Augex Reliability - Investment Case

Overview

Our modelling has identified gaps in reliability performance in relation to Schedule 3 of the Licence Conditions and in the area of worst-performing segments. Details of the approach we will use to manage the performance gaps are listed below. In line with customer engagement (**Attachment 4.02 How Engagement Informed our Proposal**) and the Reliability Strategy we aim to maintain SAIDI, SAIFI and CAIDI, and maintain the number of planned outages.

Poor Performing Feeders: Investment in Poor Performing Feeders is required to ensure compliance with **NSW Reliability and Performance Licence Conditions for Electricity Distributors** (the Licence Conditions). Specifically, Schedule 3 of the Licence Conditions sets out individual feeder performance standards depending on network type (urban, short rural, long rural).

Worst Performing Segments: Individual customers on small sections of the network may experience very poor reliability. However, some of these areas are not on a Poor Performing Feeder. The Worst Performing Segments program is to improve the reliability of only those customers with the worst reliability, who receive reliability much poorer than the feeder standards.

We produce quarterly feeder performance reports and feeder segment performance reports in order to identify areas of investment required to maintain the individual feeder standards or to address worst performing segments.

Causal analysis differentiates between feeder segments with an underlying issue, those with poor performance caused by non-recurrent events such as the environment, and those that only require operational actions to restore performance.

We identify options to rectify the underlying causes of poor segment performance based on remediation options. These are assessed to identify the most appropriate option.

There are often projects related with asset condition improvement, protection improvement and other investments which contribute to maintaining or improving reliability, however these are not covered by this investment case unless they are on Poor Performing Feeders or Worst Performing Segments.

Forecasting Approach

The forecast expenditure for Poor Performing Feeders has been developed by forecasting the number of feeders which are classified as Poor Performing according to our License Conditions. We then estimate how many of these feeders will require a capital expenditure intervention, and apply a unit rate for capital expenditure investments of $65,900 per project. Due to changes to the Individual Feeder Standards in the Licence Conditions, we expect a 30% reduction in the number of projects. We thus forecast approximately 40 projects per year.

Worst-Performing Segment expenditure has been estimated based on the three year period investment actuals and forecast for FY22 to FY24. Average project costs for this program were similar, with an average cost of $62,350 per project. This equates to approximately 20 projects per year.

Investment Options

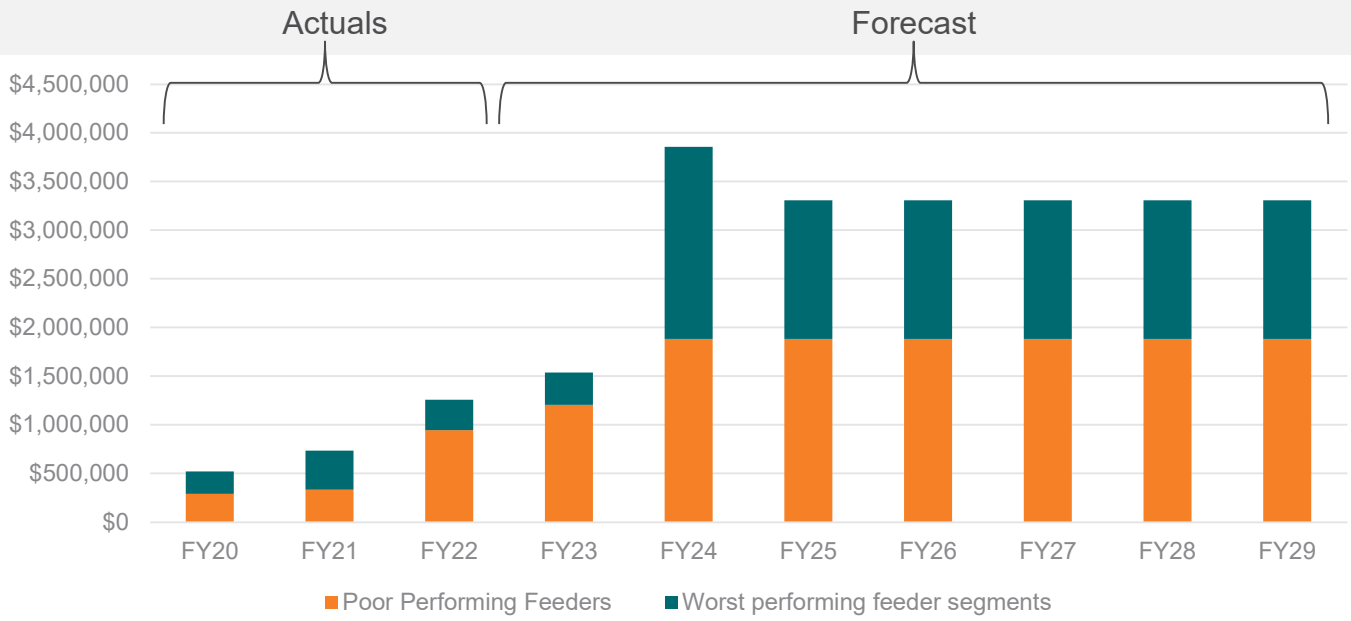
Typical network solutions include adding a new recloser, gas switch, line-fault indicators, fuses or links. They also include interventions such as reconductoring sections of network, refurbishing the pole-tops or changing the pole-top structure.

