



# Distribution Licence Compliance Review – SA Power Networks

27-28 December 2016 severe weather event

June 2017

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## Glossary of terms

Term	Definition
AER	Australian Energy Regulator
CBD	Central Business District
Code	Electricity Distribution Code
CRM	Customer Relationship Management
Electricity Act	Electricity Act 1996
ERL	Emergency Response Level as defined in SA Power Networks' Emergency Response Manual
ERT	Emergency Response Team (SA Power Networks)
ESC Act	Essential Services Commission Act 2002
Commission	Essential Services Commission, established under the Essential Services Commission Act 2002
GSL	Guaranteed Service Level
GSL Scheme	Guaranteed Service Level Scheme
HV	High Voltage (voltage greater than 1000 Volts)
IVR	Interactive Voice Response (automated telephone answering system)
Licence	Electricity Distribution Licence
LV	Low Voltage (voltage up to 1000 Volts)
MED	Major Event Day
MSWE	Major Severe Weather Event as reported by the Bureau of Meteorology monthly weather review.
USAIDI	Unplanned System Average Interruption Duration Index – total number of minutes, on average, that a customer is without electricity from unplanned interruptions in a year
USAIFI	Unplanned System Average Interruption Frequency Index – average number of times a customer's supply is interrupted per year from unplanned interruptions in a year

# 1 Executive summary

The Essential Services Commission (**Commission**) has conducted a review of SA Power Networks' compliance with its distribution licence obligations and its performance against reliability and customer service regulatory standards prior to, during and after the major storms, which affected much of South Australia on Tuesday 27 and Wednesday 28 December 2016 (**December event**).

The storms were severe, affecting the community acutely, with damage to homes, land, trees, roads and other public infrastructure, and also the electricity distribution system operated by SA Power Networks. The extent of damage to the distribution network caused by the December event is unprecedented. Long average restoration times during the event reflect the severity of the storm and the considerable restoration work required to repair the damage to the network. While the number and duration of outages experienced by individual customers differed, the Commission has found that the average time to restore supply after the storms was significant – in some cases as much as four days.

The effects of the storm lasted about 25 hours. The prevailing winds were very strong, maximum wind gusts ranging from 63 kilometres per hour in the Adelaide area to 126 kilometres per hour in Port Augusta. There was extremely heavy and persistent rain across the State at levels between one and a half and four times the monthly average. Restoration efforts were suspended in various areas because of high winds and concern for the safety of staff and equipment.

Electricity supply was interrupted to 182,540 customers across the State, representing around 22 percent of SA Power Networks' customers. The damage to the network led to an exceptionally high number of power outages, with some of those outages exceeding 48 hours' duration. In total, 546 interruptions to power supply were recorded on the distribution network during the two-day period: 284 on the high voltage network and 262 on the low voltage network. SA Power Networks reported 1,781 restoration jobs, which included 934 occurrences of wires down.

The Commission accepts that the occurrence and incidence of storms cannot be controlled, and that the weather can influence electricity network reliability to a greater or lesser degree, depending on the severity. Nevertheless, customers have made it clear through their comments to the Commission and through the media and social media, that they want to know that SA Power Networks did all it could to minimise the impact and duration of the outages which arose from the storm.

Having reviewed this matter in detail, the Commission has found that overall, SA Power Networks did not breach either the reliability or the customer service regulatory standards imposed on it by the Commission. However, improvements can be made regarding the provision of accurate restoration times during severe weather events.

Further, the Commission acknowledges there is some level of customer concern as to amounts payable to customers under the GSL scheme where SA Power Networks suspends restoration due to matters of access and safety. Those matters do not lie within the regulatory controls for which the Commission is responsible; however, it understands that the Australian Energy Regulator (**AER**) will be conducting a review of SA Power Networks' compliance with force majeure requirements pursuant to the National Electricity Rules (**NER**).

## 1.1 Reliability

It should be noted from the outset that average reliability performance standards exclude the impacts of major weather events. SA Power Networks must use best endeavours to achieve the average reliability standards prescribed in the Electricity Distribution Code (**Code**). However, those reliability standards exclude any unplanned supply interruptions that qualify as a Major Event Days (**MED**). The threshold is determined in accordance with an International Standard IEEE 1366TM-2012. Where the time without supply, as measured across all customers on the distribution network, exceeds around

6 minutes it is classified as a MED. On days classified as a MED, SA Power Networks must restore supply as soon as practicable, rather than meeting specific service standards.

Underlining the severity of the event, the average duration of outages across the whole network because of the two-day event was 187.2 minutes. As such, 27 and 28 December qualified as MEDs. By comparison, the reliability standards in the Code expect the average system-wide interruption to be no more than 165 minutes for the entire year. Historically, there has been an average of three MEDs per year in South Australia. Ten MEDs have occurred in the first six months of the current financial year.

The exclusion of MEDs is for good reason. The cost of building a storm resistant network would exceed the reliability benefits. This position has previously been tested with, and generally accepted by, the South Australian community through broad surveys undertaken by both the Commission and SA Power Networks. Reliability standards are set by the Commission on a five-year forward-looking basis. Those standards are set at levels that reflect past average network performance, excluding outages arising from major storms. South Australian customers have said, through various wide-ranging surveys, that they do not want to pay higher electricity prices for levels of reliability performance that exceed that past average performance.

If the standards were set higher to capture the impacts of storms, the costs of meeting the standards may also be higher, which in turn would flow through to higher customer charges. Given the relative infrequency of major storms, and South Australians' stated preferences for the lowest sustainable prices, inclusion of the impacts of storms in reliability standards would have adverse consequences on pricing. Customers would pay more, all of the time, to guard against relatively infrequent events.

Therefore, in terms of reliability standards, the Commission has found that SA Power Networks' performance during and after the December event has not given rise to a breach of either the average annual frequency of interruption standard or the average annual duration of interruption standard. That is because the restoration and reliability performance on 27 and 28 Dec will be excluded from the annual service standard assessment, as those days qualified as being MED's.

In the Commission's view, SA Power Networks restored supply as soon as practicable, given the level of damage to the network and the weather conditions that hampered restoration. Restoration continued in the following days, however, the Commission does not anticipate the interruptions during this time will cause SA Power Networks to breach an annual performance standard.

Notwithstanding the Commission's finding on this matter, it has also reviewed SA Power Networks' practices and procedures in preparation for, during and after the December event. While those matters are not currently subject of a regulatory obligation, the Commission has formed the view that, in the context of the severity of the December event, SA Power Networks' performance was not inconsistent with good electricity industry practice (as defined in the National Electricity Law).

In forming that view the Commission acknowledges that there is always the potential for delays to restoration following major storms. Delays could arise from variables such as the particular nature of the storm (wind, rain, lightning or the mix thereof), the severity of the storm, the size of the area impacted, the density of population in the area and the availability of crews.

On that point, the Commission notes that the number of crews available in the State and in specific areas is finite. Importantly, the Commission would not want to see SA Power Networks employing large numbers of crews that spent much of the year under-utilised. This would also impose unwarranted costs on South Australian electricity customers.

Instead, as appears to be the case, the Commission prefers that SA Power Networks takes a risk-based approach to optimising its crewing levels, such that there are sufficient crews available for the ordinary course, with the potential for additional crews to be obtained (contracted or by other arrangements) at short notice if required.

## 1.2 Guaranteed Service Level Scheme

Under the Guaranteed Service Level (GSL) Scheme, SA Power Networks makes payments to South Australian customers when it fails to meet prescribed levels of performance. For example, where a customer experiences an outage of between 12 and 15 hours, SA Power Networks must pay that customer \$100. GSL payments to customers reflect the inability of the network provider to meet a particular level of performance; it is not a punitive payment for compensation for any loss which might have been suffered by the customer as a result of the outage.

The scheme recognises that there are certain events, and certain parts of the network, for which it will not be economic for South Australian customers to pay, through tariffs, for SA Power Networks to deliver the same level of service to all customers in all conditions.

SA Power Networks expects in excess of 65,000 customers to be entitled to some level of GSL payment as a result of the December event, representing about one-third of the total number of customers affected by the event. These customers faced an outage of at least 12 hours duration. SA Power Networks estimates that it will be required to pay approximately \$16.4 million in GSL payments for the event.

The incentive element of the GSL Scheme is that the payment amount rises as the length of time off increases. Currently, there are five bands for outage duration GSL payments:

- ▶ >12 and ≤15 hours – \$100
- ▶ >15 and ≤18 hours – \$150
- ▶ >18 and ≤24 hours – \$200
- ▶ >24 and ≤48 hours – \$405
- ▶ >48 hours – \$605.

Based on those payment amounts, there was concern expressed by many customers that they may not have received a GSL payment to which they were entitled or did not receive a payment of the amount anticipated. The reason for the perceived payment anomalies was that SA Power Networks chose to apply conditions of force majeure in accordance with the provisions of its customer contracts under the National Energy Customer Framework. The effect of the force majeure is to 'stop the clock' on the timer for GSL payments such that any time where force majeure is invoked, that time is subtracted from the total time off supply of the customers affected.

