7 December 2021

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Via email: [redacted]

Dear David,

RE: Suspension of STPIS for storm-related outages

I am writing to you seeking a suspension of the Service Target Performance Incentive Scheme (the Scheme) under section 2.7 of the Scheme in relation to the following days, which were impacted by extreme storm events:

- 9 and 10 June 2021 ('June Storms'); and
- 29 October 2021.

The unplanned System Average Interruption Duration Index (SAIDIs) on these days are the top three on record since AusNet was privatised in 1995 and are clear outliers even when compared to other large events. For the purposes of STPIS reporting, these are excluded as Major Event Days and so will not attract a bonus or penalty. However, without a suspension of the Scheme for these days the SAIDIs would count towards the MED threshold calculations for future years, which has unintended consequences.

Our proposal to exclude these days meets the requirements of the Scheme because the latest and current Institute of Electrical and Electronics Engineers (IEEE) 1366-2012 standard recommended the identification of catastrophic events on a case-by-case basis, where these catastrophic events should be removed from the calculation of MED thresholds because they have the ability to distort data. While the Scheme refers to the older and out-of-date version (IEEE 1366-2003), we consider it is appropriate for the AER to assess our application under the current standard because:

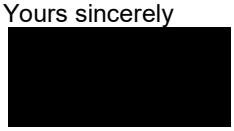
- The current standard was released 6 years prior to the 2018 amendment and thus the Scheme should have referred to the current standard;
- The definition of 'IEEE Guide' in the AER's Distribution Reliability Measures Guideline refers to the current 2012 standard.[1]
- Adopting the current 2012 standard in the assessment of this application is consistent with how we report reliability metrics in accordance with the AER's Distribution Reliability Measures Guideline; and
- As far as we are aware, the old standard cannot be sourced. We contacted SAI Global, via our subscription, and they said that the 2003 standard is not available (see email attached).

We have provided background material and further information below, which (for the June storm event) is also contained in our cost pass through application for the June 2021 storms.

We look forward to working with the AER on this issue. If you have any questions regarding this submission, please contact [redacted] by email on [redacted].

[1] AER 2018, Distribution Reliability Measures Guideline, 14 November, p. 6.

Yours sincerely



Charlotte Eddy
General Manager Regulatory Strategy and Policy
AusNet Services

Background

The Scheme is an incentive scheme that rewards businesses for continual reliability improvements. The Scheme operates by providing businesses who outperform annual STPIS targets with a reward and penalise businesses for underperformance.

There are two important concepts to understand and distinguish when considering the STPIS:

- Our performance is measured relative to our STPIS targets, where Major Event Day (MED) exclusions are removed from our performance metrics. These exclusions remove days where our performance was impacted by factors outside of our control (such as storms and other catastrophic events) or because they are not representative of a normal day. This mechanism ensures the incentive we face to improve our performance is based on factors that we can control.
- A MED exclusion is a day in which the daily SAIDI exceeds a threshold value. The STPIS Guideline adopts the 'beta method' from the Institute of Electrical and Electronics Engineers' (IEEE) standard 1366-2003[2] to calculate MED thresholds because as far as we are aware, this is the most authoritative standard on reliability metrics (see Box 1 below). However, we note that the latest and most up-to-date guideline is the 2012 version (IEEE 1366-2012) which we have referenced in this application. We are not aware of any Australian equivalent. The 'beta method' outlines that all SAIDIs are to be used to determine the threshold value, i.e., the SAIDIs of very large events, such as catastrophic events, remain included to determine the threshold value.