Options analysis, including identifying non-network solutions, are undertaken for projects as they enter the planning pipeline. Some solutions that might be considered which differ from traditional network solutions include vegetation clearing, protection review, stand-alone power systems and microgrids. All individual projects are subject to cost benefit analysis before proceeding.

	Worst Performing Segments	Poor Performing Feeders
Average Project Cost	$62,350	$65,900

Capex Forecast

Forecast Augex for Reliability expenditure for the 2024-29 period is $16.5M, averaging $3.3M per annum. Actual/forecast spend for 2019-24 is $9.4M.



Note: All values are in middle of the year 2023-24 real dollar terms
Data source: Actuals: Internal delivery reports, Forecasts: Internal analysis documented in 'Forecasting approach'

Justification

We are confident that our approach delivers an efficient and prudent level of investment because:

- **Prudent:** Licence condition and customer expectation to maintain reliability and willingness to pay for worst performing feeder upgrades. Investments are subject to a cost-benefit analysis.
- **Clear drivers from Asset Management Objectives (as detailed in Attachment 10.1 SAMP) for safety, quality, reliability and compliance):** This investment will deliver the sustained network reliability performance our customers expect, and maintain compliance with our network-related obligations.
- **Customer support:** We engaged with our customers on network reliability in general, and specifically the Worst Performing Segments program. Customers were supportive of maintaining reliability, and were particularly supportive of improving reliability for our worst served customers.
- **Deliverable:** With the exception of the impact of unforeseen events on our resource availability, we have adequate resources available to deliver the work.

The major benefits expected from these investments are:

- **Reduced network risk:** Investments forecast to reduce the likelihood of asset failure, or allow better recognition of faults.
- **Improved maintainability:** Options to reconductor or refurbish the network will result in less operating expenditure for these sections of network in the future.
- **Improved service to customers:** will result in fewer unplanned outages and shorter outage times to improve network reliability for targeted areas.

Forecast Reliability expenditure for the 2024-29 period is $16.5M The is a decrease from 2019-24 allowance of $47.4m but an increase against actual/forecast spend of $9.4M due to:

- Amendment to Licence Conditions expected to result in 30% reduction of reliability projects.
- Expenditure in FY20 – FY22 significantly reduced compared to historic expenditure due to the impact of fires, floods and other interruptions to resources on the planned works programs. Many projects scheduled for FY22 have been deferred to FY23 and FY24 due to these resource constraints. Forecasts for FY24 to FY29 show our projected medium-term expenditure levels.
- The impact of underspend from FY20 to FY22 is primarily that customers who are experiencing very poor reliability continue to experience poor reliability until the investments have been completed.

