



Energy

Energy Networks' regulatory performance report for 2016-17

SA Power Networks, ElectraNet and Australian Gas Networks

Enquiries concerning the currency of this Energy Networks' Regulatory Performance Report 2016-17 should be addressed to: Mark Evans, Manager, Regulatory Reporting

Essential Services Commission of South Australia
GPO Box 2605
ADELAIDE SA 5001

Telephone: (08) 8463 4444
Freecall: 1800 633 592 (SA and mobiles only)
E-mail: escosa@escosa.sa.gov.au
Web: www.escosa.sa.gov.au



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Glossary of terms

Term	Description
AEMA	Australian Energy Market Agreement
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AGN	Australian Gas Networks
CBD	Central Business District
Commission	Essential Services Commission, established under the Essential Services Commission Act 2002
Electricity Act	Electricity Act 1996
ESC Act	Essential Services Commission Act 2002
Gas Act	Gas Act 1997
GSL	Guaranteed Service Level
KPa	Kilopascal (1,000 newtons per square metre) – a measure of pressure
LMSWE	Localised major severe weather event
LPG	Liquefied Petroleum Gas
LRDF	Low Reliability Distribution Feeders
MED	Major event day
NEM	National Electricity Market
NER	National Electricity Rules
SMOS	System Minutes Off Supply
SRMTMP	Safety, Reliability, Maintenance and Technical Management Plan
TJ	Terajoules (joules x 10 ¹²)
UAFG	Unaccounted for Gas
UCAIDI	Unplanned Customer Average Interruption Duration Index
USAIDI	Unplanned System Average Interruption Duration Index
USAIFI	Unplanned System Average Interruption Frequency Index

A traffic light system is used to display SA Power Networks performance against its service standards

Traffic light	Description
	SA Power Networks met the service standard
	SA Power Networks did not meet the service standard

Executive summary

The Essential Services Commission (**Commission**) publishes annual regulatory performance reports in relation to licensed energy networks operating in South Australia. These reports are intended to inform stakeholders and consumers of relevant service and operational performance outcomes during the year and to drive business accountability for performance. This 2016-17 regulatory performance report covers the period 1 July 2016 to 30 June 2017 and covers the following energy network businesses:

- ▶ SA Power Networks (electricity distribution)
- ▶ ElectraNet Pty Ltd (**ElectraNet**) (electricity transmission)
- ▶ Australian Gas Networks Ltd (**Australian Gas Networks**) (gas distribution)

This is the second year of a new regulatory period for SA Power Networks (running from 2015 to 2020), in which network reliability service standards applied for the performance of categories of feeder, rather than for regions (as in prior years). The regulatory period for ElectraNet runs from 2013 to 2018 and from 2016 to 2021 for Australian Gas Networks.

The Commission's key observations for 2016-17 are set out below.

SA Power Networks

- ▶ In 2016-17, SA Power Networks met all ten service standards.
- ▶ There were 125,462 Guaranteed Service Level (**GSL**) payments made totalling \$28.4 million. That was the highest amount since the regime's inception in 2005 (the previous highest amount was \$9.3 million in 2007-08) and over nine times the average annual payment amount over the past 11 years. Ninety-seven percent of GSL payments were made for duration of interruptions, and were mainly related to protracted outages following the severe weather event on 27-28 December 2016. The average payment per year since introduction has been \$3.03 million.
- ▶ There were nine Major Event Days (**MED**)¹ in 2016-17, this is the highest recorded since 2005-06. MEDs was the highest contributor to interruptions on the distribution network since 2005-06. On average, the distribution network experiences three MEDs per year.
- ▶ For the customer service category, SA Power Networks met the standards for responsiveness to telephone calls and written enquiries.
- ▶ The Commission required SA Power Networks to provide evidence that it met the best endeavours service standard for Central Business District (CBD) feeders and Short Rural feeders, as it did not meet the Unplanned System Average Interruption Duration Index (USAIDI) targets for these feeders. The Commission reviewed and analysed the material provided, in its determination of SA Power Networks having met best endeavours.

The Commission notes that weather patterns during the 2016-17 period have caused more severe weather events, in addition to MEDs, than in previous years (confirmed by the Bureau of Meteorology). Such events can materially affect the performance of network reliability.

¹ Refer chapter two for further information on Major Event Days.

The Commission will continue to review trends in SA Power Networks' performance against all service standards, on a quarterly basis (or more frequently as required), to ensure the performance is appropriate and to ensure the early identification of potential systemic issues. In doing so, the Commission will liaise with the Office of the Technical Regulator and other relevant regulatory authorities as required.

The Commission reviews the reliability service standards that apply to SA Power Networks every five years, prior to the commencement of a new price regulation period. It is currently reviewing the reliability standards that will apply to SA Power Networks for the 2020-2025 period. The overall objective for this review is to establish reliability standards for SA Power Networks that are valued by its customers. This will include considering both average reliability standards and the effectiveness of the current Guaranteed Service Level (GSL) scheme.

ElectraNet

- ▶ In 2016-17, ElectraNet met all three restoration service standards.
- ▶ There was one transmission line failure during the year (not including the events of 28 September 2016 that was the subject of a separate investigation and report). ElectraNet met the exit point reliability standard timeframe for restoring the transmission line capacity after the line failure.
- ▶ The number of interruptions was relatively low, at nine. However, the system minutes off supply has increased significantly to 13 minutes due to severe weather events during the year (in particular, the storms which occurred on 8 September and 28 September 2016).

Australian Gas Networks

- ▶ No formal service standards have been set for Australian Gas Networks for the current regulatory period; however, the following three service level measures are monitored:
 - responsiveness of the leaks and emergencies telephone number,
 - responsiveness to public reporting of gas leaks, and
 - customer interruptions.

The Commission has reviewed Australian Gas Networks' performance and notes that there were no significant, protracted interruptions to customers supply on the gas distribution network in the year.

A detailed 'time series data' set for SA Power Networks, ElectraNet and Australian Gas Networks performance outcomes is available on the Commission's website.

1 Why and how we regulate South Australia's energy networks

The Essential Services Commission (**Commission**) is a statutory authority established as an independent economic regulator and advisory body under the Essential Services Commission Act 2002 (**ESC Act**).

The Commission publishes annual regulatory performance reports in relation to licensed energy networks operating in South Australia. These reports are intended to inform stakeholders and consumers of relevant service and operational performance outcomes during the year and to drive business accountability for performance. This 2016-17 regulatory performance report covers the period 1 July 2016 to 30 June 2017 and covers the following energy network businesses:

- ▶ SA Power Networks² (electricity distribution)
- ▶ ElectraNet Pty Ltd (**ElectraNet**)³ (electricity transmission)
- ▶ Australian Gas Networks Ltd (**Australian Gas Networks**)⁴ (gas distribution)

Monitoring and reporting on performance also helps the Commission to assess whether the regulatory framework is aiding positive consumer outcomes, consistent with the Commission's primary statutory objective.

1.1 The Commission's regulatory role

The Commission's role encompasses the regulation of reliability standards for SA Power Networks, ElectraNet and Australian Gas Networks, in accordance with the Australian Energy Market Agreement (**AEMA**). The AEMA provides that State and Territory Governments have the responsibility for developing reliability standards for those network businesses.

On that basis, the Commission establishes certain state-based customer service and reliability standards for network businesses operating within the national electricity market (SA Power Networks and ElectraNet) or providing natural gas network services (Australian Gas Networks). Those standards are prescribed in industry codes made and administered by the Commission under the ESC Act. Compliance with those industry codes is a condition of licence.

The Commission does not regulate revenue or other regulatory requirements for those businesses. Instead, that is done by the Australian Energy Regulator (**AER**), which takes the Commission's reliability standards into account when making regulatory (revenue) determinations for the businesses.

The Commission monitors network businesses' performance against those service reliability standards and other key metrics that impact on services to South Australian customers.

1.2 How the Commission regulates energy businesses

Under the Electricity Act 1996 (**Electricity Act**) and the Gas Act 1997 (**Gas Act**), the Commission licenses and monitors the performance of:

- ▶ electricity generators, transmitters and power system controllers
- ▶ electricity and gas distributors, and

² SA Power Networks, ABN 13 332 330 749

³ ElectraNet Pty Ltd, ABN 41 094 482 416

⁴ Australian Gas Networks Ltd, ABN 19 078 551 685

- ▶ off-grid electricity and gas retailers.

Table 1 summarises the Commission's functions under the Electricity Act and the Gas Act.

Table 1: Commission's regulatory functions in the electricity and gas industries

Legislation	Regulatory functions
Electricity Act 1996	<p>Electricity generation, transmission, distribution and off-grid suppliers:</p> <ul style="list-style-type: none"> ▶ licensing ▶ network service/reliability standard setting, and ▶ performance monitoring and reporting. <p>Electricity retail operations (NEM connected):</p> <ul style="list-style-type: none"> ▶ determination of the retailer solar photovoltaic Feed-in Tariff ▶ preparation and publication of Ministerial Energy Retail Pricing reports, and ▶ Retailer Energy Efficiency Scheme administration.
Gas Act 1997	<p>Natural gas retail operations:</p> <ul style="list-style-type: none"> ▶ preparation and publication of Ministerial Energy Retail Pricing reports, and ▶ Retailer Energy Efficiency Scheme administration. <p>Licensing of retail and distribution Liquefied Petroleum Gas (LPG) gas operations.</p> <p>Licensing of natural gas network operations, standard setting, performance monitoring and reporting.</p>

See Appendix 1 for information on the Commission's statutory responsibilities and its role in licensing and monitoring electricity and gas suppliers.

2 How SA Power Networks performed

Key points

- ▶ In 2016-17, SA Power Networks met all ten service standards.
- ▶ There were 128,859 Guaranteed Service Level (GSL) payments made totalling \$28.4 million. That was the highest amount since the regime's inception in 2005 (the previous highest amount was \$9.3 million in 2007-08) and over nine times the average annual payment amount over the past 12 years. Ninety seven percent of GSL payments were made for duration of interruptions, and were mainly related to protracted outages following the severe weather event on 27-28 December 2016 and five other severe weather events. The average payment per year since introduction has been \$3.03 million.
- ▶ There were nine Major Event Days⁵ in 2016-17 associated with six severe weather events, this is the highest recorded since 2005-06. MEDs was the highest contributor to interruptions on the distribution network since 2005-06. On average, the distribution network experiences three MEDs per year.

SA Power Networks operates the major South Australian electricity distribution network, which connects each of its 859,913 customers to the National Electricity Market (NEM).

SA Power Networks' distribution network covers an area of about 178,200 square km, along a coastline of over 5,000 km. The network extends to over 88,982 km, of which approximately 20 percent is underground. Approximately 70 percent of customers reside in the Greater Metropolitan Area of Adelaide, but 70 percent of the network infrastructure by length is required to deliver energy to the remaining 30 percent of customers.

The Commission sets two customer service standards (see Table 2) and eight network reliability standards (see Table 3) for SA Power Networks. These standards have two elements: first, SA Power Networks is set a target; second, it is required to use best endeavours to meet that target. Where a target is not met, the business can still meet the service standard if it can demonstrate to the Commission's satisfaction that best endeavours were used in attempting to meet the target.⁶

See Appendix 2 for information on the South Australian electricity distribution network and regulatory regime.

2.1 Definition of average annual reliability standards (duration and frequency)

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 on an annual average basis. The Commission has set the following network reliability standards:

⁵ Major Events Days 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.

