



EXPLANATORY STATEMENT

Draft Distribution Reliability Measures Guidelines

June 2017

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1 About this consultation

This explanatory statement represents our second consultation with stakeholders on the development of a Distribution Reliability Measures Guidelines (Guideline).

The purpose of the Guideline is to specify a set of common definitions of distribution reliability measures that can be used to assess and compare the reliability performance of distributors.¹ We are developing the Guideline in response to a new NER requirement (rule 6.28) following the recommendations made by the Australian Energy Market Commission (AEMC) to the Council of Australian Governments Energy Council.²

In developing the Guideline, we must have regard to the AEMC's recommendations and our service target performance incentive scheme (STPIS) because the STPIS has significant influence on distributors' performance outcomes.

Our proposed timelines are set out Section 1.2 below.

1.1 How to make a submission

Energy consumers and other interested parties are invited to make submissions on this Draft Guideline by 11 August 2017.

In each section below, we outline our reasoning to support or to depart from the AEMC's recommended definitions on distribution reliability measures. On these issues we seek and encourage you to address any matters of relevance.

We prefer that all submissions are in Microsoft Word or another text readable document format. Submissions on our Draft Guideline should be sent to: AERInquiry@aer.gov.au.

Alternatively, submissions can be sent to:

Mr Chris Pattas
General Manager
Australian Energy Regulator
GPO Box 520
Melbourne VIC 3001

We prefer that all submissions be publicly available to facilitate an informed and transparent consultative process. Submissions will be treated as public documents unless otherwise requested. Parties wishing to submit confidential information should:

1. clearly identify the information that is the subject of the confidentiality claim

¹ NER, rules 6.28(a).

² AEMC, *Review of Distribution Reliability Measures*, Final Report, 5 September 2014.

2. provide a non-confidential version of the submission in a form suitable for publication.

All non-confidential submissions will be placed on our website. For further information regarding our use and disclosure of information provided to us, see the ACCC/AER Information Policy (October 2008), which is available on our website.

1.2 Timelines

Table 1.1 Timeline for establishing a Distribution Reliability Measures Guidelines

Project steps for establishing the Guideline	Date
Draft Guideline with an Explanatory Statement	23 June 2017
Submissions on Draft Guideline close	11 August 2017
Final Guideline published with a Final Decision	October 2017

1.3 NER requirements

We must follow the distribution consultation procedures in clause 6.16 of the NER to consult with stakeholder prior to finalising the Guideline. This process requires us to publish a Draft Guideline and this accompanying explanatory statement to inform stakeholders of our reasons for the proposed Guideline.

The rules also require that we publish the final Guideline and an accompanying final decision within 80 business days of publishing a proposed Guideline.

We may extend the time within which it is required to publish our final decision if the consultation involves issues of unusual complexity or difficulty.

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Shortened forms

Shortened form	Extended form
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
distributor	distribution network service provider
MAIFI	momentary average interruption frequency index
NEL	national electricity law
MAIFle	momentary average interruption frequency index event
NER	national electricity rules
RIN	regulatory information notice
SAIDI	system average interruption duration index
SAIFI	system average interruption frequency index
STPIS	service target performance incentive scheme

2 Summary

We are required to publish, administer and maintain a Distribution Reliability Measures Guidelines in accordance with rule 6.28 of the National Electricity Rules (NER) with the purpose of prescribing a set of common definitions and parameters to assess and compare the reliability performance of distributors.

Accompanying the Draft Guideline is an explanatory statement outlining our reasons for implementing distribution reliability measures and seeks stakeholders' responses on adopting these measures.

In developing the Guideline, we must have regard to the AEMC's recommendations and our service target performance incentive scheme (STPIS). Relevantly, the STPIS has a significant influence on distributors' performance outcomes.

On 5 January 2017, we published an Issues Paper that outlined our intention to review the Service Target Performance Incentive Scheme (STPIS) and the establishment of this Guideline. The Issues Paper sought stakeholders' feedback on issues we have identified in implementing the STPIS since 2009 and outlined our position on creating uniform distribution reliability measures across all jurisdictions.

The SPTIS review is still being progressed. Position papers covering the STPIS matters will be published separately. As indicated in the Issues Paper, we will separately develop a Draft Guideline and revised STPIS, taking into consideration stakeholders' submissions to that process.

2.1 Developing a Distribution Reliability Measures Guidelines

In 2016 the AEMC reviewed the framework for measuring reliability performance and noted the inconsistencies in measuring reliability across the NEM, partly due to jurisdictional definitions. The AEMC's review resulted in a rule change that required us to publish this Guideline.

In accordance with the NER, we have developed a Draft Guideline and explanatory statement for consultation. This explanatory statement sets our reasons for:

- developing this Guideline
- the issues we identified with several reliability measures and stakeholders' comments
- supporting the AEMC's recommendation on most of its proposed distribution reliability measures definitions
- departing from the AEMC's recommendation for an additional exclusion for catastrophic events (which would be in addition to the current statistical Major Event Days exclusion framework).

