

Submission
No 39

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

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Select Committee on the Feasibility of Undergrounding Infrastructure for Renewable Energy Projects
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Inquiry into the feasibility of undergrounding the transmission infrastructure for renewable energy projects

Nexa Advisory welcomes the opportunity to share our views and insights on the option of undergrounding new transmission lines in NSW.

Context

Australia needs to build over 10,000 km of new electricity transmission before 2030, including interconnectors such as HumeLink and the transmission needed for Renewable Energy Zones.

Lack of progress on building this transmission capacity is recognised as a major roadblock to connecting the new renewable generation that will replace the coal generation as it exits, delivering the broader environmental and economic benefits of the clean energy transition. The delays to building new transmission and renewable generation have now reached a critical point, impacting our ability to close coal power stations on time¹ to meet national and state emission reduction and renewable generation targets. New South Wales will need to replace three coal-fired power stations over the next decade and work by Nexa Advisory shows that transmission delays are already costing consumers².

Key Points & Recommended Policy Directions

In our submission, we provide some insights into, and advice about, potential approaches to delivering new transmission in NSW efficiently and expeditiously. These are drawn from examples in leading global energy markets and a recent paper we prepared on issues related to transmission in the National Energy Market (NEM).

Undergrounding transmission lines to expedite social licence

Undergrounding transmission lines has been suggested as a solution to some of the key social licence issues. However, placing very high voltage transmission lines underground is complex and as a result it is typically more expensive to build and maintain than overhead transmission power lines.

Undergrounding the very high voltage transmission lines that need to be constructed in NSW will be complex and necessitate the use of bespoke, niche skills and equipment that was already in short supply

¹ <https://nexaadvisory.com.au/site/wp-content/uploads/2023/07/Nexa-Advisory-Eraring-can-be-closed-on-schedule-Report-24072023.pdf>

² https://nexaadvisory.com.au/site/wp-content/uploads/2022/06/Report-Modelling-Electricity-bill-impact-due-to-transmission-delay_2022-06-07.pdf

prior to the global expansion in renewable energy and the transmission to connect it to customers and the current issues in supply chains.

There are a number of significant considerations in regard to undergrounding that raise questions of feasibility, and add to both cost and timescale:

- Underground transmission cables must be joined in a sterile and dust-free environment. At present this would require international expertise for production and delivery of the transmission lines. This also makes very high voltage underground lines slow to construct.
- In order to dissipate the significant heat generated by very high voltage electricity flowing along power lines, and to minimise safety issues, the trench for a high voltage underground cable needs to be back-filled with specialist material, not the earth that was originally removed to create the trench.
- Undergrounding is very dependent on suitable geology, topography and soil moisture to conduct away heat and locations that are prone to drought or flood, or poor rocky soils that carry little water, are unlikely to be suitable for undergrounding approaches.
- In common with high voltage overhead transmission lines, undergrounded lines result in the restriction of some activities in their immediate vicinity under. In fact, bushfires that would pass underneath high voltage overhead lines will impact underground lines as ground temperatures increase.

Conclusion:

While undergrounding of transmission may be possible and helpful in some instances, such as for short distances in visually sensitive areas, wholesale undergrounding of transmission lines is not an approach adopted internationally.

Even at the distribution level, where undergrounding is more common, undergrounding lower voltage lines is not challenge-free. In particular, we note that the 2002 Independent Pricing and Regulatory Tribunal (IPART) Inquiry into the Undergrounding of Electricity in NSW, which are substantially less complex to underground than transmission lines, identified that the benefits of undergrounding distribution lines did not outweigh the costs³.

At this late stage, the ongoing exploration of undergrounding high voltage transmission lines further delays the transition to clean electricity. For the future, it will be important to develop a set of criteria and principles that can be used to rapidly assess where undergrounding offers maximum benefits for transmission projects.

³ <https://www.ipart.nsw.gov.au/Home/Industries/Special-Reviews/Reviews/Undergrounding-Electricity/Inquiry-into-the-Undergrounding-of-Electricity-in-NSW>

However, at the moment, we do not believe putting transmission lines underground is the panacea it is publicised to be, and ongoing prosecution of this option runs the risk of using time and diverting resources we do not have to waste.

Opening the market to align incentives and utilise global experience and supply chains

Adopting an open market approach to the build out of transmission will be critical to reducing cost and increase the speed of transmission build and recent work by Nexa Advisory (attached) has demonstrated that opening up the transmission market to other parties beyond the regulated monopolies would save customers of the order \$13 billion across the NEM.⁴

Australia is a relatively small, and distant market. Overseas transmission markets are of a much more significant scale and as such providers and operators in the international markets have more established build experience, and access to and leverage in international supply chains, plus access to capital. A number of these entities already have a presence in Australia and have engaged in the tender process for the unregulated Renewable Energy Zone transmission in NSW. Allowing them to enter the broader market for the NEM transmission would expedite the critical build delivery, and potentially reduce the cost of delivering the critical infrastructure needed to expedite the transition to a clean powers system.

Nexa Advisory would be happy to provide a briefing on our work on competitive delivery of transmission, and discuss any of the issues raised in this submission.

Yours Sincerely,

Stephanie Bashir
CEO and Principal, Nexa Advisory

⁴ https://nexaadvisory.com.au/site/wp-content/uploads/2023/06/Nexa-Advisory_Transmission-Contestability-in-Australia-Research-Report-June-2023.pdf