STPIS and Non-Compliant Feeder CAPEX Proposal

FY25-29 Regulatory Control Period

November 2022

Endeavour Energy

POWER together

Contents

Executive Summary

This document details Endeavour Energy's proposed STPIS targets and Capex requirements to meet NSW reliability Licence Conditions obligations, as well as our proposal for the application of the STPIS for the 2024-2029 Regulatory Control Period.

The key aspects of this document are summarised as follows:

Category	Application of Scheme	Section Detailing
Revenue at Risk	±5.0%,	Section 2.2
Feeder Categories	Urban, Short Rural	Section 2.3.1
Reliability of Supply Parameters	Unplanned SAIDI Unplanned SAIFI	Section 2.3.2
VCR	Application of the 2019 values adjusted by CPI	Section 2.3.3
Indicative Urban SAIDI Feeder Targets (FY24-29)	50.1	Section 2.3.4.1
Indicative Short Rural SAIDI Feeder Targets (FY24-29)	148.0	Section 2.3.4.1
Indicative Urban SAIFI Feeder Targets (FY24-29)	0.550	Section 2.3.4.2
Indicative Short Rural SAIFI Feeder Targets (FY24-29)	1.209	Section 2.3.4.2
Indicative Telephone Answering Targets (FY24-29) (%)	N/A	Section 2.4.1
Non-Compliant Feeder Expenditure	$16.17 M	Section 3.4

1. Overview

1.1. Introduction and Context

Endeavour Energy operate a distribution network that strives to meet the reliability performance needs and expectations of its customers, within the context of current regulatory and licence requirements, customer expectations, and capital investment constraint. Endeavour Energy has adopted a reliability strategy of maintaining existing average levels of reliability, and rectifying poor-performance outliers, within a context of climate change, i.e. increased weather events (minor and major) will become more regular

Endeavour Energy operates within the context of state and national regulation:

- The Australian Energy Regulator's (AER) distribution Service Target Performance Incentive Scheme (STPIS) which is a risk/reward revenue at risk-based scheme that incentivises performance beyond pre-established targets, with revenue gains either retained or reinvested to gain future benefits.

- The NSW state government imposes Licence Conditions to all electricity distribution businesses in NSW. Endeavour Energy has an obligation to ensure compliance with these conditions which are enforceable by the Independent Pricing and Regulatory Tribunal (IPART) and the Minister. The latest Licence Conditions were updated by variation on the 5th February 2019.

The purpose of this document is to:

- Detail Endeavour Energy's proposal on how the STPIS should apply for the 2025-29 regulatory period.

- Propose reliability and customer service targets for the 2025-29 regulatory period, noting that we are proposing a change away from telephone answering to using a blend of both customer satisfaction and planned outage management as the basis for measuring customer service

- Detail the expenditure required for Endeavour Energy to maintain compliance with its NSW Licence Conditions obligations.

2. STPIS Parameters and Targets

2.1. Endeavour Energy's Long Term Performance Context

Historically, Endeavour Energy has adopted a corporate strategy of aiming to maintain existing average levels of reliability performance, on the basis that our customers in the past have been broadly satisfied with the network reliability that they experience, although we note that customer expectations are increasing with greater dependency on electricity and increased working from home.

Normalised reliability trends, whilst removing major event days, are still subject to significant fluctuation as localised storms and significant events are often not excluded as major event days. As such, Endeavour Energy has for some time internally monitored underlying reliability performance, defined as the total SAIDI from all days where the daily SAIDI was less than one minute. This better reflects the "day to day" performance of the network in terms of overall investment and maintenance strategies as well as operational response. It is also not subject to changes in normalisation methodology over longer timeframes.

Endeavour Energy's normalised and underlying SAIDI trends are shown in Figure 1 below. It is evident that recent underlying performance is stable, in line with a corporate strategy of maintaining current average levels of reliability. This is also reflective of Endeavour Energy's response to the STPIS, which is to avoid penalties rather than pursue rewards. No step change investment for reliability improvement has occurred.
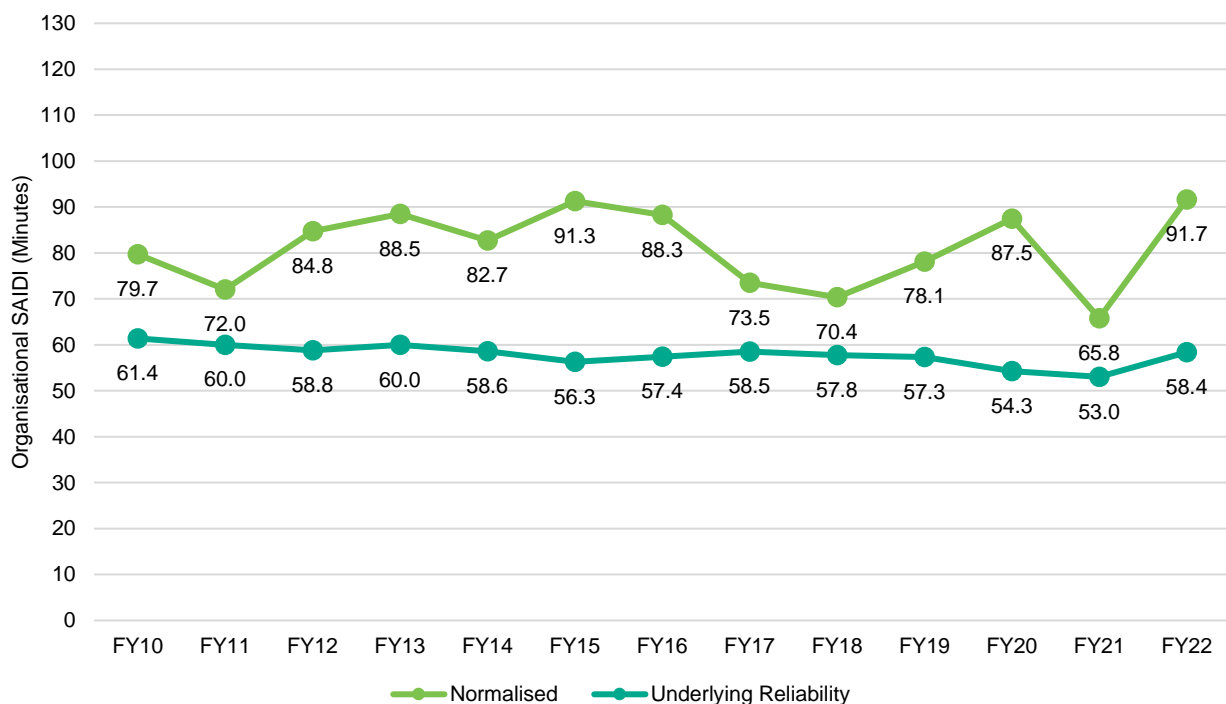