The Commission acknowledges there is some level of customer concern as to amounts payable to customers under the GSL scheme where SA Power Networks suspends restoration due to matters of access and safety. Those matters do not lie within the regulatory controls for which the Commission is responsible; however, it understands that the AER will be conducting a review of SA Power Networks' compliance with force majeure requirements pursuant to the NER.

Subsequent to the December event, the Minister for Mineral Resources and Energy requested the Commission to investigate whether payments to customers under the GSL scheme should be increased to households affected by power outages longer than 48 hours. The Commission will release an Issues Paper on the structure of the GSL scheme to seek the views of stakeholders and the community. The Issues Paper and information on how to make a submission will be available on the Commission's website.

### 1.3 Customer service

The Commission has found, based on the information obtained, that SA Power Networks used its best endeavours to respond to its customers through its call centre and via electronic media. However, improvements can be made regarding the provision of accurate restoration times during severe weather events.

A key measure of the customer service performance during a period of widespread supply interruptions is its ability to effectively respond to calls and enquiries from customers wishing to report, and to establish the likely duration of, outages.

During the five-day period that the December event affected customers, SA Power Networks' call centre (including its additional satellite call centre in Adelaide) received 60,516 phone calls and 194,000 'unique user' website visits. Customers were also in touch with SA Power Networks via Short Message Service (SMS), social media (Facebook, Twitter, Instagram), print, television and radio media. (The use of social media contact/reporting is an added dimension to customer interaction that has not been evident in the Commission's previous significant event reviews).

On the measure of telephone responsiveness, SA Power Networks is expected to achieve an annual standard of 85 percent of calls answered in 30 seconds. During the December event it achieved very close to that standard (84 percent).

Of particular note was the broad customer criticism in the media relating to the accuracy of restoration information provided to customers by SMS. SA Power Networks sent many texts to customers that stated inaccurate restoration information. The frustration of prolonged outages, felt by customers was exacerbated by the provision of inaccurate information, particularly in regard to when supply was likely to be restored.

SA Power Networks has acknowledged and accepted that the multiple messages regarding predicted restoration times during the event was at times confusing. In response, it has implemented corrective action, immediate and longer-term, to mitigate the reoccurrence of erroneous customer information.

The Commission will monitor the implementation of those proposed actions to confirm that the proposed measures are implemented and that they are effective.

### 1.4 Next steps

The Commission will continue to liaise with SA Power Networks on these matters and will publish a follow up report if there is a material change to the facts or observations contained in this report. In all other cases, finalised observations and conclusions regarding the event will be addressed in the Commission's Regulatory Performance Report for SA Power Networks, due to be released in late 2017.

In regard to GSLs, the Commission will release an Issues Paper on the structure of the GSL scheme to seek the views of stakeholders and the community. The Issues Paper and information on how to make a submission will be available on the Commission's website.

Finally, the Commission will continue to apply its current monitoring approach for reliability, which encompasses reporting by SA Power Networks, its quarterly and annual operational performance reporting, its summer preparedness reporting, summer period reliability reporting and public reporting by the Commission.

## 2 Scope of the review

### 2.1 Licensing under the Electricity Act 1996

Licensing of electricity distribution businesses in South Australia is one of the Essential Services Commission's (**Commission**) statutory functions. As a licensing authority under the Electricity Act 1996 (**Electricity Act**), and consistent with its general powers and functions under the Essential Services Commission Act (**ESC Act**), the Commission has compliance and enforcement powers in relation to the performance of licensees.

SA Power Networks operates the main electricity distribution network in South Australia and holds the appropriate licence<sup>1</sup> issued by the Commission pursuant to Part 3 of the Electricity Act. It is a condition of SA Power Networks' licence that it complies with the Electricity Distribution Code (**Code**) (including service standards).

### 2.2 Summary of the event

South Australia experienced severe weather conditions from the evening of 27 December 2016, with extended periods of rain and strong wind in many centres across the state. Those severe weather conditions extended to 28 December 2016 and caused widespread damage and power outages across SA Power Networks' electricity distribution network.

The storms were very severe, affecting the community acutely, with damage to homes, land, trees, roads and other public infrastructure, and also the electricity distribution system operated by SA Power Networks. It is important to understand the severity of the weather during that period. The prevailing winds were very strong, maximum wind gusts ranging from 63 kms per hour in the Adelaide area to 126 kms per hour in Port Augusta. There was extremely heavy and persistent rain across the State at levels between one and a half and four times the monthly average.

Electricity supply was interrupted to 182,540 customers across the State, representing around 22 percent of SA Power Networks' customers. The damage to the network led to an exceptionally high number of power outages, with some of those outages exceeding 48 hours' duration. In total, 546 interruptions to power supply were recorded on the distribution network during the two-day period: 284 on the high voltage network and 262 on the low voltage network.

By way of contrast, the average number of high voltage interruptions on the distribution network is approximately 10 per day. Ordinarily, around 20 high voltage interruptions would have been expected between 27 and 28 December, rather than the 284 which eventuated.

Underlining the severity of the event, the average duration of outages across the whole network because of the two-day event was 187.2 minutes, as compared to an expected annual system-wide average of no more than 165 minutes for the entire year.

While the number and duration of outages experienced by individual customers differed, the Commission has found that the average time to restore supply after the storms was significant – in some cases as much as four days.

There was broad customer criticism in the media relating to the accuracy of restoration information provided to customers. SA Power Networks sent 283,385 unplanned outage messages to 56,203 unique properties, many stating inaccurate restoration times. This led to frustration and inconvenience, as customers were unable to determine when supply was likely to be restored and therefore were not able to make suitable alternate arrangements for the duration of the interruption.

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<sup>1</sup> Refer: <http://www.escosa.sa.gov.au/industry/electricity/licensing/licence-register>.

## 2.3 Significant event reporting

While the Commission assesses some aspects of a licensee's performance on an annual basis against service standards and regulatory obligations, events may occur during the year that warrant special ad hoc reporting. For example, an event that may result in a large number of customers being without electricity supply for an extended period, posing questions as to the licensee's ability to meet the service standards and whether the entity has used best endeavours in its effort to restore supply. These are significant performance events.<sup>2</sup>

The Commission routinely monitors the reliability performance of the distribution network and pays particular attention to events that may have resulted in a significant number of customers experiencing outages for extended periods. The reliability performance of an electricity distribution network, and the customer service performance of the distributor, is influenced by extreme weather events, such as widespread storms and heatwaves.

The Commission determined that special reporting was warranted as the event met the criteria of being a significant performance event as:

- ▶ a significant number of customers were affected by the unplanned interruptions, some for a lengthy duration
- ▶ the event may impact on SA Power Networks' ability to comply with its annual service standards.
- ▶ it needed to undertake a review to be confident that SA Power Networks' has complied with its electricity licence obligations, and
- ▶ there is strong stakeholder interest in SA Power Networks' performance in responding to the unplanned interruptions.

All significant events are reviewed and reported in the Commission's annual Regulatory Performance Report.<sup>3</sup> The purpose of designating a significant performance event is to determine when an immediate review and reporting on an event, that is in the public interest, will occur.

## 2.4 Licence conditions under review

As a condition of its licence, SA Power Networks is required to comply with the Code, an industry code made by the Commission pursuant to section 28 of the ESC Act. In setting the terms and provisions of the Code, the Commission seeks to meet its primary statutory objective (as specified in section six of the ESC Act): to protect the long-term interests of South Australian consumers with respect to the price, quality and reliability of essential services.

The Commission has assessed SA Power Networks' compliance with the following licence condition, which forms part of its Electricity Distribution Licence:

*The licensee must comply with all applicable regulatory instruments, including any technical or safety requirements under the Act.*

In this case, 'applicable regulatory instruments' means the Electricity Distribution Code.

In reviewing SA Power Networks' compliance with the Code, the Commission has considered SA Power Networks' performance against the service standards prescribed in the Code. Refer to sections 3.1 and 4.1 of this report for further details on the Code requirements.

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<sup>2</sup> Refer: <http://www.escosa.sa.gov.au/industry/electricity/reporting-compliance/significant-performance-event-reporting-framework>

<sup>3</sup> Refer: <http://www.escosa.sa.gov.au/industry/electricity/reporting-compliance/regulatory-performance-reports>.

## 2.5 Process and scope

The Commission requested information and data from SA Power Networks to determine compliance with its licence obligations. In summary, the Commission requested the following:

- ▶ a description of the significant weather event commencing on 27 December 2016 including whether SA Power Networks considered these days to be Major Event Days (refer section 3.2.2)
- ▶ information on SA Power Networks' preparations preceding the event
- ▶ details of the outages that occurred including the duration and cause
- ▶ information on the restoration including the methodology used to prioritise jobs and how restoration times were communicated to customers, and
- ▶ the expected amount to be paid to customers for GSL payments as a result of the event.

SA Power Networks provided the data to the Commission on 7 Feb 2017. The Commission requested further information on 6 March 2017 relating to customer communications and that information was provided on 20 March 2017.

