Distribution Transformer Replacements

Business Case

22 January 2024

energex
Part of Energy Queensland

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DOCUMENT VERSION

Version Number	Change Detail	Date	Updated by
Draft v0.1	Draft	13/05/2023	Asset Strategy Engineer
Draft v0.2	Internal Feedback update	09/11/2023	Asset Strategy Analyst
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RELATED DOCUMENTS

Document Date	Document Name	Document Type
JAN 2024	Asset Management Plan – Distribution Transformers - 3047850	PDF
NOV 2023	Weibull Model Report – Dist TX v0.1	DOCX
NOV 2023	Distribution Transformer Weibull modelling	Excel
NOV 2023	Distribution Transformer risk modelling	Excel
NOV 2023	RIN 2.2 Compare 2022-23 (Rosetta)	Excel
NOV 2023	Energex 2022-23 - Category Analysis - RIN Response - Consolidated - 24 November 2023 - PUBLIC(16063386.1)	Excel
JUN 2023	Maintenance Acceptance Criteria (MAC) – Release 11	PDF
AUG 2023	Maintenance Activity Frequency (MAF) – Release 2	PDF
OCT 2023	Lines Defect Classification Manual	PDF
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
MAY 2023	Distribution Lines Refurbishment Guidelines – REPEX (Doc ID: 3034999)	PDF

1 SUMMARY

Title	Distribution Transformer 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 Distribution Transformers (DT) 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 value for our customers. The purpose of this document is to outline the proposed volumes of replacement and expenditure associated with distribution transformers during the regulatory period 2025-30, in accordance with the lifecycle management strategies detailed in the Asset Management Plan for Distribution Transformers. Energex replaces distribution transformers to ensure safety, reliability, environmental, and financial risks are managed in the best interest of consumers.
Alternate options	Three different options were considered as follows over the counterfactual (Current defect rate - Average 171 per year) replacements: • Option 1 – Repex Model Cost Scenario – Average 154/yr • Option 2 – Repex Model Live Scenario - Average 33/yr • Option 3 – Additional Targeted Replacement - Average 434/yr.

Expenditure	This business case relates only to defect replacement.

Year $m, direct 2022-23	2025-26	2026-27	2027-28	2028-29	2029-33	Total
Defect* Business Case Total Investment	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**24.1**
Investments not in this Business Case are shown below						
Pole Replacement Program Dist. Tx Replacement	1.8	1.8	1.8	1.8	1.8	9.2
Reconductor Program Dist. Tx Replacement	11.4	11.4	11.4	11.4	11.4	57.1
Consequential Dist. Tx Replacement	13.2	13.2	13.2	13.2	13.2	66.4
Dist. Tx Total Investment	**18.1**	**18.1**	**18.1**	**18.1**	**18.1**	**90.6**

Benefits	After a thorough evaluation of all available options, it has been determined that Energex will continue with **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.

2 PURPOSE AND SCOPE

The purpose of this document is to outline the forecast expenditure and volumes associated with distribution transformers for the Regulatory period 2025-30 . The Business case includes the analysis of different options, to determine the more prudent option 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 - Distribution Transformers Asset Management Plan. All dollar values in this document are based upon real 2022/23 dollars, excluding any overheads.

3 BACKGROUND

Following a thorough examination of the asset performance, it was evident that the current level of defects will be maintained, largely as the result of the consequential replacements occurring under our defective pole replacement and targeted overhead reconductoring programs. These program are expected to be continued to achieve the current level of service for those asset classes.

Irrespective of our continuation of our existing asset management strategy for distribution transofrmers, we undertook a cost benefit analysis to ensure that our proposed distribution transformer asset management strategies provide value to the community 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

The age profile of all our distribution transformer assets is shown in Figure 1. There are approximately 53,707 distribution transformers in Energex distribution network. We have 700 assets are over 50 years.