Figure 1 - Normalised and Underlying Reliability

2.2. Application of the STPIS to the 2024-29 Regulatory Control Period

The Framework and Approach (F&A) paper released in July 2022 addresses the application of the STPIS to the regulatory control period; 1 July 2024 to 30 June 2029. Specifically, the AER's proposed approach to applying the STPIS in the subsequent period will be to:

- Set revenue at risk for each distributor within the range of ±5%
- Segment the network according to the four STPIS feeder categories (CBD, urban, short rural and long rural) as per the scheme definitions.
- Set applicable parameters for:
  - The reliability of supply component: SAIDI and SAIFI
  - The customer service component: telephone answering
- Set performance targets based on our average performance over the past five regulatory years.
- Apply the methodology indicated in the national STPIS for excluding specific events from the calculation of annual performance and performance targets
- Apply the methodology and value of customer reliability (VCR) values as published by the AER.
- Not apply the GSL component while NSW distributers remain subject to a jurisdictional GSL scheme.

Consistent with previous submissions, Endeavour Energy accepts the application of the STPIS for the 2024-29 regulatory control period and the AER's proposed approach, with the exception of the methodology used to calculate the excluded Major Event Days (MED) threshold. In the following sections we outline our proposed targets, revenue at risk and detail any proposed amendments to the AER's approach in accordance with clause 2.2 of the STPIS.

2.3. STPIS Reliability Component

2.3.1. Feeder Categorisation

The scheme requires that to calculate revenue incentives, the electricity distribution network should be divided into segments by network type. Consistent with the application of STPIS to Endeavour Energy for the 2024-29 regulatory control period, the network is to be classified by feeder categories consisting of Urban and Short Rural.

There are no SAIDI and SAIFI CBD targets under the STPIS as Endeavour Energy has no feeders which are categorised as CBD feeders. Furthermore, Endeavour Energy only has one rural long feeder that supplies 303 customers. A single rural long feeder results in significant volatility for which a feeder category target is not sensible. Previous Electricity Network Performance Reports identified this issue, noting that *"The Minister has recognised this in not imposing a Rural Long target for Endeavour Energy."* As such there is no application of the STPIS to the Rural Long feeder category for Endeavour Energy.

2.3.2. Reliability of Supply Parameters

There are three reliability of supply parameters that may be applied under the scheme including unplanned System Average Interruption Duration Index (SAIDI), unplanned System Average Interruption Frequency Index (SAIFI); and Momentary Average Interruption Frequency Index (MAIFI).

Consistent with the previous two applications of STPIS, which was accepted by the AER, only unplanned SAIDI and SAIFI will be subject to revenue at risk when applying the scheme to the 2024-29 regulatory control period. We consider that the exclusion of MAIFI/MAIFIe is consistent with the criteria and objectives of the STPIS as we have previously demonstrated to the AER that we are unable to reliably measure MAIFI for the purposes of revenue incentives.

2.3.3. Value of Customer Reliability

The Value of Customer Reliability (VCR) proposed in the scheme is as published in AER's 2019 Value of Customer Reliability final report. This value is adjusted for CPI from the date of publishing to the start of the 2024-29 regulatory control period.

2.3.4. Proposed Reliability Targets

The AER's approach to setting SAIDI and SAIFI performance targets under the STPIS is to average performance over the latest five regulatory years. We have adopted this approach for establishing reliability targets. At this stage, the last full five regulatory years comprise FY18 to FY22. It is recognised that by the time of the revised regulatory proposal the FY23 performance results will be available for targets to be set based on the average of FY19 to FY23. Therefore, the targets proposed hereafter are indicative.

2.3.4.1. SAIDI Targets

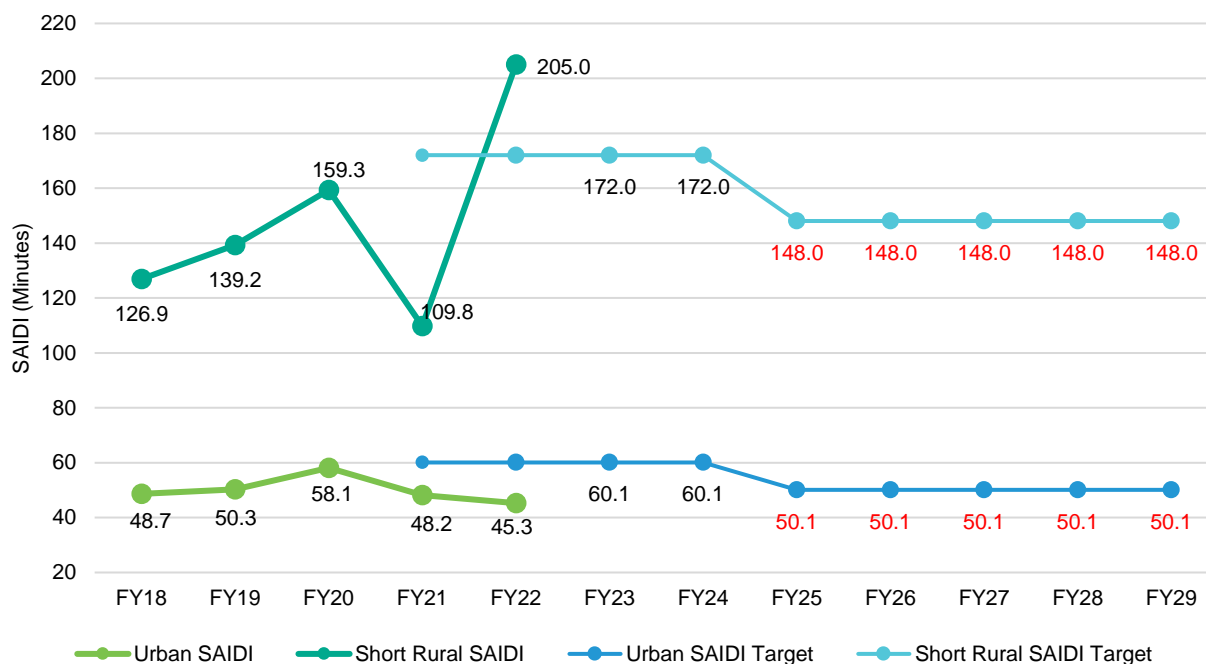The feeder category SAIDI performance trend and resultant targets are shown in Figure 2 and Table 1 respectively.