Network Strategy – Reliability: Summary

Essential Energy's Network Reliability Strategy provides direction across the business and all asset classes to ensure compliance with **NSW Reliability and Performance Licence Conditions for Electricity Distributors**, the **National Electricity Rules** and **Essential Energy's Corporate Objectives**.

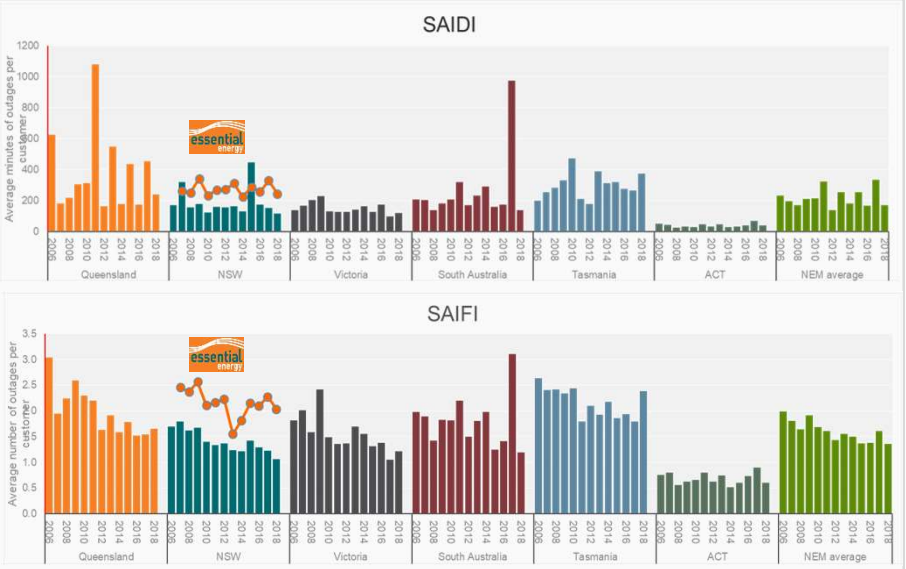
Context

Reliability is a key performance requirement for Essential Energy's network to meet the expectations of customers, regulators and other stakeholders.

Customers have expressed a willingness to pay for continued performance at current levels with some targeted improvement in worst performing areas.

This strategy sets the targets to meet these expectations and licence conditions through a comprehensive approach across all asset classes in addition to identifying Actions to improve the future management of reliability.

Reliability targets are expressed using System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI) and Customer Average Interruption Duration Index (CAIDI) to capture the effects of reliability event duration and frequency on customers.



Line of Sight

The Reliability Strategy is an enabler for Essential Energy's Corporate Strategy, Pillar 1 - Strengthen the core business. The Asset Management Objectives (AMO) related to the strategy are AMO-06 and AMO-08. Subsequent Network Targets (NT) R1 to R5 have been developed to align with the AMOs

R1	R2	R3	R4	R5
Unavailability and Frequency duration measures – Maintain network level SAIDI and SAIFI over the short and long term	**Outage response measures – maintain network level CAIDI over the short and long term**	**Maintain zero Material Non-Compliances against IPART Reliability Licence Standards and reporting Conditions over the short and long term**	**Reduce cumulative SAIDI by 25% on worst performing segments by 2024**	**Maintain the number of planned customer interruptions per annum**

Performance and Targets

R1 Historical performance is displayed in the graphs to the right. The annual targets for maintenance are

Feeder Type	Annual SAIDI Target	Annual SAIFI Target
Urban	75	0.95
Short-rural	211	1.86
Long-rural	487	3.09

R2 Historical CAIDI performance has been used to set targets. The annual targets for maintenance are

Feeder Classification	Annual CAIDI Target
Urban	80.36
Short-rural	113.74
Long-rural	157.5

R3 There have been no material licence condition non-compliances within the last five years.

