Pole Top Structure Replacements

Business Case

19 January 2024

energex
Part of Energy Queensland

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DOCUMENT VERSION

Version Number	Change Detail	Date	Updated by
Draft v0.1	Draft	22/10/2023	Senior Asset Strategy Engineer
Draft v0.2	Draft	30/10/2023	Manager Asset Strategy
V1.0	Finalised	21/11/2023	Manager Asset Strategy

RELATED DOCUMENTS

Document Date	Document Name	Document Type
JAN 2024	Asset Management Plan – Pole Top Structures	PDF
MAR 2023	Weibull Model Report – Crossarm v0.1	DOCX
NOV 2023	Crossarm Weibull modelling	Excel
NOV 2023	Crossarm risk modelling	Excel
JUN 2023	RIN 2.2 Compare 2021-22 (Rosetta)	Excel
NOV 2023	Energex 2022-23 - Category Analysis - RIN Response - Consolidated - 24 November 2023 – PUBLIC (16063386.1)	Excel
OCT 2023	Australian Government, Department of the Prime Minister, and Cabinet (office of Best Practice Regulation) – Best Practice Regulation Guidance Note – Value of a Statistical Life	PDF
ND	Australian major natural Disasters.xlsx (a compendium of various sources)	Excel

1 SUMMARY

Title	Pole Top Structure Replacements
DNSP	Energex
Expenditure category	☒ Replacement ☐ Augmentation ☐ Connections ☐ Tools and Equipment ☐ ICT ☐ Property ☐ Fleet
Purpose	The purpose of this Business Case is: • to evaluate the benefits of the proposed volume of Pole Top Structures replacements mainly crossarms for the 2025-2030 regulatory control period • to support the Energex forecast capital expenditure over the regulatory period via a cost benefit analysis.
Identified need	☐ Legislation ☒ Regulatory compliance ☐ Reliability ☐ CECV ☒ Safety ☐ Environment ☒ Financial ☐ Other Energex is committed to adopting an economic, customer value-based approach when it comes to ensuring the safety and reliability of the network. To substantiate the advantages of this approach for the community and businesses over the modelling period, we have employed Net Present Value (NPV) modelling. This commitment is in line with our efforts to maximise the benefits to our customers. The purpose of this document is to outline the proposed volumes of replacement and expenditure associated with pole top structures during the regulatory period 2025-30, in accordance with the lifecycle management strategies detailed in the Asset Management Plan - Pole Top Structures. Energex replaces pole top structures to ensure safety, reliability, environmental, and financial risks are managed in the best interest of consumers.
Summary of preferred option	Three different options were considered as per following over the continuation of the counterfactual (2,000 Targeted Replacements with 100% Defect replacements [OPEX]) replacements: • Option 1 – Counterfactual -1k targeted • Option 2– Counterfactual with no targeted • Option 3 – Counterfactual +4k targeted

<table>
<tr>
<td>Expenditure of Proposed Program</td>
<td>
This business case relates only to defective pole top structure crossarms and targeted replacement. Consequential replacements of crossarms with other asset category replacements (such as conductor and poles), and their respective benefit is included in the overhead conductor and pole replacement business cases.
Preferred Counterfactual (2k Targeted per annum)
<table>
<tr><th>Year
$m, direct 2022-23</th><th>2025-26</th><th>2026-27</th><th>2027-28</th><th>2028-29</th><th>2029-30</th><th>2025-30</th></tr>
<tr><td>Targeted Replacement (this business case)*</td><td>4.3</td><td>4.3</td><td>4.3</td><td>4.3</td><td>4.3</td><td>21.5</td></tr>
<tr><td>Consequential#</td><td>21.4</td><td>21.4</td><td>21.4</td><td>21.4</td><td>21.4</td><td>107.0</td></tr>
<tr><td>Grand Total</td><td>25.7</td><td>25.7</td><td>25.7</td><td>25.7</td><td>25.7</td><td>128.5</td></tr>
</table>
* Expenditure considered for this business case.
# Expenditure included in other investment programs (Pole Replacement, Overhead Conductor)
Note: Defect related pole-top structure expenditure is OPEX, therefore not include in this business case analysis.
</td>
</tr>
<tr>
<td>Benefits</td>
<td>After a thorough evaluation of all available options, it has been determined that Energex will continue with our Counterfactual. This option has been chosen over other options, as it provides the best balance of benefits, deliverability, and safety risks for our customers, with a focus on optimizing existing processes and enhancing efficiencies where possible in terms delivery with other projects/programs.</td>
</tr>
</table>

2 PURPOSE AND SCOPE

The purpose of this document is to outline the forecast expenditure and volumes associated with pole top structures for the Regulatory period 2025-30. The Business case includes the analysis of different options, to determine prudency through financial NPV modelling, considered to manage the replacement volumes to comply with regulatory obligations, maintain existing service delivery performance including customer reliability and quality standards, and especially maintain the safety of the network for the Queensland community.

This document is to be read in conjunction with the Asset Management Plan - Pole Top Structures.

3 BACKGROUND

Following a thorough examination of our pole-top structure asset performance, we are forecasting that the current level of defects are expected to be maintained, largely due to our consequential replacements of pole-top structures that occur during defective pole replacement and our targeted overhead reconductoring program.

Energex has ensured that our proposed pole top structures asset management strategies provides value to the community and shareholders over time through the provision of safe and reliable overhead network and a more secure electricity supply for consumers in Southeast Queensland.

3.1 Asset Population

Energex have approximately 600,000 crossarms as detailed in Figure 1. The age profile of our crossarms shows that approximately 125,000 crossarms are over 35 years old. From the late 1990s, the use of composite crossarms can be seen to increase steadily.