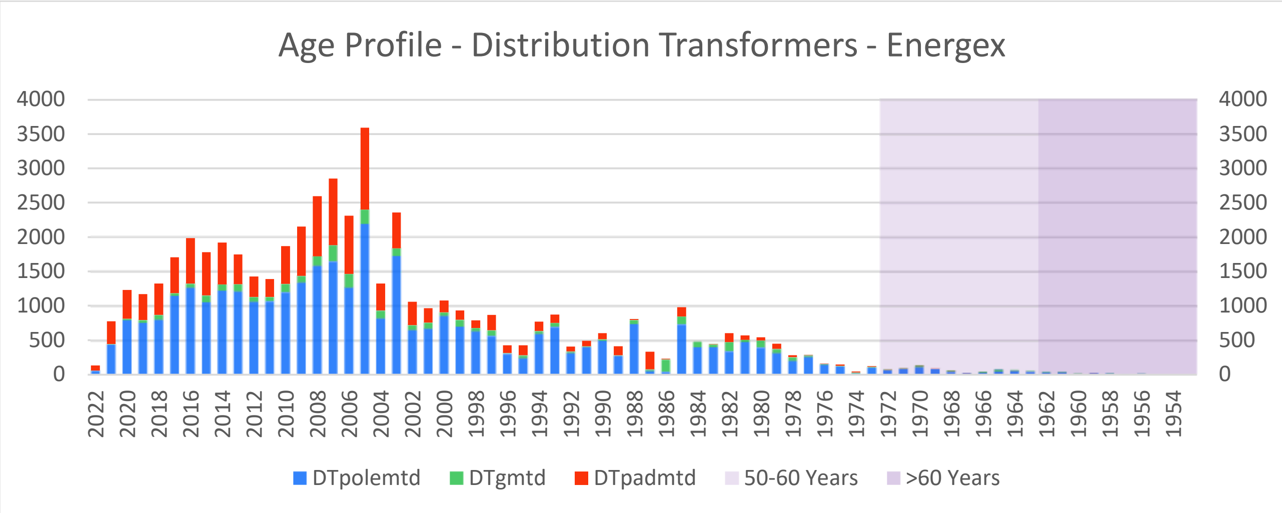

Figure 1: Distribution Transformer Asset Age Profile

3.2 Asset Management Overview

Distribution transformers are inspected periodically as required per the Network Schedule of Maintenance Activity Frequency. They are reactively replaced, due to either electrical failure or poor condition (leaking oil, chipped insulators etc.) as assessed by ground-based inspection. It is generally considered uneconomical to refurbish distribution transformers, specifically small pole mounted transformers, and they are routinely scrapped once removed.

End of asset life is determined by reference to the benchmark standards defined in the Defect Classification Manual and the Maintenance Acceptance Criteria. Replacement work practices are optimised to achieve bulk replacement to minimise overall replacement cost and customer impact.

Distribution transformers may also be replaced based on risk, where criteria indicating assets are either at or near end of life can be identified. Consequential replacement is typically undertaken with other work such as feeder refurbishment programs or bundled into logical groups for efficiency of delivery and cost.

3.3 Asset Performance

The two main functional failures considered in this business case and the associated modelling are defined in Table 1.

Functional Failure Type	Description
Catastrophic **(Unassisted failure)**	Loss of structural integrity of a distribution transformer or associated components with transformer, excluding any associated other hardware related to pole or structure. Functional failure of this asset under normal operating conditions not caused by any external intervention such as abnormal weather or human.
Degraded (**defect**)	A distribution transformer or associated component asset deemed defective based on physical or observed serviceability criteria and if not rectified within a prescribed timescale (P0/P1/P2) could result in an unassisted failure.

Table 1: Description of Functional Failure

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). As a result of the defect classification analysis, all P1 defects have now been categorised as P2 to defer the replacement, unless it is assessed beyond doubt that failure is imminent, or location is too critical in terms of failure consequences.

The history of failures within the distribution transformer asset class over the last five years has been provided in Figure 2. While it is evident that there has been a significant increase in failures since 2018-19, it is worth noting that the failure trend has started reversing mainly because of consequential replacements.

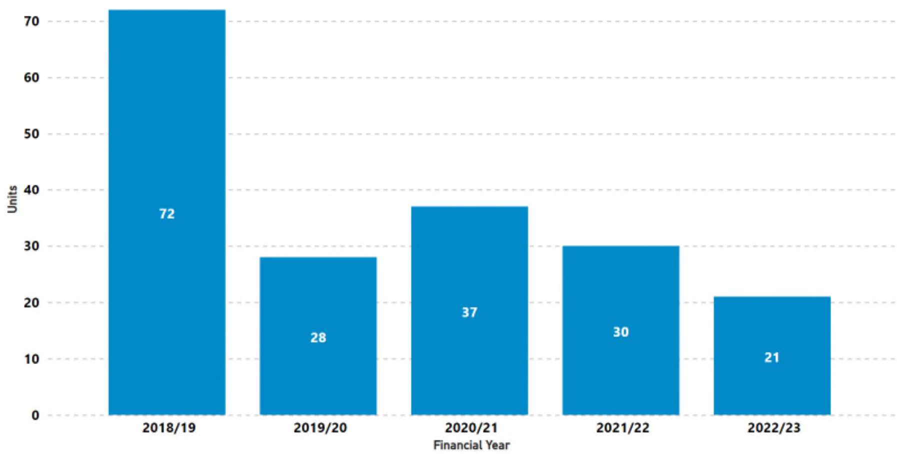

Figure 2: Distribution Transformer Unassisted Failures

The annual numbers of P1 and P2 level defects for transformers combined is shown in Figure 3. Like the failures trend, a decreasing trend is observed in P1 and P2 level defects of this asset class.

