

Alternative strategies should be adopted by government to fund best practice sustainable, long-term transmission infrastructure for NSW without punishing energy users.

Undergrounding is already the preferred technology in other countries and parts of Australia, and the costs are far lower than claimed by the proponents of HumeLink, particularly when viewed over the 80+ year lifetime of this project.

1. Flaws in project evaluation – overhead transmission

The current process of evaluating transmission line projects is no longer fit for purpose. It was established at the time of the establishment of the National Electricity Market. It did not contemplate the wholesale shift to renewable energy. It contains major assumptions which are against the interests of local communities and the environment.

Undergrounding benefits:

- Less impact on wildlife and habitat
- Reduced fire risks
- Improved fire management
- Stop community opposition and delays
- Less outages
- Lower maintenance costs
- Minimal impact to prime agricultural land, local industries, communities and visual impacts
- Reduced energy losses in transmission
- Less risk to national security

The benefits of undergrounding significantly outweighs the short-term cost savings to build transmission lines above ground.

In particular, it focuses on the construction costs of alternative transmission mechanisms. It does not take into account the full environmental impact of these projects.

Environmental assessment is delegated to the Environmental Impact Statement (EIS) which is not submitted until the project is well established, and is therefore a formality.

Environment

Building the above ground transmission line will require clear-felling large areas of native forests and bushland with serious impacts on habitat for 82 threatened species of plants and animals including the Koala, Booroolong Frog, Superb Parrot, Gang-gang Cockatoo, and the Powerful Owl.

It directly impacts a nationally important wetland and 1,861 hectares of endangered woodland and will fragment numerous wildlife corridors and reduce biodiversity.

Land clearing operations to make way for the HumeLink easement will also create large quantities of greenhouse gas emissions.

Please read the attached paper by Ecologist Lesley Peden presented to NSW Parliamentary briefing, November 10, 2022.

Bushfire

In the case of transmission lines like HumeLink, a key omission is the impact of bushfires on the long-term costs of transmission. Yet, bushfires are a feature of the Australian life. They can cause massive loss of property and loss of life.

Indeed, we need to understand that over the life of a project like HumeLink the contingencies are likely to become certainties, particularly in a region still recovering from the 2019/2020 Black Summer fires. The bushfire risks from above ground transmission have been highlighted in several recent bushfire inquiries and our recent report "*Why are we super-charging bushfire risks in a changing climate?*" (attached).

A transmission line which is 360 km long is almost certainly going to be involved in bushfires at some stage over its design life, [with power line related faults causing up to 50% of major fires when weather conditions are unfavourable](#). These risks will increase dramatically with global warming as has already been seen over recent years. Involvement can include both the ignition of bushfires and the restriction of the ability of local and national efforts to control established fires.

The cost of bushfires can be an enormous impost to the State. Deloitte Access Economics put the tangible and intangible costs of the Victoria Black Saturday bush fires at \$7.6 billion. By extrapolation, the cost of the 2019-20 Australian bush fire season, 'Black Summer', has been estimated at \$230 billion.

Insurance

The fire risks associated with the HumeLink towers is well recognised by insurers. Insurance companies use extremely sophisticated risk models. We understand that they are considering refusing to insure farms which are directly affected by the overhead lines or at least massively increasing the premiums they charge to landowners in the path of the project. (See attached legal advice regarding the insurance issue)

In the absence of insurance, these businesses may not have access to bank finance which threatens the viability of their operations into the future.

The situation around liability for consequential damage of any bushfire resulting from HumeLink is unclear. However, following on from the recent floods in Lismore, it is highly likely the NSW Government will have a moral responsibility to assume some part of the duty of care for any damage caused by any fire ignited by HumeLink.

We urge the Committee to call the Insurance Council of Australia to give evidence on this issue.

Outages, maintenance and network leakage

Other cost issues not properly considered by Transgrid include outages from natural disasters, ongoing maintenance and grid leakage.

In the case of grid leakage, transmission towers with Alternating Current (AC) cables are considered inefficient compared to undergrounding with Direct Current (DC). The current HumeLink proposal therefore wastes precious renewable energy supplies. This impact could be significant as AEMO says current losses total about 10 per cent of total energy transported.

Similarly, ongoing maintenance of hardware and vegetation under the transmission towers could be considerable over the 80-year life of the project, but is not costed in any detail.

Maintenance of corridors for existing lines is performed using strong chemical herbicides whose impact is increasingly being questioned from a health perspective. The actual cost of maintenance of the towers and the exposed cables is substantial. In contrast the narrow corridor for underground transmission requires correspondingly smaller maintenance.