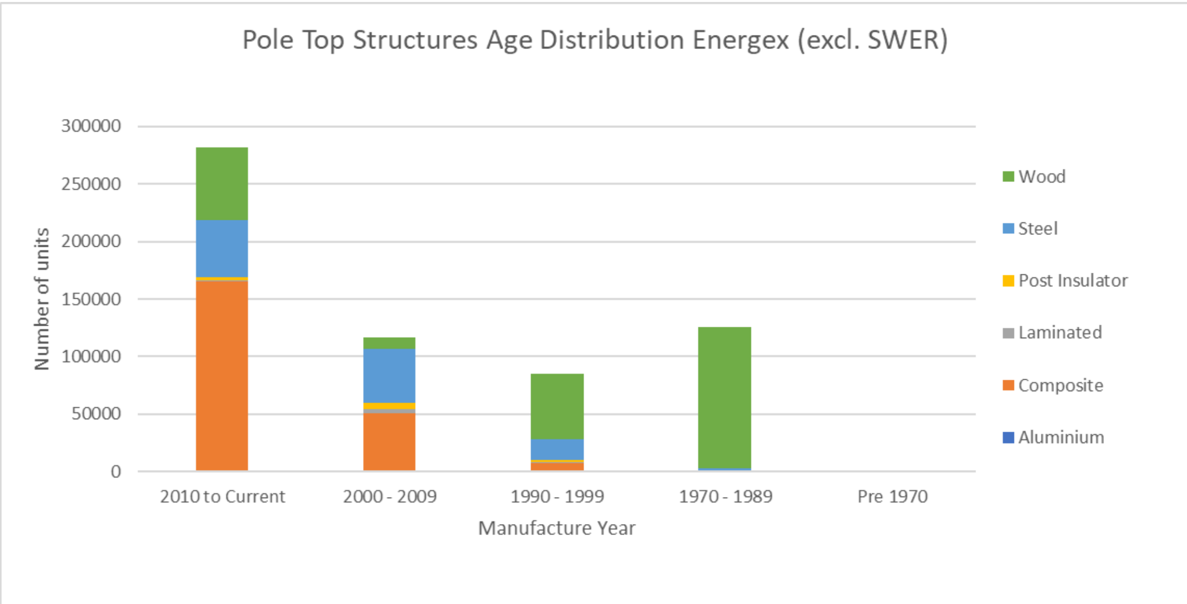

Figure 1: Energex Network Crossarm Age Profile

3.2 Asset Management Overview

Crossarm replacements are mostly driven by well-established inspection programs which identify severe structural strength degradation. They are actively managed through a condition-based approach including:

- Visual inspection of physical condition from ground level.
- Aerial visual inspection carried out from helicopters/aircrafts/drones.
- Pole top structures inspection carried out from elevated work platform or climbing.

Physically defective crossarms identified through inspection are replaced. They are also proactively replaced based on identified emerging defect from inspection and asset performance trend. Proactive replacement is also undertaken with other work such as feeder refurbishment programs or bundled into logical groups for efficiency of delivery and cost.

3.3 Asset Performance

Two functional failure modes of crossarms defined in this model are found in Table 1.

Functional Failure Type	Description
Catastrophic (Unassisted failure)	• Loss of structural integrity of a crossarm, excluding any associated hardware or crossarm mounted plant, such that the residual strength of the crossarm required immediate intervention. • Functional failure of a crossarm asset under normal operating conditions not caused by any external intervention such as abnormal weather or human.
Degraded (Defects)	A crossarm asset deemed defective based on observed serviceability that if not rectified within a prescribed timescale (P0/P1/P2) could cause to an unassisted catastrophic failure.

Table 1: Description of Functional Failure

Figure 2 displays the number of unassisted crossarm failures. It can be observed that Energex's unassisted pole top failures have been steady in the last 2 years, averaging around 180 failures per year. This indicates that to improve our asset performance, more proactive replacements are required in the coming regulatory period.

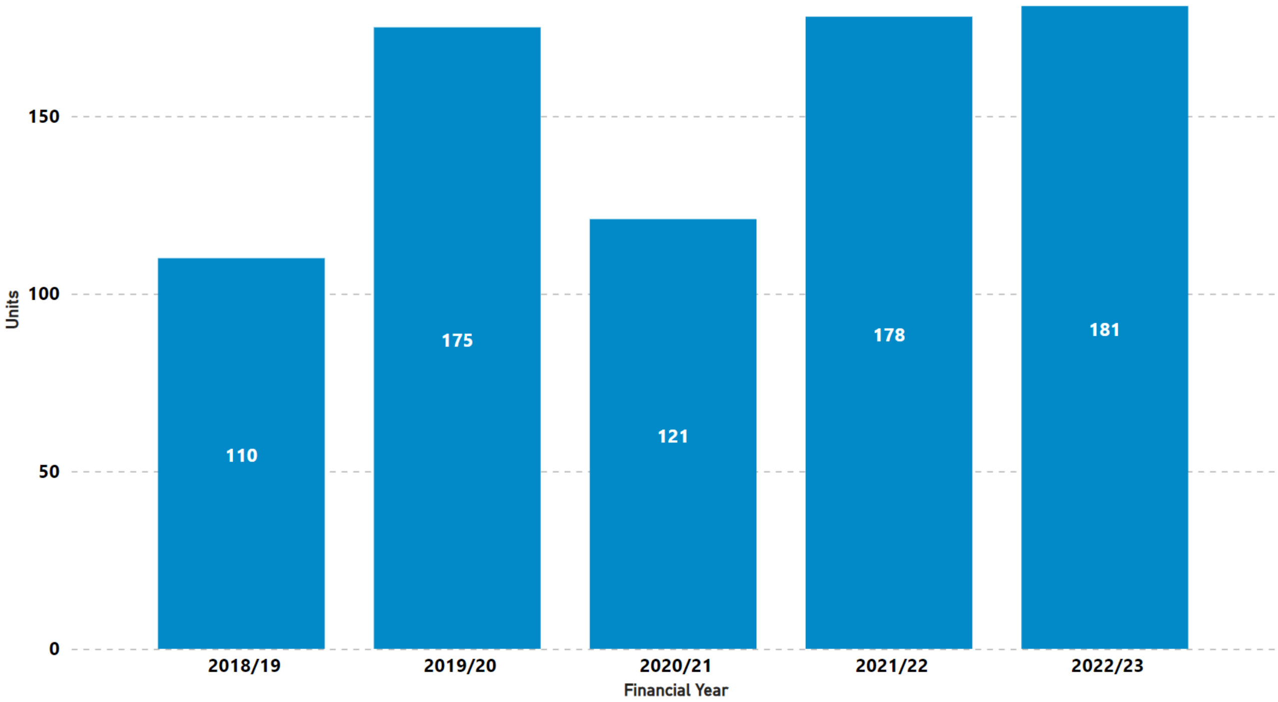

Figure 2: Pole Top Structure Unassisted Crossarm Failures

Figure 3 contains the volume of crossarm defects. Identified defects are scheduled for repair according to a risk-based priority scheme (P0/P1/P2). The P0, P1 and P2 defect categories relate to priority of repair, which effectively dictates whether normal planning processes are employed (P2), or more urgent repair works are initiated (P1 and P0).

