



## Fact sheet: What is reliability?

### AEMC Review of the national framework for distribution reliability

#### What is reliability?

Reliability refers to the extent to which customers have a continuous supply of electricity. As electricity cannot be easily stored, a reliable supply of electricity requires generators to produce electricity and the transmission and distribution networks to transport the electricity to customers in real time.

As a result, a reliable supply of electricity to customers requires adequate planning, capacity, and maintenance on all components of the electricity supply chain to ensure electricity can be delivered to customers when it is required.

#### What are the causes of power outages?

Outages can be considered in terms of both planned and unplanned outages. Planned outages generally occur so that maintenance or construction can be undertaken on generators or the transmission or distribution networks. Unplanned outages occur when equipment failure causes electricity to be disconnected unexpectedly.

The reliability that customers experience is a combination of the service provided by generators, transmission networks, and distribution networks. However, most of the outages that customers experience are due to issues on the distribution networks.

Large amounts of money have been spent on distribution networks across Australia to provide a reliable supply of electricity. While the level of reliability experienced by customers can vary for different areas of the network, average reliability is at a relatively high level. To further improve current average levels of reliability, significantly more expenditure would be needed. As a result, it would not be cost efficient to remove all outages on the distribution networks.

There are also a number of factors which can lead to unplanned outages, which distribution networks have only a limited control over. This includes factors such as birds or possums on lines, or extreme weather such as storms, which may bring lines down.

#### What is the AEMC's role in reliability?

The AEMC's Reliability Panel sets the reliability standard for generation, which currently requires there to be sufficient generation to meet 99.998% of annual demand.

Each state and territory government retains control over how transmission and distribution reliability is regulated, which has resulted in different regulations in each jurisdiction.

On 27 September 2013, the AEMC published its final report on the design of a framework for distribution reliability in the National Electricity Market (NEM). This report sets out the features of the framework and outlines steps that can be taken to support improvements in determining the levels of reliability in distribution networks that best meet the needs of customers.

#### How is distribution reliability currently regulated?

In general, each state and territory has reliability standards for the average number and duration of unplanned outages that each distribution network should not exceed each year. For each network, these standards are often further split into specific standards for different levels of customer density, geographic areas, or customer types.

Most states and territories also have a number of other measures to regulate distribution reliability. In addition to reliability standards which set standards for the average reliability performance of each distribution network, there are:

- input planning criteria, which determine how the distribution networks should be built in the longer term;
- incentive schemes, which assign rewards or penalties to distribution businesses, where performance is better or worse than the target performance level; and
- requirements relating to worst served customers, which impose obligations on distribution businesses, such as improvement programs or annual reporting, directed at service standards for customers in poor performing parts of the network.

### **What is the appropriate level of reliability?**

It's not cost-effective or even feasible to remove all potential supply interruptions to every customer. Determining the appropriate level of reliability that networks should provide involves trading-off the costs of building and maintaining distribution networks against reliability outcomes. Challenges arise from the uncertainty that exists in relation to determining the trade-off between cost and reliability.

The costs to customers of interruptions to their supply of electricity can be used to guide the setting of reliability targets. The costs to customers will depend on the extent to which they value reliability. It is not possible to base estimates of the value that customers place on reliability (VCR) on direct observations and there remains no universally accepted methodology. In Australia, the VCR has only been assessed a handful of times and results have varied extensively.

Developing a methodology which can accurately estimate the VCR is difficult, as the VCR is inherently subjective, and can be influenced by, amongst other factors, the characteristics of the customer, whether the customer has recently experienced a supply interruption, and the length, duration and time of day of the supply interruption.

In distribution networks, a large number of customers may be served by the same network asset. This means that reliability must be aggregated rather than providing individual customers with different levels of reliability according to their preferences. This ultimately means that determining the level of reliability that distribution network service providers (DNSPs) should provide involves trading-off the reliability preferences of different customers in the same supply area.

In addition, there are a number of factors which may affect the value that customers place on reliability, which are difficult to capture in the calculation of the VCR. For example, the potential broader costs to society from high impact low probability events such as city wide supply interruptions, and concerns around equity and fairness associated with the need to provide customers in rural and remote areas with a reliable supply of electricity.