The explanatory statement also outlines the process for the staged implementation of the Guideline.

2.2 Our issues paper on STPIS and the Guideline

Our issues paper sought inputs from stakeholders on the measurement of key reliability measures including:

- Changes to how SAIDI, SAIFI, MAIFI and MAIFLe are measured under the proposed 3-minute threshold definition for momentary interruptions.
- The criteria for excluding certain events from the calculation SAIDI, MAIFI, SAIFI and MAIFLe. For example, outages caused by the transmission network are usually not included in reliability measures SAIDI, SAIFI etc because they are beyond the control of distributors. However, distributors should be held accountable for supply interruptions due to their actions or inactions that do not conform to good industry practices.
- The classification of feeders.
- How to identify customers with reliability levels that are severely below the national average—the worst served customers.

We have reviewed stakeholders' responses to this issues paper and our considerations are outlined in the following chapters.

2.3 Structure of this explanatory statement

The remainder of the explanatory statement is structured as follows:

- Chapter 3: Outline an overview of the key distribution measures.
- Chapter 4: Explain our decision on the proposed reliability measurement methods and approaches.
- Chapter 5: Explain how we will administer and implement the new Guideline.

3 Overview of key distribution reliability measures

The reliability of power supply to customers is measured in terms of its unavailability (number and duration of interruptions) rather than when it is available, because power supply is mostly reliable and available more than 99 per cent of the time.

Interruptions are classified as either a momentary interruption (short-duration) or sustained interruptions (long-duration).

The brief loss of electricity supply, momentary interruption, to a customer is the result of reclosing circuit breakers, or reclosers, attempting to clear non-permanent faults—by first opening and then reclosing after a short time delay. Alternatively, sustained interruptions are much longer in duration and require distributor's intervention for restoration.

Sustained interruptions are typically caused by faults such as lightning damages, trees striking powerlines and equipment failures. The impact of a sustained interruption on customers is usually significantly greater than that of a momentary interruption because of the much longer duration.

We currently measure the impact of customers' supply outages (both sustained and momentary) using traditional distribution reliability measures known as SAIDI, SAIFI and MAIFI and MAIFIE:

- SAIDI (System Average Interruption Duration Index): Represents the sum of the duration of each unplanned sustained customer interruption (in minutes) divided by the total number of distribution customers. SAIDI measures are grouped into planned and unplanned outages, both exclude momentary interruptions.
- SAIFI (System Average Interruption Frequency Index): Represents the total number of unplanned sustained customer interruptions divided by the total number of distribution customers. SAIFI measures are grouped into planned and unplanned outages, both exclude momentary interruptions.
- MAIFI (Momentary Average Interruption Frequency Index): Represents the total number of customer interruptions of momentary nature, divided by the total number of distribution customers.
- MAIFIE (Momentary Average Interruption Frequency Index event): means the total number of Momentary Interruption Events divided by the total number of customers.
- Momentary Interruption Event: means each event during which a distributor makes single or multiple attempts to restore supply through the use of an auto-recloser. While there may be more than one restoration attempt during the event, the MAIFIE is counted as one event.

These outage measures are further grouped by feeder categories (feeder classification) at the CBD, Urban, Short and Long Rural segments. However, outages that are caused by the following events are not included for the purposes of measuring the underlying reliability outcomes:

- beyond the control of the distributors
- extreme in nature, such as unusually large storms.

To harmonise with international reliability standards, the AEMC recommended minor amendment to these measures and to include an additional measure to identify customers experiencing reliability levels severely below the national average. Broadly, the AEMC's recommendation included:³

- Changing the definition of a momentary interruption and a momentary interruption event from less than one minute to less than three minutes in duration. That is, the threshold to determine a momentary interruption should be three minutes.
- The use of MAIFI and MAIFle as reliability measures for benchmarking and economic incentive schemes.
- Broadening definition exclusions to include load interruption caused by the exercise of regulatory or legal obligation and load interruptions directed by emergency services.
- The removal of "catastrophic event days" from distributors' annual daily performance data set before setting the Major Event Day (MED) threshold values—that is increasing the level of extreme event exclusions in a year when a catastrophic event occurs.
- Broadening the definition of CBD and Urban feeders to allow for more intuitive feeder classifications.
- Adding a reliability measure to identify customers with unsatisfactory reliability outcomes.
- Removing unmetered supply from the definition of distribution customer.

Overview of stakeholders' comments

Submissions from thirteen distributors supported the AEMC's definitions on key distribution reliability measures. Some distributors submissions commented that they could not provide MAIFle data without additional infrastructure or significant investment⁴, and the AER must take this into consideration when requiring DNSPs to apply the MAIFle measurement.

³ AEMC, *Review of Distribution Reliability Measures*, Final Report, 5 September 2014, pp. i–v and 17–18.