Figure 2 - Feeder Category SAIDI Trends and Targets

Table 1 - Proposed SAIDI Targets

Year	Existing	2024-25	2025-26	2026-27	2027-28	2028-29
Urban	60.1	50.1	50.1	50.1	50.1	50.1
Short Rural	172.0	148.0	148.0	148.0	148.0	148.0

2.3.4.2. SAIFI Targets

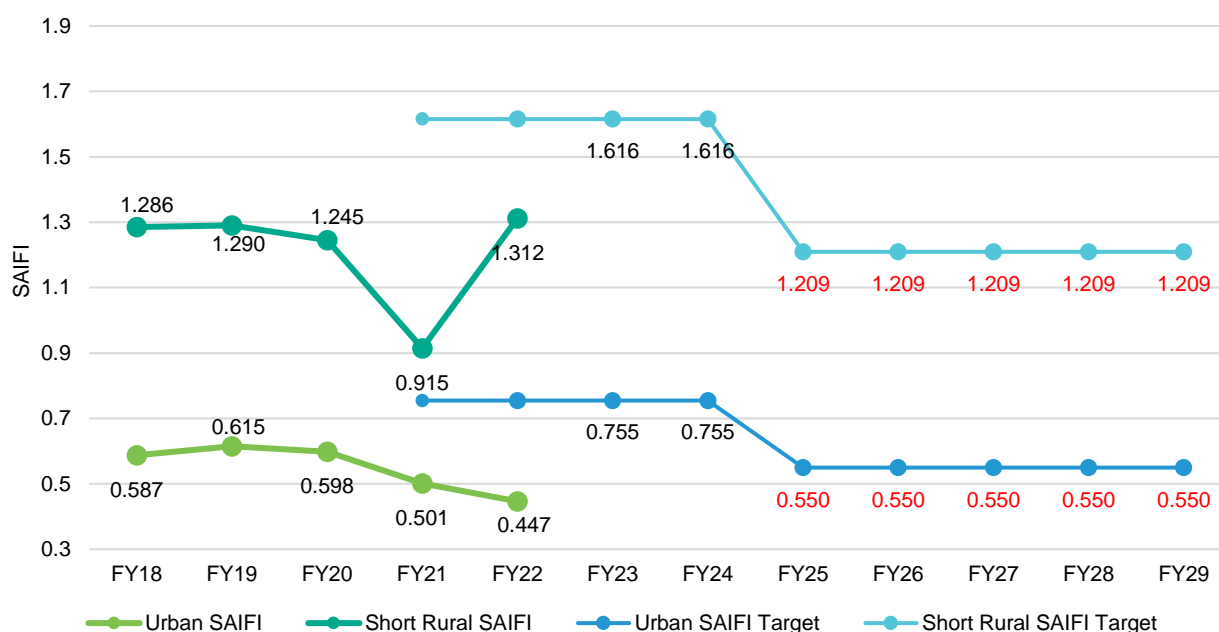The feeder category SAIFI performance trend and resultant targets are shown in Figure 3 and Table 2 respectively.

Figure 3 - Feeder Category SAIFI Trends and Targets

Table 2 - Proposed SAIFI Targets

Year	Existing	2024-25	2025-26	2026-27	2027-28	2028-29
Urban	0.716	0.550	0.550	0.550	0.550	0.550
Short Rural	1.493	1.209	1.209	1.209	1.209	1.209

2.3.5. Adjustments to Targets

Endeavour Energy has not proposed any further adjustment to the proposed targets as there has been no direct investment in overall reliability improvement for which forward targets should reflect. Targeted reliability improvement investment has occurred on feeders non-compliant to NSW reliability licence conditions. This is in line with Endeavour Energy's reliability strategy. Any demonstrated average improvement in recent performance will naturally be reflected in forward targets through the base five year average target setting process under the STPIS.

2.3.6. Exclusions - Major Event Day Threshold

Appendix D of the AER's STPIS document allows for an alternative daily unplanned SAIDI data normalisation method to be proposed where this improves the normality of transformed data on the basis of statistical analysis.

A statistical review is provided within the Appendix of this document, highlighting the validity of continued use of the Box-Cox transform, and how this methodology results in a more normally distributed data set.

2.4. STPIS Customer Service Component

The existing customer service component of the STPIS is percentage of customer calls answered within 30 seconds and currently worth incentive/penalty of ± 0.5% maximum allowable revenue (MAR).

The performance Endeavour Energy has achieved so far, is outlined in section 2.4.1 below. However, for the 2024-29 period we propose this component of the STPIS is replaced with the measures in Table 3, with an equivalent ±0.5% revenue at risk are proposed. The development and application of this approach (CSIS), is outlined further in our regulatory proposal.