Energex defect showing an increasing trend over last 4 years period. During last four-year total number of defects has been increased from 3300 to 10,500. The upward trend is mainly driven by P2 defects. This indicates the importance of increasing the proactive replacements.

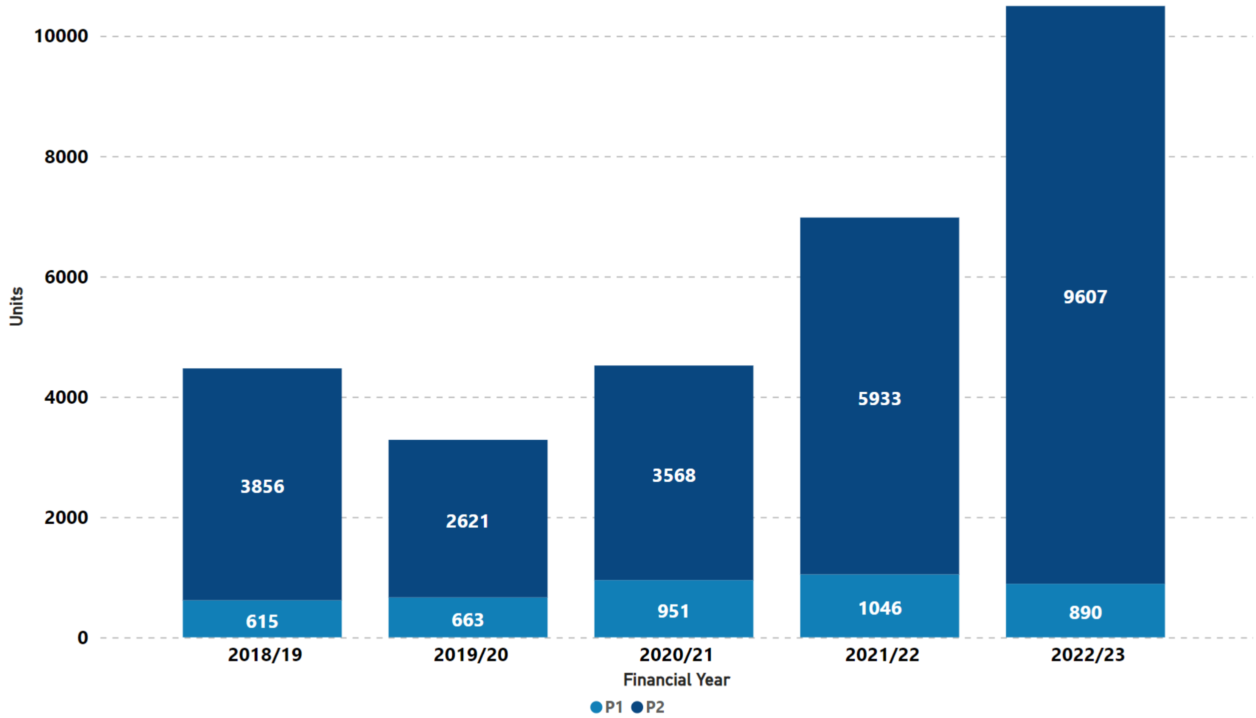

Figure 3: Pole Top Structure Crossarm Defects Data

4 RISK EVALUATION

Our cost-benefit analysis aims to optimize our risk calculation at the program level, so that we can maximize the benefits to our customers. After conducting a cost-benefit analysis using net present value (NPV) modelling, we will select the preferred replacement option based on the most positive NPV of the volumes considered. In the case of this AER submission proposal, the most positive NPV validates that the volume of replacement proposed over the AER period 2025-2030 is a prudent approach.

The monetised risk is simply calculated by as per the calculation in Figure 4.

Figure 4: Monetised Risk Calculation per Category

Each consequence category follows the same calculations in Figure 4 to obtain the total monetised risk as shown in Figure 5. Energex broadly considers five value streams for investment justifications regarding replacement of widespread assets. The ‘Export’ impact is not relevant to this study and will be excluded from the analysis.

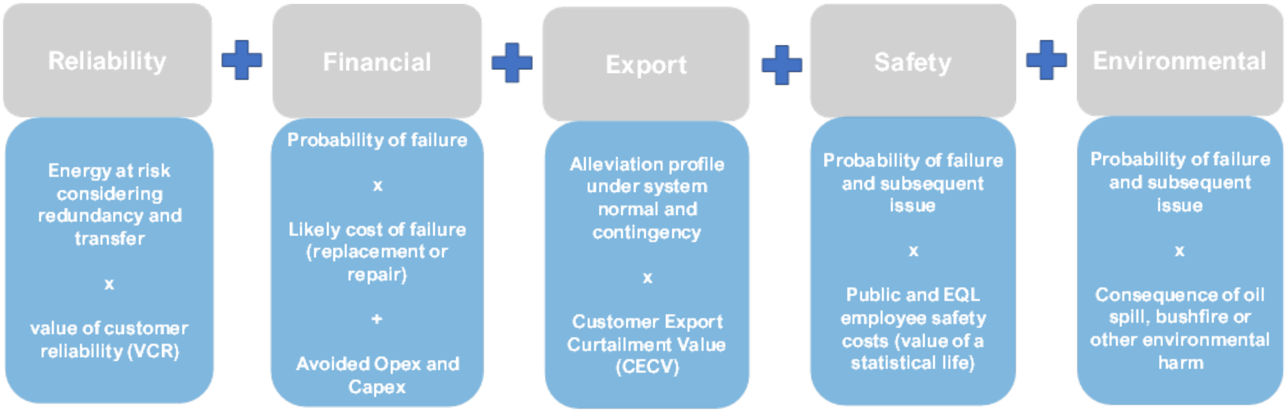

Figure 5: Total Risk Cost Calculation

4.1 Probability of Failure (Weibull Analysis)

Due to the limited condition data available for the implementation of an Asset Health Index (HI), the Weibull distribution model has been utilized due to its flexibility and ability to model skewed data. The statistical model Weibull Distribution has been developed for assets having only observed inspection and not having measured data to predict the PoF such as Low Voltage service cables, Pole Top Structures (Crossarm), distribution transformers and distribution switches to assist with the replacement management of ageing assets.