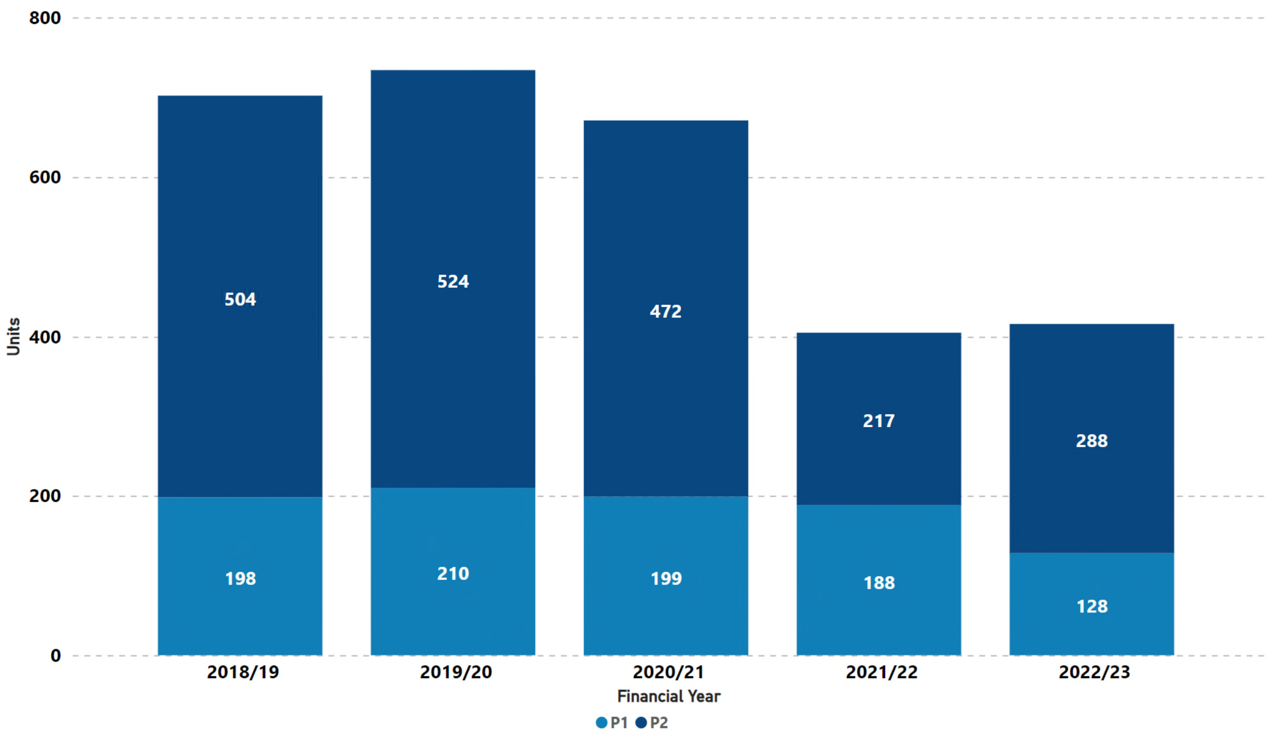

Figure 3: Distribution Transformer Defects P1 & P2

4 RISK ANAYLYSIS

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) modeling, we have selected the proposed preferred replacement option based on the most positive NPV of the volumes considered. In this business case the most positive NPV validates that the volume of proposed replacement over the regulatory period 2025-30 is a prudent approach.

The monetized risk is calculated as per the equation 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.

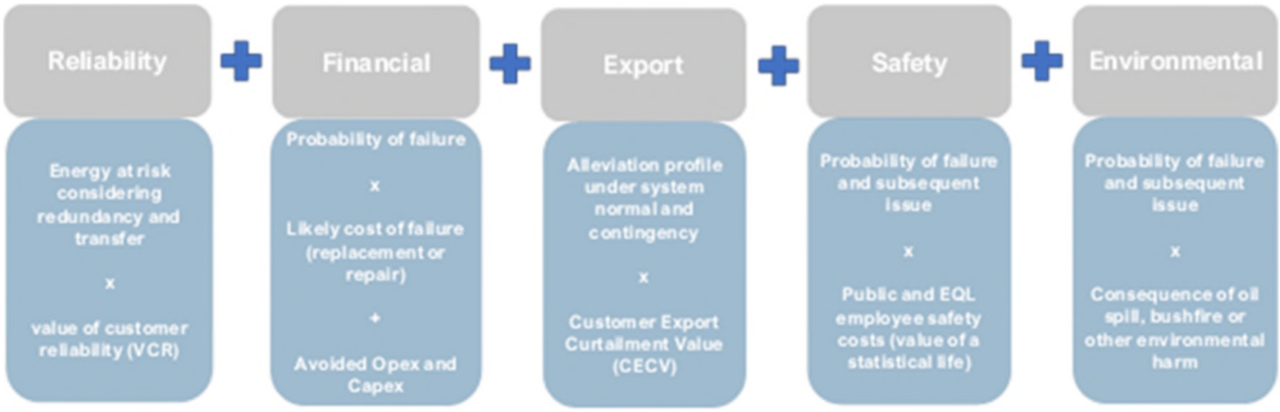

Figure 5: Total Risk Cost Calculation

4.1 Probability of Failure (PoF) – 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 instead 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 distribution transformer assets. The resultant curve produced the following characteristics as per Table 2 and Figure 6:

Weibull Variables	Value
Beta β	2.2
Eta η	20

Table 2: CDF Weibull Variables – Distribution Transformer – All Type

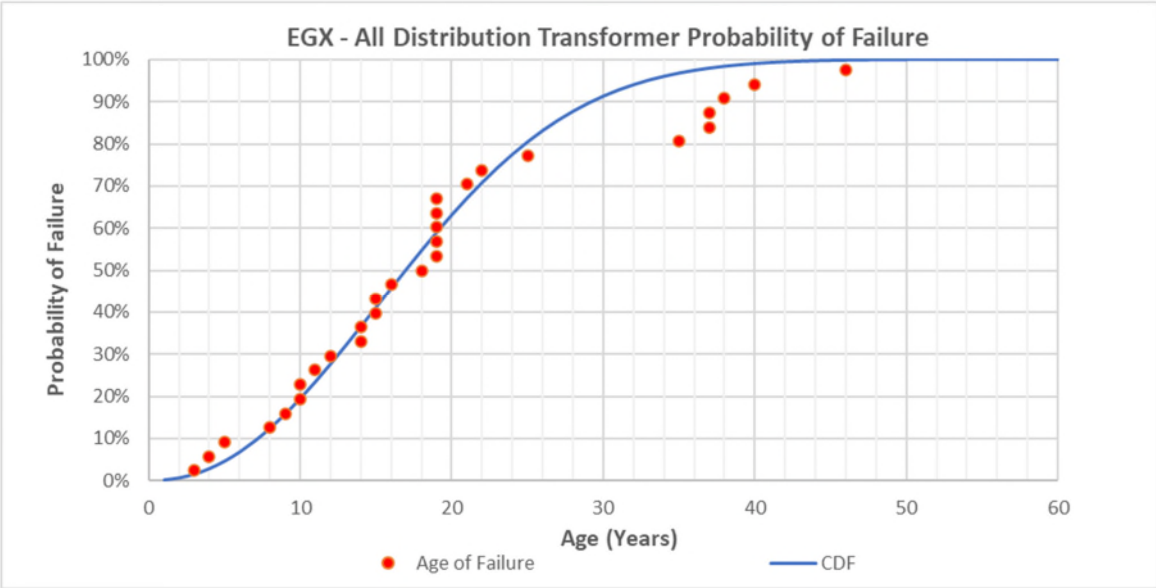

Figure 6: Weibull Cumulative Distribution Function for Distribution Transformers

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

The key consequence of distribution transformer 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 transformer type and size specific. This is particularly the case for the reliability and benefits stream.

4.2.1 Reliability

Reliability represents the unserved energy cost to customers of transformer outages and is based on an assessment of the amount of Load at Risk during failure Frepair/replacement time. The following assumptions are used in developing the risk cost outcome for a pole failure:

- **Lost load:** Load loss for each transformer is estimated using the transformer type and kVA rating and assumed kilowatt loss is 33% of the maximum rating of the transformer type band. With the large distribution transformers (over 600kVA rating), 600kW assumption is used. The restoration time is estimated from historical outage restoration period that is about 3 hours approximately.
- **Value of Customer Reliability Rate:** We have used the Queensland average VCR rate.
- **Probability of Consequence:** all in-service distribution transformer failures result in an outage to customers.

4.2.2 Financial

Financial cost of failure is derived from an assessment of the likely replacement costs incurred by the failure of the asset, which is replaced under emergency. The following assumptions have been used in developing the safety risk costs for a pole failure:

- **Transformer replacement:** different unit cost of distribution transformer replacement has been taken based on the type and size of the transformer including replacement condition (Planned or emergency). The cost varies between approximately $23,000 to $95,000 based on transformer specification.
- **Probability of Consequence:** all in-service transformer failures result in a need to replace the transformer under emergency.

4.2.3 Safety

The safety risk for a transformer failure is primarily that a member of the public is in the presence of a fallen transformer debris or shattered porcelain pieces in case of an explosive failure of transformer with/without fire. This could result in a fatality or injury. For our modelling we have used August 2022 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:** $1.3m
- **Disproportionality Factor:** 6 for members of the public
- **Probability of Consequence**: Following an unassisted asset failure, there is a 1 in 20 years chance of causing a fatality and 2 in 20 years chance of a serious injury based on historical data evidence. The average number of safety incidents has been derived by analysing 20 years of Significant Electrical Incident data. Historically, the data shows, distribution transformer 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 Environmental - 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 transformer causing pole fire or bushfire. 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.
- **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:** The bushfire risk cost per crossarm is used to infer the distribution switches bush fire risk.

5 CONSEQUENTIAL REPLACEMENT

Within the scope of the pole and overhead conductor replacement investments, we always assess the condition of the equipment attached to the assets and determine the feasibility and cost-effectiveness of replacing them. This equipment includes pole top structures, transformers, service lines, and switches. Consequently, when evaluating the benefits of this approach for our customers, we take into account the investments and advantages associated with these consequential replacements in our analysis of the respective Poles and Overhead Conductor business cases to ensure that the overall asset expenses are accounted for.