Table 3 – Proposed Customer Service Targets

Performance parameter	Revenue at risk	2024-29 CSIS Target
Customer Satisfaction (CSat)		
Unplanned outage		6.4
Planned outage		5.5
General enquiry		**7.9**
Planned outage management		
% of planned outages starting within 30 minutes of communicated start time		26.52%
% of planned outages finishing within 1 hour of the planned duration		22.21%
Total	**0.5%**	**-**

2.4.1. Performance against current Customer Service Targets

Customer service targets are set as the average of the past five regulatory years according to the STPIS.
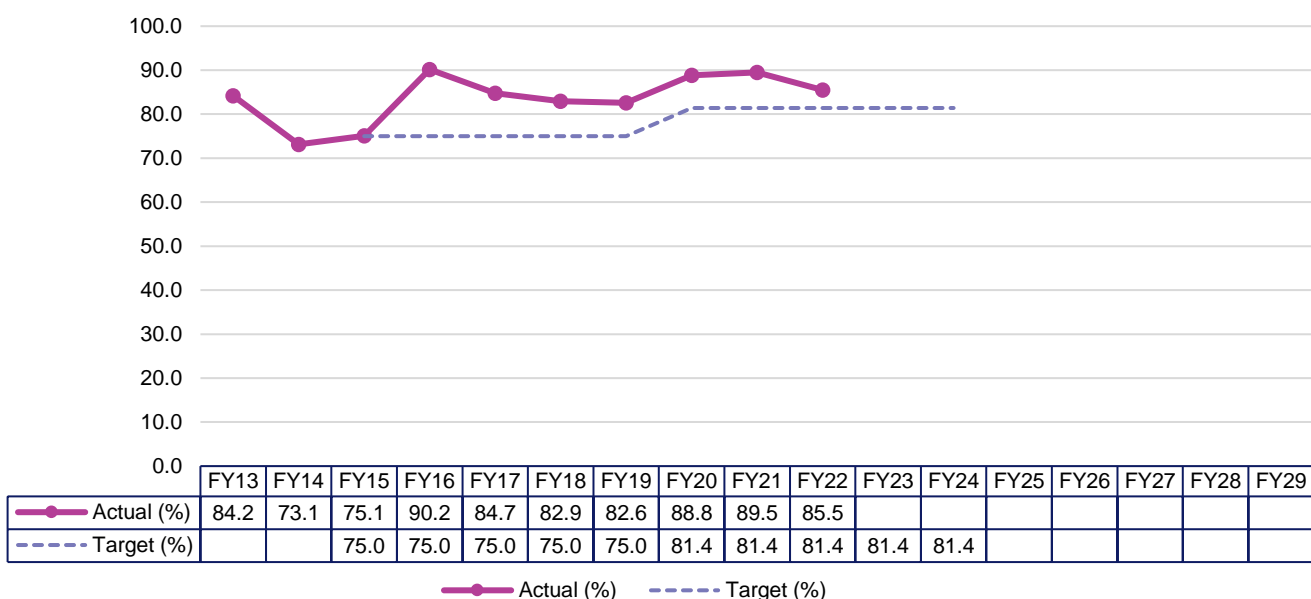
	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Actual (%)	84.2	73.1	75.1	90.2	84.7	82.9	82.6	88.8	89.5	85.5							
Target (%)			75.0	75.0	75.0	75.0	75.0	81.4	81.4	81.4	81.4	81.4					

Figure 4 – Telephone Answering Performance

3. Required Expenditure for NSW Licence Conditions Compliance

3.1. Endeavour Energy Licence Conditions Requirements

Endeavour Energy's NSW reliability Licence Conditions define minimum performance standards for reliability, namely:

- Network overall reliability standards (Schedule 2),
- Individual feeder standards (Schedule 3); and
- Customer service standards (Schedule 5).

The network overall reliability standards for Endeavour Energy are as per Table 4.

Table 4 - Licence Conditions Feeder Category Limits

Feeder Type	SAIDI (Minutes per customer)	SAIFI (Number per customer)
Urban	80	1.2
Short-Rural	300	2.8
Long-Rural	n/a	n/a

The individual feeder standards for Endeavour Energy are as per Table 5.

Table 5 - Licence Conditions Schedule 3 Individual Feeder Limits

Feeder Type	SAIDI (Minutes per customer)	SAIFI (Number per customer)
Urban	350	4
Short-Rural	1000	8
Long-Rural	1400	10

Jurisdictional Guaranteed Service Levels (GSL) apply for Endeavour Energy in the form of Customer Service Standards (Schedule 5) as per Table 6.

Table 6 - Licence Conditions Schedule 5 Customer Service Standards

Feeder Type	SAIDI (Minutes per customer)	SAIFI (Number per customer)
Type of Area in which Customer's premises is located	Interruption Duration (hours)	Interruption Frequency (number and duration)
Metropolitan	12	4 interruptions of greater than or equal to 4 hours
Non-metropolitan	18	4 interruptions of greater than or equal to 5 hours

3.2. Endeavour Energy's NSW Licence Conditions Obligations

Endeavour Energy's NSW Distributor Licence Conditions stipulate minimum levels of acceptable reliability performance for the network. The Licence Conditions require that Endeavour Energy:

- Must not exceed its Schedule 2 Network Overall Reliability performance limits; and
- Investigate and "take all reasonable steps to improve supply reliability" to feeders which are non-compliant to the Schedule 3 Individual Feeder Limits. This includes implementing operational actions, investigation of non-network options as well as develop and implement capital improvement projects.

Endeavour Energy investigate non-compliant feeder performance and develop improvement strategies and projects in accordance with the Licence Condition framework (Chapter 3). This is a significant business priority and is a key component of Endeavour Energy's reliability strategy. Capital projects for improving performance on non-compliant feeders are developed and released on an ongoing basis throughout the regulatory control period. These projects are captured within Endeavour Energy's Reliability Works Program (RWP) and align with the implementation timeframe requirements as specified in the NSW Licence Conditions.

Endeavour Energy's compliance to the reliability requirements of its NSW Licence Conditions is subject to yearly audits by Independent Pricing and Regulatory Tribunal (IPART).

3.3. Current Licence Compliance Performance

To date, Endeavour Energy has always been compliant to its Schedule 2 network overall reliability standards. Historical non-compliance levels to its Schedule 3 individual feeder standards are shown in Figure 4 below.