⁶ Best endeavours means 'to act in good faith and use all reasonable efforts, skill and resources' to achieve an outcome in the circumstances.

► **Unplanned System Average Interruption Duration Index (USAIDI)**

This reliability index is the average duration (in minutes) of supply interruptions per customer per year. This standard is referred to as the 'duration of interruptions (USAIDI)' in this report. Note all graphs in the reports will only use the reference 'USAIDI'.

► **Unplanned System Average Interruption Frequency Index (USAIFI)**

This reliability index is the average number of supply interruptions per customer per year. This standard is referred to as the 'frequency of interruptions (USAIFI)' in this report. Note all graphs in the reports will only use the reference 'USAIFI'.

2.2 Categories of feeders used for monitoring network reliability

SA Power Networks' feeders are divided into four categories for the purposes of monitoring network reliability:

- **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 greater than 0.3 megavolt amps/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 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).

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 network reliability targets have been set based on historical performance for the years 2009-2010 to 2013-2014, reflecting generally high customer satisfaction with the prevailing levels of electricity supply reliability.

The targets exclude SA Power Networks' performance during abnormal weather and are referred to as normalised performance – the metrics are "normalised USAIDI" and "normalised USAIFI". This is consistent with the reliability methodology used in the AER's Service Target Performance Incentive Scheme.

2.3 How abnormal weather events are excluded from performance

The Commission excludes the effects of abnormal weather events when assessing the performance of SA Power Networks. In order to determine which days to exclude, the Commission uses a methodology developed by the Institute of Electrical and Electronics Engineers that categorises certain days as **Major Event Days (MED)**.

A MED is any day where the daily duration of interruptions (USAIDI) accrued on that day, exceeds a predetermined duration of interruptions (USAIDI) threshold. Any day that is a MED is a statistical outlier and is excluded from the performance assessment. Usually only a few MEDs occur per year and SA Power Networks' restoration performance during MEDs is assessed separately from daily operations.

The effects of other **severe weather** (that do not meet the MED classification threshold) are included in the performance assessment. In the event of ordinary storms and heatwaves, SA Power Networks is required to respond to customers in accordance with the reliability service standards set out in the

Electricity Distribution Code. Responsiveness to customers during severe weather is an important measure of reliability and part of the ordinary course of business for network operators.

The Commission notes that weather patterns during the 2016-17 period have resulted in more severe weather events, in addition to MEDs, than in previous years (confirmed by the Bureau of Meteorology). Such events can materially adversely affect the network reliability performance.



See Appendix 3 for further information on the network reliability standards.

2.4 SA Power Networks outperformed its customer service standards

For the customer service category, SA Power Networks outperformed the targets for responsiveness to telephone calls and written enquiries, and therefore met both service standards (Table 2).

SA Power Networks is required to use its best endeavours to achieve customer service standards for response to customer telephone calls and written enquiries. It received 606,753 telephone calls and 1,331 written enquiries in 2016-17.

Table 2: SA Power Networks performance against customer service standards











Standard	Target	2016-17 performance	Service standard met
Telephone calls answered within 30 seconds	85%	87%	
Written enquiries answered within five business days	95%	99%	

2.5 SA Power Networks met all of its network reliability standards

2.5.1 Summary of performance

In 2016-17, SA Power Networks met all 10 reliability standards. While it did not meet the reliability standard targets for the CBD and short rural feeder category, it was assessed as having used its best endeavours in attempting to meet those two missed targets. (Table 3).

Table 3: SA Power Networks performance against interruption service standards

Feeder category	Duration of interruptions (minutes/customer/year)			Frequency of interruptions (number/customer/year)		
	Target	2016-17 result	Service standard met	Target	2016-17 result	Service standard met
CBD	15	16	 *	0.15	0.11	
Urban	120	111		1.30	1.12	
Rural short	220	230	 *	1.85	1.71	
Rural long	300	264		1.95	1.43	
Overall State (implied target)	165	151		1.50	1.24	

*Service standard subject to best endeavours assessment. Refer to discussion in section 2 page 5.

Assessment of missed targets: CBD feeder and Short Rural feeder USAIDI performance

SA Power Networks stated that it used its best endeavours to meet the respective targets and provided evidence to support its assessment. The evidence presented by SA Power Networks included the following:

- ▶ The CBD feeders supply less than one percent of customers in South Australia and therefore, given that small customer base and the average nature of the standards, one-off events can have a significant statistical impact on performance outcomes.
- ▶ A switchgear failure contributed to 4.5 minutes of the total unplanned outages result of 16 minutes for the CBD feeders (against the target of 15 minutes). SA Power Networks had identified a fault during a planned annual inspection and the switchgear was scheduled for repair in July 2017. However, the switchgear failed on 18 June 2017, prior to the scheduled date. If that had not happened, then the service standard target would have been met.
- ▶ The CBD cable maintenance plans (including asset inspections) are in full compliance with SA Power Networks' Safety Reliability Maintenance and Technical Management Plan, approved by the Technical Regulator.
- ▶ It is not possible to inspect all underground cables, which are either installed in underground conduits or directly buried in the ground. SA Power Networks undertakes a program of in-service testing of high voltage cables; however, testing is limited to where specific access and safety conditions can be met.
- ▶ The result for the Short Rural feeder was due to a tree falling on power lines on 1 August 2016. This caused an interruption of 151 minutes, more than half the annual target of 230 minutes. SA Power Networks reported that it met all vegetation clearance obligations in relation to this incident.

Having reviewed and analysed the evidence noted above, the Commission accepts that SA Power Networks met the service standards for the CBD and Short Rural feeders, as it used best endeavours to meet the target (even though it ultimately did not do so).

In forming this view, the Commission also took into account that service standards relate to average annual performance for a particular feeder type and do not relate to one off events, and that the targets were narrowly missed.

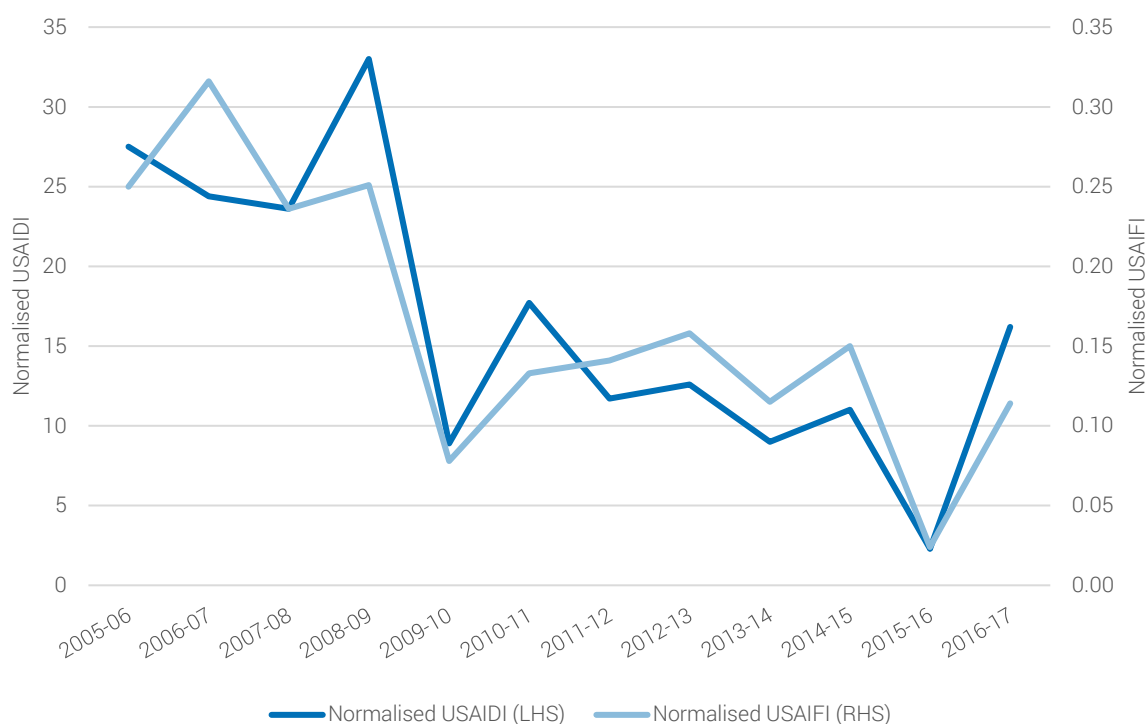
However, the Commission will be reviewing trends in performance on these feeders, on a quarterly basis, to ensure the maintenance of average network performance and the early identification of potential systemic issues.

2.5.2 Reliability performance where targets were not met

Figure 1 and Figure 2 show the normalised duration of interruptions (USAIDI) and frequency of interruptions (USAIFI) performance of SA Power Networks for the CBD and short rural feeder categories over the last 12 years. That is the two previous five-year regulatory periods and the first two years of the current regulatory period (the historical performance of the 2009-2010 to 2013-2014 five-year period, which was used to set the current regulatory period targets).

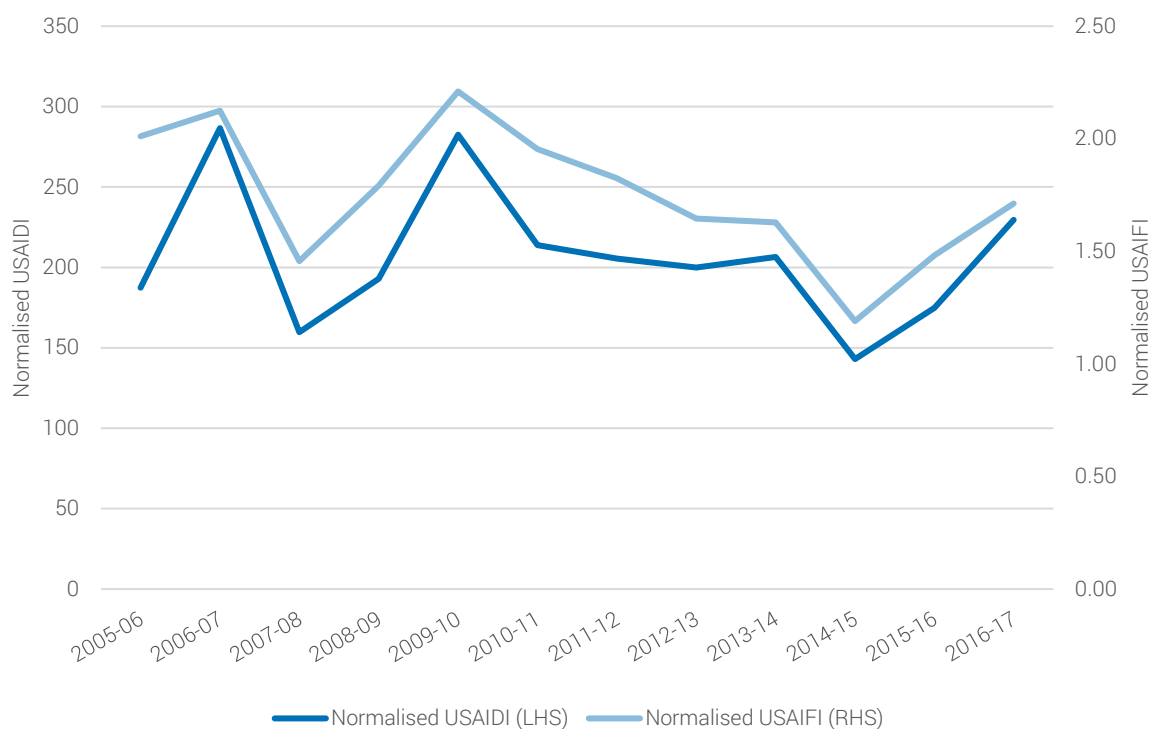
Prior to 2016-17, the CBD feeder normalised results had shown an overall downward trend.