⁴ ENA, *Service Target Performance Incentive Scheme and Distribution Reliability Measures Guidelines*, 1 March 2017, pp. 7–8; Ausgrid, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 23 February 2017, p. 7; SA PowerNetworks, *Issues*

The submission from S&C Electric Company stated that there are additional costs incurred to industrial and commercial customers for durations of 3 minutes compared to 1 minute and these should not become a hidden cost. It also stated that increasing the momentary interruption to 3 minutes would affect SAIFI performance, reducing the incentive for distributors to improve reliability.⁵

Overview of our positions

We support the AEMC's position on nearly all key distribution reliability measures, except for the further exclusion of catastrophic events from setting the MED threshold. This explanatory statement sets out our consideration on the AEMC's proposed changes to key distribution reliability measures, after reviewing and considering stakeholders' feedbacks.

Paper – Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines, 24 February 2017, p. 9.

⁵ S&C Electric Company, *Submission to the Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines, 24 February 2017, p. 4.*

4 Our consideration and decision on key performance measures

4.1 Changing the definition of a momentary interruption

We support the change to the threshold of momentary interruption and momentary interruption event from less than 1 minute to less than 3 minutes. We believe this change will encourage investment in automation facilities to restore supply more quickly after a network fault.⁶

In recommending a shift to a 3 minutes threshold for sustained outage duration, the AEMC reviewed international best practice. They found that the Institute of Electrical and Electronic Engineers (US) had moved to 5 minutes, and Europe and the UK to three minutes. The basis of the change was to provide incentive to distributors to invest in feeder automation.⁷

The submissions from nine distributors⁸ and from Energy Networks Australia (ENA) in response to our issues paper all supported the change to a 3 minutes momentary interruption.

That said, we recognise that in applying the AEMC's recommended changes to key distribution reliability measures there is a need to address the following issues:

- The potential negative effects on large customers of moving to a 3 minutes definition of a momentary interruption as outlined by the S&C Electric Company's submission.
- The inability of some DNSPs to report MAIFle data—some distributors were concerned that they are unable to report this data because their current systems does not collect this information.
- Potential concerns relating to notification of planned outages sent to customers on life support equipment.

4.1.1 Effects of 3 minutes MAIFI threshold change on industrial and commercial customers

The S&C Electric Company submission stated that there may be additional costs incurred by industrial and commercial customers in moving to 3 minutes and these should not become a hidden cost. It also submitted that increasing the momentary

⁶ AEMC, *Review of Distribution Reliability Measures*, Final Report, 5 September 2014, p. ii.

⁷ AEMC, *Review of Distribution Reliability Measures*, Final Report, 5 September 2014, p. 13.

⁸ The nine distributor submissions were from Ausgrid, Citipower, Powercor, Endeavour Energy, Energex, Ergon, Essential Energy, Jemena, SA Power Network and United Energy.

interruption to 3 minutes would affect SAIFI performance, reducing the incentive for distributors to improve reliability.⁹

We consider the effect of this change is unlikely to be significant for commercial or industrial customers. The purpose for this change is to provide additional incentives to restore supply quickly, where the benefit outweighs the cost. More precisely, the additional incentive is to convert some of the longer sustained unplanned outages into short-term momentary outages.

This approach should benefit all customers, including industrial and commercial customers. This change in the measurement method should not be interpreted as meaning that those supply outages currently can be restored within one minute will be purposely delayed by two more minutes before the distributor will restore power supply.

More importantly, as identified in the AEMC Final Report, it is not economically feasible or even possible to eliminate all sustained interruptions. All network users need to take their own necessary precautions against unplanned supply interruptions.¹⁰

In setting up future STPIS performance targets, we consider that all pre-existing sub-three-minute interruptions must be removed from the historical data set to ensure that distributors do not receive a windfall gain from this change. This is the standard performance target setting method and should address the concerns expressed by S&C Electric Company.

4.1.2 The use of MAIFI and MAIFle

We support the AEMC's recommendation to use MAIFle as the preferable measure for reporting purposes and in our STPIS. This said, we recognise that some DNSPs cannot provide MAIFle data without significant investment to capture this data.¹¹

Consequently, we consider that MAIFle be applied where DNSPs have the capability to capture this data. Alternatively, MAIFI will be applied where DNSPs are unable to capture MAIFle data.

⁹ S&C Electric Company, *Submission to the Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, 24 February 2017, p. 4.

¹⁰ AEMC, *Review of Distribution Reliability Measures, Final Report*, 5 September 2014, p.14.

¹¹ ENA, *Service Target Performance Incentive Scheme and Distribution Reliability Measures Guidelines*, 1 March 2017, p. 8; Essential Energy, *Submission on the issues paper for Reviewing the Service Target Performance Incentive Scheme and Establishing New Distribution Reliability Measures Guidelines*, February 2017, p. 3; Ausgrid, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, 23 February 2017, p. 2; SA PowerNetworks, *Issues Paper – Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 8.

4.1.3 Notification under National Energy Retail Rules for life support customers

Under clause 90 of the NERR, distributors must provide a minimum of 4 business days notice for all planned interruptions of any duration, including momentary interruptions.

