Justification Statement
Clearance to Ground and Clearance to Structure
2020 – 25

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Contents

1. Purpose

The purpose of this document is to outline the proposed expenditure specifically associated with remediating clearance to ground and clearance to structure issues for overhead conductor, in accordance with the lifecycle management strategies detailed in Section 9 of the Asset Management Plan[1]. This document also provides a summary of replacement scenarios as well as the impact in terms of performance and cost to demonstrate prudence and efficiency.

This document is to be read in conjunction with the Asset Management Plan which contains detailed information on the asset class, populations, risks, asset management objectives, performance history, influencing factors, and the lifecycle strategy.

All dollar values in this document are based upon real 2018/19 dollars and exclude overheads.

2. Scope

The basic intent of this replacement expenditure is to comply with regulatory obligations, maintain service delivery performance including customer reliability standards and customer quality standards, and maintain the safety of the network for all of the Queensland community. The engineering strategies employed are consistent with best practice strategies employed by DNSPs across Australia.

The scope of this forecast includes all works necessary to achieve regulatory standard clearance for energised overhead assets. This work varies from retensioning conductors to conductor, pole or crossarm redesign. In some cases, works cost recovery may be possible through enforceable actions with third parties who erect structures within regulatory defined exclusion zones.

Regulatory clearance standards have changed across the years, and there are grandfather clauses within the regulations accepting that existing lines will comply with clearance standards if they continue to comply with the regulatory standards in place at the time of construction. With some lines in service designed to 1932 regulatory standards, Energex also considers the public safety risks associated with such designs and where considered necessary, will improve clearances to better suit modern community operation.

The key programs which drive the volume forecast in the 2020-25 Regulatory Control Period are as follows:

- CA52 CAPEX LIDAR Defect Remediation (Condition and Risk)
- CA56 Maintain Statutory & Standard Requirements (Condition and Risk)

3. Basis of Forecast

The present LiDAR approach is a point-in-time geospatial solution – clearance issues are identified based upon simple calculation of overhead asset to ground or structure clearance. Energex's recent clearance remediation effort is based upon the system-wide LiDAR scan made in 2016, with work expected to be substantially completed by 2020. The experience reported by Ergon Energy post the

[1] AMP – Overhead Conductor, Energy Queensland Limited, 2018

initial survey and remediation indicates an ongoing number of clearance issues being identified annually. Energex expects a similar trend. There are multiple reasons for this, notably pole movement in the ground, changes in land use, ongoing community and building construction, and basic conductor temperature and tension physics impacting line sag at different points in time.

Across Energex, there is a risk of people and equipment contacting overhead lines, and there are significant safety risks associated with each contact. Therefore it is imperative that Energex delivers a range of measures to mitigate these risks, and ensuring adequate conductor clearances is an important part of that mitigation.

Energex intends to combine the LiDAR data with actual design history, environmental data and loading analysis, to establish those overhead assets that are expected to experience clearance issues as a result of dynamic conductor sag. This analysis is complex and will require the use of detailed load forecasting. The use of modelling to identify clearance issues is expected to deliver greater efficiency of remediation delivery and reduce the need to return to the same area within a short period.

To this end, an allowance forecast has been developed of $7.3 million per annum, which is anticipated to substantially resolve many of the ongoing higher risk clearance issues that are expected to continue to arise during the period up to 2024/25. With the acceleration of DER, the proliferation of the Industrial Internet of Things, and the rapid development of communication technologies, identification and remediation of clearance issues can be expected to become more precise over time, and it is expected that remediation works will be required well beyond 2025.

4. Forecast Expenditure

The following section provides a summary of the historical and forecast remediation expenditure. It should be noted that expenditures in 17/18 and 18/19 spiked due to the backlog of remediation issues arising from the first LiDAR review conducted in 2016. Expenditure in prior years was based on ground patrols, which failed to detect many of the issues found using LiDAR.

Volume & Unit Rate Details ($, Real 18/19)			15-20 Regulatory Period					20-25 Regulatory Period				
	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
Actual Expenditure ($,000)	3,718	3,645	3,591	3,539	43,264							
Forecast Expenditure ($,000)						35,600	19,000	7,300	7,300	7,300	7,300	7,300

Table 1 – Forecast Expenditure

5. Testing higher remediation volumes

This option would raise all spans to achieve current design standards using ABC construction. Approximately 85% of lines were built before 1994, and many have not been upgraded in some fashion. Due to the substantial volume, this work would entail a 20-year program due to resource and cost constraint issues and is estimated to cost around $12 million per annum. There is no regulatory

obligation to achieve current regulatory standard clearances for these lines, however, it would provide a substantially lower risk outcome through use of current standard design parameters. This estimate is not precise due to the uncertainties associated with future survey findings, however, it is based on experience in both Energex and Ergon Energy and knowledge of the existing Energex network design.