To support the Commission's request, SA Power Networks has also provided performance data. In assessing both reliability and customer service performance during the weather event, the method adopted by the Commission was to compare performance to the key measures set out in the Code.

The Commission's review of this event considers whether SA Power Networks' preparation for the event, its supply restoration performance and its customer service performance were at levels expected within the overall regulatory framework that SA Power Networks operates and that they are in keeping with performance standards set by the Commission.

The Commission's review has focused on SA Power Networks' systems, processes, controls and response in relation to the outage – with particular emphasis on customer communications. It did not cover issues relating to the cause of the outage and associated technical, safety, maintenance and reliability considerations, as those fall within the remit of other regulatory bodies.

The Commission sought to understand the course of events, SA Power Networks' response and actions and to identify opportunities for improvements in customer outcomes. The review is in the context of the current regulatory framework. Specifically, the Commission has assessed SA Power Networks' response to the event against the conditions of its distribution licence and the reliability provisions of the Code.

## 3 Reliability

Having regard to information obtained from SA Power Networks and the Bureau of Meteorology, the weather event that commenced on 27 December 2016 and the subsequent restoration, the Commission is satisfied that SA Power Networks restored distribution services as soon as practicable to its customers, as required under the Code. Therefore, the Commission considers that SA Power Networks complied with its licence obligation.

This section of the report assesses the reliability performance of SA Power Networks during the December event.<sup>4</sup> Unlike a heatwave, where faults on the network are localised by the operation of fuses or failure of transformers, outages during storm conditions have a broad range of causes that may be more difficult to detect, locate and repair.

The key measures chosen for this assessment concern those areas of performance that the Commission considers to be most likely to impact customers when SA Power Networks' distribution network and resources are under stress, ie supply restoration times. The measures are as follows:

- ▶ Network Interruptions - high voltage (HV) and low voltage (LV)
- ▶ the number of interruptions
- ▶ the number of customers affected
- ▶ the cause of interruptions
- ▶ the average restoration performance Unplanned System Average Interruption Duration Index (USAIDI), and Unplanned System Average Interruption Frequency Index (USAIFI), and
- ▶ the number of outages and customers interrupted by duration class as specified in clause 2.3.1(d) of the Code.

### 3.1 Obligation

In accordance with the Code, SA Power Networks is required to use its best endeavours to meet the service standards for customer service and duration of supply interruptions. Best endeavours means to act in good faith and use all reasonable efforts, skill and resources. However, the average reliability standards in the Code exclude SA Power Networks' performance during specific weather conditions, such as storms and heatwaves.

#### 3.1.1 Reliability service standards – clause 2.2 of the Code

For the 2015-2020 regulatory period, the reliability of SA Power Networks' distribution network is measured by the frequency and the duration of unplanned interruptions. The Commission set the following network reliability service standards:

- ▶ Unplanned System Average Interruption Duration Index (USAIDI). This reliability index is the average duration (in minutes) of supply interruptions per customer per year.
- ▶ Unplanned System Average Interruption Frequency Index (USAIFI) This reliability index is the average number of interruptions per customer per year.

Its feeders are divided into four broad categories for the purposes of monitoring network reliability:

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<sup>4</sup> SA Power Networks advises that the first interruption of the severe weather event occurred at about 9 pm on Tuesday 27 December 2016 and the last interruptions commenced at about prior to midnight on Thursday 29 December 2016. Supply was restored to all customers affected by the severe weather event at about midday on 1 January 2017.

- ▶ Central Business District (CBD) feeders - those supplying predominantly commercial, high-rise buildings, supplied by a predominantly underground distribution network containing significant interconnection and redundancy when compared to urban areas.
- ▶ Urban feeders – those with actual maximum demand over the reporting period per total feeder route length (for example, load density) greater than 0.3 megavolt amps per km (but which are not CBD feeders).
- ▶ Short rural feeders – those with a total route length less than 200 km (but which are not CBD or urban feeders). Short Rural feeders may include feeders in fringe urban areas with low load densities.
- ▶ Long rural feeders – those with a total route length greater than 200 km (but which are not CBD or urban feeders).

These standards, USAIDI<sub>n</sub> and USAIFI<sub>n</sub>, are set out in the following table:

Table 1: Feeder types and performance targets

Feeder type	USAIDI <sub>n</sub> - (average minutes off supply per customer per annum)	USAIFI <sub>n</sub> - (average no. of supply interruptions per customer per annum)
CBD Feeders	15	0.15
Urban Feeders	120	1.30
Short Rural Feeders	220	1.85
Long Rural Feeders	300	1.95

However, the above targets exclude SA Power Networks' performance during Major Event Days (**MED**), such as storms and heatwaves, and are therefore referred to as normalised performance – the metrics used are normalised duration of interruptions (USAIDI<sub>n</sub>) and normalised frequency of interruptions (USAIFI<sub>n</sub>). SA Power Networks' restoration performance during MEDs is assessed separately from daily operations. On days classified as a MED, SA Power Networks must restore supply as soon as practicable, rather than meeting specific service standards.

MEDs refer to days on which reliability performance are statistical outliers from normal performance. The methodology used to identify excluded days was developed by the Institute of Electrical and Electronics Engineers. The majority of MEDs result from severe or abnormal weather events (although other factors can result in MEDs). Excluding MEDs allows major events to be studied separately from daily operations, and in the process, to better reveal trends in daily operation that would be hidden by the large statistical effect of major events.

Basing targets on feeder categories is consistent with the reliability indices used in the AER's Service Target Performance Incentive Scheme. Prior to the 2015-2020 regulatory period, network reliability targets were set for seven geographic regions. The Commission reports on performance in the seven geographic regions in the annual Regulatory Performance Report.<sup>5</sup>

The network reliability targets, set by the Commission in October 2014, are based on historical performance for the years 2009-10 to 2013-14. The network reliability standards are 'best endeavours' average annual service standards for unplanned interruptions. They require SA Power Networks to use its best endeavours to meet specified average service level targets each year for the four feeder categories.

<sup>5</sup> Refer: <http://www.escosa.sa.gov.au/industry/electricity/reporting-compliance/regulatory-performance-reports>.

Where a target is not met, this does not necessarily mean the standard is not met. The standard may still be met if SA Power Networks can demonstrate that it has used best endeavours in trying to meet the target that year.

The Commission considers several factors in assessing whether or not SA Power Networks has used its best endeavours to meet a network reliability standard. These include:

- ▶ the effect of localised weather events which may impact significantly on a particular feeder category performance
- ▶ performance of SA Power Networks' restoration of supply following severe weather events, based on:
  - the time taken to restore supply, using the Unplanned Customer Average Interruption Duration Index (UCAIDI), considering the relative severity of the event, and
  - the contribution of equipment failure to the duration of the interruption
- ▶ preparation for imminent severe weather events, and
- ▶ other impacts on the network that may have affected performance during the year.

As network performance is expected to vary from year to year, and the service standard targets are based on average historical performance, the Commission also considers whether there is any evidence of a deteriorating long-term trend in performance.

### 3.1.2 Guaranteed Service Levels - clause 2.3 of the Code

In accordance with the Code, SA Power Networks is required to use its best endeavours to minimise the duration of supply interruptions to a customer's supply address.

As outlined above, network reliability standards for SA Power Networks are included in the Code. The Code includes a GSL Scheme, under which SA Power Networks must automatically make payments to customers in the event that specified service levels are not met. GSL payments are the same for residential and small business customers, and for customers in metropolitan and regional areas. The GSL Scheme payment categories and amounts are set out below in Table 2 and Table 3.

Table 2: SA Power Networks GSL Scheme – Frequency and duration payments

GSL category	Amount (GST inc)
<b>Number of supply interruptions received in a year (USAIFI)</b>	
10 to 12 interruptions	\$100
13 to 15 interruptions	\$150
More than 15 interruptions	\$200
<b>Duration of a supply interruption (USAIDI)</b>	
>12 and ≤15 hours	\$100
>15 and ≤18 hours	\$150
>18 and ≤24 hours	\$200
>24 and ≤48 hours	\$405
>48 hours	\$605

Table 3: SA Power Networks GSL Scheme – Other payments

GSL category	Amount (GST inc)
<b>Other payments</b>	
Timeliness of appointments - more than 15 minutes late	\$25
Promptness of new connections – more than 6 business days	\$65 per day to a maximum of \$325
Timeliness of street light repairs (for street lights owned by SA Power Networks) – CBD, Metropolitan Adelaide, Whyalla, Mt Gambier, Mt Barker, Gawler, Stirling, Murray Bridge, Pt Augusta, Willunga, Pt Pirie and Pt Lincoln – more than 5 business days	\$25 per 5 business day period
Timeliness of street light repairs (for street lights owned by SA Power Networks) – Country (all other areas) – more than 10 business days	\$25 per 10 business day period

## 3.2 Facts and evidence

A severe weather warning for destructive winds and heavy rainfall was issued by the Bureau of Meteorology at 10:59 am Tuesday, 27 December 2016. It was expected to affect people in the Adelaide Metropolitan, Mount Lofty Ranges, Eastern Eyre Peninsula, Yorke Peninsula, Flinders, Mid North, Kangaroo Island, Riverland, Murraylands, Upper South East, Lower South East and parts of the North West Pastoral and North East Pastoral districts.