Figure 1: CBD feeder category normalised USAIDI and USAIFI performance over the last 12 years



For 2015-16 and 2016-17, the rural short feeder results have shown an upward trend, previous to this the trend had been downwards.

Figure 2: Rural short feeder category normalised USAIDI and USAIFI performance over the last 12 years

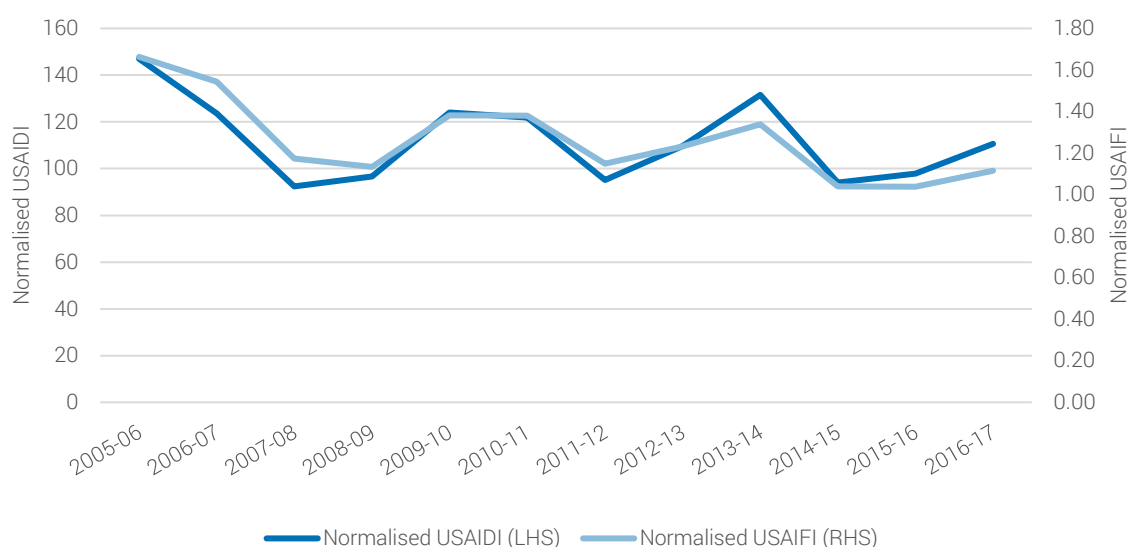


2.5.3 Reliability performance where targets were met

SA Power Networks met the service standard targets, and therefore the annual service standards, for the urban and rural long feeder categories. Figure 3 and Figure 4 show the normalised duration of interruptions (USAIDI) and normalised frequency of interruptions (USAIFI) performance of SA Power Networks for these categories over the last 12 years. That is the two previous five-year regulatory periods and the first two years of the current regulatory period (the historical performance of the 2009-2010 to 2013-2014 five-year period was used to set the current regulatory period targets). The rural long feeder duration of interruptions (USAIDI) and frequency of interruptions (USAIFI) results were the only feeder results not to experience slight increases.

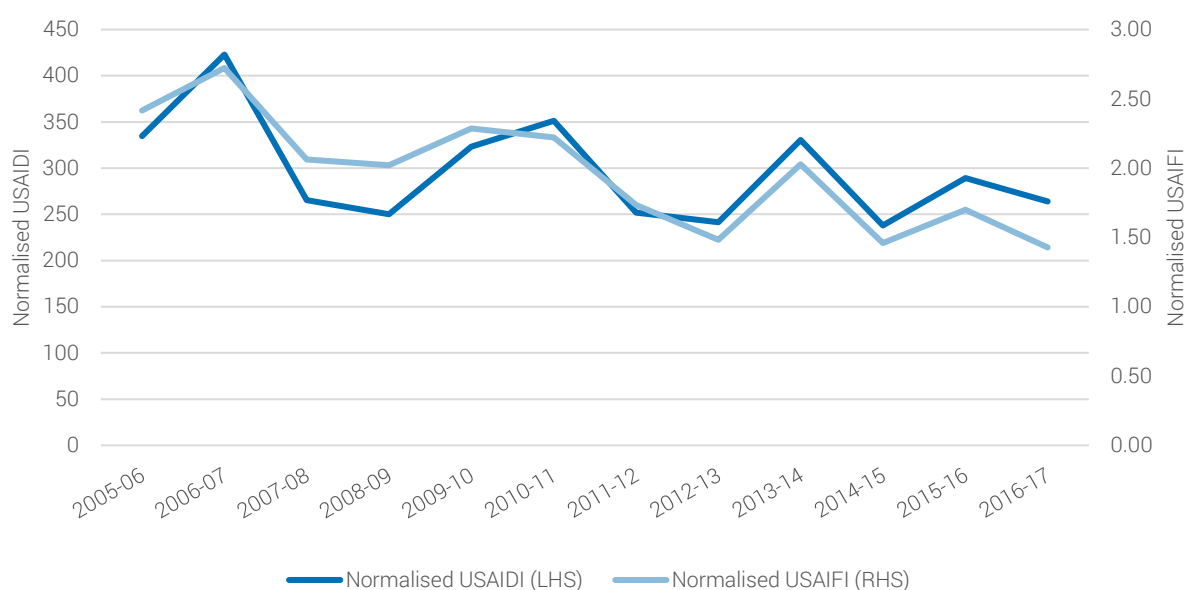
The overall trend for the urban feeder normalised results has been reasonably consistent.

Figure 3: Urban feeder category normalised USAIDI and USAIFI performance over the last 12 years



Overall, the trend for the rural long feeder has been downward.

Figure 4: Rural long feeder category normalised USAIDI and USAIFI performance over the last 12 years



2.5.4 Causes of interruptions were consistent with causes in previous years

Table 4 summarises the causes of interruptions to customers in 2016-17, by reference to the contribution to state-wide normalised duration of interruptions (USAIDI) of each cause. Note that the impact of MEDs is excluded and therefore the table shows the underlying causes of interruptions.⁷ The split of causes is generally consistent with the average over the last six years, prior to 2016-17, with planned interruptions accounting for the largest proportion (33 percent).

Table 4: Interruption causes contributing to state-wide USAIDI (excluding MEDs) in 2016-17

Interruption cause	Proportion of USAIDI	Average for last six years
Weather	23%	21%
Equipment failure	23%	23%
Planned	30%	33%
Other (unplanned)	24%	23%

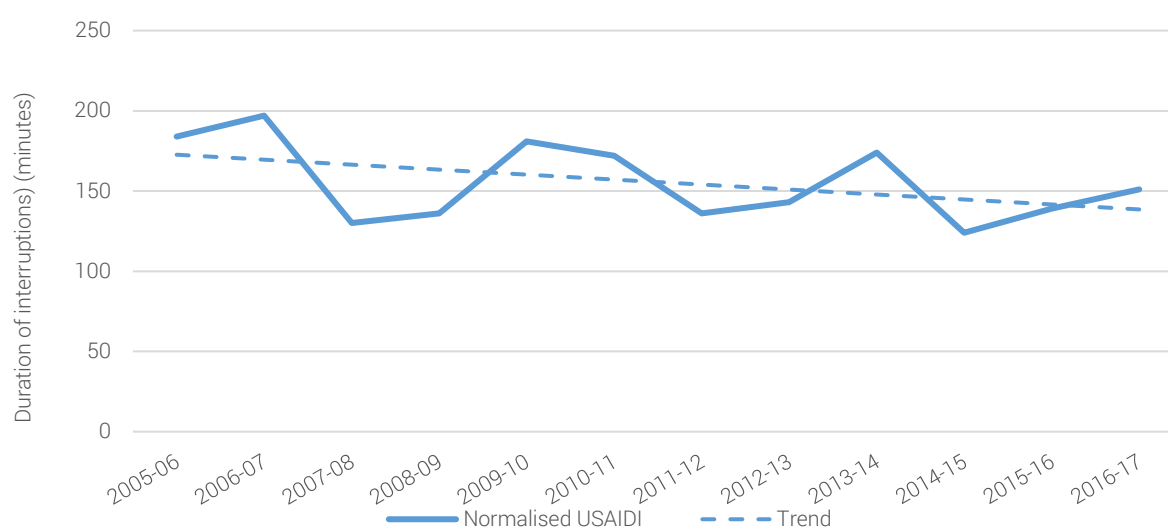
As noted above, the service standards for duration and frequency of interruptions are for unplanned interruptions only, noting that the Electricity Distribution Code requires SA Power Networks to use its best endeavours to minimise interruptions or limitations to supply caused by planned interruptions.

It is expected that there will be some variability in non-weather impacted performance from year to year, and the best endeavours framework allows individual events and circumstances to be analysed when assessing whether or not service standards have been met.

2.5.5 Long term normalised performance

Figure 5 shows normalised state-wide average duration of interruptions between 2005-06 and 2016-17 (normalised USAIDI). The effect of MEDs has been removed for each year so that underlying performance over time can be assessed.

Figure 5: Normalised State-wide USAIDI performance over the last 12 years⁸



⁷ In prior Regulatory Performance Reports, data did not exclude MEDs.

⁸ 2006-07 to 2009-10 duration of interruptions are for the high voltage network only. 2010-11 onwards includes duration of interruptions on the low voltage network. The Commission does not set a service standard for state-wide performance.

State-wide normalised duration of interruptions (USAIDI) in 2016-17 was slightly higher than the average observed over the last 11 years, but the overall trend is downwards. State-wide normalised frequency of interruptions (USAIFI) was also slightly higher in 2016-17 than the average over the 11-year period.

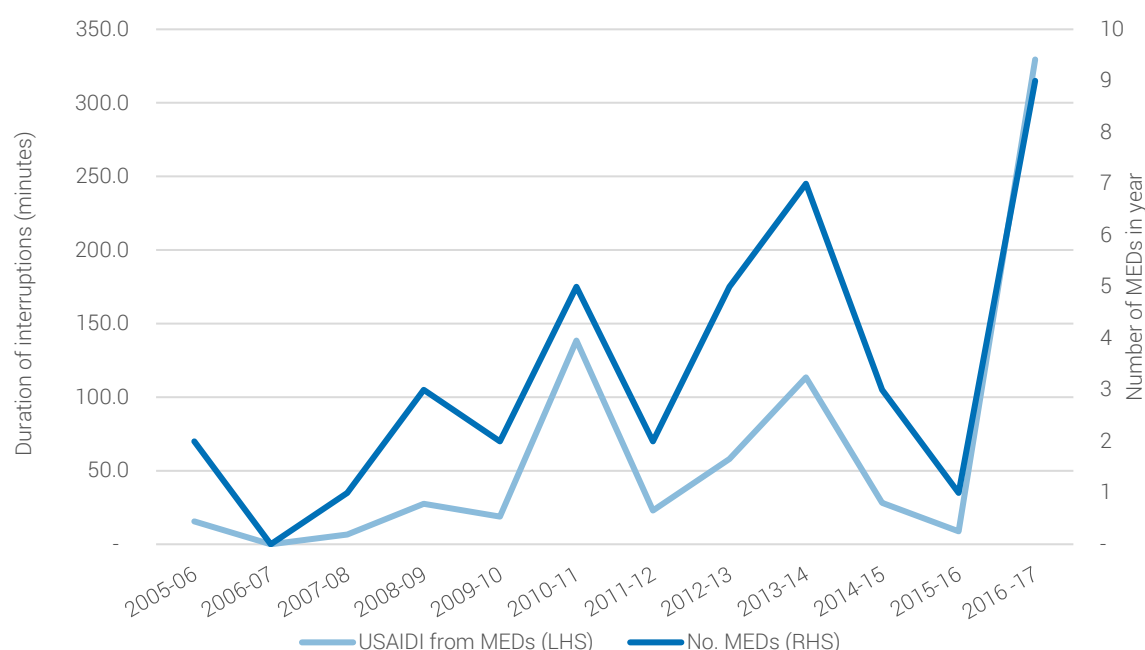
2.5.6 More severe weather impacts in 2016-17

In 2016-17, there were nine MEDs which contributed 329.5 minutes to duration of interruptions (USAIDI), compared to the average of three MEDs per annum over the 11-year period, 1 July 2006 to 30 June 2016, contributing an annual average 43 minutes to duration of interruptions (USAIDI). This was the highest contribution to interruptions from MEDs since 2013-14 (Figure 6).