The calculated probability of failure (PoF) from the Weibull distribution allows calculation of an individual PoF for each asset, categorized by age, in the population.

Using the recorded failures and inferred failure ages of distribution transformer assets that failed in the past years, a Weibull Distribution model was developed for Energex’s crossarms. The resultant curve produced the following characteristics:

The Weibull parameters are outlined in Table 2 and Figure 6.

Weibull Variables	Value
Beta β	4.3
Eta η	43

Table 2: CDF Weibull Variables

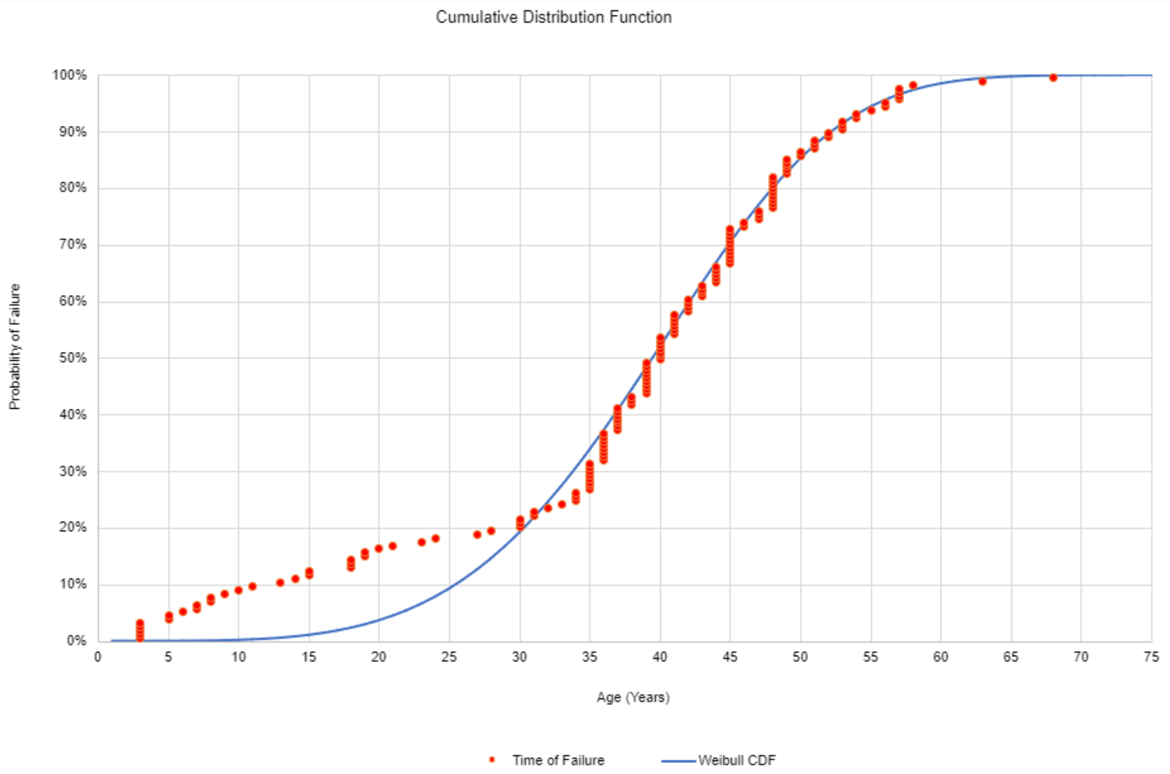

Figure 6**: Crossarm Failure Plot against Weibull CDF Curve**

4.2 Consequence of Failure (CoF) and Likelihood of Consequence (LoC)

The key consequence of crossarm failures that have been modelled are reliability, financial, safety and environmental. The CoF refers to the financial or economic outcomes if an event were to occur.

The LoC refers to the probability of a particular outcome or result occurring because of a given event or action. To estimate the LoC, Energex has utilised a combination of historical performances and researched results. Energex has analysed past events, incidents, and data to identify patterns and trends that can provide insights into the likelihood of similar outcomes occurring in the future. Additionally, Energex also has conducted extensive research to gather relevant information and data related to the respective risk criteria such as bushfire.

To the extent possible the CoF and LoC are crossarm age band specific. This is particularly the case for the reliability and benefits stream, where the site-specific location and bushfire risk informs the benefits calculations for preventing unassisted crossarm failures.

4.2.1 Reliability

Reliability represents the unserved energy cost to customers of network outages and is based on an assessment of the amount of Load at Risk during three stages of failure: fault, initial switching and repair time. The following assumptions are used in developing the risk cost outcome for a crossarm failure:

- **Lost load:** Each crossarm (age band population) in our network is modelled individually, with the relationship developed between a crossarm and the pole and feeder/conductor that it is supporting. The historical average load on each feeder in our network is utilised to determine the kW that would on average be lost following a crossarm failure. We have utilised half of the historic average load on the feeder, which represents the most likely outcome, as the data regarding the exact electrical location of the crossarm that may fail in future in a feeder is not feasible to obtain as Crossarm is also not and uniquely identified asset.
- **Load transfers and Restoration timeframe:** The restoration time is estimated from the actual historical outage data, and the calculated value is average of 3 hours. The staged restoration is considered as a 3-step process, based on auto changeover, manual switching and full rectification period.
- **Value of Customer Reliability Rate:** We have used the Queensland average VCR rate.
- **Probability of Consequence:** For modelling purpose, crossarm failures results in the conductor drop has been assumed to cause an outage to customers.

4.2.2 Financial

The Financial cost of failure is derived from an assessment of the likely replacement costs incurred by the failure of the asset and replaced under emergency. The same unit cost has been taken for replacement in both planned and unplanned circumstances. Historical average cost has been used for this purpose and is approximately $2,167.