Figure 4 – Quarterly Schedule 3 Individual Feeder Standards Non-Compliance
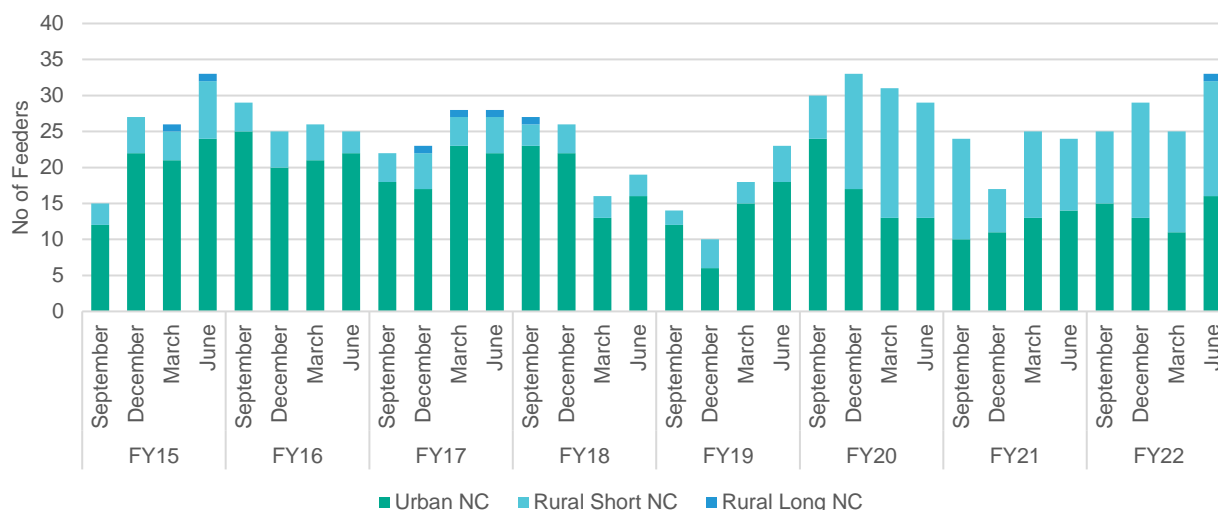
The five year average levels of non-compliance is 24 feeders or 1.6% of all feeders per quarter.

3.4. Licence Conditions Expenditure History and Requirements

Changes in regulatory requirements and environment have in recent years shifted the focus of reliability improvement investment towards lower-cost capital works, particularly leveraging new technology and automation.

In 2014 the NSW Licence Conditions were updated with the introduction of a requirement for cost-benefit analysis to be applied on any further investment in the rectification of non-compliant feeder performance. In response, Endeavour Energy introduced a Value of Customer Reliability (VCR) based cost-benefit analysis test for justification of Licence Conditions reliability improvement investment. This resulted in a reduction in justifiable capital expenditure to date.

Endeavour Energy has developed a reliability strategy which focusses more attention on process and data analysis improvement and low-cost operational actions to help maintain performance at existing average

levels, rather than capital intensive actions. Recognising this, Endeavour Energy has over time reduced overall expenditure targeted at Licence Compliance improvement.

This discussion of historical and proposed expenditure is represented graphically in Figure 5 below.

Figure 5 - Historical and Proposed Licence Compliance Expenditure
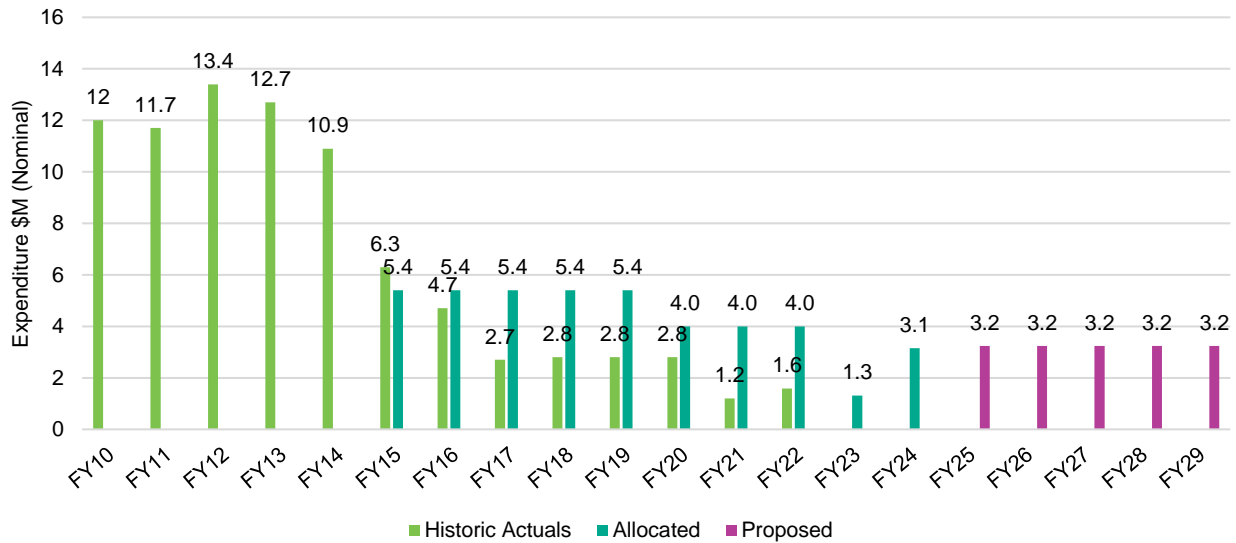
In determining the required capital expenditure for Licence Compliance for the 2024-29 regulatory period, Endeavour Energy has considered the following:

- The underlying increasing trend in the number of non-compliant feeders in recent years. This will increase the number of investigations and investment requirement.
- Recognition of historical CAPEX efficiency improvement through leveraging new technology.
- Recognition of the potential for ongoing, albeit limited, CAPEX efficiency improvement.

Considering the above factors, Endeavour Energy proposes that the required expenditure for Licence Compliance obligations over the 2024-29 regulatory period is to be equivalent to the average expenditure over current regulatory period of $3.2M (FY24 real) per year. This equates to a requirement of $16.17M (FY24 real) over the 2024-29 regulatory period.

