16 July 2014

Mr John Pierce
Chairman
Australian Energy Market Commission
PO Box A2449
SYDNEY SOUTH NSW 1235

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positive energy

Dear Mr Pierce

Draft Report: Distribution Reliability Measures (EPR0041)

Energex Limited (Energex) appreciates the opportunity to provide a submission on the Australian Energy Market Commission's (AEMC's) draft report on distribution reliability measures (draft report). The draft report seeks comments on common definitions for distribution reliability targets and outcomes across the National Electricity Market (NEM).

Energex supports the AEMC's objective of establishing a consistent set of measures for reliability performance in electricity distribution networks and provides responses to the questions raised by the AEMC in the draft report in **Attachment 1**. In particular, Energex would like to emphasise the following key points:

- Energex not only supports the AEMC's proposal to implement national definitions for distribution reliability measures in a non-binding guideline to be drafted, published and maintained by the Australian Energy Regulator but also the consistent application of those definitions across regulatory instruments. Therefore, amendments may also be required to the National Energy Retail Rules and other relevant rules, laws and guidelines to ensure consistency.

- While transparency in reporting the total performance outcome experienced by customers is supported, Energex considers it is only valid to compare performance after removal of exclusions and major event days for benchmarking purposes.

- Energex recommends retaining the current approach to identifying low reliability performance by feeder. Although the underlying objective for identifying low reliability performance at an individual customer level is appreciated, this approach will be difficult and potentially costly to apply in practice.

Energex has also contributed to the Energy Networks Association's (ENA's) submission and is supportive of the views contained therein.

Enquiries
Rachel Leaver
Telephone
(07) 3664 4115
Facsimile
(07) 3664 9818
Email
rachelleaver
@energex.com.au

Corporate Office
26 Reddacliff Street
Newstead Qld 4006
GPO Box 1461
Brisbane Qld 4001
Telephone (07) 3664 4000
Facsimile (07) 3025 8301
www.energex.com.au

Energex Limited
ABN 40 078 849 055

Should you have any queries regarding this submission, please contact Rachel Leaver, Network Regulation Manager, on (07) 3664 4115.

Yours sincerely

Neil Andersen
Group Manager Regulation and Pricing

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ATTACHMENT 1

Issues for Consultation	Energex Response
Proposed definitions for distribution reliability measures for sustained interruptions **SAIDI** or **System Average Interruption Duration Index** in respect of a relevant period, means the sum of the durations of all the *Sustained Interruptions* (in minutes) that have occurred during the relevant period, divided by the *Customer Base*. **SAIFI** or **System Average Interruption Frequency Index** in respect of a relevant period, means the total number of *Sustained Interruptions* that have occurred during the relevant period, divided by the *Customer Base*. **Sustained Interruption** means an *Interruption* to a *Distribution Customer's* electricity supply that has a duration longer than 3 minutes, provided that the successful restoration of supply to the *Distribution Customer* is taken to be the end of the *Sustained Interruption*.	The use of SAIDI and SAIFI as the key measures for sustained interruptions is supported. However, Energex considers greater clarity would be achieved by adopting the following amended definitions: • **SAIDI** or **System Average Interruption Duration Index** in respect of a relevant period, means the sum of the customer durations interrupted of all the *Sustained Interruptions* (in minutes) that have occurred during the relevant period, divided by the *Customer Base*. • **SAIFI** or **System Average Interruption Frequency Index** in respect of a relevant period, means the sum of the customers interrupted of all the *Sustained Interruptions* that have occurred during the relevant period, divided by the *Customer Base*. Customers interrupted more than once through the restoration process are only counted once for each *Sustained Interruption.* The proposed definition of "sustained interruption" is supported, including the intention to define the duration of a sustained interruption as greater than three minutes.
Proposed definitions for distribution reliability measures for momentary interruptions **MAIFI** or **Momentary Average Interruption Frequency Index** in respect of a relevant period, means the total number of *Momentary Interruptions* that have occurred during the relevant period, divided by the *Customer Base*, provided that *Momentary Interruptions* that occur within the first three minutes of a *Sustained Interruption* are excluded from the calculation. **MAIFIe** or **Momentary Average Interruption Frequency Index event** in respect of a relevant period, means the total number of *Momentary Interruption Events* that have occurred during the relevant period divided by the *Customer Base* for	Energex supports the use of MAIFIe as a key measure for momentary interruptions. However, MAIFI is considered to be an inferior measure and is not supported. Energex favours MAIFIe over MAIFI as it is widely recognised as a more suitable measure for comparing customer reliability service levels. MAIFIe is less likely to be skewed by different operational practices and allows for more meaningful intra and inter comparisons. Energex supports the extension of the momentary interruption threshold from one minute to three minutes. It is not expected that this extended threshold will result in any significant adverse customer impacts such as longer momentary interruptions. Previous modelling would suggest that extending the