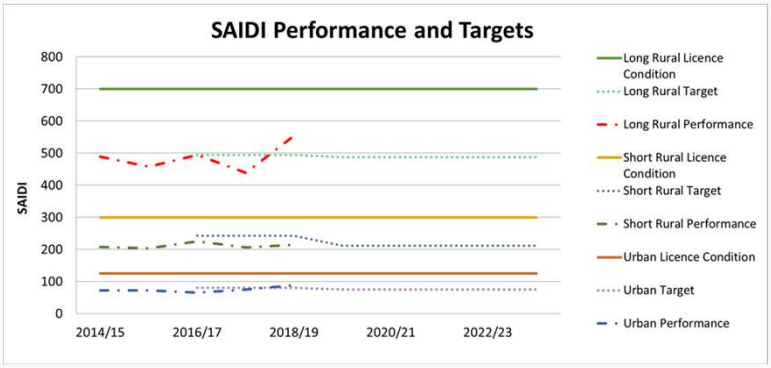
Historical Non-Compliances (2014 – 2019)	Target Number of Non-Compliances
0	0

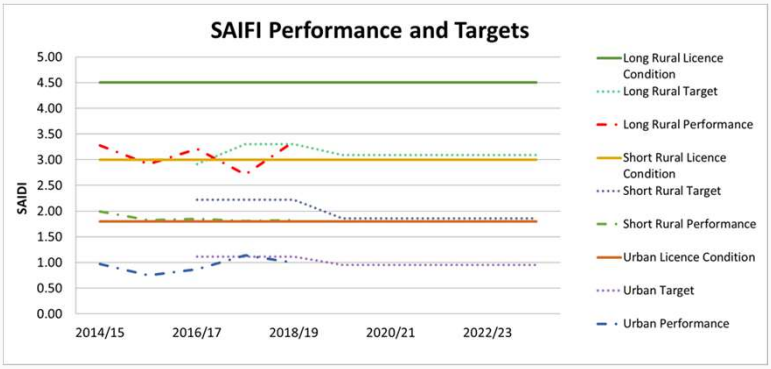
R4 The cumulative SAIDI targets for worst performing segments have been based off historical performance.

Year	Cumulative Target
2020/21	257,122
2021/22	239,981
2022/23	222,839
2023/24	205,698
Post 2024	*Reassess*

R5 Historical planned outage performance has been used to set a target annual planned outage number. This has not previously had a metric.

Target number of annual planned outages per customer
0.67





Cause	SAIDI	SAIFI
Animal	7%	9%
Environment	37%	29%
Equip. Failure	34%	37%
Planned Outage	0%	0%
Unauth. Contact	6%	9%
Urg. Ntwk Repair	2%	2%
Vegetation	14%	14%

Reliability Causal Framework

The five asset classes that contributed the most to SAIDI and SAIFI through equipment failures are:

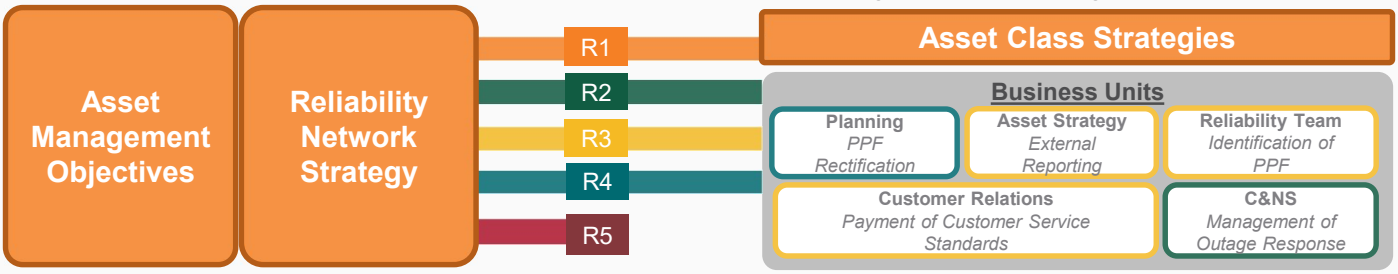
- Pole Tops
- OH Conductors
- Underground High Voltage Ring Main Units
- Overhead Switchgear
- Poles