4.2.3 Safety

The safety risk for a crossarm failure is primarily that a member of the public is in the presence of a fallen conductor which was caused by crossarm failure. This could result in a fatality or injury. For our modelling we have used October 2023 published document from, The Australian Government, Department of the Prime Minister and Cabinet (Office of Best Practice Regulation) – Best Practice Regulation Guidance Note - Value of a Statistical Life.

- **Value of a Statistical Life:** $5.4m
- **Value of an Injury:** $1.35m
- **Disproportionality Factor:** 6 for members of the public
- **Probability of Consequence**: Following an unassisted asset failure in Energex, there is a 1 in 20 years chance of causing a fatality and 4 in 20 years chance of a serious injury based on historical data evidence. The average number of safety incidents has been derived by analyzing 20 years of Significant Electrical Incident data comprising 5 incidents where unassisted asset failure has driven a safety incident of the appropriate severity. Historically, the data shows, pole top structure has not been the cause of fatality, therefore the fatality incident due to a conductor asset unassisted failure has been considered for the modelling purpose.

4.2.4 Environment (Bushfire)

The value of a Bushfire Event consists of the safety cost of a fatalities and the material cost of property damage following a failed crossarm and conductor. For our modelling we have used:

- **Value of Bushfire:** $22.3m – which includes average damage to housing and fatalities following a bushfire being started. In Queensland *as per Australian major natural Disasters.xlsx (a compendium of various sources)*, there were 122 homes lost and 309 buildings lost during bushfires between 1990 and present (2021) across 12 significant fire records. Homes were estimated an average cost of $400,000 while the buildings were estimated at an average cost of $80k. The weighted average cost of bushfire consequence per pole top has been estimated as $1,829.
- **Safety Consequence of Bushfire -** Safety consequences are evaluated on same assumptions as safety incident consequence in 4.2.3 with a frequency of 0.5 per incident as there has been 6 fatalities recorded across those 12 bushfire incidents in Queensland.
- **Probability of Consequence:** Following the failure of a crossarm, we have estimated that there is a 0.0260 chance of causing a fire. This is based on a historical full two years data when there were 18 fires recorded due to electrical asset failures in Energex. In those two years there were 12 pole failures, 285 cross-arm failures and 402 conductor failures that had potential to cause fire ignition, giving a probability of 0.026 (18/699).
    - Also, bushfire consequence weighting and probability of containing/non-containing the fire has been incorporated into calculations along with % number of days considerations during no-forecast to extreme/catastrophic danger rating forecasts. A fire is also only considered to be possible if the conductor has dropped and made contact with the ground due to the failure of a pole top. In 2021, a total of 29 conductors dropped in the 178 failures recorded. Therefore a 16.3% factor has been considered as part of the probability of consequence.

5 CONSEQUENTIAL REPLACEMENT

In addition to our defective and targeted crossarm replacements many crossarms are replaced with the replacement of a pole. This is because there is a delivery efficiency dividend to replace both the pole and crossarm together, instead of just replacing the pole and then dismantling and reinstalling the old crossarm. This is called the consequential replacement of a crossarm and is undertaken wherever a pole is replaced. However, the cost and investment associated with these consequential replacements under several different programs have been excluded from this business case and included in those respective business cases.

The estimated volume of consequential cross arm replacement with other replacement programs has been provided in Table 3.

Forecast Volume Consequential Replacement	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Pole Program	5,490	5,490	5,490	5,490	5,490	27,449
Reconductoring Program	4,379	4,379	4,379	4,379	4,379	21,897

Table 3: Consequential Replacement with Pole and Reconductoring Programs

6 IDENTIFIED NEED

6.1 Problem Statement

Energex reviewed its asset management practices with respect to pole top assets. The asset performance trend analysis reveals that the performance of this asset class has not seen any improvement in recent years, and defects rates have started to increase. Additionally, an average of around 14% of crossarm failures lead to a conductor falling to the ground, exposing a high safety risk to the community.

The review also found that pole top assets were frequently replaced consequentially when the defective pole and targeted reconductoring was undertaken in addition to the defect and targeted replacement. The Pole and Conductor replacement business case cover this replacement expenditure.

Effective management of pole top assets requires a range of factors to be considered, including public safety, physical condition, historical design standards, and environmental and operational conditions. Energex has a regulatory duty of care to manage these assets and has introduced performance targets to help monitor and manage asset-related public shocks. The asset inspection and defect management process, supplemented by targeted and consequential replacement programs, will be critical to ensuring the ongoing safety and reliability of overhead service assets in Energex.

6.2 Compliance

Energex's crossarm assets are subject to a number of legislative and regulatory standards.

- The Electrical Safety Act 2002 (Qld) s29 imposes a specific duty of care on a prescribed Electrical Entity to ensure that its works
    - are electrically safe
    - are operated in a way that is electrically safe.
- The duty includes the requirement that the electricity entity inspects, tests and maintains the assets and works.

The Electrical Safety Regulation 2013 (ESR) details requirements for electric lines, specifically about safety clearances, of which crossarms are classed as associated equipment. These include various general obligations related to the safety of works of an electrical entity. The desired level of service for crossarms in the Energex network is to achieve in-service crossarm failure numbers which deliver a safety risk outcome which is considered SFAIRP, and as a minimum, maintains current performance standards.

6.3 Counterfactual Analysis (Base case)- Preferred Option

To provide a comparison of the potential alternatives to our preferred program for our cost benefit analysis, we have set the counterfactual volumes as our proposed program.

6.3.1 Intervention Volumes

The number of targeted crossarm replacement volume modelled in this option is outlined in Table 4. Note that the defect volume is not included in this business as the delivery of this work is under OPEX.

Year	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Volume	2,000	2,000	2,000	2,000	2,000	**10,000**

Table 4: Counterfactual Intervention Volumes

6.3.2 Risk Quantification

Energex has determined the risk values for a twenty-year time horizon as a period representative of the expected period of realisable benefits from any program interventions.

Figure 7 provides the results of a quantitative forecast of emerging risk associated with pole top structure failure. The risk variation is mainly driven by the reliability risk. With proposed proactive replacement on top of the defect and failure replacements the reliability risk shows a moderate downward trend based on the population profile and estimated probability of failure.