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the relevant period, provided that *Momentary Interruptions* that occur within the first three minutes of a *Sustained Interruption* are excluded from the calculation. **Momentary Interruption** means an *Interruption* to a *Distribution Customer's* electricity supply with a duration of 3 minutes or less, provided that the end of each *Momentary Interruption* is taken to be when electricity supply is temporarily restored or, in the absence of a temporary restoration of supply, when supply is successfully restored. **Momentary Interruption Event** means one or more *Momentary Interruptions* that occur within a continued duration of 3 minutes or less, provided that the successful restoration of electricity supply after any number of *Momentary Interruptions* is taken to be the end of the *Momentary Interruption Event*.	momentary interruption threshold to three minutes will result in a 5% increase in MAIFIe and a complimentary reduction in SAIFI of 5%. The impact on SAIDI will not be material (approximately 0.1%). Customers are not expected to perceive any difference, with the benefit that the DNSP is not penalised for increasing the MAIFIe in order to reduce the SAIFI. In practice, there is unlikely to be any change to the current DNSP automated restoration processes in the short-term. However, Energex considers that the extended threshold may potentially drive future improvements in automated restoration to the benefit of all customers. Changing the threshold from one minute to three minutes will make it more technically feasible to introduce a central hierarchy-managed automation scheme. While decentralised autonomous schemes are possible, they are limited to local decision-making and do not take into account the state of the network and any limit violations. More sophisticated "network aware" automation requires limit calculations to be run on pre and post fault conditions on a live network model, usually as part of the Distribution Management System (DMS). The limit calculations are difficult to achieve reliably within a one minute timeframe. A more practical design should result in lower costs to implement and maintain, while a longer timeframe will allow more "network aware" and responsive schemes. Energex does not currently have the jurisdictional reliability drivers to develop this capability. Current performance levels are above minimum service standards and, while a business case using STPIS incentives may be considered in the future, in the short-term Energex is mindful of minimising the cost impact on customers.

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Proposed supporting definitions **Planned Interruption** means an *Interruption* resulting from a *Distribution Network Service Provider's* intentional interruption of electricity supply to a *Customer's* premise where the *Customer* has been provided with prior notification of the *Interruption* in accordance with all applicable laws and regulations. **Unplanned Interruption** means an *Interruption* that is not a *Planned Interruption*. **Customer** means an end user of electricity who purchases electricity *supplied* through a *distribution system* to a *connection point*. **Distribution Customer** means a *connection point* between a *distribution network* and *Customer* that has been assigned a *NMI*, including energised and de-energised *connection points* but excluding *unmetered connection points*. **Customer Base** in respect of a relevant period, means: • the number of *Distribution Customers* as at the start of the relevant period; plus • the number of *Distribution Customers* as at the end of the relevant period, divided by two. **Interruption** means any loss of electricity supply to *Distribution Customers* associated with an *outage* of any part of the *network*, including *outages* affecting a single *Customer's* premises but excluding *disconnections* caused by a *retailer* or a fault in electrical equipment owned by a *Customer*, provided that: • the start of an *Interruption* is taken to be when the *Interruption* is initially automatically recorded by equipment such as *SCADA* or, where such	Energex generally supports the proposed supporting definitions. In addition, the definition for an "interruption" refers to "any loss of electricity supply" which is broad and open to interpretation. For example, currently some distributors treat a high voltage (HV) fuse operation or HV bridge failure on the primary distribution system as an interruption to two-thirds of customers on the affected downstream secondary network. These incidents are commonly referred to as "brownouts" as there is only approximately half of the normal supply voltage on two phases available to affected customers. Although technically there is no loss of supply under brownout conditions, equipment may or may not cease operation and many customers will, based on general advice, switch off appliances such as refrigerators to prevent the motor from burning out. This period of brownout occurs prior to the distributor becoming aware of the situation and disconnecting supply until repairs can be carried out. Energex considers that the definition of interruption should be clarified to account for incidents such as brownouts to ensure consistency of reporting. There may also be some benefit in clarifying the definition of interruption to account for the following situations where: 1. Network supply is unavailable but power has been restored through a portable generator supplied by the distributor; 2. Network supply is unavailable but the customer has restored supply with their own standby generator; 3. Network supply is unavailable and the customer does not require or want alternative supply due to the time of event, for example while a business is closed or for other reasons; and 4. Network supply has been restored but the customer cannot take supply and remains disconnected, for example due to a fault on the customer's switchboard.