Appendix A - Major Event Days Calculation

Current Process

As part of both its 2015-19, and 2019-24 regulatory submission, Endeavour Energy requested approval from the AER for the use of the alternative "Box-Cox transform" for daily SAIDI normalisation under the STPIS on the basis of statistical analysis. This was accepted and approved by the AER.

This section details a review of the statistical performance of the Box-Cox transform in comparison to the natural log transform. In doing so it reaffirms the justification for the continued use of the Box-Cox transform as part of the derivation of Major Event Day thresholds for Endeavour Energy.

Statistical Performance of the Box-Cox Transform

A number of statistical evaluation tests exist to evaluate the normality of a dataset. Some of the key approaches are discussed below. These will be utilised as the basis for comparison.

1. **Inspection of Distribution Properties** – A normal distribution has the following properties:
    -   The *Skewness* is equal to 0
    -   The *Excess Kurtosis* is equal to 0
2. **Statistical test of Normality** – Examples of statistical "goodness-of-fit" tests for normality include the Anderson Darling and Jarque-Bera test. For the Jarque-Bera test, a Jarque-Bera (JB) statistic can be calculated using the sample size, the Skewness and the Excess Kurtosis. The assumption of normality is accepted or rejected based on a comparison with a Chi-squared distribution where the assumption of normality is rejected with a 95% confidence level if the JB statistic is greater than 5.99. It is important to be mindful that the power of these statistical tests to reject the normality assumption typically increases greatly with the size of the dataset.
3. **Visual Inspection** – A normal distribution is a straight line on a Quantile-Quantile or "Q-Q" plot and therefore it follows that the better the data overlays this straight line by visual inspection the more normal the dataset is.

Endeavour's Box-Cox spreadsheet model has been utilised along with 10 historical iterations of 5-year daily SAIDI data to compare and contrast the performance of normalisation methodologies using the above mentioned common statistical measures and tests. A summary of the results are provided in Table 7 below.

Table 7 - Statistical Comparison

| Data Years (for TMED of next FY)	Skewness Criteria: For a normal distribution = 0		Excess Kurtosis Criteria: For a normal distribution = 0		JB-Test Criteria: Normality rejected if stat is > 5.99*	
	Log Natural	Box Cox	Log Natural	Box Cox	Log Natural	Box Cox
FY18 - FY22	-0.214	**0.027**	**1.441**	1.460	171.9	**162.4**
FY17 - FY21	-0.248	**0.028**	**1.535**	1.554	198.1	**184.1**
FY16 - FY20	-0.222	**0.019**	**1.411**	1.457	166.5	**161.8**
FY15 - FY19	-0.303	**0.028**	1.272	**1.172**	151.0	**104.7**
FY14 - FY18	-0.308	**0.023**	1.107	**0.983**	122.2	**73.6**
FY13 – FY17	-0.240	**0.016**	0.949	**0.856**	86.0	**55.8**
FY12 – FY16	-0.242	**0.020**	1.033	**0.973**	99.2	**72.3**
FY11 – FY15	-0.379	**0.037**	1.449	**1.256**	203.5	**120.5**
FY10 – FY14	-0.466	**0.039**	1.286	**1.203**	192.0	**110.5**
FY09 – FY13	-0.408	**0.032**	1.076	**1.010**	138.6	**77.9**

FY18 – FY22 normalised dataset (FY23 MED day)
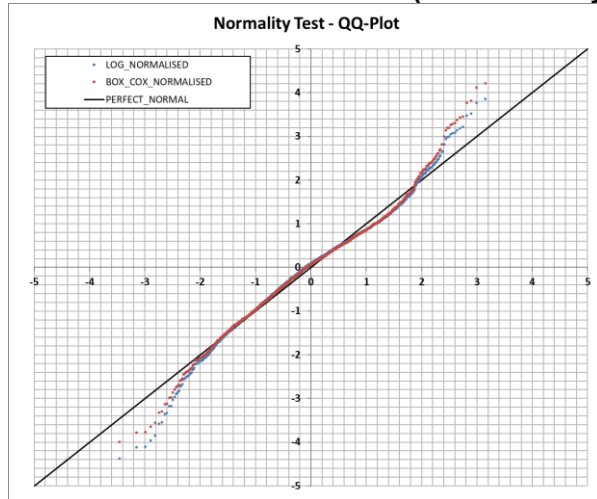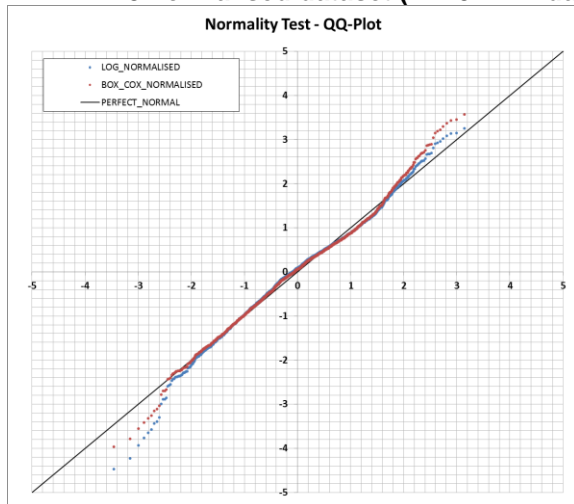