Table 3 outlines the volume of distribution transformers replaced as a result of the pole replacement and reconductoring proposed program during the specified reporting period.

Actual Delivery Consequential Transformer Volumes	2018-19	2019-20	2020-21	2021-22	2022-23	Total
With Pole Replacement	66	66	66	66	66	330
With Reconductoring	405	405	405	405	405	2,025

Table 3: Consequential Asset Volume

6 IDENTIFIED NEED

6.1 Problem statement

Energex reviewed its asset management practices with respect to distribution transformers. The review found that distribution transformers were frequently replaced consequentially when a defective pole replacement or targeted reconductoring was undertaken in addition to the moderate defect rate replacement rate. This business case only covers the defect replacement volume prudency.

6.2 Compliance

Energex's distribution transformer assets are subject to several legislative and regulatory standards:

- National Electricity Rules (NER)
- Electricity Act 1994 (Qld)
- Electrical Safety Act 2002 (Qld)
- Electrical Safety Regulation 2013 (Qld)
- Work Health & Safety Act 2014 (Qld)
- Work Health & Safety Regulation 2011 (Qld)
- Energex Corporation Limited Distribution Authority No D01/99
- Energex Limited Distribution Authority No. D07/98.

6.3 Counterfactual (Base Case Scenario) Proposed Program

To provide a comparison of the potential alternatives to our actual delivery for our cost benefit analysis, we have set the counterfactual as our current defect rate volume.

6.3.1 Costs/Volume

The estimated forecast volume and expenditure for both pole and ground mounted transformers is shown in Table 4**.**

Year	2025-26	2026-27	2027-28	2028-29	2029-30	Total
$m, direct 2022-23	4.8	4.8	4.8	4.8	4.8	**24.1**
Volume	171	171	171	171	171	**855**

Table 4**: Counterfactual Delivery Volumes**

6.3.2 Risk Quantification

Figure 7 provides the results of a quantitative forecast of emerging risk associated with Energex's distribution pole and ground mounted transformer asset population failure due to condition related failure modes . This counterfactual risk is based on existing failure and defect rates and the calculated escalation forecast.

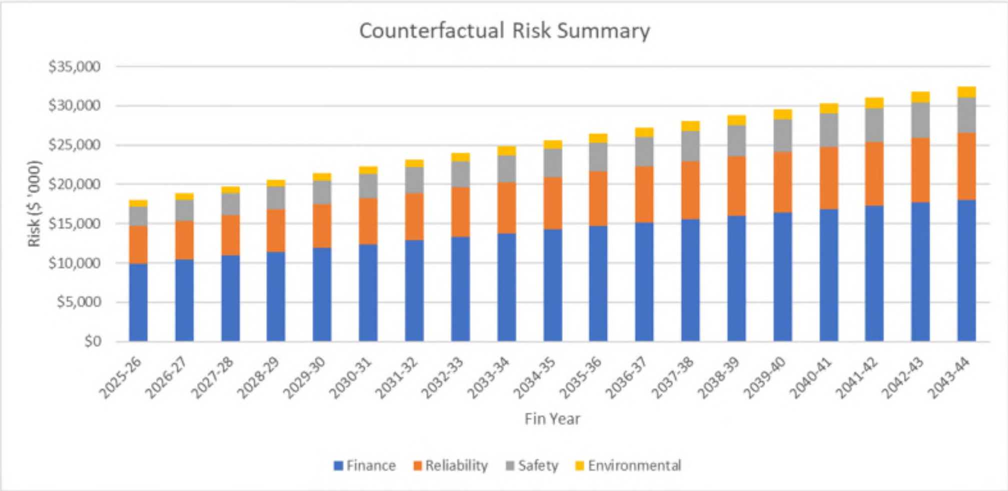

Figure 7: Counterfactual Quantitative Risk Assessment

Risk costs rise moderately in the counterfactual due to financial risks and reliability of supply associated with distribution transformer failures as per Figure 8. The cost of these risks increases marginally over the 20-year period shown, driven by the ageing of our transformer assets if we were to maintain the same counterfactual rate of replacements into the future.

As the consequential replacements are forecast to be maintained in the next 5 years based on the "REPEX guideline" , older transformers will be targeted consequentially as part of efficiency bundling. That has resulted in maintaining the transformer performance. The current forecast shows that failures would increase, but in conjunction with consequential replacement with pole and conductor programs, the failures are expected to be maintained within current service levels.