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equipment does not exist, at the time of the first *Customer* call reporting that there has been an *outage* in the *network*; and • the end of an *Interruption* is taken to be when the *Interruption* is automatically recorded as ending by equipment such as *SCADA* or, where such equipment does not exist, the time when electricity supply is restored to affected Distribution Customers.	In all four situations described above it could be considered that supply has been restored. Energex also notes that the proposed definitions for planned and unplanned interruptions are inconsistent with those that currently apply under the National Energy Retail Rules. Energex considers that common definitions should be applied consistently across all regulatory instruments.
Proposed definitions for exclusions **Exclusions** - *Interruptions* that result from the following circumstances may be excluded from the calculation of *SAIDI*, *SAIFI*, *MAIFI* and *MAIFIe*: 1. *Load shedding* due to a *generation* shortfall. 2. Automatic *load shedding* due to the operation of under-frequency relays following the occurrence of a *power system* under-frequency condition. 3. *Load shedding* at the direction of *AEMO* or a *System Operator*. 4. *Load* interruptions caused by a failure of the shared *transmission network*. 5. *Load* interruptions caused by a failure of *transmission connection assets* except where the *interruptions* were due to inadequate planning of *transmission network connections points* and the *Distribution Network Service Provider* is responsible for the planning of *transmission network connection points*. 6. *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*. 7. *Load* interruptions caused by, or extended by, a direction from state or federal emergency services.	Energex supports the proposed list of exclusions including the additional exclusion for interruptions caused by or extended by emergency services. Energex proposes that a further exclusion criteria is added to cover single premise planned interruptions due to metering equipment changes. It is suggested that this will avoid issues arising when the DNSP is not the Meter Provider.

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Proposed definitions for major event days and catastrophic events **Major Event Day** - *Interruptions* that occur on a Major Event Day may be excluded from the calculation of SAIDI, SAIFI, MAIFI and MAIFIe. *Major events day* has the meaning given in the *IEEE Guide*, provided that: • for the purposes of applying an economic incentive scheme, the regulator may apply a different multiple of log standard deviation than the 2.5 multiple used in the statistical method set out in section 3.5 of the *IEEE Guide* should such multiple be determined by the regulator to more accurately reflect the normal operation of the *distribution network*; and • *Catastrophic events* may be excluded from the statistical method used to classify *Major Event Days*. **Catastrophic event** means a large scale event (such as a cyclone, flood or bushfire) that is identified by: • applying a 4.15 multiple to the log standard deviation used in the statistical method set out in section 3.5 of the *IEEE Guide*; or • such other statistical method determined by the regulator to more accurately identify large scale events. **IEEE Guide** means the 'IEEE Guide for Electric Power Distribution Reliability Indices, IEEE Std 1366-2012' published by the Institute of Electrical and Electronic Engineers on 31 May 2012.	Energex agrees that the 2.5 beta method described in IEEE standard 1366 - 2012 is an appropriate default method for identifying major event days. This method is already used in the national STPIS and in most jurisdictions for licence conditions (i.e. minimum service standards). Energex considers the option to exclude catastrophic events from the statistical method used to classify major event days would be an enhancement to the 2.5 beta process and potentially provides a more stable threshold to define normalised performance. The choice of the threshold of 4.15 beta is reasonable to identify more extreme outliers.

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Proposed definitions for feeder classifications **CBD feeder** means a *feeder* in one or more geographic areas that have been determined by the relevant participating jurisdiction as supplying electricity to predominantly commercial, high-rise buildings, supplied by a predominantly underground *distribution network* containing significant interconnection and redundancy when compared to urban areas. **urban feeder** is a *feeder* which is not a *CBD feeder* and has a weather normalised maximum demand over the feeder route length greater than 0.3 MVA/km. **short rural feeder** means a *feeder* with a total feeder route length less than 200 km, which is not a *CBD feeder* or *urban feeder*. **long rural feeder** means a *feeder* with a total feeder route length greater than 200 km, which is not a *CBD feeder* or *urban feeder*. **Alternative definition for urban feeder** **urban feeder** is a feeder which is not a **CBD feeder** and either: • has a weather normalised maximum demand over the feeder route length greater than 0.3 MVA/km; or • has a customer density of greater than X customers per route km of feeder length. This alternative definition would improve the intuitiveness of the definition of urban feeder, however, we are not proposing that this change is made in isolation to a review of the associated reliability targets and incentive schemes.	The use of temperature normalised maximum demand is supported over raw maximum demand as it will reduce the tendency of feeder category churn from year to year for those feeders close to the threshold. No adverse impacts are anticipated. The additional customer density of X criteria for the urban network is supported for the reasons proposed (given a light load outcome for feeders close to the load density threshold). Unfortunately any change in criteria has the potential to change the historical performance and could result in a need to "back cast" the figures. This would be a requirement for realigning jurisdictional standards and incentive schemes. The existing definition for CBD is supported. However, Energex would support further restricting the definition to the capital city.