Severe weather events can vary significantly in their strength and can have differing effects on the distribution network, depending on their location and duration. The increasing impact of severe weather events on the network over time appears to be caused by a combination of greater severity and greater asset damage resulting from each event.

In assessing the performance of SA Power Networks in restoring customer supply following a MED, factors that the Commission considers include the time taken to restore supply (considering the relative severity of the event) and the contribution of equipment failure to the duration of the interruption.

Figure 6: MEDs and state-wide impact of MEDS on duration of interruptions performance over the last 11 years



2.5.7 Regional performance normalised is consistent with previous years, except for Adelaide Business Area

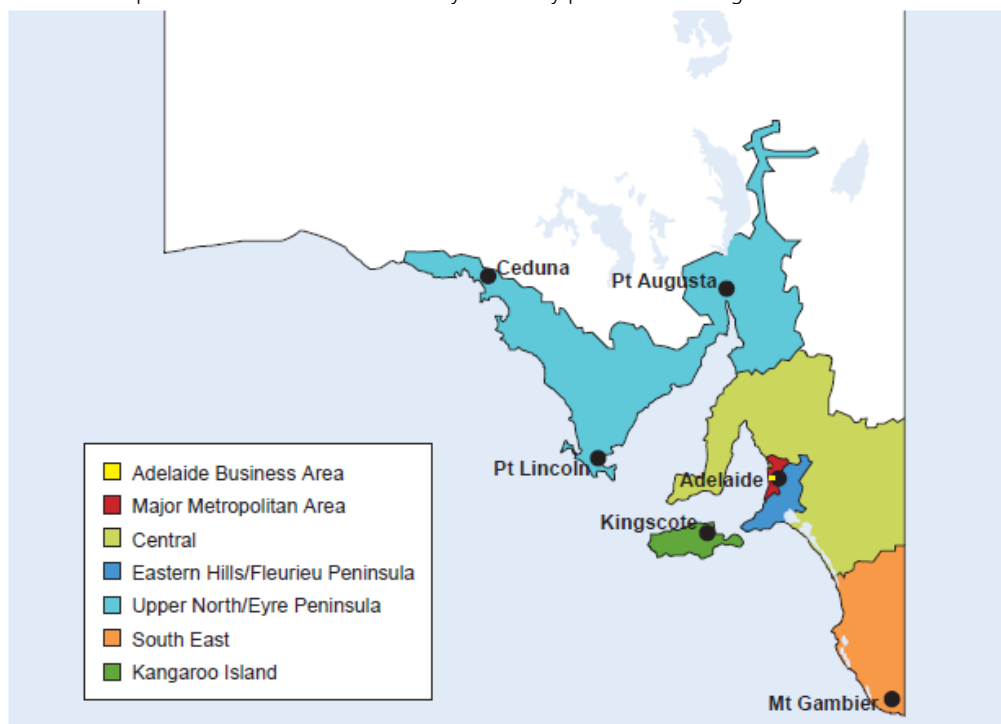
The Commission recognises that customers seeking to understand the levels of reliability they receive may be unaware of the type of network feeder to which they are connected. The Commission also continues to review the reliability performance outcomes in the seven geographic regions (see Map 1).

Normalised reliability performance excludes weather events classified as MEDs. It does not exclude severe weather events; however, such events can still materially affect the performance of a regions outage results. The weather patterns during 2016-17 (confirmed by the Bureau of Meteorology) have caused more of these severe weather events than was the case in the previous few years.

The following sections summarise the reliability performance for the seven geographic regions of the State covered by the reporting regime (noting that standards are not set for regions; they are set for feeder types as explained in Section 2.2 page 6).

See Appendix 4 for information on regional reliability monitoring.

Map 1: South Australian electricity reliability performance regions



See Appendix 5 for individual maps of Adelaide Business Area and the Major Metropolitan Area.

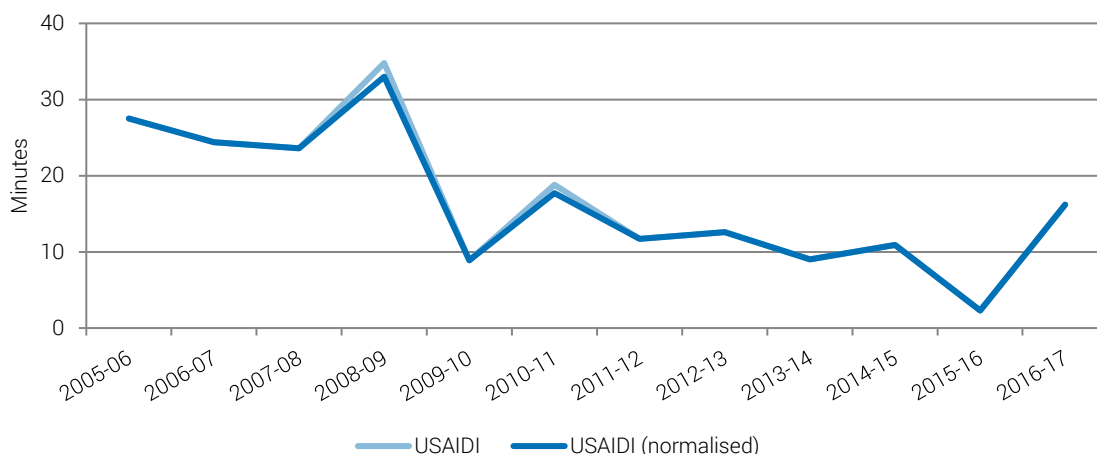
Normalised duration excludes those severe weather events, classified as MEDs, as such events can materially affect the performance of the region. The following graphs show the normalised performance for the seven regions in South Australia (excluding MEDs).

Adelaide Business Area

The Adelaide Business Area covers Adelaide CBD bordered by the parklands. It accounts for 0.6 percent of SA Power Networks' customers and comprises 0.3 percent of the distribution system by length. The distribution network is about 97 percent underground and is therefore not normally affected by severe weather.

Figure 7 shows that SA Power Networks' normalised duration of interruptions (USAIDI) performance had been trending downwards, until this year.

Figure 7: Adelaide Business Area duration of interruptions performance (minutes)

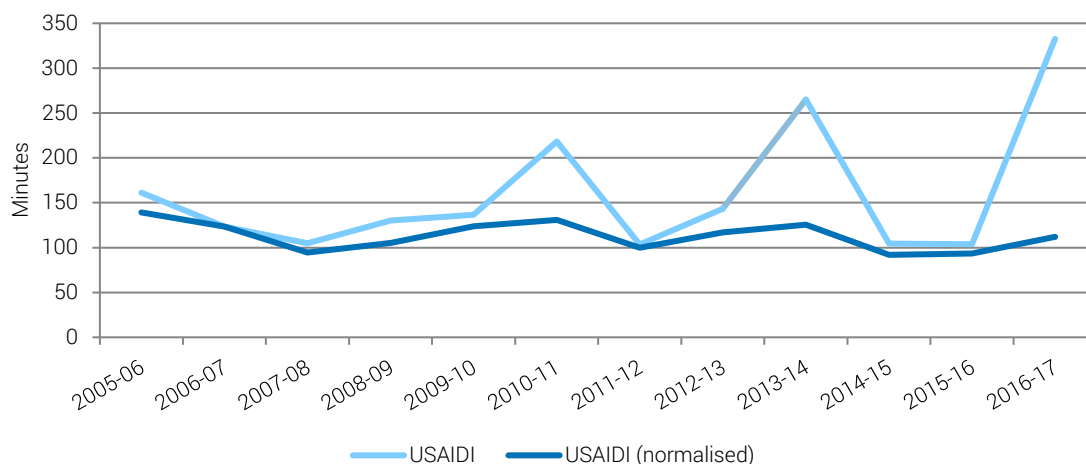


Major Metropolitan Areas

The Major Metropolitan Areas region supplies 70 percent of SA Power Networks' customers and comprises 30 percent of the distribution system by length, including most of the Adelaide region and other major centres outside of the Adelaide region. Approximately 44 percent of the distribution network in this region is underground.

Figure 8 shows that SA Power Networks' normalised duration of interruptions (USAIDI) performance in 2016-17 was in line with previous years.

Figure 8: Major Metropolitan Area's duration of interruptions performance (minutes)

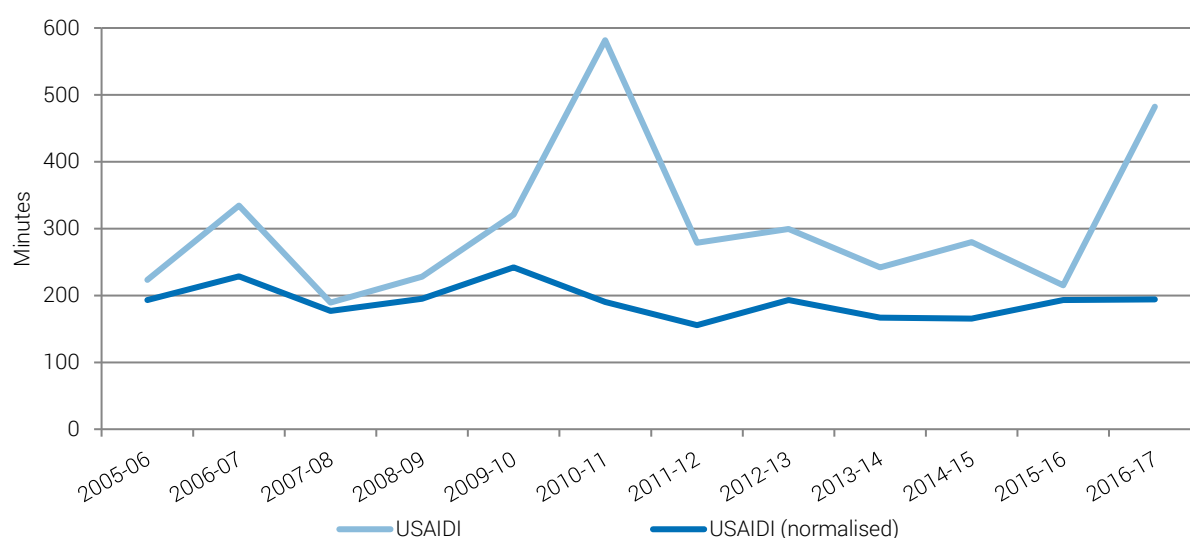


Central region

The Central region covers the Barossa, Mid-North, Riverland and Murraylands. The region accounts for 12 percent of SA Power Networks' customers but comprises 28 percent of the distribution system by length. The distribution network in the Central region is nine percent underground.