We consider the change to 3 minutes for unplanned interruptions may be misinterpreted as applying to planned interruptions. The change to 3 minutes only applies to unplanned outages.

We consider that adopting the 3 minutes definition will not affect customers on life support equipment. Rather, changing the definition has the potential to improve supply restoration time for unplanned outages to some of these customers because of the additional financial incentive.

More precisely, the additional incentive is to convert some of the longer sustained unplanned outages into short-term momentary outages.

In its Final Report, the AEMC concluded that:¹²

As shown in our State of the Energy Market 2015 report,¹³ currently, urban customers (including those on life support equipment) experience about two unplanned interruptions a year, the average duration of these unplanned outages is about 100 minutes. The frequency and duration of unplanned outages are longer in rural areas. While the current rules cannot protect customers on life support equipment against unplanned outages, there are existing rules that require distributors to provide at least 4 days warning to these customers ahead of any planned outages.

While the recommended change is likely to reduce the number of sustained interruptions, it is important to acknowledge that it is not economically feasible or even possible to eliminate sustained interruptions. This needs to be taken into account when determining the level of backup provided by life support equipment. As stated above, the change to three minutes only applies to unplanned outages. We therefore urge distributors to be aware of their obligation under the NERR. Additionally, to avoid any misconception of the matter, we will be writing to all distributors to remind them their obligations under NERR.

4.2 Broadening exclusion conditions

This section discusses the treatment of exclusions and major event days when calculating distribution reliability measures.

¹² AEMC, *Review of Distribution Reliability Measures*, Final Report, 5 September 2014, p. 14.

¹³ AER, *State of Energy Market 2015*, pp. 83–84. The average SAIDI is 200 minutes; the majority of SAIFI is about two interruptions per year. The average supply restoration (CAIDI=SAIDI/SAIFI=100 minutes).

Our STPIS allow the removal of some types of interruptions from the set of reliability data being considered when calculating distribution reliability measures for SAIDI, SAIFI, MAIFI and MAIFLe. These interruptions are removed because they are either beyond the control of the distributors (exclusions) or are not representative of a normal day in terms of reasonable network resource availability, the Major Even Day (MED).¹⁴

4.2.1 Exclusions

We support the AEMC's recommendation on two additional exclusions for:

- Load interruptions caused by the exercise of any obligation, right or discretion imposed upon or provided for under jurisdictional electricity legislation and national electricity legislation applying to a Distribution Network Service Provider.
- Load interruptions caused or extended by a direction from state or federal emergency services, provided that a fault in, or the operation of, the network did not cause, in whole or part, the event giving rise to the direction.¹⁵

4.2.2 Treatment of major event days

Under our STPIS, distributors exclude interruptions resulting from major events from their reliability statistics because storms and other major events are uncommon and random so including them can lead to a distorted perception of the distributor's underlying reliability performance. By normalising the reliability data (i.e. removing interruptions related to major events), we can review data that more closely represents typical service conditions.

The methodology used, in our STPIS and the AEMC's recommendation, to identify major events days is outlined in Institute for Electrical and Electronic Engineers (IEEE) 1366 and called the 2.5 beta method. The main steps for identifying a major event day under Standard 1366 are shown in attachment A.

Prior to applying the 2.5 beta method, the AEMC also suggested that we consider the need to remove interruptions caused by catastrophic events from reliability measures. The AEMC's recommendations included a definition of catastrophic events and a method to identify catastrophic events interruptions.¹⁶

We do not support this proposition because of the following reasons.

¹⁴ Major event days are typically caused by severe weather conditions.

¹⁵ AEMC, *Review of Distribution Reliability Measures*, Final Report, 5 September 2014, p. 22.

¹⁶ AEMC, *Review of Distribution Reliability Measures*, Final Report, 5 September 2014, pp. 28–31.

4.2.3 Catastrophic events

The AEMC recommended we consider allowing catastrophic events to be excluded from the statistical method used to calculate the thresholds for MED. Distributors' submissions supported this approach.

We do not support this proposition because:

- There is no current objective or definitive method to identify catastrophic events as outlined by the AEMC.
- There are material differences between network characteristics in Australia, ranging from localised urban network such as CitiPower, to physically diverse and geographically large networks such as SA Power Networks and Ergon Energy, so any definition of catastrophic events and their measurement methods are not likely to be uniform across all distributors.
- Despite the majority of stakeholder submissions supporting exclusion of catastrophic days, there was no clear agreement amongst stakeholders on how to define catastrophic days.
- Submissions from some distributors supported using the 4.15 beta method identify catastrophic events. We consider that 4.15 beta (or 4.15 standard deviations from the mean) represents a probability of 0.000167, or a less than 1 in 163 years event. Hence, further exclusion of such extremely rare events should not have material impact on the MED threshold calculations.
- Any event likely to be identified as a 'catastrophic event' will coincide with the current 2.5 beta threshold for MED, so a 4.15 beta catastrophic day event need not be separately identified and excluded from reliability measures. As such, these events are already recognised as advocated by the submission from S&C Electric Company.¹⁷

The Submission from the Minister for Energy, Environment and Climate change of Victoria supported our position stating that:

As outlined above, it is appropriate to preserve the tension between the incentives provided by the f-factor and STPIS. This tension reflects the operational challenge of maintaining the correct balance between supply reliability and community safety on days of heightened bushfire risk. For that reason, the AER's intent not to modify the current exclusion methods by adding "catastrophic events" is supported.¹⁸

¹⁷ S&C Electric Company, *Submission to the Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, 24 February 2017, p. 4.