FY17 – FY21 normalised dataset (FY22 MED day)
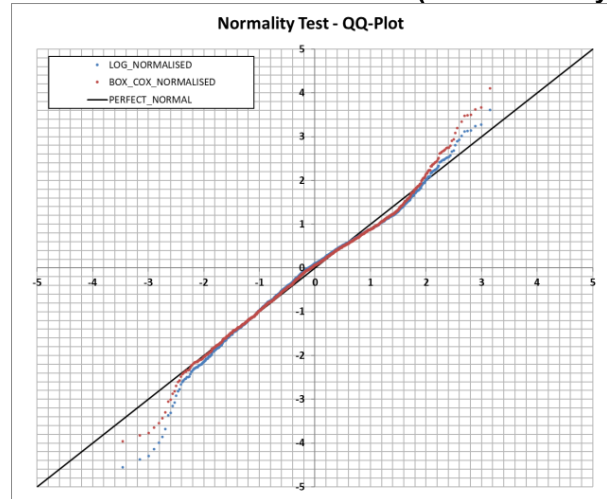
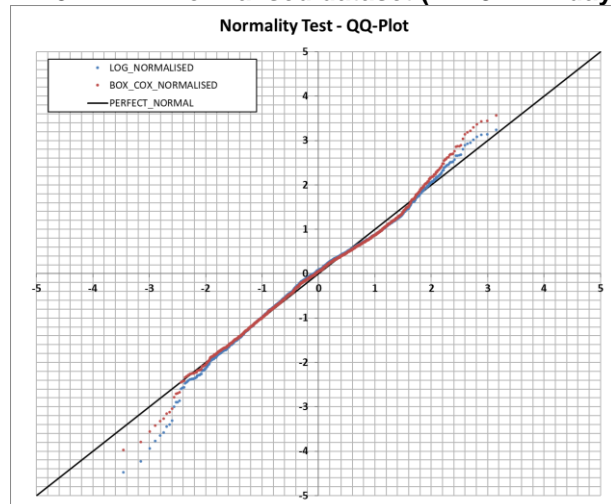## FY16 – FY20 normalised dataset (FY21 MED day)
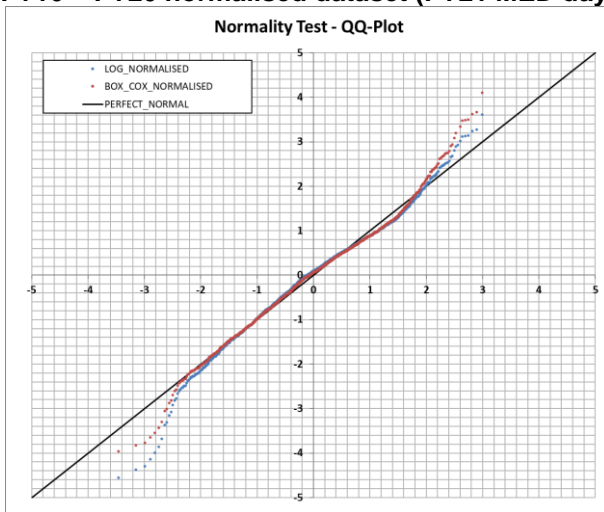
FY15 – FY19 normalised dataset (FY20 MED day)
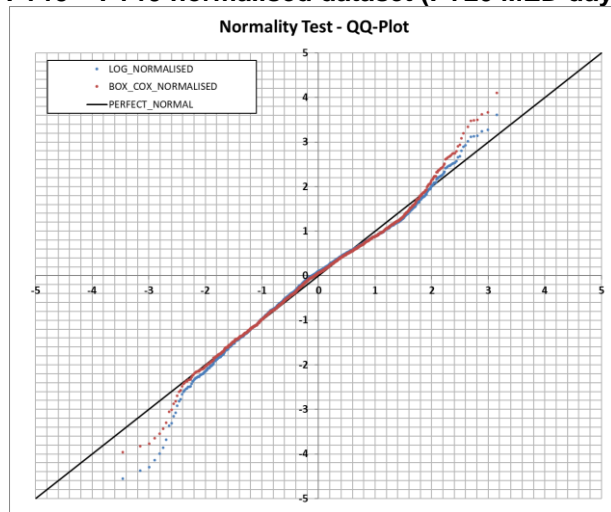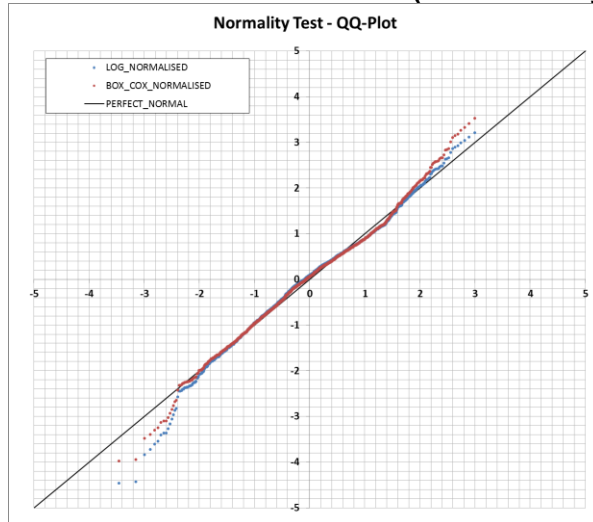

FY14 – FY18 normalised dataset (FY19 MED day)

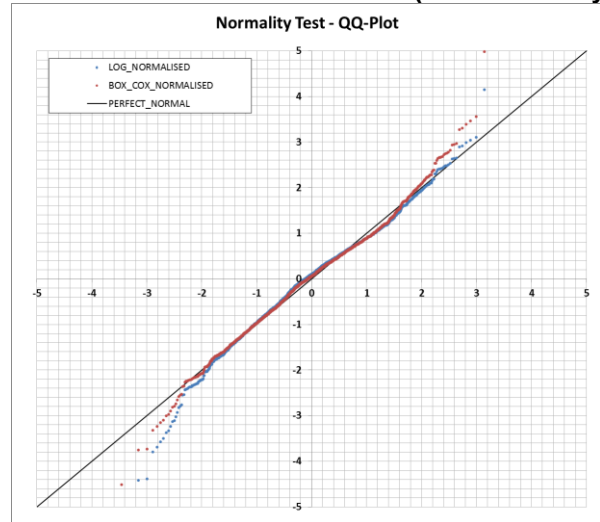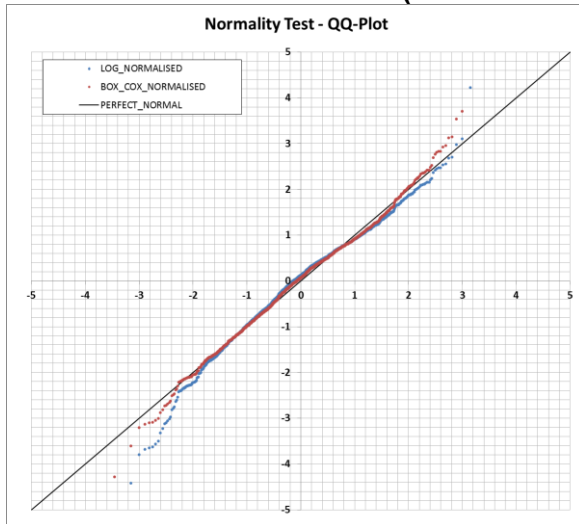## FY13 – FY17 normalised dataset (FY18 MED day)