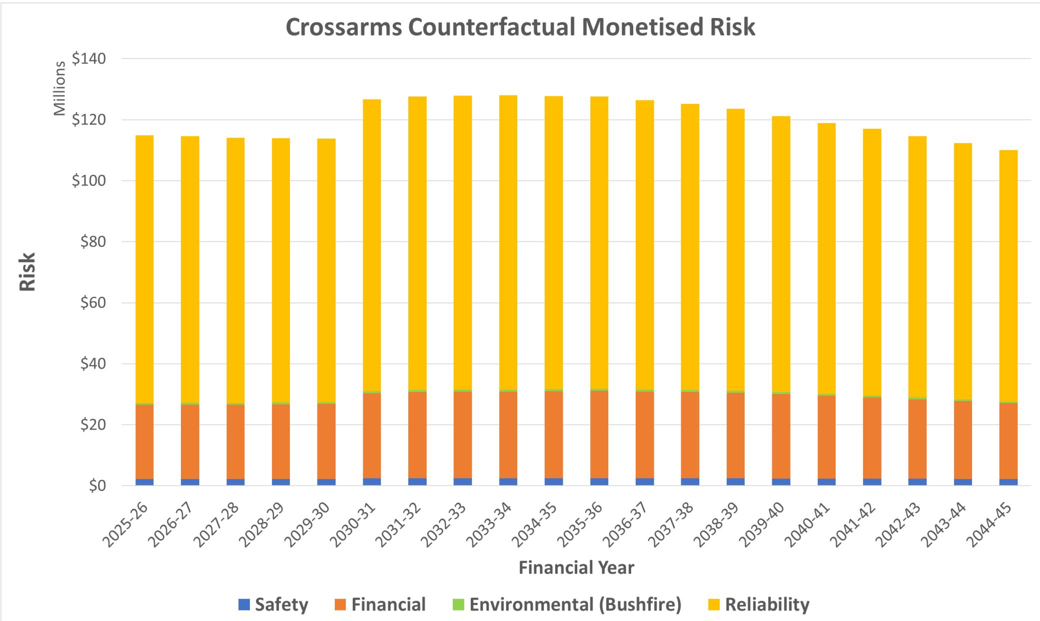

Figure 7: Counterfactual Quantitative Risk Assessment

Figure 8 represents the failure forecast for the proposed program. Forecast failures follows similar trend as risk. Although it has increasing trend, failure rate starts to reduce after 2033-34 financial year following the population profile and estimated probability of failure.

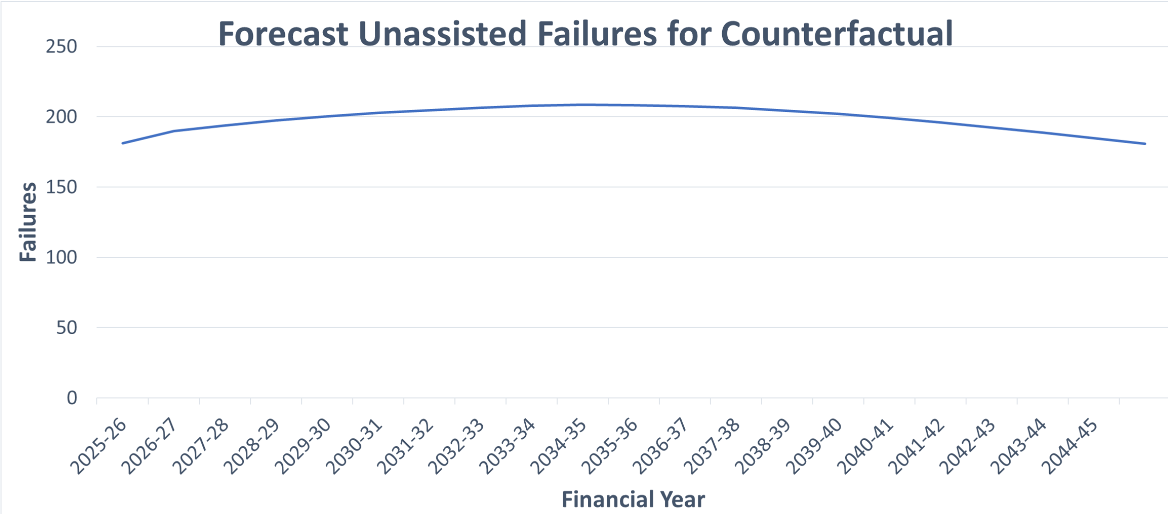

Figure 8: Counterfactual Unassisted Failures

7 OPTIONS ANALYSIS

In the process of maximizing the value to customers to address the identified need, Energex has sought to identify a practicable range of technically feasible, alternative options that will satisfy the network requirements in a timely and efficient manner.

7.1 Option 1 – 50% of current Targeted Program (-1k)

Option 1 includes the reduction of current targeted replacement by half to the volume of 1,000 replacements.

7.1.1 Intervention Volumes

The targeted volume under this option has been provided in Table 5.

Year	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Volume	1,000	1,000	1,000	1,000	1,000	5,000

Table 5: Counterfactual -1k Targeted Intervention Volumes

7.1.2 Risks/Benefits

In this option, our modelling shows that the unassisted crossarm failures are projected to increase in comparison to those in the counterfactual option. Furthermore, opting for this approach will result in a growing need for substantial investment in the near term due to the escalating rate of aged assets and performance.

7.2 Option 2 – Counterfactual with no targeted

Option 2 includes no targeted replacement.

7.2.1 Intervention Volumes

The targeted volume under this option has been provided in Table 6.

Year	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Volume	-	-	-	-	-	-

Table 6: Option Counterfactual with no targeted replacements Intervention Volumes

7.2.2 Risks/Benefits

This option returns the lowest customer benefits compared to all other options. Due to no targeted replacements, asset failure rate increases due to aging asset population. Additionally, this option impact on the Energex's vision towards improving the network performance.

7.3 Option 3 – Double the Current Targeted Program (+4k)

Option 3 includes double the amount of current targeted program. An increase in replacement volume has estimated an improvement in asset performance and risk.

7.3.1 Intervention Volumes

The cost and volumes under this option has been provided in Table 7.