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Principles for considering lowest reliability customers We are proposing that the following principles should be considered when developing a method for assessing the areas with the lowest reliability customers: 1. The approach used should be able to be applied consistently across the jurisdictions and distributors. 2. The focus should be on customer experiences of reliability, rather than on feeder reliability. 3. The approach needs to measure the experience of the lowest reliability customers compared to that of the average customers, on feeders of the same classifications. 4. The approach needs to take into account that reliability outcomes may vary from year to year.	Energex supports the general thrust of identifying lowest reliability customers but would argue in support of using current methods that are relatively simple to apply. These are discussed in further detail below in relation to the four principles proposed by the AEMC in its draft report. Energex also supports the application of system-wide approaches to low reliability measures. ***Principle 1*** Energex generally agrees that the approach used should be able to be applied consistently across jurisdictions and distributors. However, it needs to be recognised that existing jurisdictional requirements may be different and that costs may be incurred in changing business systems and reporting processes. Adoption by jurisdictions should therefore be aspirational and voluntary. Currently, Energex has requirements under clause 11.2 of its Distribution Authority to report on programs to improve the reliability performance of worst performing feeders. The worst performing feeders are selected based on SAIDI and SAIFI performance using three year average performance (planned plus unplanned) after removing exclusion and major event days. The Distribution Authority requirements are as follows: (a) From 1 July 2014 onwards, the distribution entity will, as part of its Distribution Annual Planning Report, monitor and report on the reliability of the network's worst performing 11kV feeders; (b) The distribution entity will implement a program to improve the reliability on the worst performing 11kV feeders based on the criteria set out in Clause 11.2(c); and (c) The worst performing 11kV feeder program will apply to any 11kV feeder which meets the following criteria:

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	(i) The 11kV feeder is in the worst 10% of the network's 11kV feeders based on its three year average SAIDI/SAIFI performance; and (ii) The 11kV feeder's SAIDI/SAIFI outcome is 150% or more of the MSS SAIDI/SAIFI limit applicable to that category of 11kV feeder. ***Principle 2*** Energex does not consider that it is practical to manage low reliability performance at an individual customer level. While it is agreed that focussing on feeder sections may offer some advantages in differentiating low performance, the number of feeder sections involved could be substantial, particularly on rural feeders. Consequently, it would be significantly burdensome and costly to introduce and maintain a reporting system based on feeder sections. While the use of whole feeders has its limitations, it is relatively simple to apply, does not introduce any additional requirements for categorising feeders and achieves the desired outcomes over time. ***Principle 3*** This principle should be modified to measure the experience of the lowest reliability customers compared to the average performance standard applicable to the category rather than the performance experience of the average customer. This will provide a clear benchmark of low reliability performance subject to periodic review of the average performance standard. The standard should be set with appropriate consideration of economic principles.

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	Principle 4 A three year average would seem a reasonable and practical approach to identifying consistently low performance, given there is statistical variability.
Customer based distribution reliability measures that may be used **CAIDI** or **Customer Average Interruption Duration Index** in respect of a relevant period, means the sum of the durations of all Sustained Interruptions (in minutes) that have occurred during the relevant period, divided by the total number of Sustained Interruptions (ie SAIDI divided by SAIFI). **CAIFI** or **Customer Average Interruption Frequency Index** in respect of a relevant period, means the average frequency of Sustained Interruptions that have occurred during the relevant period for those Customers experiencing Sustained Interruptions. **CTAIDI** or **Customer Total Average Interruption Duration Index** in respect of a relevant period, means the total time during the relevant period that average Customers who actually experienced an Interruption were without power. This is similar to CAIDI, except that those Customers with multiple Interruptions are counted only once.	It is agreed that customer-based distribution reliability measures have their limitations and require very careful application. Energex therefore supports not using these measures in the NEM.
Load based distribution reliability measures that may be used **ASIDI** or **Average System Interruption Duration Index** is similar to SAIDI except that it is based on load (kVA) rather than numbers of Customers. **ASIFI** or **Average System Interruption Frequency Index** is similar to SAIFI except that it is based on load (kVA) rather than numbers of Customers.	

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Proposed implementation plan	Energex agrees that the common definitions should only form part of a non-binding guideline. DNSPs should be able to choose the most appropriate measures applicable to their network and jurisdictional drivers. Energex agrees that the NER would be the appropriate mechanism for implementing and maintaining the guideline and that the AER should be responsible for drafting, maintaining and publishing the guideline.