As a result of the difficulties associated with assessing the trade-offs between cost and reliability, there may be a need for a degree of judgement in setting reliability targets to supplement assessments based on the VCR.

### **Background to the AEMC's review**

In December 2012, the Council of Australian Governments (CoAG) agreed in principle to adopt a new best practice framework for reliability standards and asked that SCER task the AEMC with the development of a national framework by the end of 2013. The framework would be considered for adoption by jurisdictions and CoAG agreed to provide jurisdictions with the opportunity to transfer responsibility for applying the framework to the AER.

On 8 February 2013, the AEMC received terms of reference from the Standing Council on Energy and Resources (SCER) to conduct a review to develop a national framework for expressing, setting, and reporting on electricity distribution reliability in the NEM. The terms of reference build on prior projects conducted by the AEMC to develop national frameworks for distribution reliability. The Commission's final report has been developed after considering submissions received on the AEMC's consultation paper and discussions with stakeholders.

The explicit and transparent consideration of the value placed on reliability by customers, along with greater requirements for stakeholder consultation when reliability levels are set, are likely to ensure community preferences are taken into account.

## Features of the AEMC’s framework

The AEMC has recommended a framework which promotes greater efficiency, transparency, and community consultation in how reliability levels are set and provided across the NEM.

The framework includes:

- the expression of distribution reliability targets in terms of the duration and frequency of unplanned interruptions;
- the use of a transparent process which is independent of DNSPs in setting reliability targets;
- an economic assessment process that will expose the way network costs vary with different levels of reliability and include consideration of the expected costs of investments, the value that customers place on reliability, and the probability of interruptions;
- jurisdictional responsibility for determining the appropriate level of reliability targets with the option to delegate responsibility for applying the framework to the Australian Energy Regulator (AER) or another independent body;
- in light of the limitations in the measurement and application of value of customer reliability estimates, the ability for jurisdictions to incorporate additional reliability requirements for areas of particular economic or social importance;
- greater opportunities for the inclusion of customer and community preferences;
- the use of the Service Target Performance Incentive Scheme to encourage DNSPs to perform at least to the level of their reliability targets; and
- national reporting and auditing of distribution reliability performance and planning.

As part of the framework, the AER would become responsible for VCR estimates to assist jurisdictions to assess reliability levels. With this responsibility the AER will improve the VCR methodology using the experience gained through repeated application. This will allow customer preferences to be more accurately revealed over time.

In light of the limitations in the measurement and application of value of customer reliability estimates, the framework would include the ability for jurisdictions to incorporate additional reliability requirements for areas of particular economic or social importance.

Table 1 sets out the expression of distribution reliability targets and additional reliability requirements under the framework.

**Table 1: Expression of distribution reliability targets**

Type of application	Reliability measure	Inclusion in framework
Average duration and frequency of interruptions	Average unplanned SAIDI and SAIFI by feeder type	Standard setter required to include
Other supporting measures of network reliability	Average planned SAIDI and SAIFI, CAIDI, MAIFI, etc	Can be included by the standard setter
Areas of high economic importance	Separate SAIDI and SAIFI minimum standards for individual feeders	Determined by the jurisdictional minister
Areas of poor reliability performance	Separate SAIDI and SAIFI minimum standards for individual feeders	Determined by the jurisdictional minister
Transmission and sub-transmission	Definitions set out in the transmission reliability framework, eg minimum redundancy levels	Based on classification of network assets defined under the transmission reliability framework.

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The AEMC has also been requested to develop a framework for transmission reliability.

## Framework for transmission reliability

The AEMC has also been requested by SCER to develop a framework for transmission reliability in parallel with the distribution framework.

Transmission networks are designed to provide a higher level of reliability than distribution networks due to the potentially widespread consequences of failure.

While a substantially common set of arrangements has been developed for the distribution and transmission reliability frameworks, some key differences in the approach have been required to account for the characteristics of transmission networks.

The AEMC's final report on its recommended framework for transmission reliability will be published by 1 November 2013.

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