The potential cost of outages caused by bushfires, storms and defects is likely to grow over time. In particular, higher temperatures associated with global warming are likely to increase the number of bushfires and cyclones which will impact the overhead lines. An overview of 2019-20 Black Summer Bushfires showed that damage to Transgrid's Network caused 65 outages of 330kv lines in Snowy Valleys area during the Dunn's Rd Fire alone. Underground lines are rarely impacted by these incidents.

According to the Australian Energy Market Operator (AEMO), "good engineering design will ensure 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".

2. Flaws in Project Evaluation – underground transmission

The benefits of undergrounding

Adopting undergrounding, as is already being done in many other parts of Australia and the world, would create significant cost and social advantages for HumeLink that Transgrid has failed to properly take into account including:

- **Bushfires** - Remove the overhead network threat of igniting bushfires. In California, which has legislated for overhead lines to be taken underground because it **reduces ignition risk by 99 per cent**
- **Environment** - undergrounding will result in much reduced corridor easement, estimated at around 15m, compared to a 70m easement for overhead lines. This is not only less expensive but will be well received by landowners.

- **Significantly reduce community opposition** that could cause ongoing construction delays for the current overhead tower proposal if Transgrid was to attempt construction
- **Reduce outages** caused by weather events such as lightning, bushfires, storms, extreme winds, and flooding. Such events are expected to become more frequent and intense with climate change, causing more outages, physical damage, more repair costs, and lost revenue, sometimes costing tens of millions from a single event. Transmission security and resilience is required under the [SLACIP Act](#);
- **Reduce ongoing maintenance costs**, including land clearing to avoid fires
- **Minimise damage to prime agricultural land, local industries, communities and visual impacts**
- **Reduce energy losses in transmission**, Over the life of the project this has significant efficiency benefits as the value of the saved energy increases.
- **Pose less risk to national security** from potential network attacks.

Upfront costs

While in the long-term cost and social benefits of undergrounding are compelling and largely unaccounted for in the current HumeLink proposal, the true upfront costs quoted by Transgrid are also highly questionable.

Initially costed by Transgrid at \$21.5 million per kilometre to take a single circuit 500KV cable underground, a revised Transgrid report in 2022 almost halved the initial upfront costing to \$11.4 million per kilometre.

Recent costings provided by independent consultants and real-world experience overseas clearly show that the cost is most likely even less than Transgrid's reduced estimate, with California current large-scale undergrounding work coming in at around AU\$3.35 million per km per kilometre.

The Committee will be presented evidence by experts like Professor Simon Bartlett who will argue that HVDC VSC transmission lines are far more amenable to undergrounding than HVAC lines.

Of course, no true cost estimate for undergrounding HumeLink will be known until the project is put to a competitive tender process.

Australia should be a leader in renewables transmission too

Recently there has been much discussion about Australia's biggest opportunity for growth and prosperity is the global shift to clean energy.

The Albanese Government's second Budget was designed to help unlock Australia's potential as a "renewable energy superpower" with investments in clean energy industries and jobs.

However, clean energy must also include green transmission infrastructure, and currently NSW and Australia are at risk of becoming laggards in this regard.

To truly become a renewable energy superpower, we must adopt best practice in transmission through undergrounding. Without that, we are promoting old tower infrastructure with counterintuitive greenhouse gas outcomes through large-scale land clearing, heavy use of steel and concrete, and unnecessarily high energy leakage from the network.

The actual carbon footprint of the towers and their foundations is considerable. It contributes to unfavourable comparisons with smaller countries using alternative sources of low emission generation and transmission.

3. Impacts on communities, environment, farmers, businesses and individuals

Transgrid's current HumeLink proposal is one of the biggest energy infrastructure projects ever undertaken in NSW and involves building high voltage overhead transmission towers from Wagga Wagga and the Snowy Mountains to the outskirts of the Southern Highlands, featuring between 800 to 900 towers measuring 80 metres in height.

According to Transgrid's figures, the project impacts 48,322 hectares of land (483.22 square kilometres) in this region, equivalent to 67,678 football fields. Dozens of towns and communities will be affected including Wagga Wagga, Tumut, Adelong, Adjungbilly, Batlow, Bookham, Yass, Gunning and Bannaby, as well as national parks, state forests and prime farming land.

Transgrid has at its disposal significant resources, whose costs are largely tax deductible, to lobby for support in Canberra and Macquarie Street - money that simply cannot be matched by concerned citizens in regional communities, no matter how passionate we are.

There should be no doubt that Transgrid has not received a social licence - or acceptance - from our communities for this project. Nor has it, in good faith and with an open mind, truly considered other alternatives such as undergrounding.

The prospect of these overhead powerlines has heightened the level of anxiety in affected local communities. People are deeply offended by the lack of genuine care for their plight, their homes, their businesses, their connection to the land and their histories in our tight-knit communities.