Year	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Volume	4,000	4,000	4,000	4,000	4,000	20,000

Table 7: Counterfactual + 4k proactive replacements Intervention Volumes

7.3.2 Risks/Benefits

Under this approach, our modelling predicts that the occurrence of unassisted services failures will be notably reduced in comparison to the counterfactual option. Accordingly, this transition aims to bring the failure rate down SFAIRP ensuring a satisfactory level of public safety risks. While this option provides significant advantages to customers it is not without substantial cost impacts.

8 OUTCOME OF OPTION ANALYSIS

8.1 Crossarm Failure Forecast

The service failure rate forecast for all the main options have been provided in the Figure 9. The projected failure forecast shows a significant improvement in asset performance for the options involve increased targeted replacement strategy.

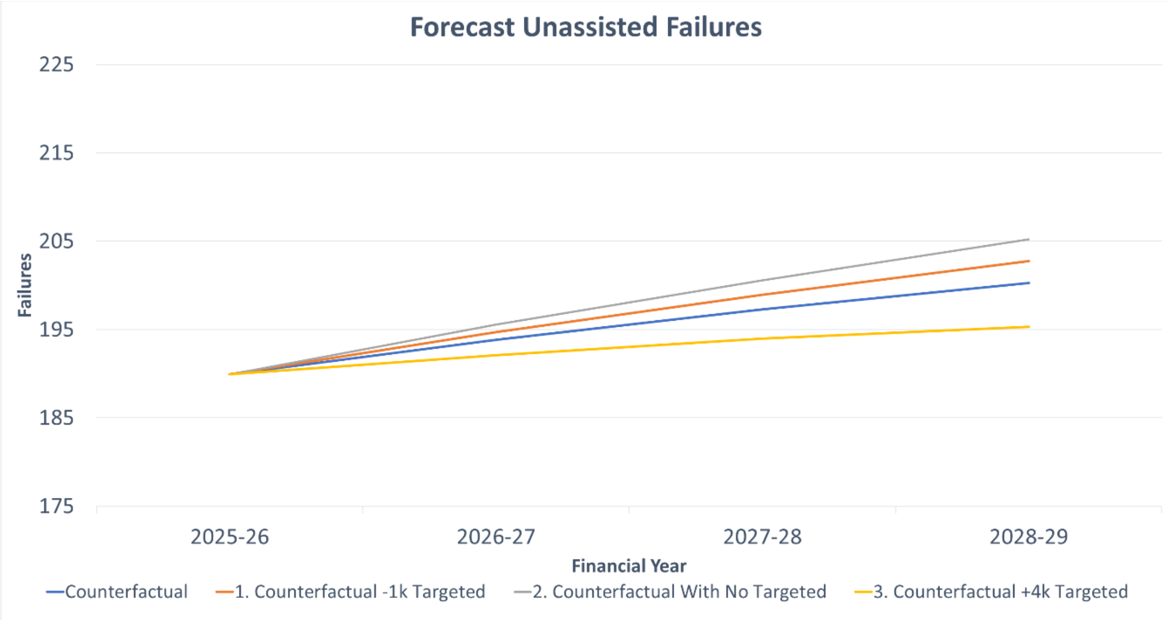

Figure 9: Unassisted Failures Forecast

8.2 Economic Analysis

The NPV of cost benefit analysis of the options is summarised in Table 8 which demonstrates the following:

- Option 3 is the only option that provides positive NPV, and positive Customer benefits compared to counterfactual.
- Both options 1 and 2 save investments due to lesser number of replacements compared to counterfactual. However, due to increasing failures it produces negative NPV and negative benefits to the customer.
- As a result of the required additional investment and resources for Option 3, and the forecast reduction in failures into the future, the Counterfactual option is chosen as the winning option over the Option 3.

NPV Analysis to Counterfactual				
Intervention	Rank	Net NPV	Additional Cost	Benefit
Counterfactual	2	$0	$0	$0
1. Counterfactual -1k Targeted	3	-$22,793,298	$3,513,450	-$26,306,748
2. Counterfactual With No Targeted	4	-$45,596,614	$7,024,858	-$52,621,472
3. Counterfactual +4k Targeted	1	$45,555,128	-$7,033,315	$52,588,443

Table 8: NPV Analysis

Table 9 summarises the volume replacements for all options.

Targeted Replacement	2025-26	2026-27	2027-28	2028-29	2029-30
Counterfactual	2,000	2,000	2,000	2,000	2,000
1. Counterfactual -1k Targeted	1,000	1,000	1,000	1,000	1,000
2. Counterfactual With No Targeted	-	-	-	-	-
3. Counterfactual +4k Targeted	4,000	4,000	4,000	4,000	4,000

Table 9: Option Replacement Volume

Figure 10 illustrates the advantages of all options over their counterfactual Option. This indicates significant NPV gains for option 3 with rising NPV rate due to the additional investment. However, this option required additional resources and investment compared to counterfactual.

The counterfactual is the most optimum solution in terms of investment, net NPV gains and practicality of delivery. Considering that Counterfactual is the option which is highly likely to achieve network standard compliances with improvement in the public safety risk, this is prudent to choose this option.