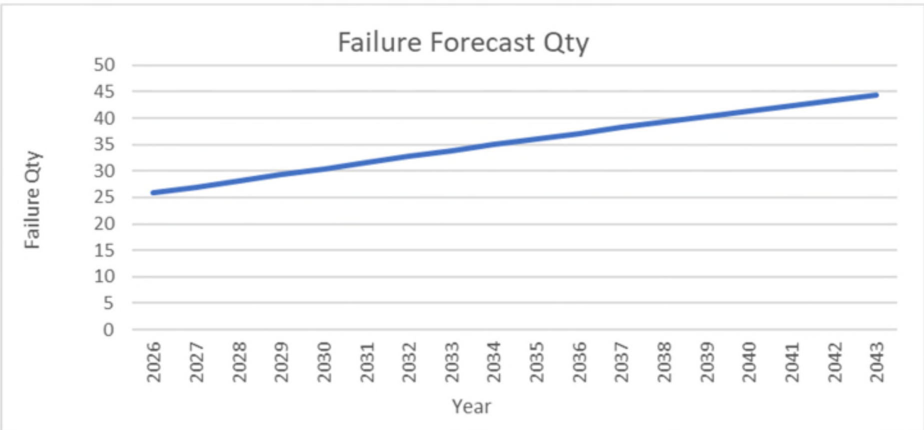

Figure 8: Counterfactual Failure Forecast

7 OPTIONS ANALYSIS

In assessing the prudency of our proposed volumes, we have compared a range of interventions against the counterfactual to assess the options that could have maximised value to our customers. We have sought to identify a practicable range of technically feasible, alternative options that can satisfy the network requirements in a timely and efficient manner.

7.1 Option 1 – REPEX Model Cost Scenario

This option includes the replacement of transformers based on the REPEX model cost scenario with volumes estimated using distribution transformers expenditure allowance between 2025-30 divided by our average actual unit cost. This estimated volume is around 90% of counterfactual, or 154 replacements per year.

7.1.1 Intervention Volume

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

Year	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Volume	154	154	154	154	154	**770**

Table 5: **Intervention Volume - Option 1**

7.1.2 Risks/Benefits

In this option, our modelling shows that the unassisted failures are projected to increase marginally, given we are leaving 10% of defects unattended, which are likely to result in unassisted failure. This option is NPV negative due to reduction of customer benefits compared to replacing 100% of identified defective asset (Counterfactual).

7.2 Option 2 –Repex Model – Lives Scenario

This option includes the replacement of transformers based on REPEX model Lives scenario with volumes estimated using distribution transformers expenditure allowance between 2025-30 divided by our average actual unit cost. This estimated volume is around only 20% of counterfactual.

7.2.1 Intervention Volume

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

Year	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Volume	33	33	33	33	33	**165**

Table 6: Intervention Volume - Option 2

7.2.2 Risks/Benefits

In this option, our modelling shows that unassisted failures are projected to increase substantially as we would be leaving around 80% of defects unattended, increasing the likelihood of unassisted failures. Furthermore, opting for this approach will result in a growing need for substantial investment in the near term due to the escalating rate of asset failures. This is primarily because low defective transformer replacement volume result in keeping increasingly more defective transformers in active service, causing a flow on effect of investment requirements and poor asset performance.

7.3 Option 3 – Additional Targeted Replacement

This option includes additional replacement of greater than 45 years old assets proactively including corrective replacement of all identified defective assets (counterfactual).

7.3.1 Intervention Volume

The volume summary under this option has been provided in Table 7.

Year	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Volume	474	474	474	474	474	**2,370**

Table 7: Intervention Volume - Option 3

7.3.2 Risks/Benefits

Under this approach, our modelling predicts that the occurrence of unassisted distribution transformer failures will be reduced in comparison to not only the counterfactual option, but all other options as well. However, this option requires more resources and investment compared to all the other options with significant cost impact on customers outweighs the advantages.

8 OUTCOMES OF OPTIONS ANALYSIS

8.1 Distribution Transformer Failure Forecast

The distribution transformer failure forecast for all main options is shown in Figure 9, and as stated, in option 2 Repex Lives Scenario where a portion of the defects left unattended leads to elevated failure. Option 3 being the best asset performance model requires additional investment offsetting the risk reduction and community benefits up to some extent. Option 1 and counterfactual maintains the current performance and delivers the balanced outcome for our customer.