Similarly, there has been little consideration about the impact of HumeLink on the region's productive farmlands, which are significant contributors to local employment and the State's food production and economy. Numerous farms will see operations significantly impacted with HumeLink lines cutting through their land. The actual operation of modern farms near these lines will be severely impeded

In the era of the Internet of Things (IOT), modern farmers use the internet extensively. It is used to monitor water supply and reticulation systems with automatic monitors. It is used for precision spraying, sowing, and harvesting through GPS equipped tractors, spreaders, and harvesters. The existence of these high voltage overhead lines is expected to severely disrupt the provision of internet and GPS signals and therefore the efficient operation of modern farms.

While the Snowy Mountains and Tablelands have been selected as iconic locations to promote regional Australia, their tourism status are not treated as a serious consideration in Transgrid's HumeLink proposal.

4. Flaws in industry structure, regulations and project assessment

The fact that generation projects are deliberately evaluated without reference to the cost of transmission is a major structural flaw in the energy industry as we move to renewables. While this may have been a realistic proposition to foster competition in the early days of the National Electricity market when most generation was located close to the East Coast centres of population, it does not work today.

New generation projects for renewables are often located hundreds, if not thousands, of kilometres away from large population centres like Sydney. Transmission costs are considerable and, by regulation, must be passed on to energy users rather than generators. This in turn creates adverse environmental and social outcomes for communities faced with projects like HumeLink which are forced, by more regulation, to implement inferior, low cost transmission solutions in the name of “reducing energy bills”.

This is particularly problematic because transmission infrastructure companies like Transgrid are natural monopolies that can use both Federal regulations and State planning laws to push through proposals inferior projects like HumeLink without competition.

Designated as a State significant project, HumeLink can avoid proper scrutiny and normal planning laws, while completely removing the rights of families and communities that have lived and worked in these areas for generations.

The threat of Compulsory Acquisition of corridors has been made very real both by Transgrid and their legal counsel, Corrs.

Transgrid has stated on numerous occasions that above-ground towers are the only option for HumeLink because it is bound by the “rules” and, therefore, must deliver the cheapest project, and in the fastest time despite ongoing delays to Snowy 2.0.

Transgrid notes that the rules established by the Australian Energy Regulator (AER) give greater weight to upfront cost and speed than other important factors. Therefore, it fails to properly acknowledge issues such as the protection of endangered animals, outages, bushfires, the impact on rural communities, ongoing operational costs, market benefits, and reliability.

In fact, the AER rules were established to provide a basis for allowing Transgrid to receive a guaranteed return on assets. This guarantee is what makes transmission infrastructure so attractive to foreign investors such as the Canadian owners of Transgrid. It was not designed to ensure the design of a modern, efficient and environmentally friendly transmission grid.

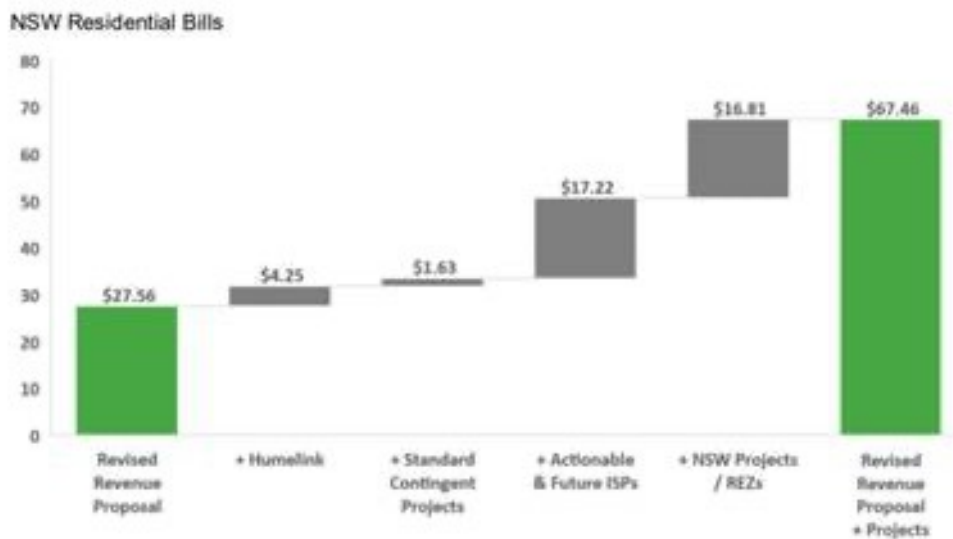
One of many such statements by Transgrid can be found in the Daily Advertiser on 27 December 2022: *“A TransGrid spokesperson said the cost difference between overground and underground construction of HumeLink is so much that it would significantly impact the costs to consumers. Given the cost-of-living pressures being experienced by customers, this is particularly pertinent and TransGrid is committed to doing everything it can to put downward pressure on customer bills,” the spokesperson said. “In addition, delays associated with undergrounding would have a significant impact on network security.”*

5. Alternative options for funding

Based on [Transgrid’s Revised Revenue Proposal 2023-28](#), it appears the current costing for the overhead tower proposal will add \$4.25 a year to the bill of NSW residents, out of a total additional cost impost of \$67.46 for transmission.