This means all events are included in the determination of the MED threshold value, and the MED threshold value is used to identify MED exclusions. This can lead to a problem that the IEEE standard provides a discussion on. The IEEE standard said that the inclusion of catastrophic events (which would include the June Storms and 29 October 2021), in the calculation of reliability indices could cause a shift of the average of the data set and increase the standard deviation, and therefore cause a relatively minor upward shift in the resulting reliability metric trends. This means that the inclusion of rare and large events (catastrophic events) could artificially increase our average SAIDI and standard deviation and lead to a MED threshold that is artificially high:

> *When using daily SAIDI and the 2.5β method, there is an assumption that the distribution of the natural log values will most likely resemble a Gaussian distribution, namely a bell-shaped curve. As companies have used this method, a certain number of them have experienced large-scale events (such as hurricanes or ice storms) that result in unusually sizable daily SAIDI values. The events that give rise to these particular days, considered "catastrophic events," have a low probability of occurring. However, the extremely large daily SAIDI values may tend to skew the distribution of performance toward the right, causing a shift of the average of the data set and an increase in its standard deviation. Large daily SAIDI values caused by catastrophic events will exist in the data set for five years and could cause a relatively minor upward shift in the resulting reliability metric trends.*[3]

The impact of an artificially high MED threshold is that it could result in the under-identification of MED exclusions. This means more outages are counted towards our performance indices, leading to artificially under-performing indices. This is an unreasonable outcome as it would penalise us for catastrophic events that are clearly rare and considered outliers, even when compared to other large events.

[2] AER 2018, Electricity distribution network service providers, Service target performance incentive scheme, version 2.0, November, clause 3.3(b).
[3] IEEE 1366-2012, p. 19.

Box 1: Institute of Electrical and Electronics Engineers

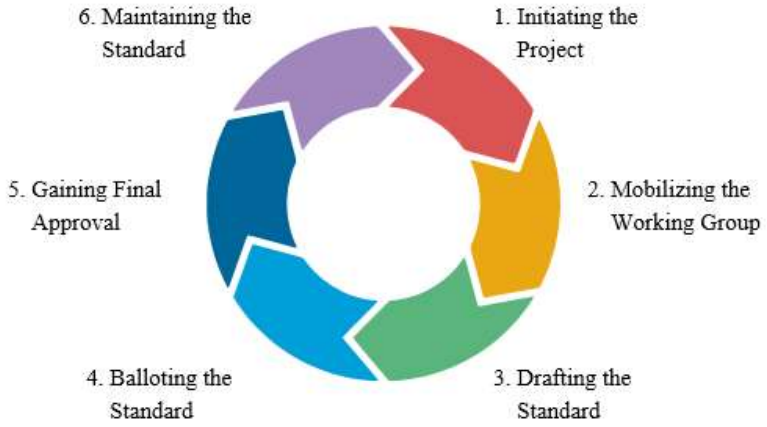
The Institute of Electrical and Electronics Engineers (IEEE) is the world's largest technical professional organisation for the advancement of technology, and has:

- Over 400,000 members in more than 160 countries, more than 60% of whom are from outside the United States;
- More than 107,000 Student members;
- 342 Sections in ten geographic Regions worldwide;
- 2,562 Chapters that unite local members with similar technical interests;
- 3,485 Student Branches at colleges and universities in over 100 countries;
- 2,877 Student Branch Chapters of IEEE technical Societies; and
- 580 affinity groups; IEEE affinity groups are non-technical sub-units of one or more Sections or a Council. The affinity group patent entities are the IEEE-USA Consultants Network, Young Professionals (YP), Women in Engineering (WIE), Life Members (LM), and IEEE Entrepreneurship.

Additionally, the IEEE:

- Has 39 technical Societies and seven Technical Councils representing the wide range of IEEE technical interests;
- Has more than 5 million documents in the IEEE Xplore® digital library, with more than 15 million downloads each month;
- Has an active portfolio of nearly 1,200 standards and more than 900 projects under development;
- Publishes approximately 200 transactions, journals and magazines; and
- Sponsors more than 1,600 conferences and events in 96 countries while contributing over 3.6 million total conference papers to IEEE Xplore since 1936, with as many as 200,000 new papers added annually.

IEEE standards are developed using a time-tested, effective and trusted process that is easily explained in the following six-stage lifecycle diagram.



Source: https://standards.ieee.org/develop/index.html (accessed 26 October 2021).