Figure 9 shows that SA Power Networks' normalised duration of interruptions (USAIDI) performance in 2016-17 was in line with previous years.

Figure 9: Central region duration of interruptions performance (minutes)

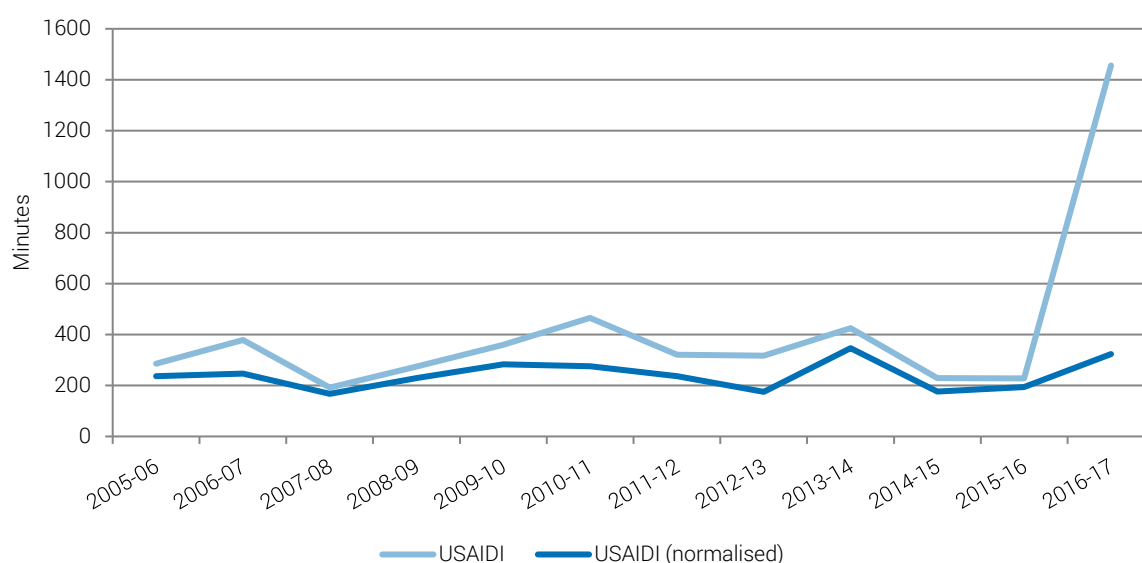


Eastern Hills/Fleurieu Peninsula

The Eastern Hills/Fleurieu Peninsula supplies nine percent of SA Power Networks' customers and comprises nine percent of the distribution system by length. The distribution network is 21 percent underground.

Figure 10 shows that SA Power Networks' normalised duration of interruptions (USAIDI) performance in 2016-17 increased in comparison with last year's performance; this can be largely explained by the severe weather patterns experienced in the region.

Figure 10: Eastern Hills/Fleurieu Peninsula duration of interruptions performance (minutes)

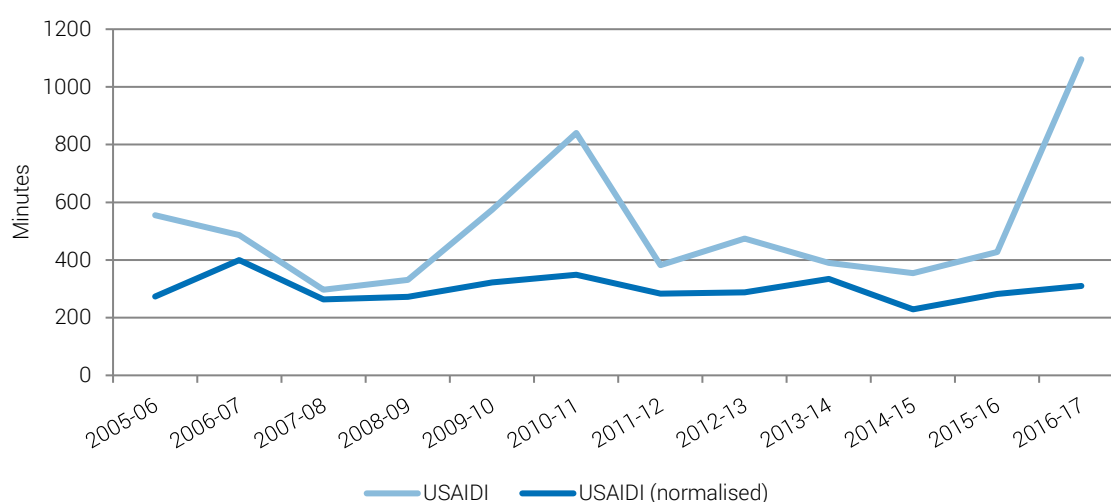


Upper North/Eyre Peninsula

The Upper North/Eyre Peninsula region accounts for five percent of SA Power Networks' customers but comprises 18 percent of the distribution system by length. The distribution network is only four percent underground.

Figure 11 shows that SA Power Networks' normalised duration of interruptions (USAIDI) performance in 2016-17 was in line with previous years.

Figure 11: Upper North/Eyre Peninsula duration of interruptions performance (minutes)

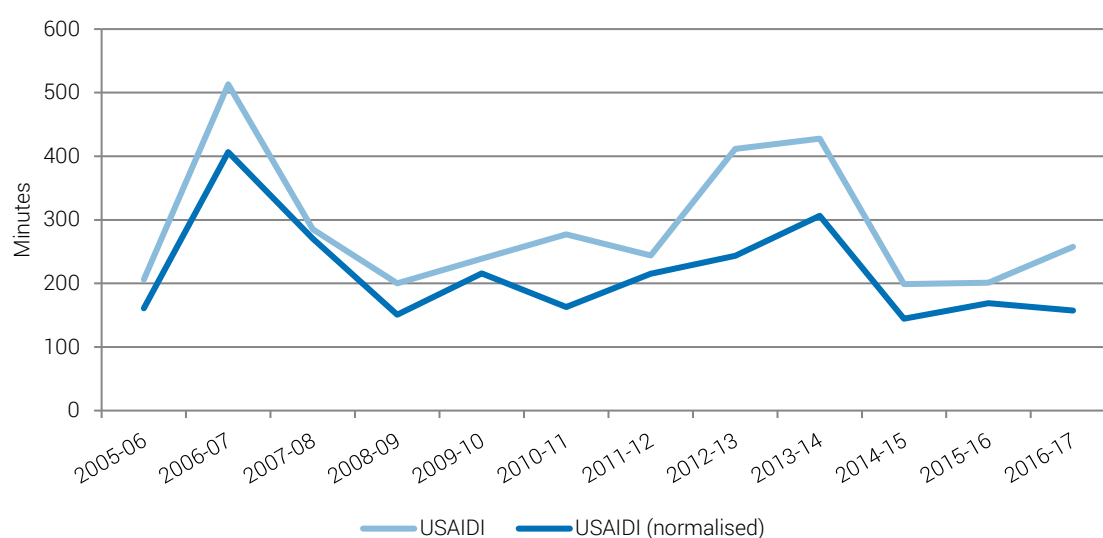


South East

The South East region supplies four percent of SA Power Networks' customers but comprises 11 percent of the distribution system by length. The distribution network is only seven percent underground.

Figure 12 shows that SA Power Networks' normalised duration of interruptions (USAIDI) performance in 2016-17 was in line with the last two years.

Figure 12: South East duration of interruptions performance (minutes)

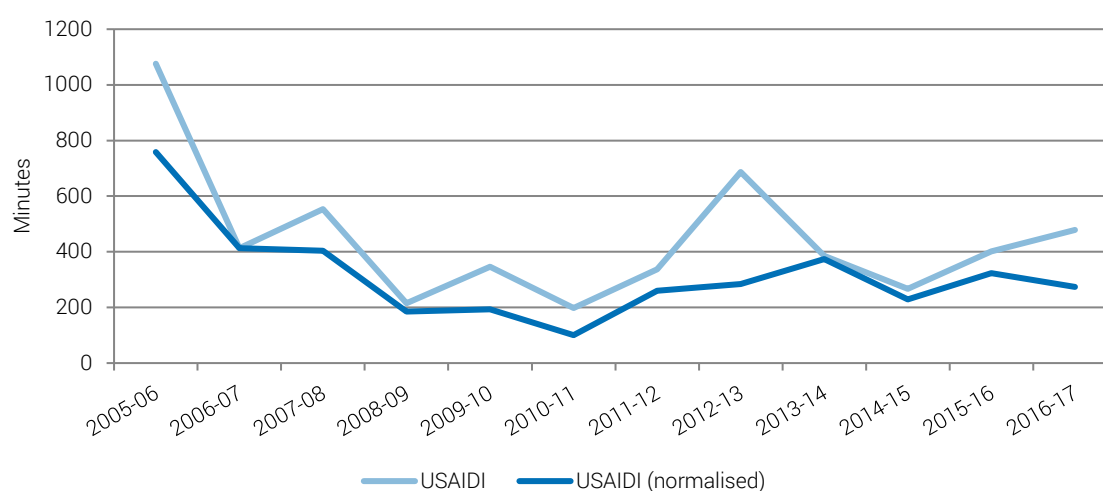


Kangaroo Island

The Kangaroo Island network supplies 0.5 percent of SA Power Networks' customers and comprises 1.7 percent of the distribution system by length. The distribution network is only seven percent underground.

Figure 13 shows that SA Power Networks' normalised duration of interruptions (USAIDI) performance in 2016-17 was in line with the last two years.

Figure 13: Kangaroo Island duration of interruptions performance (minutes)



2.5.8 South Australia low reliability distribution feeders

In assessing performance, the Commission reviews the number of Low Reliability Distribution Feeders (LRDF) and customers affected in any given year. The review process focuses on individual feeder performance (including during MEDs) in poorly served parts of the network over two or more consecutive years, thus reducing the variability impact of individual events in any one year (for example, storms or abnormal incidents).

In 2016-17, there were 91 feeders that qualified as LRDFs affecting 23,394 customers (less than three percent of the customer base), compared to 71 feeders affecting 18,032 customers in 2015-16 (Table 5 and Table 6). The increase in the number of LRDFs in 2016-17 was largely due to the effects of severe weather events during the year, particularly on rural long feeders in the Central, Eastern Hills/Fleurieu Peninsula and Upper North and Eyre Peninsula regions.

Table 5: Low reliability performing feeders in 2013-14 to 2016-17 (by feeder category)

Feeder category	2013-14		2014-15		2015-16		2016-17	
	No. of feeders	No. of customers	No. of feeders	No. of customers	No. of feeders	No. of customers	No. of feeders	No. of customers
CBD	2	195	0	0	1	7	0	0
Urban	18	25,309	10	12,450	11	12,388	12	13,585
Rural Short	24	4,733	10	1,872	8	1,688	23	5,180
Rural Long	101	11,539	88	9,289	51	3,949	56	4,692
State-wide	145	41,776	108	23,611	71	18,032	91	23,394

Table 6: Low reliability performing feeders in 2013-14 to 2016-17 (by region)

Region	2013-14		2014-15		2015-16		2016-17	
	No. of feeders	No. of customers	No. of feeders	No. of customers	No. of feeders	No. of customers	No. of feeders	No. of customers
Adelaide Business Area	2	195	0	0	1	7	0	0
Major Metropolitan Areas	24	26,269	15	12,763	11	12,388	17	14,223
Central	42	4,149	41	4,483	18	1,444	14	1,293
Easter Hills/Fleurieu Peninsula	19	5,624	12	3,414	4	1,729	10	3,144
Upper North & Eyre Peninsula	36	2,492	30	2,073	32	1,857	41	3,979
South East	19	2,755	8	669	4	490	5	393
Kangaroo Island	3	292	2	209	1	117	2	246
State-wide	145	41,776	108	23,611	71	18,032	91	23,408

One feeder supplying 36 customers has been classed as a LRDF for seven or more consecutive years, two feeders, supplying 108 customers, have been classed as LRDFs for five or more consecutive years, and a further three feeders, supplying 184 customers, have been classed as LRDFs for four or more consecutive years Table 7.