The warning described a deep low pressure system west of Coober Pedy that would move in a south to south-easterly direction to be east of Tarcoola by mid-afternoon, then over Spencer Gulf by midnight, south of Kangaroo Island by early the following morning and offshore southwest of Mount Gambier by late morning.

Damaging winds averaging 60 to 70 km per hour with gusts of 90 to 125 km per hour were expected over parts of the warning area mostly near and over the eastern side of the low pressure system. Destructive wind gusts in excess of 125 km per hour were considered possible about elevated areas within the Flinders Ranges, Mid North and Mount Lofty Ranges districts, but generally widespread.

It was forecast that heavy rainfall would lead to flash flooding over the warning area. The heaviest rainfall was expected to reach the Flinders and Eastern Eyre Peninsula districts by the evening, central districts (including the Adelaide Metropolitan area) around midnight and then the south-eastern districts early the morning of 28 December 2016.

### 3.2.1 Observed weather

Adelaide received significant rainfall and was buffeted by high winds on 28 December 2016. Notably, the weather during December deviated significantly from the average, which is evident from the rainfall data shown in Table 4. Generally, many locations received around three times the average December rainfall – Adelaide being no exception. However, Adelaide received 70 percent of its December rainfall on 28 December alone.

Table 4: Rainfall data December 2016 – various centres

Location	December 2016 total	December average	Fraction of December average (%)
Adelaide (Kent Town)	86.8	29.1	298
Mount Barker	108.8	35	311
Cleve	47.4	26	182
North Shields (Port Lincoln)	31.6	18.8	168
Port Augusta Aero	72.6	25.7	282
Whyalla Aero	65.4	24.4	268
Hawker	98.4	22.4	439
Snowtown	121.2	29	418
Kadina	88.4	31.5	281

The actual temperature, rain and wind gust data for the Adelaide area during and following the December event is shown in Table 5 and wind gust data for various centres in Table 6.

Table 5: Adelaide weather data 27 – 31 December 2016

Date	Day	Min °C	Max °C	Rain (mm)	Max wind gust		
					Direction	Speed (kph)	Time
27	Tue	21.1	29.9	5.8	NNE	54	22:35
28	Wed	22.5	30.1	61.2	NNE	63	01:42
29	Thu	17.2	30.8	3.0	SSW	37	18:17
30	Fri	17.9	24.3	0.2	WSW	33	10:42
31	Sat	18.1	25.3	0	SW	33	17:59

Table 6: Maximum wind gusts – various centres

Location	Maximum wind gust	Location	Maximum wind gust
Adelaide	63 kph on 28 December	Clare	89 kph on 28 December
Port Augusta	126 kph on 28 December	Snowtown	93 kph on 28 December
Mount Lofty	83 kph on 27 December	Kadina	91 kph on 28 December
Nuriootpa	80 kph on 28 December	Kuitpo	94 kph on 28 December
Noarlunga	76 kph on 28 December	Mount Crawford	120 kph on 28 December
Whyalla	74 kph on 27 and 28 December		

The Bureau of Meteorology stated that, during December 2016:

*'It was a wet finish to an overall wet year for South Australia with particularly heavy rainfall recorded between 27<sup>th</sup> and 29<sup>th</sup>*

*The passage of a deep low pressure system brought record high daily rainfall for many locations across the State between the 27<sup>th</sup> and 29<sup>th</sup>, and*

*“As the low pressure system tracked eastwards record high humidity, heavy rainfall and destructive winds were brought to many parts of the State on the 27<sup>th</sup> and 28<sup>th</sup>.”<sup>6</sup>*

SA Power Networks reported, ‘from the evening of 27 December 2016, severe weather conditions were experienced in South Australia, with extended periods of rain and strong wind in many centres across the state.’<sup>7</sup> Those severe weather conditions extended to 28 December and caused widespread power outages across SA Power Networks’ electricity distribution network, interrupting the electricity supply to 182,540 customers across the state. The prevailing conditions caused difficulties for SA Power Networks in restoring supply to those who experienced outages.

### 3.2.2 Classification of Major Event Days

The Commission has assessed SA Power Networks’ reliability and customer service performance over the period 27 to 29 December 2016<sup>8</sup>, noting that the final customer was restored about midday on 1 January 2017. In forming a view on SA Power Networks’ forecast compliance with annual service standards, the Commission has considered whether the MED framework is applicable.

December 27 and 28 are classified as a MED as determined in the Code (note that 29 December was not a MED). Therefore, the performance of SA Power Networks’ during the event will be excluded from the Commission’s assessment of SA Power Network compliance with annual service standards.

Historically there have been three MEDs per year on average in South Australia. However, there were ten in the first six months of 2016-2017. By comparison, only one MED occurred during 2015-2016 (during May 2016), which reflects the intensity of the frequency of the current year’s events – refer Table 7.

Table 7: Performance data – Major Event Days July to December 2016

Date	Location	USAIDI (min)	No. customers impacted
11/07/2016	Various	16.9	28,139
12/07/2016	Various	32.7	95,510
28/09/2016	Various	11.9	24,815
28/09/2016	Entire State (transmission)	448.8	856,597
29/09/2016	Various	24.7	64,716
29/09/2016	Port Lincoln/Cummins (transmission)	42.5	17,975
11/11/2016	Various	14.5	26,687
23/12/2016	Mainly Moorkitabie – Wudinna 66kV	10.2	16,900
27/12/2016	Mainly Metro, Adelaide Hills, Mid North	18.2	23,491
28/12/2016	Mainly Metro, Adelaide Hills, Mid North	164.9	141,777

The overall network-wide impact on the USAIDI spread across all customers (between 9pm on 27 December and 29 December) is calculated to be 187.2 minutes. The network-wide impact on USAIFI was 0.21 interruptions. This means that, on average, each customer in the State experienced an

<sup>6</sup> Refer: <http://www.bom.gov.au/climate/current/month/sa/archive/201612.summary.shtml>.

<sup>7</sup> The impact of the severe weather event was felt to a lesser extent in the South East region and did not affect the Adelaide Business Area and Kangaroo Island regions.

<sup>8</sup> Noting that final customer restoration occurred on 1 January 2017.

interruption of 187 minutes duration and 0.2 interruptions as a result of the storm. In contrast to state-wide USAIDI, each of the 182,540 customers affected over the full period of the storm experienced a restoration time, on average, of 891 minutes (14.85 hours).

From an overall reliability perspective, SA Power Networks' performance targets for USAIDI<sub>n</sub> and USAIFI<sub>n</sub> as specified in the Code are annual targets. The total network contribution to USAIDI from this event alone exceeded the implied annual target of approximately 165 minutes by 15 percent. This indicates the impact of the storm event on SA Power Networks' overall performance for unplanned interruptions for the year (but is not included in the normalised performance).

SA Power Networks' performance targets for normalised USAIDI and normalised USAIFI, as specified in the Code, are annual targets (noting that normalising these metrics removes the impacts of Major MED's, such as the first two days of this storm). The total network contribution to USAIDI of 187 minutes from this event alone was greater than the annual normalised target (165 minutes). This indicates the magnitude of the storm and resultant impact on customers.

SA Power Networks' annual reporting of service standards to the Commission is based on four feeder categories as required by the Code.<sup>9</sup> However, the Commission, following its review of service standards for this current regulatory period, decided to maintain the monitoring of performance on the seven state regions as reported in the previous regime as it provides a better picture of locational impacts on customers. Table 8 shows basic reliability performance data for specific regions in SA Power Networks' distribution network and the State-wide USAIDI impact of the storm event.

Table 8: Performance data for regions – 27-29 December 2016

Region	USAIDI (min)	USAIFI	UCAIDI* (min)	No. of events
Adelaide Business Area	0	0	0	0
Central	148.9	0.241	618	119
Eastern Hills/Fleurieu Peninsula	704.3	0.504	1,396	85
Major Metropolitan Areas	133.6	0.173	774	284
South East	48.2	0.100	483	11
Upper North/Eyre Peninsula	261.5	0.274	955	47
Kangaroo Island	0	0	0	0
<b>State</b>	<b>187.2</b>	<b>0.210</b>	<b>891</b>	<b>546</b>

*\*Note: UCAIDI is not a measure required by the Commission for SA Power Networks' performance reporting. It is a measure of the average restoration time for customers affected by an interruption.*

### 3.2.3 Number of interruptions

The storm caused a total of 284 high voltage interruptions and 262 low voltage interruptions on the distribution network. On average, SA Power Networks experiences around ten high voltage interruptions daily. Of the combined total, 52 percent of the interruptions occurred in the Major Metropolitan region, which has the highest customer density, and 22 percent of the interruptions occurred in the Central region, which includes the Riverland, Murraylands, the Barossa Valley and Yorke Peninsula.

