



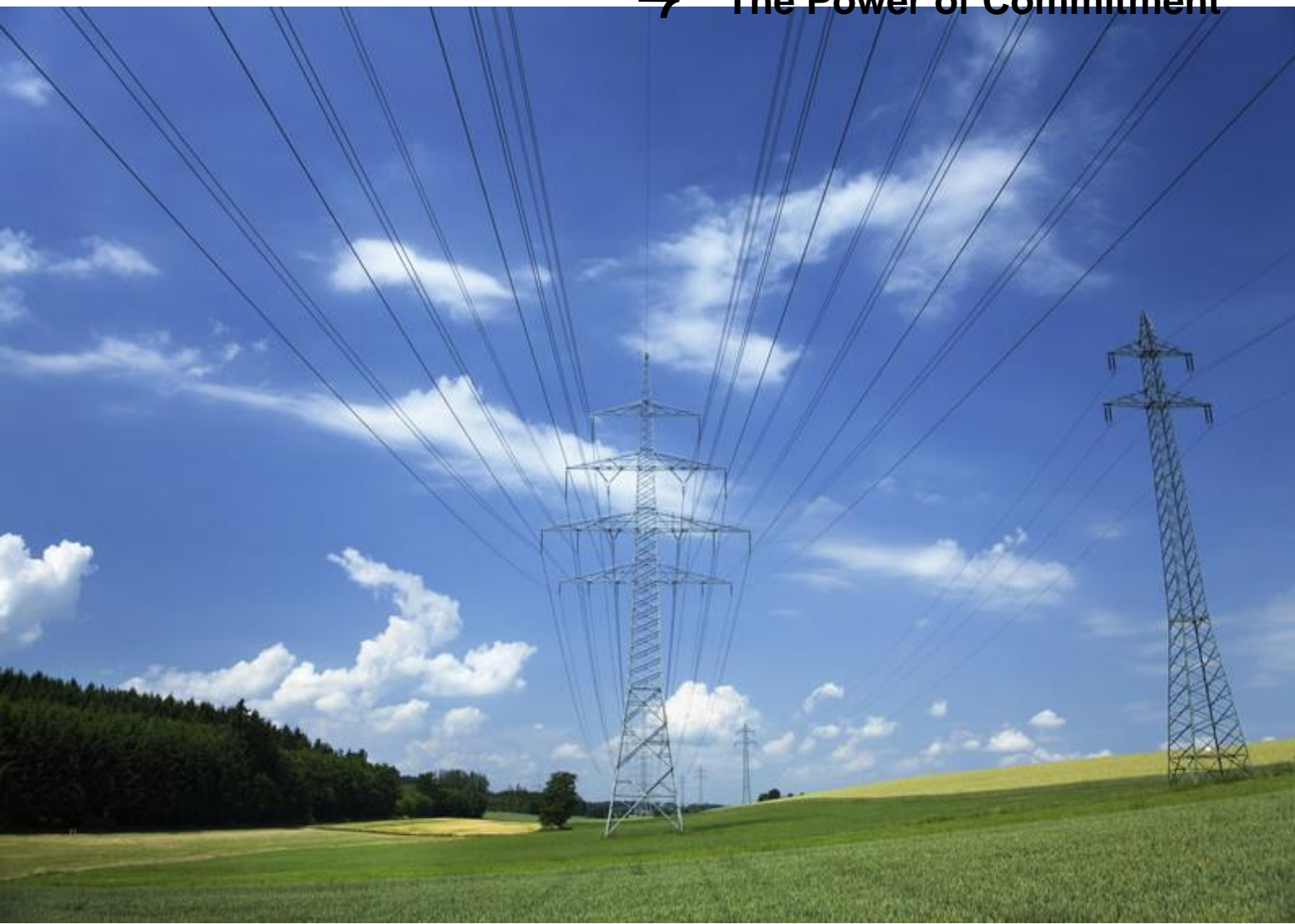
132KV Low Spans - Duty of Care Demonstration

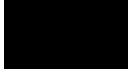



2023-28 Revenue Proposal

Transgrid

7 November 2022

→ **The Power of Commitment**



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Executive summary

Transgrid operates 132kV lines that breach their 6.7m clearance distance recommended under AS/NZS 7000:2106 - Overhead line design.

Transgrid analysed the separation distances on these lines and have identified instances where the separation distance to ground breaches 6.7m based upon the Low Span Risk Assessment Methodology.

To reduce the risk associated with these lines, Transgrid developed OER N2616 that assesses three options against a base case of business as usual. The preferred option remediates 132KV identified low spans with high utilisation at a cost of \$24.9M and a weighted NPV of \$34.5M.

N-1 was used to determine the prioritisation of the investment which is considered appropriate.