Of those six feeders, five demonstrated decreased performance in 2016-17 than in 2015-16. Nine feeders that were LRDFs for the four previous years, improved performance and were no longer categorised as LRDFs in 2016-17.

SA Power Networks has provided action plans for all of the LRDFs, which the Commission is reviewing. In some cases, no economically viable technical improvements have been identified; in others, remedial works are planned for 2018 and some will be included in the 2020-25 Low Reliability Feeder reset proposal.

Table 7: Number of feeders classed as low reliability distribution feeders for consecutive years

Year	Number of feeders - consecutive years as LRDF					
	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years
2016-17	30	6	3	2	not applicable	1
2015-16	14	6	6	2	1	not applicable
2014-15	28	12	5	5	not applicable	not applicable
2013-14	31	13	15	not applicable	not applicable	not applicable
2012-13	25	31	not applicable	not applicable	not applicable	not applicable

See Appendix 6 for information on other network reliability performance measures.

2.6 SA Power Networks paid the highest level of GSL payments since the introduction of the scheme

Under the Electricity Distribution Code, SA Power Networks is required to make Guaranteed Service Level (GSL) payments to customers who have received service that is worse than a pre-determined duration outage threshold (see Table 8).

While GSL payments are directed at individual customers, they also provide a financial incentive for SA Power Networks to assess the trade-off between making GSL payments and undertaking capital and/or operating expenditure to address poor performance.

Customers ultimately fund GSL payments through distribution tariffs, in accordance with regulatory (revenue) determinations made by the AER.

GSL payments are made in recognition of the inconvenience caused to customers, rather than attempting to reflect the full (and different) costs incurred by individual customers in response to a long interruption. SA Power Networks administers a separate customer compensation scheme for damage or losses resulting from an incident associated with its electricity distribution network, which relate to loss due to negligence or bad faith.

The categories of GSL payments are:

- ▶ timeliness of appointments
- ▶ promptness of new connections
- ▶ timeliness of street light repairs
- ▶ duration of supply interruption, and⁹
- ▶ frequency of supply interruption.

From 2015-16, a new long duration supply interruption GSL payment of \$605 for single interruptions in excess of 48 hours was introduced. The GSL payment amounts for the 2015-2020 regulatory period were increased to reflect movements in the Consumer Price Index since the GSL regime was first established in 2005 (see Table 8).

2.6.1 GSL payments in 2016-17

In 2016-17 there were 125,462 GSL payments made totalling \$28.4 million (Figure 14). That was the highest amount since the regime's inception in 2005 (the previous highest amount was \$9.3 million in 2013-14, the lowest was 2007-08 with \$0.5 million paid) and over nine times the average annual payment amount over the past 11 years.

Ninety seven percent of GSL payments (Figure 15) were made for duration of interruptions, and were mainly related to protracted outages following the severe weather event on 27-28 December 2016.

The average total annual payment (prior to 2016-17) since the scheme's introduction has been \$3.03 million.

Most GSL payments relate to the duration of interruptions during major severe weather events. Table 8 details the duration of interruptions, GSL thresholds and levels of payments.

⁹ While SA Power Networks' reliability targets exclude performance during severe or abnormal weather events that qualify as MEDs, GSL payments are made to customers that experience interruptions during MED excluded events.

Table 8: Duration of interruption GSL thresholds and payment amounts

	Threshold 1	Threshold 2	Threshold 3	Threshold 4	Threshold 5
Duration of interruption (hours)	>12≤ 15	>15≤ 18	>18≤ 24	>24≤ 48	>48
Payment	\$100	\$150	\$200	\$405	\$605

Figure 14: GSL payments by category

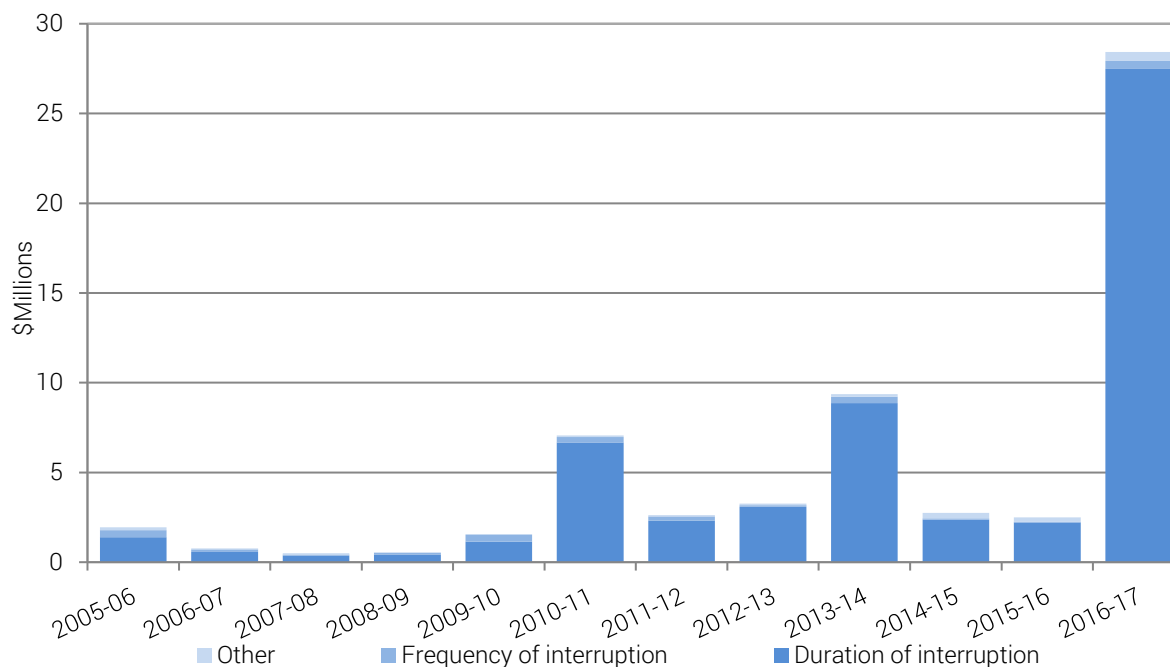
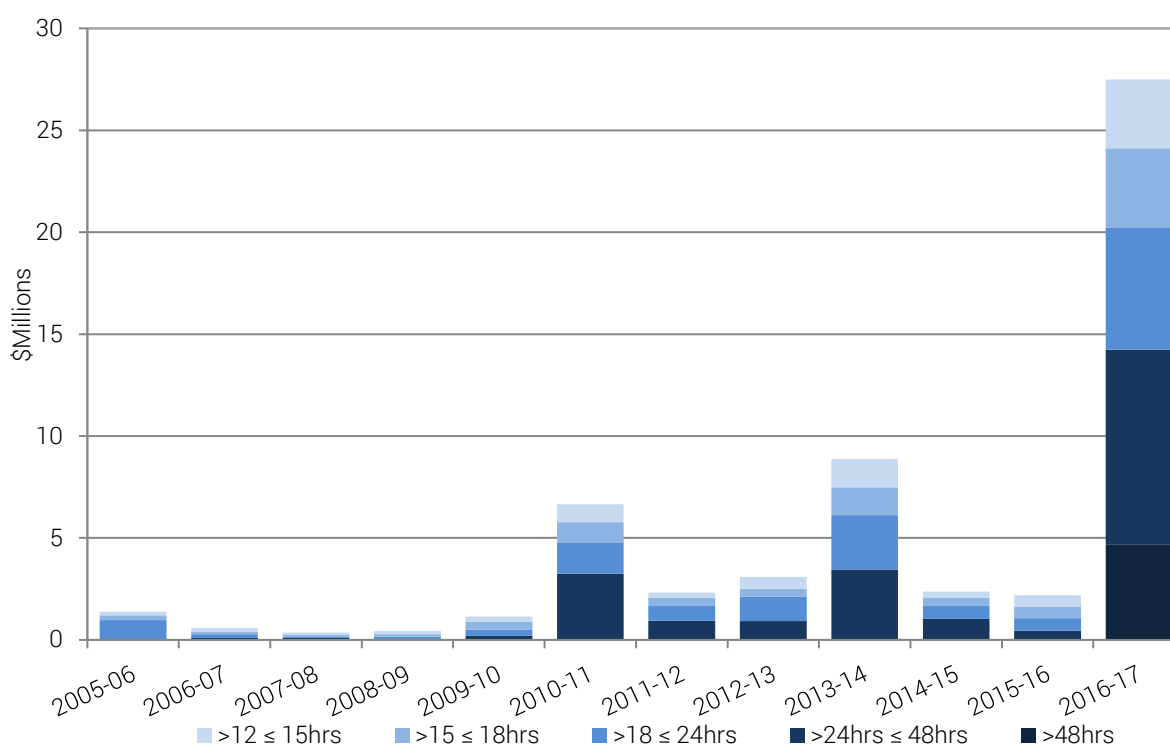


Figure 15: GSL duration payments 2005-06 to 2016-17



2.6.2 Street light repair performance declined in major metropolitan and regional areas

SA Power Networks is obliged to use its best endeavours to repair faulty street lights for which it is responsible. The timeframe is within five business days in major metropolitan and major regional centres and within 10 business days in regional areas.

The proportion of street lights SA Power Networks repaired within these timeframes declined in the major metropolitan area to its lowest level since 2010-11. This performance was significantly affected by nine MEDs, which impacted on the level of resources available to repair street lights. Eighty nine percent of street light faults in the major metropolitan and major regional centres were repaired within five working days. In regional areas, over 99 percent of street light faults were repaired within 10 working days.

However, in major metropolitan and major regional centres, the length of time taken to repair those street lights not fixed within five business days has increased over the last four years. This suggests that a small number of street lights are remaining broken for extended periods. As a result, SA Power Networks paid \$442,600 in GSL payments to customers where it did not complete repairs within the required time.

2.7 Compliance

The Commission 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 2016.¹⁰

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

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

SA Power Networks provided details on its proposed three-stage improvement strategy, as shown below (Table 9).