Response Summaries

R1	R2	R3	R4	R5
The **SAIDI** and **SAIFI** cause contributions within the asset classes were identified based off Feeder Categories. The **Equipment Failure** component is passed to the asset classes to actively manage, while monitoring the contributions of other causes against targets	The response involves assigning the responsibility for delivering the reduction to Customer and Network Services. Historical CAIDI data has been analysed to **identify factors contributing to outage response**, including the time of the outage, day of outage and voltage level.	The strategic response to achieving this asset management objective is to **assign responsibility for monitoring and reporting to a single area within the business**. This will enable clear line of sight for business processes through to the legislation while providing oversight of conformance.	The response involves assigning the responsibility for delivering the reduction to the planning team, **identifying projects that demonstrate value** using the value framework. This has been supported through a number of strategic actions to increase effectiveness of delivery in future iterations.	This response involves identifying and establishing a **reporting mechanism** for the strategic management of planned outages. This is supported through actions investigating the potential requirement of an outage management strategy.

Response Implementation

The figure below outlines the paths of implementation for each strategic response. AMO R5 is addressed within the reliability strategy and does not require implementation within another business unit. The asset class targets for Network Targets detailed below.



R1 – Asset Class Targets (SAIDI/SAIFI)

Asset Class – SAIDI	L-Rural	S-Rural	Urban
Pole Top Equipment19	36.985	16.840	2.869
OH Conductors	36.271	14.604	4.638
Underground Cables	23.156	21.435	12.489
Poles	10.383	4.368	1.378
OH Links, Switches and Fuses	8.603	3.999	2.295
Dx Power Transformers	6.777	3.041	2.153
Circuit Breakers	5.072	3.394	1.474
OH Customer Services	2.039	2.354	1.405
Zone Substation Transformers	1.814	1.257	1.038
Surge Arrestors	1.602	1.458	1.253
Protection and Control Systems	1.534	0.185	-
Instrument Transformers	0.825	0.183	-
HV Ring Main Units	0.558	0.223	1.201
Disconnector/isolator/air break switch & earth switches	0.278	0.734	0.140
UG Pits, Pillars and Cubicles	0.095	0.325	0.156
Switchboards	0.004	0.533	0.509
Load Control	0.001	0.000	0.003
Reactive Plant	0.001	-	-
Meters	0.001	0.067	-

Asset Class – SAIFI	L-Rural	S-Rural	Urban
Pole Top Equipment	0.2795	0.1463	0.0412
Overhead Conductors	0.2467	0.1185	0.0398
Underground Cables	0.1694	0.1878	0.1240
OH Links, Switches and Fuses	0.0762	0.0502	0.0293
Circuit Breakers	0.0539	0.0276	0.0269
Poles	0.0533	0.0330	0.0165
Dx Power Transformers	0.0450	0.0273	0.0229
Zone Substation Transformers	0.0305	0.0210	0.0245
OH Customer Services	0.0216	0.0304	0.0170
Protection and Control Systems	0.0157	0.0029	-
Surge Arrestors	0.0140	0.0169	0.0191
Instrument Transformers	0.0071	0.0014	-
HV Ring Main Units	0.0045	0.0038	0.0109
Disconnector/isolator/air break switches	0.0031	0.0047	0.0015
Switchboards	0.0004	0.0029	0.0073
UG Pits, Pillars and Cubicles	0.0002	0.0025	0.0010
Load Control	0.0000	0.0000	0.0001
Meters	0.0000	0.0006	-
Reactive Plant	0.0000	-	-