The Eastern Hills and Fleurieu and the Upper North and Eyre Peninsula regions were affected to a lesser degree, with 16 percent and nine percent of the interruptions occurring in those regions

<sup>9</sup> Refer: <http://www.escosa.sa.gov.au/industry/electricity/codes-guidelines/codes>.

respectively. However, those regions had a high proportion of their customer base interrupted. The weather event had minimal impact on the South-East region.

### 3.2.4 Number of customers affected

SA Power Networks' data reported that 182,540 customers lost supply because of the storm (refer Table 9). Notably, the Adelaide Business area was unaffected due to the prevalence of underground cabling. Kangaroo Island reliability was also unaffected by the storm. Upper North and Eyre region and the South East region experienced comparatively less impact. In the Major Metropolitan region 17 percent of customers experienced interruptions whereas 50 percent of the Eastern Hills and Fleurieu Peninsula region's customers were affected, which represents the greatest proportion of customers on a region basis. In the Metropolitan Areas region, 104,606 customers were interrupted which represents 55 percent of the total number of customers interrupted, during the two days.

Table 9: Total Interruptions and number of customers affected

Region	No. of Interruptions	Total Customers	Customers Affected
Adelaide Business Area	0	5,160	Not affected
Central	119	103,892	25,026 (24%)
Eastern Hills/Fleurieu Pen.	85	76,612	38,649 (50%)
Major Metropolitan Areas	284	605,884	104,606 (17%)
South East	11	28,899	3,186 (11%)
Upper North/Eyre Pen.	47	31,867	11,073 (35%)
Kangaroo Island	0	3,992	Not affected
<b>Totals</b>	<b>546</b>	<b>867,835</b>	<b>182,540</b>

### 3.2.5 Cause of interruptions

Table 10 details the percentage contribution to USAIDI by the cause. Seventy-nine percent of the customer outage time was related to 'Weather' and 'Unknown' causes and 20 percent due to 'Equipment Failure'.

Table 10: Cause of interruptions – 27-29 December 2016

Cause Category	Percentage contribution (%)
Equipment Failure	19.9
Operational	0.1
Other	0
Third Party	0.8
Unknown	26.1
Weather	53.2

An interruption is listed as 'Unknown' where there is no cause evident. This category features significantly during such events where the weather may have caused the interruption but the cause is not obvious at the location. For instance, flying debris or vegetation may have cleared itself by the time

an asset inspection takes place. Nonetheless, a complete asset inspection of the affected power line is required to be undertaken prior to re-energisation.

The majority of asset damage occurred in the Adelaide Hills and Metropolitan Area and was caused mainly by trees and debris contacting the power lines. SA Power Networks reported 1,781 restoration jobs, which included 934 occurrences of wires down.

### 3.2.6 Average restoration times

Total average restoration of supply time for customers affected was 890 minutes (about 15 hours). SA Power Networks notes that restoration efforts were suspended for safety reasons for around six to nine hours, mainly due to high winds and falling trees on the night of 27 December and the morning of 28 December 2016. SA Power Networks noted that allowing for the time restoration efforts were suspended, the average restoration of supply time for customers was 740 minutes (about 12 hours). The districts and periods when works were suspended due to unsafe working conditions were:

- ▶ Mid-north from 10pm on 27 December to 6am on 28 December 2016.
- ▶ Adelaide Metropolitan Area from 12am to 6am on 28 December 2016.
- ▶ Adelaide Hills from 12am to 9am on 28 December 2016.

The Commission notes SA Power Networks' conditions of force majeure that it applies in accordance with the provisions of its customer contract. The effect of the force majeure is to 'stop the clock' on the timer for Guaranteed Service Level (GSL) payments such that any time where force majeure is invoked, it is subtracted from the total time off supply of the customers affected. This may mean that some customers may not receive payment for the duration of the interruption that they may expect.

There were 934 reports of 'wires down' during the event which had to be investigated as a matter of priority (ie took precedence over restoring supply to ensure public safety). SA Power Networks' restoration of supply priority, as developed in conjunction with the State Government Emergency Services organisations as referenced in Table 11.

Table 11: SA Power Networks' restoration priority

Priority	Customer/Load	Priority	Customer/Load
1	State Electricity Grid	7	Major Shopping Centres
2	Communications	8	Emergency Services Control Centres
3	Water for drinking	9	Correctional Services
4	Wastewater	10	Major Industrial customers
5	Hospitals, Aged care	11	Residential customers
6	Bulk transport		

Although the priority order for residential customers is listed last, it does not mean it is of the least priority. Understandably, the priority list sets the degree of importance from a high level. However, in relation to residential customers, SA Power Networks gives consideration to where it can restore the most customers in the shortest time and then turns its attention to those most likely to be off-supply for the longest period.

Average restoration time in all regions was protracted. The Eastern Hills/Fleurieu Peninsula region recorded the longest average restoration time for its customers where accessibility was a major issue (apart from the suspension of restoration period). The number of events in the Major Metropolitan region exacerbated the restoration effort, extending the overall restoration time. The Upper North and

Eyre Peninsula region has historically experienced extended restoration times owing to the long distances involved in patrolling and restoration work. This of itself is not unusual given the damage to the network in the region was widespread. Of note, the Upper North and Eyre Peninsula region was also affected by a severe weather event on 23 December 2016.

SA Power Networks reported that the unprecedented number of wires-down reports (934) exceeded the previous historical maximum of 852, which was associated with the 3-4 February 2014 weather event. The 3-4 February 2014 event was the previous worst event in recent decades that only impacted the distribution system. The 3-4 February 2014 event had similar types of infrastructure damage at its peak to the December event. However, the scale (ie areas affected) and duration of the December event far exceeded the 3-4 February 2014 event.

### 3.2.7 Availability of field personnel

Following the implementation of programs established as a result of the findings of the January 2006 Heatwave Inquiry<sup>10</sup>, SA Power Networks has demonstrated reasonable success in its preparedness for heatwave events. It is expected that SA Power Networks' preparations for any significant weather event should follow these established procedures, especially in using its contracted meteorology services in anticipating a storm event, and the media for dissemination of information to customers.

SA Power Networks made note of its awareness that a serious storm can hit at any time of the year. It has set a compulsory annual leave 'ceiling' requirement and a range of other resourcing arrangements and schemes that ensure that a balance of field personnel is available across all days of the year (both working days and holidays). SA Power Networks engaged contractors and some interstate crews to respond to the storm event. The established pre-summer preparations ensured ample stocks of materials were available to enable timely supply restoration operations. There was no delay in restoration of supply due to material shortages.

To maximise availability of field operational resources throughout the event, incentive schemes were invoked for its duration. In addition, on 28 December 2016, assistance was sought from interstate utilities. Victorian crews were successfully sourced to supplement local field staff.

### 3.2.8 Emergency response preparations

SA Power Networks provided the detail in Table 12 in respect of its response to emergencies as published in its Emergency Response Manual, which details the roles, responsibilities and activities that it will implement in the event of an actual or forecast network emergency.

Table 12: SA Power Networks' emergency response matrix

Emergency Response Level (ERL)	Event characteristics	Summary response
ERLO	Normal daily operation	Normal operation
ERL1	Weather forecast includes likely some or all: <ul style="list-style-type: none"> <li>▶ Strong to gale force winds</li> <li>▶ One or two days of high maxima and minima temperatures.</li> <li>▶ Likely severe weather</li> <li>▶ Forecast LOR3<sup>11</sup></li> </ul>	<ul style="list-style-type: none"> <li>▶ Monitor weather and forecasts</li> <li>▶ Monitor National Electricity Market Notices</li> <li>▶ Alert Incident Response Manager if/as required</li> </ul>

<sup>10</sup> Refer: <http://www.escosa.sa.gov.au/projects-and-publications/projects/electricity/heatwave-reporting-and-summer-reliability>.

<sup>11</sup> Lack Of Reserve Level 3 as defined in the National Electricity Rules.

Emergency Response Level (ERL)	Event characteristics	Summary response
<b>ERL2</b>	ERL1 weather forecast elements are almost certain. <sup>12</sup> Consequences: Minimal to Minor. <sup>13</sup> Common elements of the type: storms, actual LOR3, heatwaves	<ul style="list-style-type: none"> <li>▶ IRM determines that Emergency Response Team (ERT)<sup>14</sup> to be convened.</li> <li>▶ ERT prepares in accordance with pre-event responsibilities as detailed in Emergency Response Manual.</li> <li>▶ Continuous shift resource planning almost certain for some areas.</li> </ul>
<b>ERL3</b>	ERL2 size event is forecast to escalate. Consequence: Minor to Major. <sup>15</sup> Common events of this type: Severe storms over two or more days, actual LOR3 that persists for two or more days, heatwaves lasting a week or more.	<ul style="list-style-type: none"> <li>▶ Continuous shift in place for all operational staff including ERT, Call Centre and field crews.</li> <li>▶ ERT meets continuously for three days or more.</li> <li>▶ SA Power Networks' Crisis Management Team is convened.</li> <li>▶ ERT prepares in accordance with pre-Event Responsibilities detailed in Emergency Response Manual.</li> </ul>

For this specific event, the Emergency Response Team (ERT) was put on alert for possible escalation as soon as there was a suggestion of possible adverse weather conditions from meteorological service providers. The ERT was alerted as early as 23 December 2016 of possible adverse conditions occurring on 27 December 2016. Though not directly related to this event, adequate resourcing for the forecast 40°C temperatures on Christmas day were also taken into account in resourcing plans at the ERT meeting.