¹⁰ The Commission's *Review of 28 September 2016 state wide power system outage*, available at: <http://www.escosa.sa.gov.au/projects-and-publications/projects/electricity/28-september-2016-system-black-event/28-september-2016-state-wide-power-system-outage>

Table 9: SA Power Networks Responses to Review

SA Power Networks Initial Strategy Response to the Commission	Current Status
<p>Strategy 1 - Immediate proposal (by June 2017)</p> <p>In the short term, our messaging tool will be disabled so as <u>not</u> 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.</p>	<p>SA Power Networks has reported that a tool has been developed that allows for automatic restoration messaging to be turned off when required. The Customer Message Manager tool has also been modified to allow SA Power Networks to place a 'No Estimated Restoration Time' notification when a severe weather event occurs.</p>
<p>Strategy 2 - Next six months (by December 2017)</p> <p>We are 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. We are also looking to update the messaging within Power@MyPlace to allow greater flexibility in messaging and provide messages that are more meaningful to customers. The required re-programming will occur over the next three months.</p>	<p>SA Power Networks has reported that it now has the capability to send ad-hoc messaging and have done so for several minor outages, especially when it has become aware of delays in the restoration process (typically due to weather conditions or access in difficult terrain). When reviewing the Power@MyPlace functionality, SA Power Networks opted to re-write its Customer Message Manager tool, instead of modifying the existing messaging, to provide greater flexibility for communication during avalanche conditions. SA Power Networks stated that this is a more complex and larger body of work and is expected to be completed by the end of 2017.</p>
<p>Strategy 3 - 12 to 24 months (by June 2019)</p> <p>We are currently in the process of a Request for Tender for a Customer Relationship Management (CRM) tool. The tool will allow us to provide customers with more tailored and integrated information that better meets our needs to enhance service during times of unplanned and planned interruptions.</p>	<p>SA Power Networks has reported that it has completed an extensive evaluation process for the preferred CRM solution and is currently undergoing discussions with a preferred supplier, around terms and conditions for the solution.</p>

2.8 Review of SA Power Networks' service standards

The Commission reviews the reliability service standards that apply to SA Power Networks every five years, prior to the commencement of a new price regulation period. It is currently reviewing the reliability standards that will apply to SA Power Networks for the 2020-2025 period. The overall objective for this review is to establish reliability standards for SA Power Networks that are valued by its customers. This will include considering both average reliability standards and the effectiveness of the current Guaranteed Service Level (GSL) scheme.

3 How ElectraNet performed

Key points

- ▶ In 2016-17, ElectraNet met all of its three restoration service standards.
- ▶ ElectraNet reported increases in both the number and average duration of supply interruptions, primarily due to the severe weather events.
- ▶ There was one transmission line failure for the year (not including the events of 28 September 2016 that was the subject of a separate investigation and report). For this failure, ElectraNet met the exit point reliability standard timeframe for restoring the transmission line capacity after the line failure.

ElectraNet is the monopoly service provider of electricity transmission services in South Australia. The electricity transmission network in South Australia extends across approximately 200,000 square kilometres, and includes 88 high voltage substations and 5,600 route kilometres of transmission lines.

Under the Electricity Transmission Code, ElectraNet must comply with obligations relating to quality, safety and reliability of electricity transmission (including minimising supply interruptions and informing customers about planned outages).

See Appendix 7 for explanation of South Australia's electricity transmission network, regulatory regime and transmission reliability standards.

3.1 ElectraNet's transmission services were reliable despite the impact of severe weather events

ElectraNet reported increases in both the number and average duration of supply interruptions in 2016-17 due to severe weather events, in particular, the storm events on the 8 September and 28 September 2016.

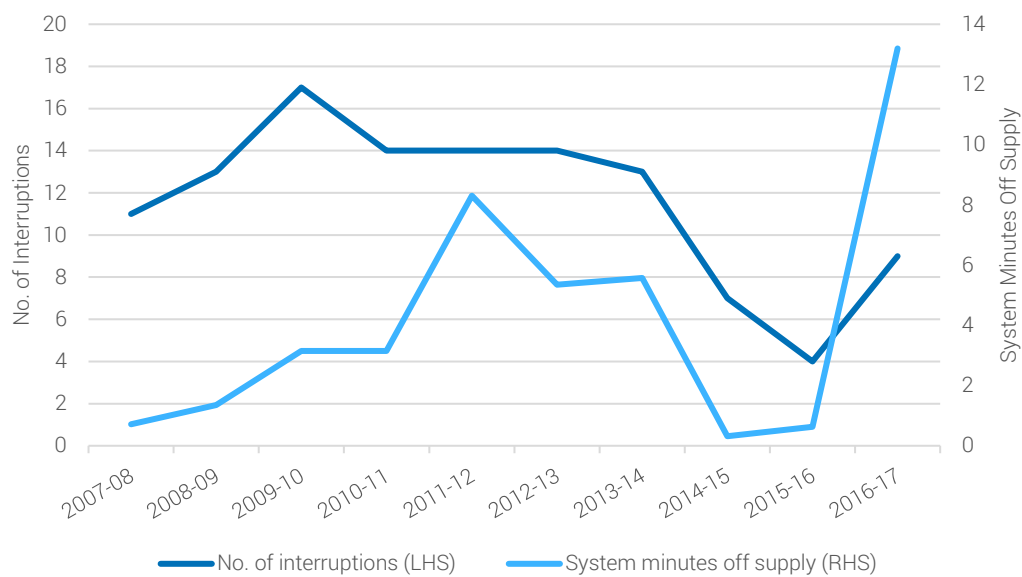
ElectraNet reported nine power system interruptions in 2016-17, compared to four interruptions reported for the previous year. On average, twelve interruptions occur each year, based on ElectraNet's nine-year historical reliability performance.

The 13 System Minutes Off Supply reported by ElectraNet in 2016-17 was significantly higher than previous years (Figure 16) due to impact from severe weather events. However, none of those events resulted in protracted interruptions for the majority of ElectraNet's customers - except for the 28 September 2016 state-wide power outage. This event was the subject of a separate report published in June 2017, available on the Commission's website.¹¹

There was one transmission line failure in 2016-17, occurring on the Yadnarie, Wudinna, Port Lincoln, Middleback 132kV line on 8 September 2016, due to broken insulators caused by storm activity. ElectraNet restored line capacity within the exit point reliability standard timeframe specified in the Electricity Transmission Code. No transformer failures were reported in the year.

¹¹ Refer to the Commission's Review of 28 September 2016 state-wide power system outage, available at: <http://www.escosa.sa.gov.au/projects-and-publications/projects/electricity/28-september-2016-system-black-event/28-september-2016-state-wide-power-system-outage>.

Figure 16: Number of transmission supply interruptions per annum and associated minutes off supply



3.1.1 Heywood and Murraylink interconnectors performed as expected

The Commission licenses and monitors compliance with licence requirements for the two regulated interconnectors between the South Australian and Victorian regions of the National Electricity Market (NEM); the Heywood interconnector, of which the South Australia section is operated by ElectraNet, and the Murraylink interconnector, operated by the Murraylink Transmission Company.

ElectraNet and the Murraylink Transmission Company did not report any non-compliances with its licence requirements in 2016-17.

The Australian Energy Market Operator (AEMO) provides information regarding energy flows across the two interconnectors.¹²

3.2 Compliance

The Commission conducted a review of ElectraNet's compliance with its transmission licence obligations and its performance against reliability standards prior to, during and after the 28 September 2016 state-wide power system outage event.

It is evident that the severe weather event, outage and damage to transmission services were significant and resulted in substantial loss of electricity supply to residential customers and businesses. Notwithstanding the significant impact on customers, the information available suggests that, overall, ElectraNet remained compliant with the conditions of its licence and the Code. However, the Commission has identified areas for improvement, to promote the long-term interests of consumers with regard to the price, reliability and quality of essential services.

ElectraNet's responses to the Commission's recommendations are summarised in Table 10.

¹² Refer to AEMO's report available at: <http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Congestion-information/Network-status-and-capability> for links regarding interconnector capability performance.

Table 10: ElectraNet's Compliance

Commission recommendations	ElectraNet's response
<p>Recommendation 1</p> <p>The Commission requested that ElectraNet and AEMO review restart procedures to ensure that the Port Lincoln network support arrangement can begin operation as soon as possible in the event of a black system condition.</p> <p>Status: Complete</p>	<p>ElectraNet has responded that the restart plan has been updated and AEMO have updated their documentation. The agreed process will still require ElectraNet requesting the approval of AEMO to commence the required switching.</p>
<p>Recommendation 2</p> <p>The Commission requested that ElectraNet coordinate with Synergen Power Pty Ltd to ensure that an inspection of all bolts, gaskets and seals at the Port Lincoln Power Station is performed on a periodic basis.</p> <p>Status: Complete</p>	<p>ElectraNet has responded that its inspection and testing procedures will align with Synergen's maintenance plan. Synergen will provide relevant documentation to ElectraNet evidencing the inspections undertaken and where, following inspection, maintenance actions are required, the timeframe for undertaking the maintenance. Synergen have supplied some initial reports, but further documentation is still to be received.</p>
<p>Recommendation 3</p> <p>The Commission will review and consult on amendments to the Electricity Transmission Code with regard to the availability of network support arrangements.</p> <p>Status: To completed by 30 June 2018</p>	<p>ElectraNet has engaged with the Commission in the consultation phase.</p>
<p>Recommendation 4</p> <p>The Commission will review and consult on additional reporting requirements regarding the availability of network support arrangements.</p> <p>Status: To completed by 30 June 2018</p>	<p>ElectraNet has engaged with the Commission in the consultation phase.</p>
<p>Recommendation 5</p> <p>The Commission requested that ElectraNet report on how its Risk Management System is applied at an operational level including the integration of the Asset Risk Management Framework. In addition, the Commission requested that the Risk Management chapter of the Management Plan is included in the annual compliance audit for 2017 and that the audit report is provided to the Commission following completion of the audit.</p> <p>Status: Complete</p>	<p>ElectraNet has confirmed that it has implemented a number of operational and business improvements. ElectraNet reported it is also in the process of updating the Asset Risk Management Framework to include explicit references and direct linkage to ElectraNet's Risk Management System in the document's scope, overview and other sections. The Commission has been provided with a copy of the results of the annual compliance audit for 2017, which found that ElectraNet complied with all audited obligations.</p>

4 How Australian Gas Networks performed

Key points

- ▶ Australian Gas Networks responded to the majority of reported leaks and emergencies in a timely manner.
- ▶ There were no significant, protracted interruptions to customers supply on the gas distribution network during 2016-17.
- ▶ The long-term mains replacement program undertaken by Australian Gas Networks has been successful in reducing water ingress associated with ageing infrastructure and the risks of gas leakages

Australian Gas Networks is the monopoly service provider of reticulated natural gas distribution services in South Australia. The gas distribution network in South Australia comprises 8,187 km of gas mains, serving over 441,913 customers.

Under the Gas Distribution Code, Australian Gas Networks must comply with obligations relating to quality, safety and reliability of gas distribution (including maintaining gas pressure in the system and the capability of the distribution system).

- ▶ See Appendix 8 for explanation of South Australia's gas distribution and regulatory framework.

4.1 Gas distribution performance by Australian Gas Networks was reliable

Although the Commission does not set service standards for Australian Gas Networks, the following three service performance measures are monitored.

4.1.1 Responsiveness of the leaks and emergencies telephone number

Of the 15,567 calls to the leaks and emergencies telephone number, 94 percent were answered within 30 seconds.

4.1.2 Responsiveness to public reporting of gas leaks

Of the 10,045 potential gas leaks reported by the public, 99.6 percent were repaired within the timeframe specified in Australian Gas Networks' Leakage Management Plan.

4.1.3 Customer interruptions

The Commission monitors unplanned supply interruptions, including the number of customers affected and the duration of the interruptions.

During the year, 28 customers were reported by Australian Gas Networks as having experienced two or more interruptions in the 12 month period ending June 2017, where the interruption is unplanned and caused by operator action, third party damage or asset condition.

Australian Gas Networks reported 135 unplanned interruptions in 2016-17 where a gas supply interruption was not restored within 12 hours.