In the AER's Final Decision for STPIS, the AER provides a discussion on catastrophic events and said that catastrophic events should be included in the calculation of MED thresholds because:

> *If we cannot identify a consistent measurement approach for the definition of a catastrophic event using multiple beta thresholds, as defined by the IEEE standard, we cannot simply adopt an arbitrary number. Hence, we will retain the current approach of using a 2.5 beta standard to define major events days without prior exclusion of catastrophic events. We require a uniform method that can be applied to all distributors consistently.*[4]

We do not agree with the AER's position on this matter and consider that catastrophic events should be excluded in the calculation of MED thresholds because the IEEE standard has already concluded that it is not possible to universally identify catastrophic events and recommended that the identification of catastrophic events should be determined on a case-by-case basis:

> *… identification and processing of catastrophic events for reliability purposes should be determined on an individual company basis by regulators and utilities since no objective method has been devised that can be applied universally to achieve acceptable results.*[5]

We consider the AER should adopt the IEEE standard's conclusion and identify catastrophic events on a case-by-case basis and should not rely on the premise that a consistent measurement approach is needed because the IEEE has already concluded that it is not possible to do so.

To support our application for the June Storms and 29 October 2021 to be deemed catastrophic events and therefore excluded from the calculation of the MED threshold value, we have provided additional information below.

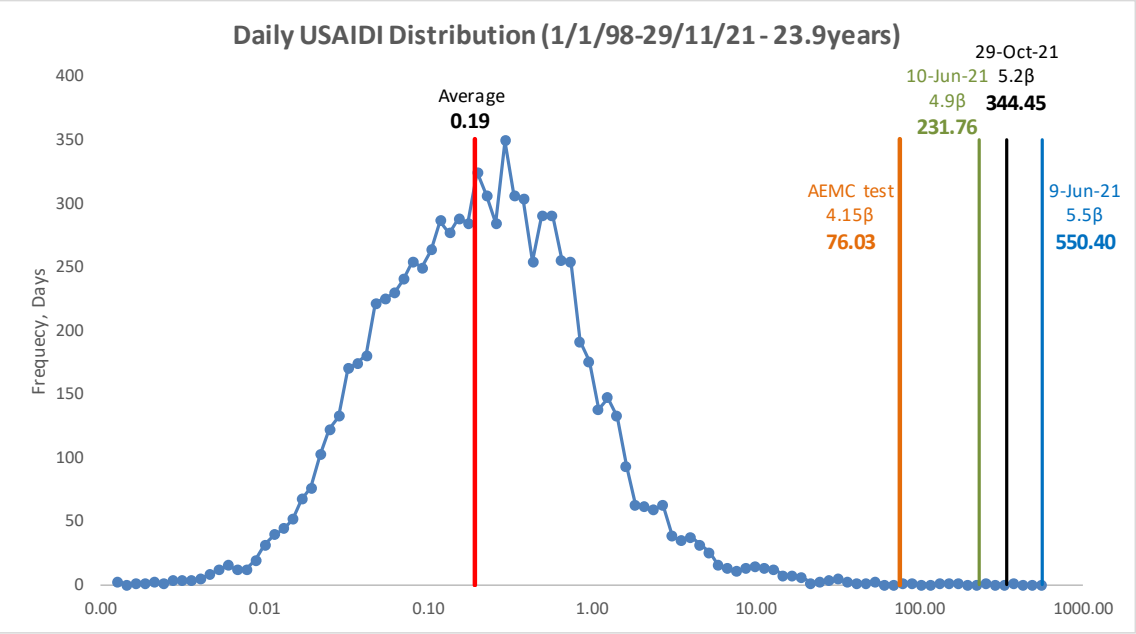
[4] AER 2018, Amendment to the Service Target Performance Incentive Scheme (STPIS), Establishing a new Distribution Reliability Measures Guideline (DRMG), Explanatory statement, Final decision, November, p. 22.
[5] IEEE 1366-2012, p. 20.

June Storms and 29 October 2021 are catastrophic events

The June Storms and 29 October 2021 should be deemed catastrophic events because they are clear outliers. The June Storms were almost five times bigger than the August 2020 Storms as measured by system minutes, and it impacted close to almost double the number of customers (~230,000).