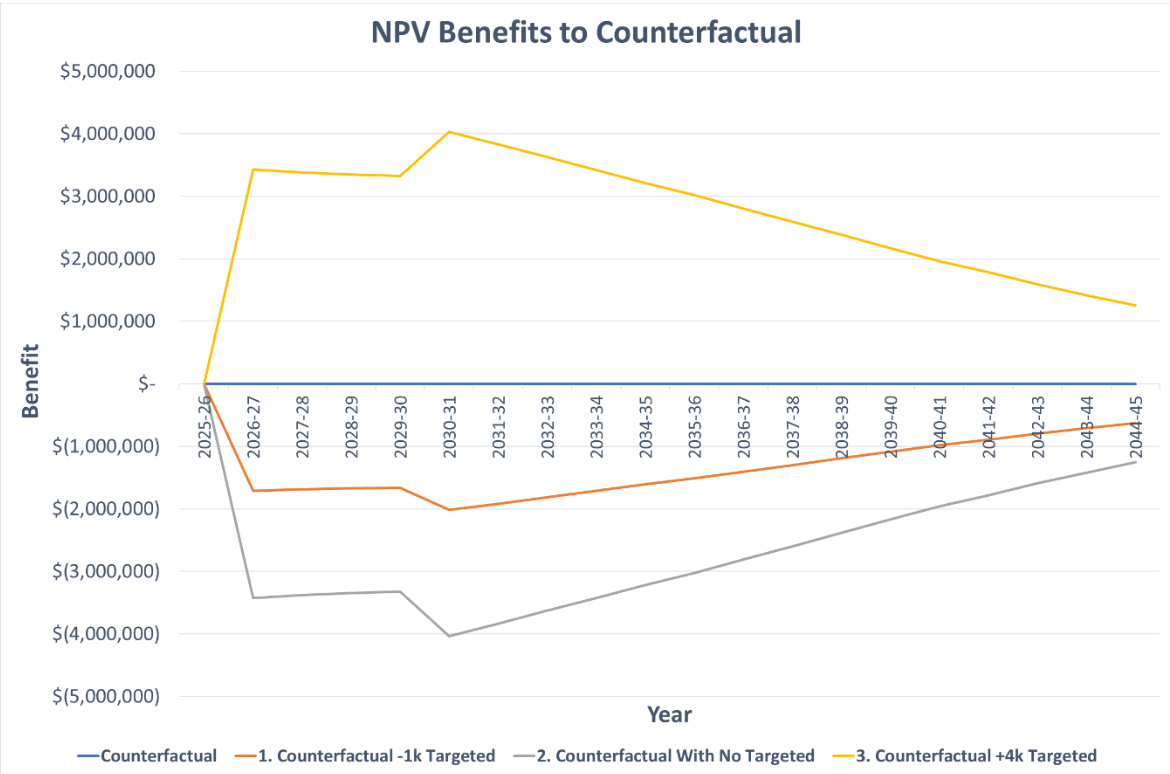

Figure 10: NPV Benefits for all Options compared to Counterfactual

The analysis presented here in Table 10 compares the options to their respective counterfactual (**Preferred option)** alternatives.

Criteria	Option 1 – 50% of Current Targeted	Option 2 – No Targeted Volume	Option 3 – Double the Current Targeted
Net NPV	-$22.8m	-$45.6m	$45.6m
Investment Risk	Low	Low	High
Benefits	Low	Very Low	Very High
Delivery Constraint	Low	Low	Very High
Detailed analysis – Advantage	• Investment saving of $3.5m.	• Do minimal option • Investment saving of $7.0m.	• Additional Customer benefit of $52.6m • Transition towards improved asset performance.
Detailed analysis – Disadvantage	• Negative NPV and negative benefits (Risk) to the customer • Failure rate increases.	• Negative NPV and negative benefits (Risk) to the customer • Failure rate increases.	• High investment risk option with cost impact on customers • High delivery impact • Double the resource requirement.

Table 10: Options Analysis Scorecard

9 SUMMARY

It is clear, even if Energex double the targeted replacement as per Option 3, the outcome is NPV positive. However, due to top-down constraints such as delivery and financial resources, Energex's proposed plan is to move forward with the **Counterfactual** volume from the regulatory period of 2025-2030. This proposed plan has been deemed prudent based on the cost benefit analysis outcome.

While the counterfactual program does not provide desired asset performance improvement, it was the minimum program necessary for the future period. Further increases in the program are likely to be required in the future based on the asset performance trend.

9.1 Sensitivity Analysis

To further test the effectiveness and prudency of the preferred option, a number of sensitivity analysis criteria have been applied, with ± 25% values, to compare the outcomes of the modelling in different scenario. The main sensitivity criteria are:

- Annual Risk cost
- WACC
- Probability of Failure (PoF).

In most of the sensitivity analysis outcomes the 'Preferred Option' has claimed its prudency and effectiveness over other options and therefore is recommended to be approved.

10 RECOMMENDATION

After a thorough evaluation of all available options, it has been determined that the **counterfactual option** is the most viable. This option has been chosen over other options, as it provides the best balance of benefits and risks for the organization, and deliverability is more assured. As such, the decision has been made to continue operations as usual, with a focus on optimizing existing processes and enhancing efficiencies where possible in terms of delivery with other projects/programs.

Our counterfactual option also 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 consequences based on the uncertainty associated with the capability new technologies may bring.

11 APPENDICES

11.1 Appendix 3: Reset Rin Investment

Table 11 shows the 2022-23 expenditure in this business case relates to asset expenditure. Table 12 showing how this reconciles with our 2024-25 Reset RIN submitted with our regulatory proposal.

Table 11: Reset RIN – Expenditure 2022-23 $

$ direct 2022-23	2025/26	2026/27	2027/28	2028/29	2029/30
PoleTop Contributor	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure
RIN	25,723,963	25,723,963	25,723,963	25,723,963	25,723,963
Crossarm Defect*	0	0	0	0	0
Targeted Replacement*	4,334,614	4,334,614	4,334,614	4,334,614	4,334,614
Consequential Replacement#	**21,389,350**	**21,389,350**	**21,389,350**	**21,389,350**	**21,389,350**

Table 12: Reset RIN – Expenditure 2024-25 $

$ direct 2024-25	2025/26	2026/27	2027/28	2028/29	2029/30
PoleTop Contributor	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure
RIN	29,248,610	29,248,610	29,248,610	29,248,610	29,248,610
Crossarm Defect*	0	0	0	0	0
Targeted Replacement*	4,928,534	4,928,534	4,928,534	4,928,534	4,928,534
Consequential Replacement#	**24,320,076**	**24,320,076**	**24,320,076**	**24,320,076**	**24,320,076**

** Expenditure considered for this business case.*

 # Expenditure included in other investment programs (Pole Replacement, Overhead Conductor)

	2025/26	2026/27	2027/28	2028/29	2029/30
PoleTop Contributor	Replacement Qty	Replacement Qty	Replacement Qty	Replacement Qty	Replacement Qty
RIN	11,869	11,869	11,869	11,869	11,869
Crossarm Defect*	0	0	0	0	0
Targeted Replacement*	2,000	2,000	2,000	2,000	2,000
Consequential Replacement#	**9,869**	**9,869**	**9,869**	**9,869**	**9,869**

Table 13: Reset RIN – Replacement Volume

** Expenditure considered for this business case.*

 # Expenditure included in other investment programs (Pole Replacement, Overhead Conductor)

Note: Crossarm defect are OPEX in Energex, therefore not included in this Repex business case analysis.