If that is the case, it is important for the Committee, government, and energy users to understand what the costing would be for undergrounding.

If you apply Transgrid's claim that undergrounding would be 3.5 times, the annual cost to the energy consumer for HumeLink would be around an additional \$10.60, per consumer per year. This costing does not include the implicit cost of things like bushfires.



However, passing on the full cost of transmission infrastructure projects like HumeLink to energy consumers is not the only option available to governments, and may in fact cause market distortions and poor project planning from generators and monopoly transmission providers.

The Government should consider alternative government funding for environmentally sustainable, infrastructure.

Generators building new projects could pay a percentage of transmission construction costs, as they are profiting from the delivery of energy to consumers, and choosing where projects are built.

Making generators pay would ensure they make sensible economic decision about where they build new generation infrastructure and force them to consider options such as better utilisation of existing infrastructure and easements.

At the moment, NSW is carrying the cost of the implicit long-term risk of HumeLink. A bushfire would require compensation to affected individuals and businesses. This compensation would be to the account of NSW taxpayers. Any upside in the project is held by Transgrid and the foreign owners of the project. This is an unattractive and deeply unfair arrangement.

The federal government has already taken full ownership of Snowy Hydro. It acquired the shares previously held by State Governments including NSW. There is a precedent for active State Governments to consider a strategy where key, monopoly infrastructure is built and controlled by State Governments. Victoria appears to be moving in this direction. Is NSW going to continue to use the somewhat discredited PPP model for this key element in our future prosperity?

6. Delivery timetables

It is understood that community opposition to overhead transmission lines in NSW and Victoria has already added some \$4 billion to the cost of AEMO's proposed 500kV interconnector between Melbourne and Sydney (being planned in 4 sections WRL, VNI West, HumeLink and Sydney Ring).

Undergrounding HumeLink will grant Transgrid a 'social licence' that will remove community opposition.

The community will work with the government and Transgrid to assist in any way possible to ensure delivery timetable is met. Farmers at Tumut have said: '*If HumeLink goes underground, Transgrid can start tomorrow, and we'll even dig the trench for them*'.

Given that Snowy Hydro has been delayed until December 2029, HumeLink can be delivered when needed as an underground solution.

AEMO's own modelling shows the optimal timing of HumeLink was 2028-29 in the Step Change scenario; and 2033-34 in Progressive Change scenario.

7. Risk management

Energy projects of State significance by definition must seriously consider risk management and continuity of supply, particularly when costs are, by regulation, forced onto consumers.

In the case of HumeLink, its designation as a State significant project is questionable, given that projects of such status should surely be nearly 100% reliable. Yet it is a known fact that overhead transmission lines are prone to fail.

As previously discussed, overhead networks are susceptible to weather events such as lightning, bushfires, storms, extreme winds, and flooding, which are all expected to become more frequent with global warming. Conversely, undergrounding is not susceptible to such events.

Similarly, above ground transmission poses far greater risk to our national security from potential network attacks. This issue has been raised by risk experts as one of the top five "discontinuous risks" facing Australia, with the proposed mitigation to "harden" electricity infrastructure by putting transmission infrastructure underground.

Conclusion

Stop, Rethink, HumeLink understands and supports the urgent need for NSW to move to renewable energy.

We must ensure that this fundamental shift is done in a responsible and sustainable way that brings long-term cost benefits and better environmental outcomes for NSW and minimises community opposition with a social licence.

There is no doubt that the economic, environmental, and social cost benefits of undergrounding HumeLink are far-reaching and profound when compared to the current above ground proposal which is based on flawed economics and short-term thinking.

The significant, economic, environmental, and social issues associated with HumeLink can be overcome by taking the transmission underground, as they have in Europe and California and Transgrid has done recently in Sydney's CBD.

We urge the Committee to strongly recommend the undergrounding of major transmission infrastructure in NSW.

The committee should also investigate the impact on the viability of existing businesses if the insurance industry is not willing to provide coverage of properties affected by overhead transmission lines.

Should the Inquiry wish to discuss any of the above or related material, I can be contacted on mobile

Yours sincerely,

Michael Katz
Stop Rethink HumeLink