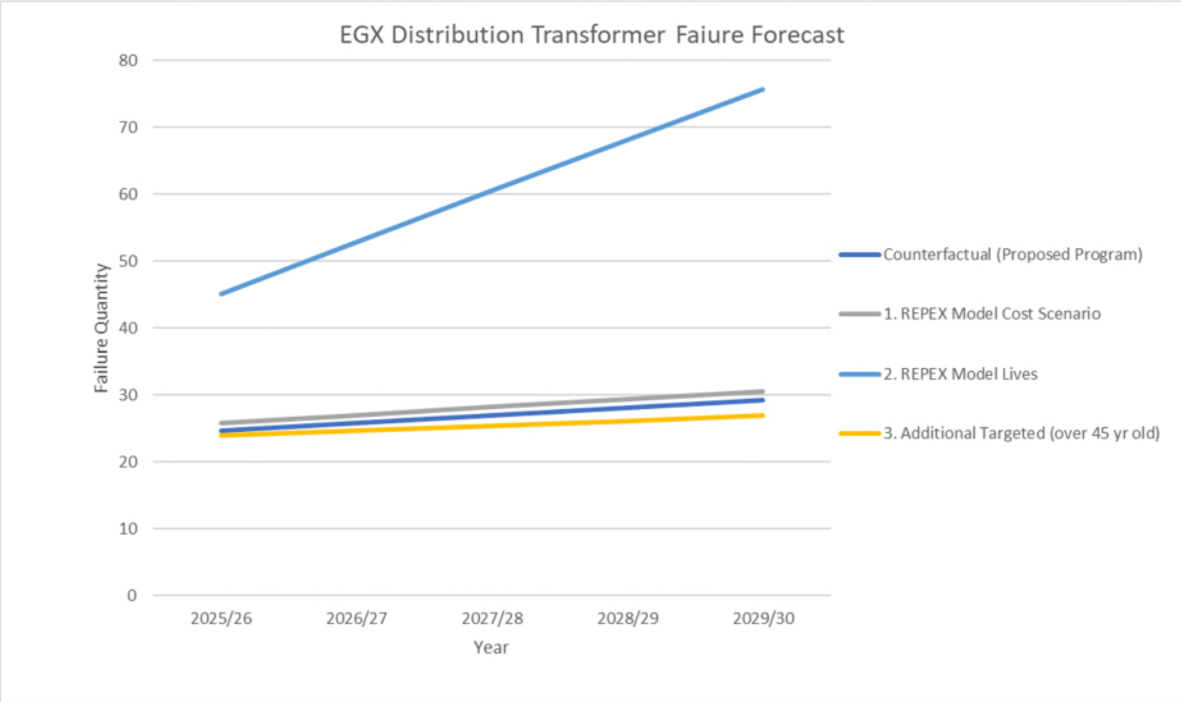

Figure 9: Failure Forecast - Intervention options

8.2 Economic Analysis

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

- Option Counterfactual – has been set for zero NPV but indicating the best balance of benefits to customers and failure reductions with no additional cost impact
- Option 3 provide adequate risk reduction but the substantial investment requirement outweigh the benefit therefore resulting a negative NPV
- Option 2 against counterfactual leads to poor asset performance as portion of defects left unattended leads to unassisted failure.

Options	Rank	Net NPV	Intervention CAPEX NPV	Intervention Benefits NPV
Counterfactual (Proposed Program)	1	0	0	0
1. REPEX Model Cost Scenario	2	-3,395,197	-160,893	-3,234,303
2. REPEX Model Lives	4	-59,029,827	22,110,176	-81,140,003
3. Additional Targeted (over 45 yr old)	3	-55,592,342	-73,808,226	18,215,884

Table 8: NPV modelling outcomes for all options

Table 9 summarises the volume replacements for all options.

Distribution Transformer	2025/26	2026/27	2027/28	2028/29	2029/30
Counterfactual (Proposed Program)	171	171	171	171	171
1. REPEX Model Cost Scenario	154	154	154	154	154
2. REPEX Model Lives	33	33	33	33	33
3. Additional Targeted (over 45 yr old)	434	434	434	434	434

Table 9**: Option volumes**

Figure 10 illustrates the advantages and disadvantages of all options over their counterfactual.

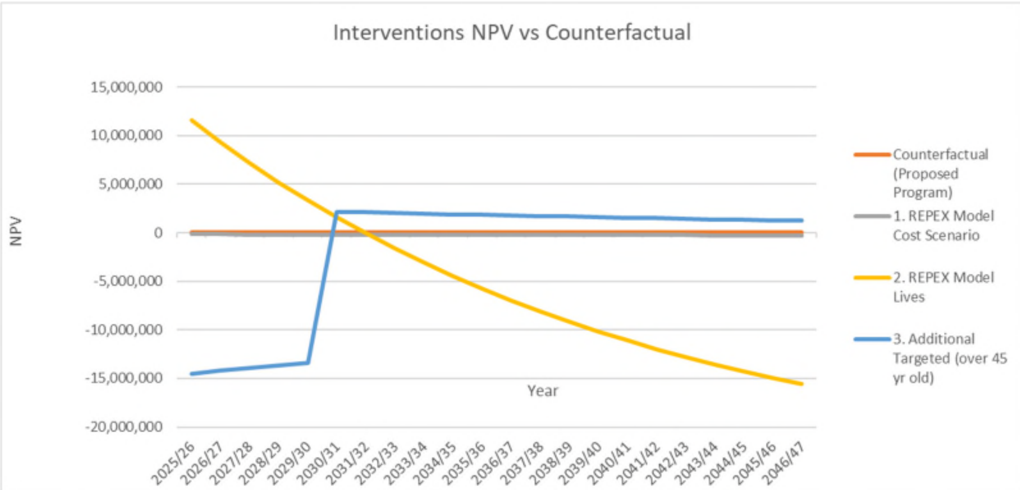

Figure 10: Benefits for all options

Volumes lower than the counterfactual option results in a negative NPV outcome based on the cost benefit analysis. This shows that the counterfactual achieves optimum solution for replacements. Therefore, the counterfactual is the option which will achieve network standards compliance and maximises customer benefits. It is therefore prudent to continue business as usual. Even though Option 3 achieves additional customer benefit, the substantial investment required outweighs the benefits and delivered a negative NPV.

The analysis presented in Table 10 compares the options to their respective counterfactual alternatives for distribution transformers.