¹⁸ Victorian Government, *Submission to the AER's review of the service target performance incentive scheme*, 5 May 2017, p. 2.

4.2.4 Outage of transmission connection assets due to the actions of a distributor

The Issues Paper, identified an issue regarding supply outages due to a failure of transmission connection assets. We considered that the current exclusion criterion for "load interruptions caused by a failure of transmission connection assets except where the interruptions were due to inadequate planning of transmission connections and the distributor is responsible for transmission connection planning except where the interruptions were due to inadequate planning of transmission connections and the distributor is responsible for transmission connection planning" needed further clarification.

We consider distributors' control over the correct operation of the transmission connection assets extend beyond the planning input. For example, we are aware of an incident that a distributor failed to take the well-established network operation procedures, which resulted in triggering a protection relay operation to shut down a transmission connection transformer and a number of high voltage feeders. Hence, we proposed to add a further test to ensure that the primary cause of outages was due to any act or omission by the distributor in the issues paper.

Submissions from ENA, distributors and S& C Electric Company, generally supported the principle that DNSPs should not be permitted to exclude a transmission outage event if the event is caused by the action, or inaction of that DNSP. That said, they considered that a clear approach to defining the "primary cause" should be established else it could create lengthy dispute resolution processes.¹⁹

We do not agree with the ENA's submission regarding the need for a prescriptive definition on what is the primary cause of the outage. We consider that both the distributor and the auditor reviewing distributor's annual regulatory information notice (RIN) responses are more than capable of distinguishing the differences between:

¹⁹ ENA, *Service Target Performance Incentive Scheme and Distribution Reliability Measures Guidelines*, 1 March 2017, p. 10; Ausgrid, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 23 February 2017, p. 9; CitiPower and Powercor, *Issues Paper Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 10; Essential Energy, *Submission on the issues paper for Reviewing the Service Target Performance Incentive Scheme and Establishing New Distribution Reliability Measures Guidelines*, February 2017, p. 3; Endeavour Energy, *AER Issues Paper - Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, January 2017, p. 3; Energex, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, February 2017, p. 7; Ergon Energy, *Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 6; Jemena Electricity Networks, *Submission on AER Issues Paper Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 8; S&C Electric Company, *Submission to the Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, 24 February 2017, p. 6.

- Whether a distributor have adequately planned for the necessary power transfer capacity of transmission connection assets under the existing exclusion criterion, and
- The new criterion—whether a transmission connection asset's outage was due to inappropriate actions or inactions of the distributor that are inconsistent with good industry practice.

4.3 Broadening the definition of CBD and Urban feeders

When measuring distribution reliability, it is common to distinguish between different parts of a distribution network by classifying the feeders. The AER and most jurisdictions currently classify feeders as CBD, urban, short rural and long rural feeders.

The AEMC Final report identified a number of issues with the current feeder classification and recommended two incremental changes:

- Amending the current definition of urban feeder to give the option to use a temperature adjusted historical maximum demand to reduce variations due to the weather in a given year.
- Amending the definition of CBD feeder to include one or more geographic areas that are determined by the relevant jurisdiction.²⁰

We support the AEMC's proposed amendment for CBD feeders. We have historically applied the relevant jurisdictional feeder definitions when applying STPIS such as in Tasmania. For Tasmania, the jurisdictional regulator classifies feeders into critical infrastructure, high density commercial, urban, high density rural and low density rural categories.

For urban feeders, our approach in applying this definition in STPIS is almost similar to the AEMC's definition but with a fixed annual threshold value for the actual maximum demand over the reporting period per total feeder route length greater than 0.3 MVA/km.

We also agree that, for maintaining consistency purposes, urban and rural feeders' classification should be based on a longer term average demand level, rather than based on one year's variation. Hence, we propose that the feeder classification should be based on a 3-year average maximum demand level.

In response to our issues papers stakeholders raised several issues for our considerations. Our responses are:

- The submission from CitiPower and Powercor considered that the determination of the CBD area should be made by the relevant distributor

²⁰ AEMC, *Review of Distribution Reliability Measures, Final Report*, 5 September 2014, p.35.

rather than jurisdictional regulators.²¹ We currently classify feeders supplying the CBD of the capital cities of each jurisdiction under the CBD category. The only exception is in Tasmania, where feeder classifications are specified by the jurisdictional regulator. We consider jurisdictional regulators are the appropriate bodies to specify which areas should have higher reliability standards rather than the distributors.