Given the uncertainty of weather forecasts, in terms of both the timing and severity, the ERT was provided with updated weather forecast analysis each day from 23 December. This daily report included the expected severity and timing of weather conditions and the potential network impact.

SA Power Networks received its daily weather forecast update just prior to 10am on 27 December 2016, which meant that there were conditions which corresponded to:

- ▶ ERL2 for Tuesday 27 December 2016 with heavy rain, thunderstorms and strong winds
- ▶ ELR1 for Wednesday 28 December 2016 with rain, thunderstorms likely east of Ceduna, and
- ▶ ERL0 for Thursday 29 December 2016 with clearing thunderstorms in the early morning and then clearing.

The ERT convened on the morning of 26 December 2016 in preparation for a forecast ERL2 and to formalise preparations ahead of possible adverse weather conditions on 27 December 2016. Preparations included making additional staff available, the establishment of the Keswick Satellite Call

<sup>12</sup> Almost certain' is defined in SA Power Networks' Risk Framework as 96-100 percent chance of occurring.

<sup>13</sup> Minor is defined in SA Power Networks' Risk Framework as a financial impact of up to \$1,000,000.

<sup>14</sup> ERT includes senior representatives from Network Management, Field Services and Customer Relations departments.

<sup>15</sup> Major is defined in the Risk Framework as a financial impact of up to \$100,000,000.

Centre backup and for overflow contact centre support and placing contractors on standby to assist as required. Field personnel were also deployed to remote and certain radially supplied larger townships.

Restoration of supply activities and priorities were coordinated centrally by SA Power Networks' ERT. The priorities were continually updated when new information came to hand.

SA Power Networks grades the severity of severe weather events as what it terms a 'Major Severe Weather Event' (**MSWE**). A MSWE is a severe weather event reported/confirmed by the Bureau of Meteorology and where interruptions to customers' supplies also result in that day being classified as an MED where the total contribution to SAIDI exceeds the MED SAIDI threshold (around 6 minutes).

SA Power Networks ranks the intensity of the MEDs into the following four categories:

- ▶ Category 1 (Cat1) MED where the maximum daily USAIDI is less than nine minutes (note: more than half the MEDs fall into this category).
- ▶ Category 2 (Cat2) MED where the maximum daily USAIDI is more than nine minutes and no more than 23 minutes.
- ▶ Category 3 (Cat3) MED where the maximum daily USAIDI is more than 23 minutes and no more than 55 minutes.
- ▶ Category 4 (Cat4) MED where the maximum daily USAIDI exceeds 55 minutes.

Generally, SA Power Networks notes that the categories of MEDs works well, but is not a perfect methodology as some MEDs are atypical as demonstrated by the December event.

### 3.3 Analysis

Prior to the December event, the Bureau of Meteorology issued several severe weather warnings; the first on 26 December 2016 for damaging winds<sup>16</sup> and heavy rainfall as a deep low pressure system moved in a south-easterly direction across the State. The forecast was amended to destructive winds<sup>17</sup> and heavy rainfall in the Bureau of Meteorology's severe weather warning issued at 10:59 am on 27 December 2016. The Bureau of Meteorology cancelled its severe weather warning for the deep low pressure system at 4:22 pm on 28 December 2016.

SA Power Networks invoked its emergency response procedures in anticipation of the weather event based on data provided by its contracted meteorological information provider and the Bureau of Meteorology. The event was declared an Emergency Response Level 2 (**ERL2**) at 10 am on Tuesday 27 December 2016, and actions were taken in response to that declaration.<sup>18</sup>

The extent of damage to the distribution network caused by the storm is unprecedented, the previous worst occurring on 3-4 February 2014. The most severe effects of the 3-4 February 2014 event lasted for about 10 hours. By comparison, the most severe effects of the December event lasted about 25 hours. SA Power Networks provided the following graphic (Figure 1) that compares the number of HV interruptions for each hour of the two events. The high average restoration time for the December event, across all regions, is a reflection of the severity of the storm and the considerable restoration work required to repair the damage to the network.

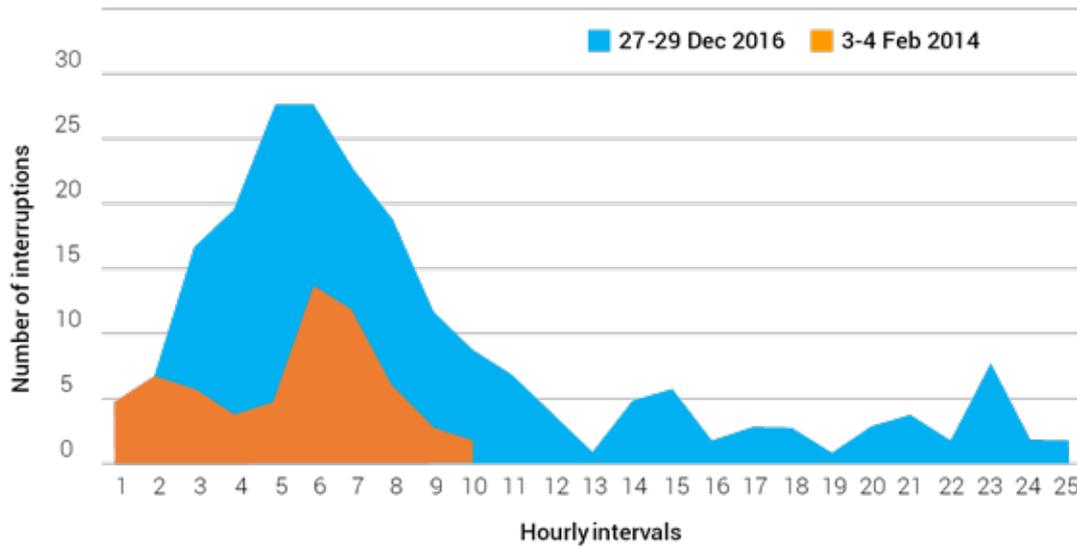
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<sup>16</sup> Damaging winds have average wind speeds of 60-70 kph with gusts between 60 to 125 kph

<sup>17</sup> Destructive winds have wind gusts in excess of 125 kph.

<sup>18</sup> Emergency Response Level 3 is the highest level, which is directed at responding to the most severe events such as bushfires.

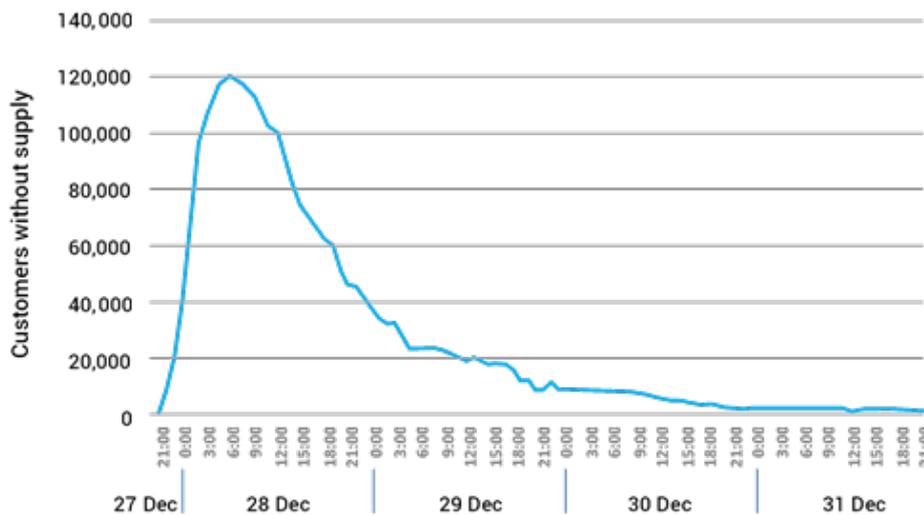
Figure 1: High Voltage interruptions



The high voltage (HV) distribution system, generally 11,000 Volts (11 kV), is the backbone of the network that interconnects transformers that provide for domestic and commercial customer loads. A single 11 kV supply line may provide electricity services to a large number of customers, or even a small township, and damage to those supply lines has a profound effect on the number of customers affected.

Around 183,000 customers were affected by power outages, representing around 22 percent of SA Power Networks' customer base. After the first three hours, midnight on 27 December 2016, approximately 60,000 customers were without supply. At 3:00 am on 28 December 2016, that figure was approximately 110,000 and by 6:00 am that day, the number of customers without supply reached its peak at around 120,000. The rate of restoration is shown in Rate of restoration Figure 2.