Criteria	Option 1 – Repex Model Cost Scenario	Option 2 – Repex Model Lives Scenario	Option 3 – Additional Targeted Volume
Net NPV	-$3.4m	-$59m	-$55m
Investment Risk	Low	Low	High
Benefits	Low	Very Low	High
Delivery Constraint	Low	Low	High
Detailed analysis – Advantage	• Volume aligns closer to counterfactual option • Asset performance only modelrately lower than counterfactual	• Do Minimum Scenario • Investment saving of $22m	• Transition towards asset performance improvement. • Additional benefit of $18m
Detailed analysis – Disadvantage	• Decline in asset performance if this option continues longer • Leaving 10% of defect unattended • Negative NPV • Loss of $3m benefit	• Leaving 80% of defects unattended • Elevated failures • Negative NPV • Poor asset performance • Elevated safety and finance risk • Reduction of $81m benefit for our customers • Need for substantial investment in future	• Additional investment of $74m • High resource impact • Negative NPV • Investment outweighs customer benefit

Table 10: Options Analysis Scorecard

9 SUMMARY

Energex's proposed plan is to continue with the **counterfactual (Preferred)** volume for the regulatory period 2025-2030. This proposed plan aligns with the current defect replacement volume and has been deemed prudent based from a cost benefit analysis outcome.

We have assessed and modelled three feasible options compared to the proposed counterfactual delivery forecast for the Reset RIN period from 2025-30.

Any reduction from our counterfactual volume delivers negative NPV benefit with increased risks for our community.

It is noted that the modelled result for counterfactual shows that distribution transformer failure rates are likely to be maintained at their current levels of service.

9.1 Sensitivity

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
- Weighted Average Capital 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

The proposed counterfactual option is reflective of the commitment to provide maximum customer benefit at optimised customer price impacts. It reflects a tolerable risk position which balances the achievement of our asset management objectives and customer service levels.

11 APPENDICES

11.1 Appendix 1: Reset RIN Reconciliation

	2025/26	2026/27	2027/28	2028/29	2029/30
Distribution Transformer Contributor	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure	Replacement Expenditure
RIN	18,121,279	18,121,279	18,121,279	18,121,279	18,121,279
Dist Transformer Replacement					
Dist Transformer Defect	4,835,789	4,835,789	4,835,789	4,835,789	4,835,789
Targeted Replacement	0	0	0	0	0
Dist Transformer Replacement Total	**4,835,789**	**4,835,789**	**4,835,789**	**4,835,789**	**4,835,789**
Consequential Dist Transformer Replacement					
Pole Consequential Replacement	1,854,143	1,854,143	1,854,143	1,854,143	1,854,143
Conductor Consequential Replacement	11,431,347	11,431,347	11,431,347	11,431,347	11,431,347
Consequential Replacement	**13,285,490**	**13,285,490**	**13,285,490**	**13,285,490**	**13,285,490**
BC Total	**4,835,789**	**4,835,789**	**4,835,789**	**4,835,789**	**4,835,789**

Table 11 **RIN reconciliation table – Expenditure $ in 2022-23**

$, direct 2024-25	2025/26	2026/27	2027/28	2028/29	2029/30
	Expenditure	Expenditure	Expenditure	Expenditure	Expenditure
RIN	20,604,221	20,673,573	20,731,041	20,769,722	20,907,474
Dist Transformer Replacement					
Dist Transformer Defect	5,498,380	5,516,887	5,532,223	5,542,545	5,579,305
Targeted Replacement	0	0	0	0	0
Dist Transformer Replacement Total	**5,498,380**	**5,516,887**	**5,532,223**	**5,542,545**	**5,579,305**
Consequential Dist Transformer Replacement					
Pole Consequential Replacement	2,108,194	2,115,289	2,121,170	2,125,127	2,139,222
Conductor Consequential Replacement	12,997,648	13,041,396	13,077,649	13,102,050	13,188,947
Consequential Replacement	**15,105,841**	**15,156,686**	**15,198,818**	**15,227,177**	**15,328,169**
BC Total	**5,498,380**	**5,516,887**	**5,532,223**	**5,542,545**	**5,579,305**

Table 12 **RIN reconciliation table – Expenditure $ in 2024-25**

	2025/26	2026/27	2027/28	2028/29	2029/30
Distribution Transformer Contributor	Replacement Qty	Replacement Qty	Replacement Qty	Replacement Qty	Replacement Qty
RIN	642	642	642	642	642
Dist Transformer Replacement					
Dist Transformer Defect	171	171	171	171	171
Targeted Replacement	0	0	0	0	0
Dist Transformer Replacement Total	**171**	**171**	**171**	**171**	**171**
Consequential Dist Transformer Replacement					
Pole Consequential Replacement	66	66	66	66	66
Conductor Consequential Replacement	405	405	405	405	405
Consequential Replacement	**471**	**471**	**471**	**471**	**471**
BC Total	**171**	**171**	**171**	**171**	**171**

Table 13 RIN reconciliation table - Volumes