- We note the ENA's submission regarding how the grouping of feeders may affect the incentive but consider jurisdictional regulators are the appropriate bodies to specify which areas should have higher reliability standards rather than the distributors.²²
- The submission from SA Power Networks stated that feeders located in Metropolitan Areas that are classified as Short Rural (due to their maximum demand), should be classified as Urban due to their characteristics.²³ We cannot accept this proposal because feeder classifications are based on energy density, rather than location and the level of interconnectivity.
- The submission from Ausgrid considered distributors should have the flexibility to manually allocate a particular feeder to a classification with agreement from the AER.²⁴ We do not agree because the purpose of having common definitions is to provide distributors regulatory certainty, provide consistency for reporting purposes and to limit gaming.

4.4 Whether unmetered supply should be included for measuring reliability indicators

Unmetered electricity supplies include a large number of typically small connections including street lighting, traffic lights, telephone box illumination, illuminated street and advertising signs, tram/bus shelter lights, ice warning lamps, security lights noise monitoring station, electronic parking meter, ticket dispensing machine, microcells for cellular phone networks, sprinkler control systems, cathode protection units, flow monitoring equipment, telemetry stations, traffic counter stations, weather stations, and cable amplifiers.

While some of these are quite small, the potential impact of an outage can be important – particularly in the case of traffic lights, security lights and safety warning systems.

²¹ CitiPower and Powercor, *Issues Paper Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p.7.

²² ENA, *Service Target Performance Incentive Scheme and Distribution Reliability Measures Guidelines*, 1 March 2017, p. 10.

²³ SA PowerNetworks, *Issues Paper – Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 10

²⁴ Ausgrid, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 23 February 2017, p. 4.

Our national STPIS, with the exception of public lighting, currently allow distributors the option of whether to include unmetered loads in calculating the SAIFI, SAIDI and MAIFI performance measures. Currently, public lighting is excluded from STPIS performance reporting.²⁵

The AEMC recommended that the definition of distribution customer exclude all unmetered connection supply points, so unmetered supply points are not considered in the calculation of performance measures, as this would be simpler to apply. They note that reliability incentive schemes do not generally target unmetered supplies, as the reliability of unmetered supplies, such as public lighting, are generally considered separately.²⁶

We support the AEMCs' definition for distribution customer because it is consistent with our STPIS. That said, our issues paper sought stakeholders' comments on whether unmetered supply should be included as a reliability measure.

Our issues paper sought submissions from stakeholders on whether unmetered supply should be included in the performance measure. Except for Endeavour Energy, distributors expressed support to exclude unmetered supply in performance measures because the costs outweighing the benefits.²⁷

Endeavour Energy submitted that unmetered supplies should be included and that it included unmetered supplies when they have a National Metering Identifier, but it provided no reasons indicating why unmetered supplies should be included.²⁸

We received submissions from several NSW councils that supported unmetered supplies being included in performance measures. The focus of their submissions was on street lighting and public lighting, and they submitted that such lighting is excluded from a variety of performance measures, including STPIS. They also outlined that

²⁵ AER, *Electricity distribution network service providers Service target performance incentive scheme*, November 2009, p. 23.

²⁶ AEMC, *Review of Distribution Reliability Measures, Final Report*, 5 September 2014, p.18.

²⁷ Energex, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, February 2017, p. 9; Essential Energy, *submission on the issues paper for Reviewing the Service Target Performance Incentive Scheme and Establishing New Distribution Reliability Measures Guidelines*, February 2017, p. 5; Ausgrid, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 23 February 2017, p. 7; ENA, *Service Target Performance Incentive Scheme and Distribution Reliability Measures Guidelines*, 1 March 2017, p. 13; Ergon Energy, *Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 9; Jemena Electricity Networks, *Submission on AER Issues Paper Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 2; SA PowerNetworks, *Issues Paper – Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 12; CitiPower and Powercor, *Issues Paper Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 8.

²⁸ Endeavour Energy, *AER Issues Paper - Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, January 2017, p. 2.

street lighting outages can last for long periods of time and street lighting is held to a substantially lower reliability standard than for all other classes of customers.²⁹

We accept the importance of maintaining high reliability standards for street lighting, but do not consider including unmetered supplies in the definition of distribution customers will effectively contribute to this goal. This conclusion is based on:

- The council's concerns about very long duration lighting outages are understandable, but it is very unlikely that long outages will be due to electricity supply issues. Unless the lighting was supplied by part of the network without any metered customers, any long outage will be identified, captured in performance reliability measures and addressed by the relevant distributor. Very long street light outages appear more likely to be the result of maintenance issues than power supply outages, so this issue is out of scope for the development of the Guideline.
- The service standard for public lighting a matter that is likely to be resolved by changes to the NSW public lightning code. We understand that the NSW government is currently reviewing its public lighting code to address the councils' concerns.
- The reliability performance of metered load should also reflect the reliability performance provided to unmetered loads.
- Including unmetered load in the overall performance reporting does not provide further clarity on street lighting service outcomes.
- Similarly, the quantity of unmetered connections other than street lights are not significant compared with metered connections. Including such loads in the overall performance reporting may not provide further clarity on the service level to such loads.