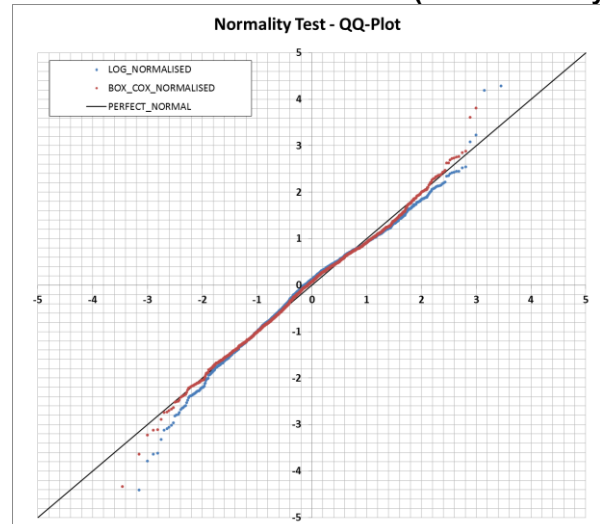**FY12 – FY16 normalised dataset (FY17 MED day)**

FY11 – FY15 normalised dataset (FY16 MED day)

FY10 – FY14 normalised dataset (FY15 MED day)

**FY09 – FY13 normalised dataset (FY14 MED day)**

Evident from the statistical tests for normalisation fit above:

- Using the skewness measure, the Box-Cox transform results in a greater normality than the log normalised calculation.
- In majority of years, using the Excess Kurtosis approach, the Box-Cox transform results in a better measure of normality, with the exception being FY16 through to FY20.
- Using the Q-Q plot, both the Box-Cox and the log normal transforms are both a good representation of normality.

MED Threshold Trends

The resulting trend in Major Event Day thresholds resulting from Log Natural and Box Cox normalisation approaches is provided in Figure 6 below. Also shown is the trend is the Lambda value which is an input to the Box Cox normalisation equation. As the value of Lambda approaches 0, the two normalisation approaches (vertical bars) converge. This feature is evident in the trend below, highlighting the adaptive nature of the Box-Cox transform to improve the likelihood of producing a normalised dataset.
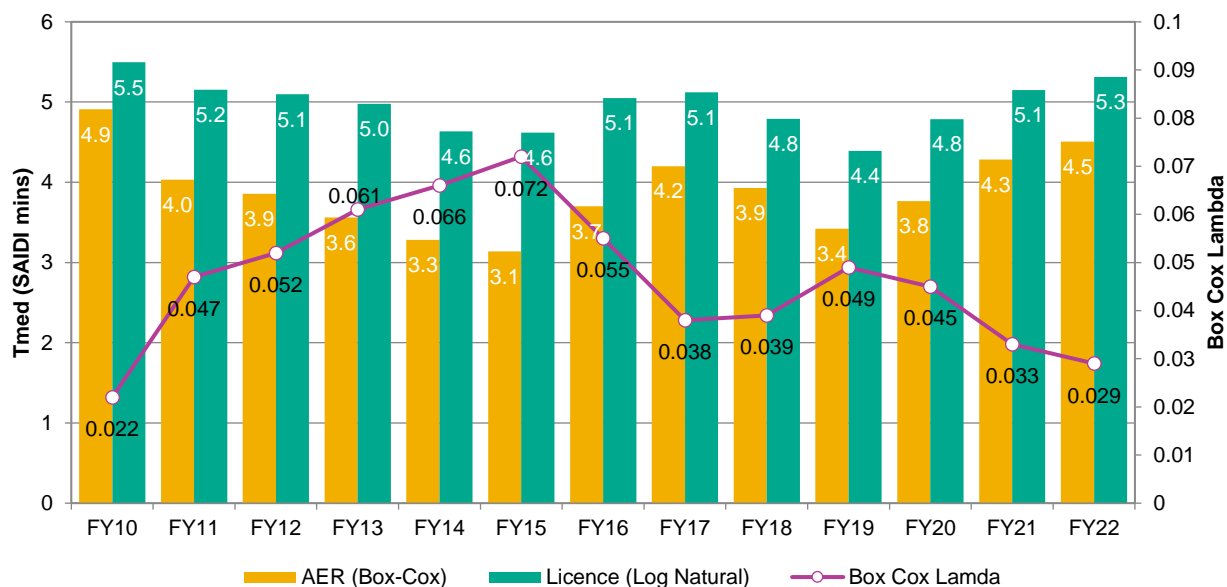
MED Days Removed

For the regulatory period to date, including 2017/18 to 2021/22, the following MEDs as per Table 8 have been excluded in accordance with the major event day threshold methodology of the STPIS Appendix D and the application of the Box-Cox normalisation transform.

Table 8 - Excluded Major Event Days 2017/18 to 2021/22

Date	Daily SAIDI
23/07/2016	6.0
04/10/2016	4.9
22/03/2017	12.4
13/12/2018	4.5
15/12/2018	49.7
16/12/2018	4.9
20/12/2018	12.3
21/01/2019	4.2
27/01/2019	3.5
08/02/2019	15.7
09/08/2019	3.9
06/09/2019	28.4
07/09/2019	7.0

Date	Daily SAIDI
26/11/2019	7.1
09/02/2020	42.4
18/02/2020	17.3
27/07/2020	13.6
09/08/2020	5.2
25/09/2020	9.0
29/11/2020	26.4
01/12/2020	11.8
24/08/2021	10.6
02/03/2022	5.7
03/03/2022	13.4
08/03/2022	15.8