GHD understands that the AER question the analysis on the basis that N-1 was not applicable to AS/NZS 7000:2106 - Overhead line design.

GHD's independent assessment of OER N2616 indicates:

- The analysis has been conducted at the maximum design temperature which is consistent with section 2.4 of AS/NZS 7000 states the overhead line shall be designed for the maximum operating temperature of the line (and its conductors).
- N-1 is not relevant to the application of AS7000, what is relevant is the maximum operating temperature which clearances are assessed against. The N-1 utilisation operating temperature is within the maximum operating temperature and therefore covered by the AS7000 clearance requirements.

GHD considers that the OER analysis and objectives defensible.

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1. Introduction

Transgrid submitted its 2023-28 Revenue Proposal in January 2022. According to the AER regulatory timetable, Transgrid can submit a Revised Revenue Proposal in December 2022.

Transgrid has engaged GHD to perform several independent assessments of Repex projects to support the development of the Revised Revenue Proposal.

1.1 Purpose of this report

This report outlines an independent assessment of OER N2616 which Transgrid submitted to the AER for funding associated with remediation of 132KV low spans.

This report may be used to support Transgrid's Revised Revenue Proposal to be submitted at the AER.

1.2 Scope and limitations

GHD has been engaged by Transgrid to perform an independent assessment of the OER prepared to support the funding request for remediation of identified 132KV low spans.

The scope of this report includes an assessment of whether the business case detailed in OER N2616 and the available supporting documentation detailed in Appendix A-1, is in alignment with:

- The AER's Asset replacement planning note¹
- AS/NZS 7000:2106 - Overhead line design

as well as demonstrating the requirements of a person conducting a business or undertaking under the Work Health and Safety Act.

This report has been prepared by GHD for Transgrid and may only be used and relied on by Transgrid for the purpose agreed between GHD and Transgrid as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Transgrid arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

¹ Industry practice application note, Asset replacement planning, January 2019, AER

2. Background

Transgrid operates 132kV lines that breach their 6.7m clearance distance recommended under AS/NZS 7000:2106 - Overhead line design.

Transgrid analysed the separation distances on these lines and have identified instances where the separation distance to ground breaches 6.7m based upon the Low Span Risk Assessment Methodology.

To reduce the risk associated with these lines, Transgrid developed OER N2616 that assesses three options against a base case of business as usual. The preferred option remediates 132KV identified low spans with high utilisation at a cost of \$24.9M and a weighted NPV of \$34.5M.

N-1 was used to determine the prioritisation of the investment.

GHD understands that the AER question the analysis on the basis that N-1 was not applicable to AS/NZS 7000:2106 - Overhead line design.

3. 132KV low span assessment

The OER identifies 132KV spans that are below the clearance distances set by AS/NZS 7000:2106 - Overhead line design. The OER details that some lines have experienced changes to generation mix resulting in lines that now operate at a higher temperature than what was previously assessed.

The identified lines were assessed using the Low Span Risk Assessment Methodology that considers the following four factors:

1. Land use – Purpose to which the land cover is committed to determine potential exposure.
2. Violation temperature – the percentage of required operating temperature when the span first starts to go below the required minimum clearances. In this case clearance breaches were assessed at the maximum design temperature which is consistent with section 2.4 of AS/NZS 7000:2106 - Overhead line design states the overhead line shall be designed for the maximum operating temperature of the line (and its conductors).

N-1 is not covered by AS/NZS 7000:2106 - Overhead line design and in this case the use of N-1 has only been used to determine prioritisation as utilisation can indicate the likelihood of breaching the clearance requirements. This is considered a reasonable assumption.

1. Violation amount – how far below the minimum clearances a particular span is at the required operating temperature of the line as recorded by the analysis.
2. Violation area – the size of the land/ground that is exposed to conductors below their minimum clearances at the required operating temperature.

A-1 Documentation considered

The following documentation was considered during our independent assessment:

- Safe Work Australia, "How to determine what is reasonable practicable to meet a health and safety duty", May 2013
- Australian Energy Regulator, "Industry practice application note, Asset replacement planning", January 2019
- TL-613883 - TRANSMISSION LINES - CONSTRUCTION - DESIGN - STANDARD MINIMUM CONSTRUCTION CLEARANCES FROM GROUND AND OTHER SERVICES - DESIGN STANDARD.pdf
- Transgrid - OER-N2616 Rev 2 132kV TLs Low Spans - 31 Oct 2022 - PUBLIC.pdf
- Transgrid - OER-N2616 Rev 0 132kV TLs Low Spans - 10 Nov 2021 - PUBLIC.pdf
- AS/NZS 7000:2106 - Overhead line design
- TransGrid, "Electricity Network Safety Management System (ENSMS) Description", Rev 4, May 2020



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