4.5 Improving consistency of measurement methods

In the Issues Paper, we identified that capturing and reporting of electrical interruption data varied across the NEM to reflect the systems and processes of the different distributors.³⁰

In order to improve the level of consistency in reporting performance, we proposed the following additional reporting approaches—in addition to the current reporting

²⁹ Central NSW Councils submission, 10 March 2017; SSROC, *Submission on Service Target Performance Incentive Scheme (STPIS) Review & Distribution Reliability Measures Guidelines*, 23 February 2017; Western Sydney Regional Organisation of Councils, *email to AER Submission on Service Target Performance Incentive Scheme (STPIS) Review & Distribution Reliability Measures Guidelines*, 10 March 2017; Local Government NSW, *AER review of Service Target Performance Incentive Scheme*, 22 March 2017.

³⁰ AER, *Issues paper Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, January 2017, p.29.

specifications—to provide greater clarity on the capture and reporting of specific events.³¹

- National Metering Identifiers—clarifying which NMI status codes should be reported (e.g. active, not energised, extinct, greenfield).
- Single premises outages—Standardising on the reporting of single premises interruptions as a network interruption unless the customer's fault is actively identified.
- For partial network failure, where more accurate (i.e. smart meter) information is absent:
- HV single phase outage—Standardising on the reporting of 67 per cent of all downstream customers for a single-phase HV outage on a three phase network.³² Reporting of 100 per cent of customers for all other HV outages, for example; when there is a single HV phase outage on a two phases or single phase HV system.
- LV single phase outage—Standardising on the reporting of 33 per cent of all downstream customers for a single phase outage.

The submissions from distributors generally supported the standardisation of measurement methods to provide more clarity for reporting purposes.³³ To accommodate this change, some distributors submitted that there may be additional costs in upgrading their outage management system to capture the revised data.

We do not consider the costs of transitioning to these standard recording methods significant. Furthermore, we consider this is a cost effective way to record outages where accurate individual customer's supply information is not available.

4.6 Supply outages due to malfunction of energy meters

Due to practicality considerations, energy meters are not place at the point of supply. Distributors' points of supply to customers are:

- For overhead services, at the junction boxes at the eaves.
- For underground services, at the service pit just outside the front fence.

The energy meters are installed inside the metering cubicles located between the point of supply and the customers' main switch boards. Hence, technically speaking, supply

³¹ AER, *Issues paper Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, January 2017, p. 30.

³² A single phase outage on a typical three phase system will result in low-voltage being supplied across two of the three low voltage phases.

³³ Endeavour Energy, *AER Issues Paper - Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guidelines*, January 2017, p. 4.

losses to a customer's installation due to malfunction of energy meters are not supply outages, because there still is power available at the point of supply.

We sought advice from distributors on whether they currently report supply outages due to malfunction of standard energy meters they provide to typical customers.³⁴ The responses were mixed because some distributors did not classify meter malfunctions as outages. In December 2017, meter services will become contestable thereby further complicating the reporting of these malfunctions because the responsible owner may not be known.

Consequently, for consistency purposes and in consideration that there will be third party meters in the future, supply outages due to meter malfunctions should be excluded from the definition of "outage" in the Guideline. Hence, we propose to define supply interruption should be measured at the point of supply.

4.7 Adding a reliability measure to identify customers with unsatisfactory reliability levels outcomes

The current incentives in our STPIS are based on the average performance results of each feeder type of the entire network. This measurement method may lead to more focus on reliability supply restoration in the more populated areas. This is because the repair of a network fault in higher customer density areas will result in supply restoration to more customers than that for a similar fault in much less populated areas. As a result, supply improvement efforts and supply restoration time to remote areas may suffer.

In terms of network connectivity, remote areas are generally located on the end of long feeders and on remote parts of the networks. Typically, only limited alternatives are available to provide supplies when faults occur and supply issues are further compounded by the higher number of faults that occur because of the long feeder lengths.

The current reliability measures do not identify customers that have unsatisfactory reliability levels. The AEMC's termed these customers "Worst Served Customers". Hence, consistent with the AEMC's recommendation we consider greater emphasis is needed to monitor and report on outages faced by these customers.

The purpose of such monitoring is to identify whether the service level to the "worst served customers" is improving, deteriorating, or steady over time. The question is how to define "worst served customers". The AEMC Final Report noted that:³⁵

- The interruptions experienced by customers are somewhat random in nature. This is because the root cause of some interruptions, like lightning, bushfires and faults caused by animals, occur randomly. Consequently, it

³⁴ Types 5 and 6 meters under chapter 7 of the NER.

³⁵ AEMC, *Review of Distribution Reliability Measures, Final Report*, 5 September 2014, p.42.

is possible that the customers that experience the lowest reliability in one year may not have such low reliability in the next year.