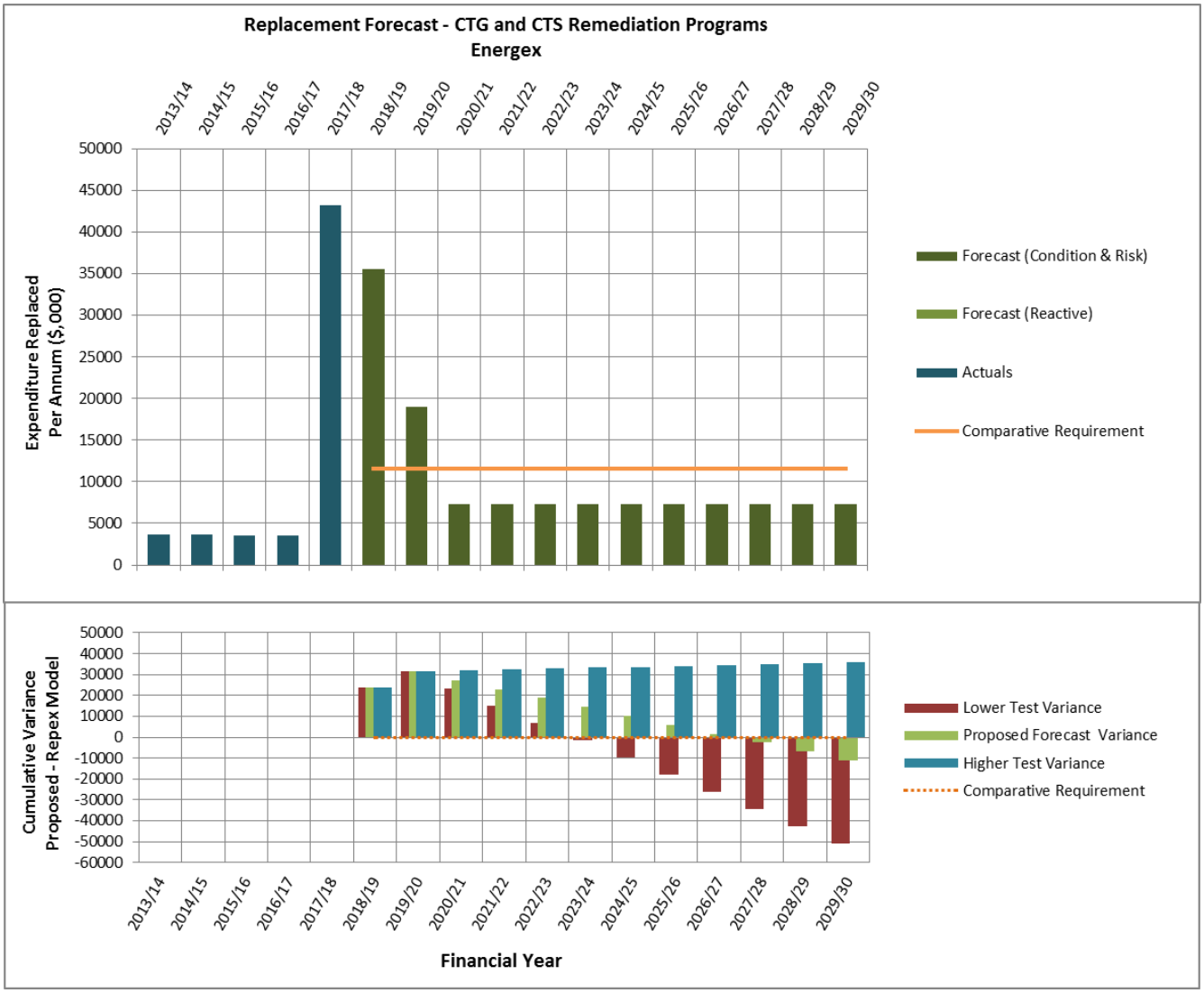
6. Testing lower replacement volumes

Lower remediation volumes can be achieved by ignoring the dynamic nature of the network, and performing a periodic LiDAR scan and remediating just those conductor spans that have clearance issues at the time of the LiDAR scan. The Ergon Energy experience is that this will be an ongoing exercise. The Energex network is typically much more heavily loaded than the Ergon Energy network, which increases the likelihood of clearance issues. Coupled with an urban environment, this presents an unacceptable ongoing risk.

This option is anticipated to require ongoing remediation works of around $3.3 million per annum but is not expected to address the public safety risks appropriately.

7. Repex Modelling and Risk Exposure

The expenditure in this category is unmodelled and so a Repex comparison cannot be presented. The following figure describes the proposed forecast allocation in this category in comparison to historical requirements. The Comparative Requirement represents the five-year average of historical actuals.



Note: *2025-2030 replacement volumes assume a flat line replacement at the 2024/25 forecast volume.*

Figure 1 – Replacement Forecast

The proposed program is reflective of the financial and resource constraints and results in a moderate and steady improvement in the risk profile over the 2020-25 period. The risk in subsequent periods is forecast to further improve as regulatory clearance issues are progressively identified and remediated.

During the course of the 2020-25 period, Energex will continue to investigate technology-based techniques to monitor condition and alternatives to like-for-like replacement such as the use of distributed generation, batteries and isolated grids. As better capability and monitoring systems are developed, they will improve Energex's ability to manage clearance risks more proactively.

As outlined in the lower graph, the high volume replacement scenario reduces the risk exposure significantly; however it comes at a substantial additional cost. The risk associated with the reduced volume scenario is considered to exceed tolerable levels for safety and legislative requirements and is likely to be ongoing for many future regulatory periods. Given the safety implications of the low volume scenario, it is likely that the safety regulator would intervene in the event of a serious incident occurring involving a conductor that is below statutory clearance standards.

The proposed program is reflective of the commitment to ensure safety, constrain customer price impacts and continue to look for efficiencies in program delivery. It reflects a tolerable risk position

which balances the achievement of asset management objectives and customer service levels and ensures a level of investment which avoids future regret based on the uncertainty associated with the capability new technologies may bring.