While the IEEE standard does not specify a method for definitively identifying catastrophic days, the AEMC's final report on distribution reliability measures recommended that the 4.15 beta method described by the IEEE presentation[6] could be used to identify catastrophic events.[7] The AEMC said that the 4.15 beta method has proven to work in many instances.[8] The application of this test to the June Storms and 29 October 2021 results in these days being identified as catastrophic events because the 9 June 2021, 10 June 2021 and 29 October 2021 were 5.5, 4.9 and 5.2 betas respectively. That is, all days exceed the 4.15 standard deviation test in the AEMC report. Importantly, 5.5 beta, 4.9 beta and 5.2 beta are the three highest betas on record since we were privatised in 1995. Of the 8,734 days on record, we have only experienced 4 other days where the daily SAIDI is 4.15 or more standard deviations from the mean (see the figure below).

Figure 1: Daily USAIDI (1 Jan 1998 to 29 November 2021)



Source: AusNet

[6] IEEE presentation, Uses of the IEEE 1366 and catastrophic days, John McDaniel, Vice Chair - Distribution Reliability WG, April 2012.
[7] AEMC 2014, Review of Distribution Reliability Measures, Final report, 5 September, p. 28.
[8] AEMC 2014, Review of Distribution Reliability Measures, Final report, 5 September, p. 28.

Including the June Storms and 29 October 2021 results in a MED threshold that is too high

The IEEE standard states that the inclusion of catastrophic events in the calculation of reliability indices could cause a shift of the average of the data set and increase the standard deviation, and therefore cause a relatively minor upward shift in the resulting reliability metric trends.[9] This means the inclusion of catastrophic events could artificially increase our average SAIDI and standard deviation and therefore lead to a MED threshold that is artificially and inappropriately high. These characteristics are demonstrated by the metrics below.

The inclusion of the June Storms in our 2021-22 reliability indices results in:

- a shift in the average daily SAIDI from 0.721 to 1.158;
- an increase in the SAIDI standard deviation from 4.960 to 15.120; and
- a relatively minor upward shift in the resulting MED threshold value from 10.2588 to 10.9729.[10]

The inclusion of the June Storms and 29 October 2021 in our 2022-23 reliability indices may result in:

- a shift in the average daily SAIDI from 0.75 to 1.38;
- an increase in the SAIDI standard deviation from 4.7805 to 17.0696; and
- a relatively minor upward shift in the resulting MED threshold value from 10.0979 to 11.1621.[11]

The 2022-23 reliability indices above are forecast indices based on forecast SAIDIs from 30 November 2021 to 30 June 2022.

Why suspending the Scheme to exclude the June Storms and 29 October 2021 is appropriate

While the IEEE standard recognises that the exclusion of catastrophic events could result in too many MEDs being identified in the future, this is not a material concern for us. Specifically:

- If the June Storms are excluded from the 2021-22 MED threshold, this will shift the MED threshold marginally down, from 10.9729 to 10.2588. Importantly, this change results in 4[12] days out of the last 20 years falling within this range.
- If the June Storms and 29 October 2021 are excluded from the 2022-23 MED threshold, this will shift the MED threshold down, from 11.1621 to 10.0979. Importantly, this change results in just 9 days out of the last 20 years falling within this range.

By excluding the June Storms and 29 October 2021 from the calculation of MED thresholds, we are not expecting a significant increase of future MEDs. This means our proposed approach will continue to ensure the STPIS provides a strong incentive for us to improve our performance over time.

[9] IEEE 1366-2012, p. 19.
[10] These metrics reflect the 2016-17 to 2020-21 data (five years).
[11] These metrics reflect the 2017-18 to 2021-22 data (five years) where we have made assumptions about the 30 November 2021 to 30 June 2022 SAIDIs to generate the 2022-23 results.
[12] In our cost pass through application for the June Storms 2021, we incorrectly said 2 days out of the last 23 years. We have corrected for this error.