- Therefore, the process to identify the customers receiving the lowest reliability service needs to consider whether the low reliability is due to an unfortunate set of outcomes in a given year, or whether there is a systemic issue with the reliability experienced by certain customers. This can be achieved by considering customers that have low reliability for several consecutive years, or by applying a moving average over several years to the customers' annual reliability.

In terms of performance measurement methods, the AEMC Final Report suggested two methods:³⁶

- identify the actual customers with lowest reliability; and
- apply network wide measures of lowest reliability outcomes.

The submission from Essential Energy proposed its current method to determine these customers. It stated that it applies fixed feeder category SAIFI thresholds at the feeder segment level to capture customers experiencing the worst 1 per cent of network reliability under the STPIS. We consider this method not appropriate because excluded major event days will be captured by this methodology as it uses SAIDI rather than SAIFI to identify these events.

Distributors' submissions and the ENA submission considered that the definition of worst served should have regard to the current minimum service standards prescribed in the relevant jurisdiction.³⁷

We consider that the jurisdictional minimum service level standards are the minimum average standard to be achieved. Such levels may not necessarily reflect the severity of the reliability faced by these customers as the level of reliability may fall below the minimum standard.

Given the differences between network characteristics in Australia, ranging from localised urban network such as CitiPower, to physically diverse and geographically large networks such as SA Power Networks and Ergon Energy, there cannot be a single threshold SAIDI and SAIFI criterion that can identify who is “worst served”.

Consequently, we consider the method to identify these customers should be based on a network and locational wide approach. Thus we propose to define “worst served customers” as, customers who suffer from a disproportionate number of faults,

³⁶ AEMC, *Review of Distribution Reliability Measures, Final Report*, 5 September 2014, p.42.

³⁷ ENA, *Service Target Performance Incentive Scheme and Distribution Reliability Measures Guidelines*, 1 March 2017, pp. 11–12; Essential Energy, *submission on the issues paper for Reviewing the Service Target Performance Incentive Scheme and Establishing New Distribution Reliability Measures Guidelines*, February 2017, p. 4–5; Ausgrid, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 23 February 2017, p. 6; SA PowerNetworks, *Issues Paper – Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 24 February 2017, p. 11.

compared with the network average customer, as greater than four times of the Network average for unplanned SAIDI on a three-year rolling average basis. We consider that this threshold level should capture approximately 10 per cent of all customers. These customers experience the most unsatisfactory reliability levels.

This definition accounts for Ausgrid's submission that it should account for reliability outcomes that may vary from year to year.³⁸

We consider this definition is likely to identify the actual feeders (or feeder sections) that supply the customers with the lowest reliability. Our definition has been informed by our analysis of DNSPs' historical aggregated reliability data.

In order to monitor the outages of these customers, we propose that distributors report:

- the average SAIDI of the worst-served customers
- the average SAIFI of the worst-served customers
- the top five feeders with the most worst-served customers
- the number of worst-served customers of the above five feeders.

³⁸ Ausgrid, *Issues paper: Reviewing the Service Target Performance Incentive Scheme and Establishing a new Distribution Reliability Measures Guideline*, 23 February 2017, p. 6

5 Implementation and reporting

The Guideline is the means to implement reporting standardisation. However, to operationalize the Guideline, we need to modify our Regulatory Information Notice instructions for each distributor for reporting purposes.

Hence, the earliest stage that we may implement and apply these distribution reliability measures is when we issue the new RINs for the next regulatory control period for individual distributors. This is also subject to adequate record management systems being available at that time in order for us to collect this data.

That said, the existing reporting requirement will remain in place until such time. We will also continue to collect the following information on the key performance indicators for STPIS; SAIDI; SAIFI; MAIFI.

A.1 IEEE 1366 2.5 beta method

The main steps for identifying an major event day under Standard 1366 are the following:

- A major event day is a day in which daily SAIDI exceeds a threshold value TMED
- In calculating daily SAIDI, interruption durations that extend into subsequent days are assigned to the day on which the interruption begins. This technique ties the customer minutes of interruption to the instigating events.
- The major event day identification threshold value TMED is calculated at the end of each reporting period for use during the next reporting period. For utilities that have six years of reliability data, the first five are used to determine TMED and that threshold is applied during the sixth year.
- The methodology for calculating TMED is as follows:
 - Values of daily SAIDI for a number of sequential years, ending on the last day of the last complete reporting period, are collected.
 - If any day in the data set has a value of zero for SAIDI, those SAIDI data are excluded from the analysis.
 - The natural logarithm of each daily SAIDI value in the data set is calculated.
 - The average of the logarithms, α , of the data set is calculated.
 - The standard deviation of the logarithms, β , of the data set is calculated.
 - The major event day threshold, TMED, is calculated by using the equation (this value should in theory give an average of 2.3 major event days per year)
 - Any day with daily SAIDI greater than the threshold value TMED is designated a major event day, and data for this day is removed from SAIFI and SAIDI performance to provide a “normalized” measure of performance.