Figure 2: Rate of restoration



Approximately 120,000 customers had their supply restored within 12 hours, and after 24 hours, around 21,000 customers remained without supply. Because of the extensive damage to infrastructure a small percentage of customers remained without supply after 48 hours (less than nine percent), with the last customer restored around lunchtime on 1 January 2017.

The December event at its most intense had a much greater impact on the HV distribution system (and the number of customers affected) when compared to the February 2014 event. The number of extreme weather events experienced in the first half of 2016-2017 is unusual, based on the fact that historically there has been an average of three MEDs per year in South Australia, but 10 have occurred in the first six months (refer Table 7).

The information available suggests that there were no systemic operational issues affecting SA Power Networks' response to the interruptions or to customers' calls. SA Power Networks' restores supply by prioritising matters of safety (eg reports of fallen wires) and then allocating crews to restore outages on high voltage power lines, to maximise the number of customers having power restored. In some cases, the protracted nature of the storm did extend the time to restore supply because of safety and access concerns.

Further, SA Power Networks' compulsory annual leave 'ceiling' requirement and other resourcing arrangements ensured that field crews were available to respond. SA Power Networks' appeared to manage its crews to ensure sufficient resources were available to handle the extended period of the event.

The estimated number of customers affected by outages of more than 48 hours was 5,719 (nine percent of the total number of affected customers). SA Power Networks' anticipates at least 65,227 customers will be entitled to a GSL payment, representing about one-third of the total number customers affected by the event. These customers faced an outage of at least 12 hours duration. SA Power Networks estimates that it will be required to pay between \$16 million and \$19 million in GSL payments depending on the outcome of customer enquiry investigations.

### **3.4 Findings**

The Commission is satisfied, based on the information obtained from SA Power Networks and the Bureau of Meteorology, that SA Power Networks restored distribution services to its customers as soon as practicable. Therefore, the Commission finds that SA Power Networks has complied with its licence obligations.

The Commission will continue to monitor SA Power Networks' performance during notable events such as heatwaves and storms under its existing framework where those types of events impact severely on the distribution network and SA Power Networks' customers.

### **3.5 Guaranteed Service Level Scheme payments**

SA Power Networks has paid around \$17.2 million in GSL payments to date, including customer follow-up enquiry payments, as a result of the December event. Average annual payments for the duration of interruption GSL over the past 10 years have been around \$2.6 million, highlighting the significance of the December event.

Table 13 shows the value and number of payments made in various regions of the State. The majority of payments were made in the Major Metropolitan Areas region, where 90 percent of those customers affected were without power for up to 24 hours.

The majority of customers that were without power for 48 hours or more were in the Eastern Hills and Fleurieu Peninsula region.

Table 13: Duration of interruption GSL payments - December severe weather event (with Force Majeure exclusions)  
(total value of payments with number of payments in brackets)

Hours	Barossa/Mid North & Yorke Peninsula/Riverland	Eastern Hills/Fleurieu Peninsula	Major Metropolitan Areas	South East	Upper North/Eyre Peninsula	Total
>12 and ≤15	\$121,900 (1,219)	\$48,400 (484)	\$1,206,100 (12,061)		\$62,600 (626)	<b>\$1,439,000</b> <b>(14,390)</b>
>15 and ≤18	\$282,150 (1,881)	\$10,200 (68)	\$1,160,400 (7,736)		\$506,400 (3,376)	<b>\$1,959,150</b> <b>(13,061)</b>
>18 and ≤24	\$39,600 (198)	\$17,000 (85)	\$3,272,200 (16,361)		\$49,200 (246)	<b>\$3,378,000</b> <b>(16,890)</b>
>24 and ≤48	\$642,735 (1,587)	\$3,384,585 (8,357)	\$1,449,900 (3,580)	\$405 (1)	\$665,010 (1,642)	<b>\$6,142,635</b> <b>(15,167)</b>
>48	\$81,070 (134)	\$3,207,710 (5,302)	\$160,325 (265)		\$10,890 (18)	<b>\$3,459,995</b> <b>(5,719)</b>
<b>Total</b>	<b>\$1,167,455</b> <b>(5,019)</b>	<b>\$6,667,895</b> <b>(14,296)</b>	<b>\$7,248,925</b> <b>(40,003)</b>	<b>\$405</b> <b>(1)</b>	<b>\$1,294,100</b> <b>(5,908)</b>	<b>\$16,378,780</b> <b>(65,227)</b>

As noted previously, SA Power Networks suspended restoration work due to safety and access considerations for its field crews. Under these conditions, SA Power Networks is able to invoke force majeure for the period that it is unsafe for field crews to work.

SA Power Networks can invoke force majeure to ‘stop the clock’ on the commencement time for a GSL payment, where it is instructed (by an appropriate authority) not to enter an area due to emergency or where it forms the reasonable view that it would be unsafe to send crews to restore supply. In the absence of prevention by an authorised person, SA Power Networks must use its best endeavours to gain access to restore a customer’s electricity supply. For example, if one road to an affected area is impassable due to flooding, all other possible routes to that area must also be explored and found impassable before the outage clock will be stopped.

In those cases, the calculation of the duration of an outage, for GSL payment purposes, commences at the time that SA Power Networks’ crews are permitted or are safely able to enter an area to commence restoration.

SA Power Networks has advised the Commission that, as a result of invoking force majeure for the December event, 30,032 additional customers that would have otherwise been entitled to a GSL payment did not receive a payment. The majority of those customers (more than 85 percent) would have received a \$100 payment. Had force majeure not been invoked SA Power Networks would have paid an additional \$6.27 million in GSL payments.

No customers who were interrupted for more than 48 hours had their payment reduced due to SA Power Networks invoking force majeure.

Subsequent to the December event, the Minister for Mineral Resources and Energy requested the Commission to investigate whether payments to customers under the GSL scheme should be increased to households affected by power outages longer than 48 hours. The Commission will release an Issues Paper on the structure of the GSL scheme to seek the views of stakeholders and the community. The Issues Paper and information on how to make a submission will be available on the Commission’s website.

## 4 Customer service

On the measure of telephone responsiveness performance during the December event, SA Power Networks' call centre (and Satellite Call Centre) managed to achieve a standard that was close to its annual telephone responsiveness service standard (on average, 84 percent achieved against the standard 85 percent of calls answered within 30 seconds) for the event.

However, the frustration of prolonged outages, felt by customers was exacerbated by the provision of inaccurate information, particularly in regard to when supply was likely to be restored. SA Power Networks' acknowledged, and accepted, that the multiple messages, regarding predicted restoration times during the event, was at times confusing. In response, it has implemented corrective action, immediate and longer-term, to mitigate the reoccurrence of erroneous customer information.

A measure of the customer service performance of an electricity distributor during a period of widespread supply interruptions is its ability to effectively respond to telephone queries from customers wishing to report, and to establish the likely duration of, outages.

The aspects of performance chosen for assessing responsiveness concern those areas that the Commission considers to be most likely to impact customers when SA Power Networks' call centres are under duress. The particular areas are as follows:

- ▶ the number of calls received
- ▶ the number of calls answered within 30 seconds
- ▶ the average wait time for a customer to talk to an operator
- ▶ the number of calls abandoned, and
- ▶ Clause 2.1 of the Code sets out the respective customer service measures.

### 4.1 Obligation

In accordance with clause 2.1 of the Code, SA Power Networks is required to use best endeavours to achieve certain annual customer service standards relating to responding to customer telephone calls and written enquires as outlined in Table 14.

Table 14: Customer service measures

Category	Customer Service measure	Standard
Customer service	Time to respond to telephone calls	85 percent within 30 seconds
Customer service	Time to respond to written enquiries	95 percent within five business days

Relevant to the December event, the Customer Service Standards set out in the Code require SA Power Networks to respond to 85 percent of customer telephone calls within 30 seconds. It should be noted that this is an annual performance target.

In responding to telephone calls, SA Power Networks can answer a customer's call in person or by providing access to a computer/telephony based interactive service with the ability to process calls by providing information or direct calls to a service officer. A response does not include answering a call by being placed in an automated queue to wait for these options.

## 4.2 Facts and evidence

As is shown in Table 15, there was considerable customer contact during the December event, with 60,516 calls received across a five-day period.

Table 15: Call Centre data, December 2016 severe weather event

Date	Calls offered	Total Answered	Answered <30 sec	Answered <30 sec (%)	Ave wait time	Calls Abandoned	Abandoned (%)
27/12/2016	702	674	661	94.2	0:00:05	28	4.0
28/12/2016	44,636	39,638	38,762	86.8	0:00:43	4,998	11.2
29/12/2016	9,532	7,897	6,374	66.9	0:02:27	1,635	17.2
30/12/2016	4,239	3,985	3,552	83.8	0:00:36	254	6.0
31/12/2016	1,407	1,355	1,225	87.1	0:00:23	52	3.7
<b>Total</b>	<b>60,516</b>	<b>53,549</b>	<b>50,574</b>	<b>83.6</b>	<b>0:00:57</b>	<b>6,967</b>	<b>11.5</b>

SA Power Networks operates a call centre based in Bendigo that is shared with its related Victorian companies Powercor and Citipower. It also has the capacity to establish, at short notice, additional or satellite call centres in Adelaide and in Melbourne to deal with large numbers of customer queries that might arise due to widespread interruptions. The Adelaide Satellite Call Centre was called on for the December event. It operated on Wednesday 28 December 2016, between 5:15 am and 11:00 pm, and on Thursday 29 December 2016, between 6:00 am and 10:00 pm.

On average, SA Power Networks' call centre receives about 540,000 telephone queries annually from customers (daily average just less than 1,500 calls). Calls may be answered either by an Interactive Voice Response (IVR) system or an operator (if requested by the customer).

Historically, the annual telephone responsiveness rate achieved by SA Power Networks has been in the order of 88 percent.

SA Power Networks reported data on its telephone responsiveness during the December event as presented in Table 15.

### 4.2.1 Customers contacting SA Power Networks

During the five days of the December event, SA Power Networks' call centre received 60,516 calls, of which 84 percent were answered within 30 seconds. Given that the annual performance target is 85 percent of calls answered within 30 seconds, SA Power Networks' performance of 84 percent for this event is satisfactory to the extent that it should not reflect poorly on annual performance.

Of the calls received, 11.5 percent were abandoned by the customer before being answered by an operator. Assessment of previous events indicates a variation of between five and 12 percent of calls abandoned, which indicates that the above outcome was not unusual for an extreme event.

Customers are also in touch with SA Power Networks via electronic media via its web site, SMS, social media (Facebook, Twitter, Instagram), print, television and radio media. Many customers could access SA Power Networks via electronic media or use it as a second option if they failed to get through by phone, which may possibly account for more abandoned calls.

SA Power Networks had 194,000 'unique user' website visits to gain outage information and report outages during the event compared to 60,516 telephone calls, i.e. more customers sought information from the website than by telephoning the Faults and Emergencies number.

Significantly, there were 8,606 customer-reported outages recorded, with 78 percent of those reported via the website.

### 4.3 Analysis

SA Power Networks' telephone responsiveness was found to be consistent with similar events based on the long-term average performance where it has bettered the performance target. It should be noted that the target is an annual performance measure and a one-off event does not constitute a failure to meet that target. However, the actual performance outcome of 84 percent is consistent with the annual target.

SA Power Networks was criticised widely in the media in relation to the accuracy of restoration information provided to customers by SMS. SA Power Networks reported that it has 301,000 customers registered for 'Power@MyPlace', which provides information to customers about power outages and other information.

SA Power Networks noted in its report, that its primary objective in providing information by SMS, is to provide the best possible information on status and restoration expectations with respect to the outages and restorations. The information published via customer information systems are generally based on historical averages for typical major severe weather events (refer Table 16 below), with an allowance for a margin of error; and with regard to factors such as the time of day, availability of resources, the location and number of interruptions and the nature of event. Restoration times are updated as new information is acquired and subject to the general progress of restoration efforts.

Table 16 indicates the estimated restoration of supply time where crews have not visited the site, located the fault, nor determined the repairs required to restore supply to customers. For example, if SA Power Networks became aware of a fault on an 'Urban' feeder at 9:00 am then it would typically immediately publish the restoration of supply time of 4:00 pm on that same day (ie 9:00am plus seven hours).

Table 16: Initial estimate of restoration of supply time

Feeder Category <sup>19</sup>	Estimated Restoration of supply time, Estimated as: current system time <i>plus</i>
CBD	3 hours
Urban	7 hours
Rural Short	12 hours
Rural Long	14 hours

There were many variables affecting restoration efforts throughout this event, making it difficult to accurately estimate the restoration times for each outage. Remedial work ranged from simple remediation such as removing a foreign object from power lines (eg vegetation), to significant re-construction work and line re-stringing which required the resources of multiple crews for a significant duration (in many cases a whole shift).

Restoration times were updated throughout the event based on the latest and best information available at the time. SA Power Networks sent 283,385 messages for unplanned outages (including both emails and SMS to multiple stakeholders at a single address) to 56,203 unique properties.

<sup>19</sup> SA Power Networks uses the feeder categories in its annual reporting of service standards to the Commission as required by the Code. However, of note, the Commission, following its review of service standards for the current regulatory period, decided to maintain the monitoring of performance on a region basis as previously reported, as it provides a better picture of locational impacts.

These notifications advised customers of the outages and restoration of supply times (including updates). They were also used to advise when power was restored. SMS messages and emails were sent to customers at key times; when SA Power Networks became aware of the outage, when restoration of supply times changed and when supply was restored. The final restoration of supply message was expressed so as to either confirm that supply was restored, but if not, then customers should register with SA Power Networks that they still did not have power.

SA Power Networks acknowledged, and accepted, that the multiple messages received by customers regarding predicted restoration times during the event was at times confusing. The Commission requested additional detail from SA Power Networks with respect to how it can avoid further issues on the provision of restoration information to customers. SA Power Networks provided details on its proposed three-stage improvement strategy, discussed below.

- ▶ **Immediate proposal** - In the short term, its messaging tool will be disabled so as not to provide default restoration of supply times during such extended events. Instead, customers will be advised that outages are likely to be of an extended duration, and information will be updated following an on-site assessment of damage and the likely duration of repairs estimated.

SA Power Networks will also better utilise social media, which it finds is becoming increasingly important for communicating with customers. SA Power Networks found that, following the storm that impacted Adelaide on 19 January 2017, posting online photos and video of storm damage and repair efforts was highly effective in providing better context to the degree of restoration work being undertaken. This action will become part of future communication.

- ▶ **Next six months** - SA Power Networks is currently building a capability to send a proactive tailored SMS or recorded voice message to customers when required. It is expected to be ready within the next two months. It is also looking to update the messaging within 'Power@MyPlace' to allow greater flexibility in messaging and provide more meaningful messages to customers. The required re-programming will occur over the next three months.
- ▶ **12 to 24 months** - SA Power Networks is currently in the process of a Request for Tender for a Customer Relationship Management (CRM) tool. The tool will allow it to provide customers with more tailored and integrated information that better meets their needs to enhance service during times of unplanned and planned interruptions.

#### 4.4 Findings

The Commission is satisfied, based on the information obtained, that SA Power Networks used its best endeavours to respond to its customers through its call centre and via electronic media. However, improvements can be made regarding the provision of accurate restoration times following severe weather events.

On the measure of telephone responsiveness performance during the December event, SA Power Networks' call centre (and Satellite Call Centre) managed to achieve a standard that was close to its annual telephone responsiveness service standard (on average, 84 percent achieved against the standard 85 percent of calls answered within 30 seconds) for the event. However, the added support of social media contact/reporting is an added dimension to customer interaction that has not been evident in the Commission's previous significant event reviews.

Of particular note was the broad customer criticism in the media relating to the accuracy of restoration information provided to customers by SMS. SA Power Networks sent 283,385 unplanned outage messages to 56,203 unique properties, of which many stated inaccurate restoration times. The level of customer frustration due to the inconvenience of outages caused by significant weather events, be it heatwaves or storms, should not be exacerbated by the provision of inaccurate information, particularly in regard to when supply is likely to be restored.

SA Power Networks has acknowledged, and accepted, that the multiple messages received by customers regarding predicted restoration times during the event was at times confusing. Further, SA Power Networks provided an outline of its corrective action, immediate and longer-term, to mitigate the reoccurrence of this aspect of its customer interaction.

SA Power Networks has provided detail to the Commission on how it is proactively investigating the internet and electronic and social media aspects of customer interaction to better develop service strategies around the relevant technologies, particularly because direct phone contact from customers appears to be diminishing. The Commission notes SA Power Networks' actions and is satisfied with its approach, especially with the improvements to its electronic and social media platforms that are playing a bigger part in customer interactions.

The Commission will follow up the implementation of those proposed communications tools and requisite processes to confirm that the measures as proposed by SA Power Networks are implemented.

## 5 Next steps

The Commission will continue to liaise with SA Power Networks on these matters and will publish a follow up report if there is a material change to the facts or observations contained in this report. In all other cases, finalised observations and conclusions regarding the event will be addressed in the Commission's Regulatory Performance Report for SA Power Networks, due to be released in late 2017.

In regard to GSLs, the Commission will release an Issues Paper on the structure of the GSL scheme to seek the views of stakeholders and the community. The Issues Paper and information on how to make a submission will be available on the Commission's website.

Further, the Commission acknowledges there is some level of customer concern as to amounts payable to customers under the GSL scheme where SA Power Networks suspends restoration due to matters of access and safety. Those matters do not lie within the regulatory controls for which the Commission is responsible; however, it understands that the AER will be conducting a review of SA Power Networks' compliance with force majeure requirements pursuant to the NER.

Finally, the Commission will continue to apply its current monitoring approach for reliability, which encompasses reporting by SA Power Networks, its quarterly and annual operational performance reporting, its summer preparedness reporting, summer period reliability reporting and public reporting by the Commission.



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