4.2 Compliance

Australian Gas Networks reported that it was non-compliant with the Gas Distribution Code with regards to maintaining gas pressure in small parts of its network, due to water ingress and third party damage.

The low pressure network operated by Australian Gas Networks is predominantly cast iron mains. Older mains can be subject to water ingress during wet weather and, as such, are a common cause of supply reliability issues.

To reduce water ingress associated with ageing infrastructure and the risks of gas leakages, Australian Gas Networks is undertaking a long-term mains replacement program, replacing the old cast iron pipes with polyethylene pipes. The program has led to a reduction in the number of incidents where the gas pressure was not maintained.

The number of such incidents were stable compared to the previous year, even with a 37 percent increase in rainfall from 2015-16 to 2016-17 (524mm to 716mm respectively) experienced around Adelaide.

The Commission is satisfied by the remedial action being undertaken by Australian Gas Networks in addressing this compliance issue.

Appendix 1: The Commission's statutory responsibilities

The Essential Services Commission (**Commission**) is a statutory authority established as an independent economic regulator and advisory body under the Essential Services Commission Act 2002 (**ESC Act**).

The Commission has economic regulatory responsibility in the water and sewerage, electricity, gas, maritime and rail industries, conducts formal public inquiries and provides advice to Government on economic and regulatory matters. The ESC Act, together with various industry Acts, provide the Commission with those regulatory and advisory powers and functions.

Under the ESC Act, the Commission has the primary objective of:

"...protection of the long term interests of South Australian consumers with respect to the price, quality and reliability of essential services".

The ESC Act, the Electricity Act 1996 (**Electricity Act**) and the Gas Act 1997 (**Gas Act**) (and the regulations under those Acts) establish the Commission's regulatory powers and functions in relation to energy businesses.

The Commission's role includes the licensing of energy businesses (generation, transmission, distribution, power system control and off-grid suppliers), making industry codes (including setting service standards), enforcing compliance with licensees' regulatory obligations and performance monitoring and reporting.

The Commission has functions under the Electricity Act and the Gas Act for licensing and monitoring the performance of businesses in the electricity and gas supply industries. Businesses that engage in generation of electricity, operation of a transmission or distribution network, power system control or retailing of energy (off-grid energy retailers only)¹³ fall under the Commission's licensing and monitoring regime.

The Commission's role encompasses the regulation of service reliability standards for SA Power Networks (electricity distribution), ElectraNet Pty Ltd (electricity transmission) and Australian Gas Networks Ltd (gas distribution). These service standards are set out in industry codes administered by the Commission. The Australian Energy Regulator, with reference to the Commission's service reliability standards, sets the efficient level of expenditure for network operators to provide the required distribution or transmission services at the specified standards.

The licensing and monitoring regime also extends to regional areas of South Australia. Locations that do not participate in the National Electricity Market are provided with electricity by off-grid generators, distributors and retailers. Similarly, distributors and retailers of Liquefied Petroleum Gas (LPG) provide some locations not connected to Australian Gas Networks natural gas distribution network, with a reticulated gas service. Distribution and retail licences issued by the Commission authorise these activities and set out conditions for operating in the industry.

¹³ The Australian Energy Regulator (**AER**) is responsible for customer protection and performance monitoring in the national electricity and gas retail markets, that is on-grid energy retailers.

Appendix 2: South Australia's electricity network and regulatory framework

SA Power Networks operates the major South Australian electricity distribution network, which connects each of its customers to the National Electricity Market.

The SA Power Networks distribution network covers an area of about 178,200 square km, along a coastline of over 5,000 km. The network extends to over 88,892 km of which approximately 20 percent is underground. SA Power Networks serves over 859,913 customers. Approximately 70 percent of customers reside in the Greater Metropolitan Area of Adelaide, but 70 percent of the network infrastructure is required to deliver energy to the remaining 30 percent of customers.

The Essential Services Commission's powers and functions in relation to SA Power Networks are contained in the Electricity Act 1996 (**Electricity Act**) and the ESC Act, and its regulatory requirements for SA Power Networks are set out in the terms and conditions of its electricity distribution licence, the Electricity Distribution Code and Electricity Industry Guideline No. 1 - Distribution.

As a monopoly service provider, SA Power Networks is subject to economic regulation in respect of the revenues it is permitted to earn from South Australian consumers. The Australian Energy Regulator (**AER**) is responsible for administering that regulatory regime under the National Electricity Rules; 2016-17 is the second year of the new five-year regulatory determination period 2015-2020.

In May 2014, the Commission released its Final Decision on the jurisdictional service standards to apply to SA Power Networks for the 2015-2020 regulatory period. These standards relate to network reliability and customer service and are set out in the Electricity Distribution Code.¹⁴ The AER, with reference to these standards, made a regulatory determination for SA Power Networks on 31 October 2015.

In setting the service standards to apply to SA Power Networks for 2015 to 2020, a key consideration was consistency with the AER's Service Target Performance Incentive Scheme, which provides financial rewards or penalties to SA Power Networks based on performance against service targets.

¹⁴ The Commission's electricity distribution code available at: <http://www.escosa.sa.gov.au/ArticleDocuments/512/20141007-Elec-DistributionCodeEDC12.pdf.aspx?Embed=Y>.

Appendix 3: Network reliability service standards

For the 2015 to 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 network reliability service standards using the normalised duration of interruptions (**USAIDI**) and frequency of interruptions (**USAIFI**) reliability indices. USAIDI is the average duration (in minutes) of supply interruptions per customer per year. USAIFI is the average number of supply interruptions per customer per year.

The network reliability targets reflect differences in the levels of interconnection and redundancy in SA Power Networks' physical network across the State. SA Power Networks' feeders are divided into four broad categories for the purposes of monitoring network reliability:

- ▶ **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 greater than 0.3 megavolt amps/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 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).

Basing targets on feeder categories is consistent with the reliability indices used in the Australian Energy Regulator's Service Target Performance Incentive Scheme. Prior to the 2015-2020 regulatory period, network reliability targets were set for seven geographic regions.

The network reliability targets have been set based on historical performance for the years 2010 to 2015, reflecting generally high customer satisfaction with current levels of electricity supply reliability.

The targets exclude SA Power Networks' performance during Major Event Days (**MEDs**)¹⁵ (such as storms/heatwaves), and are referred to as normalised performance – the metrics used are normalised USAIDI and normalised USAIFI. SA Power Networks' restoration performance during MEDs is assessed separately from daily operations. This is consistent with the reliability methodology used in the AER's Service Target Performance Incentive Scheme.

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. 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

¹⁵ 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.

- ▶ 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.

The Electricity Distribution Code also requires SA Power Networks to use its best endeavours to minimise interruptions or limitations to supply caused by planned interruptions, such as carrying out maintenance or repair to the distribution network, connecting a new supply address to the distribution network or carrying out augmentations or extensions to the distribution network.

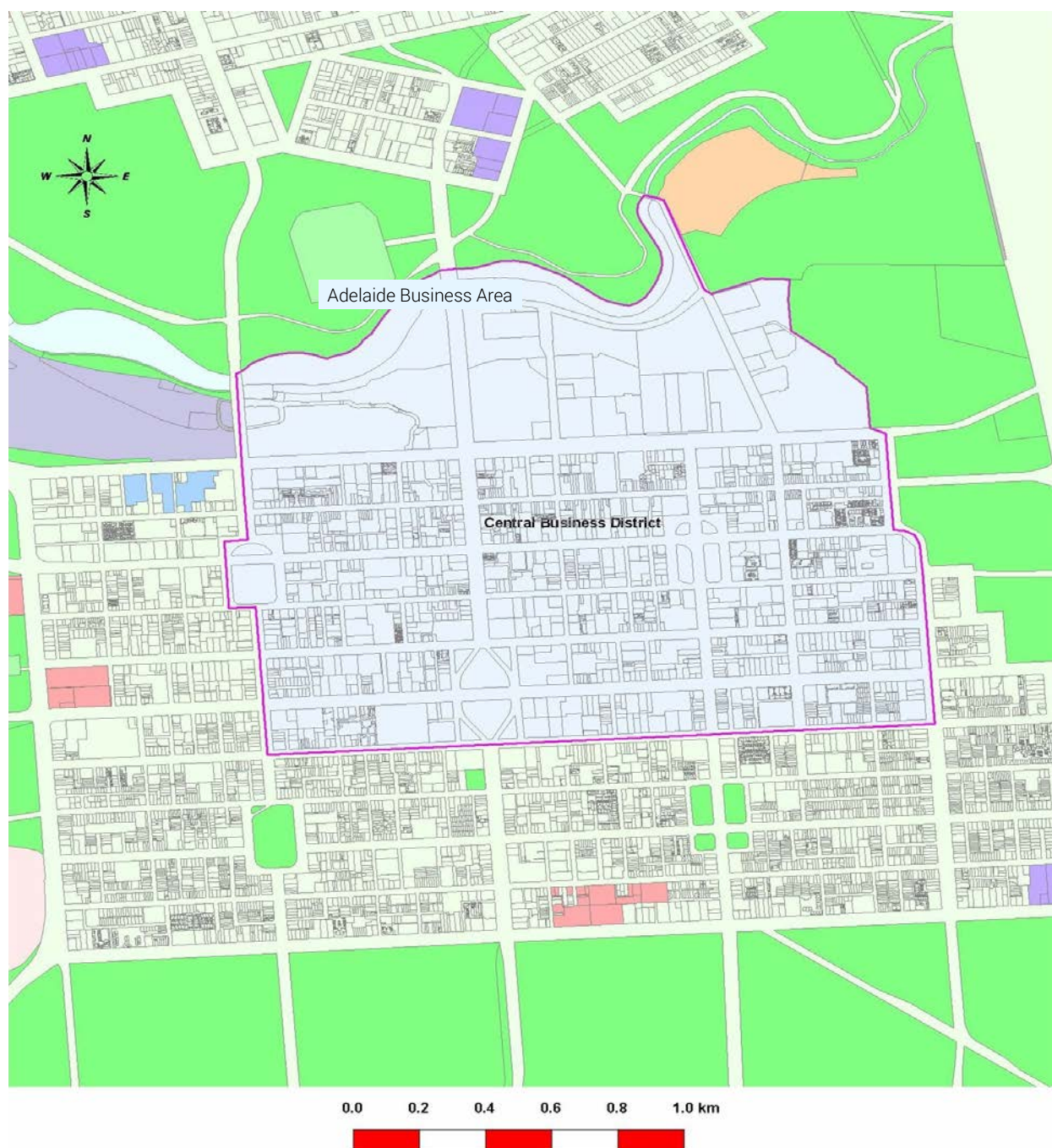
Appendix 4: Regional reliability monitoring

Consistent with the Commission's approach to setting the feeder category service standards, monitoring of regional performance is primarily focused on normalised performance, where the impact of severe weather events has been removed. Exclusion of the impact of Major Event Days (**MEDs**) from regional performance does not effectively remove the annual variations in a region's reliability performance that result from localised, Bureau of Meteorology verified, severe weather events. It is therefore more useful to 'normalise' regional performance by removing localised major severe weather events. However, where necessary, the Commission considers the performance of SA Power Networks in responding to localised (non-MEDs) events.

Observing departures from longer-term average performance outcomes allows the Commission to monitor whether the shift to feeder categories results in any degradation of average historical performance at a regional level.

Appendix 5: Maps of Adelaide Business Area and Greater Adelaide Metropolitan Area

Map Adelaide Business Area



Map Greater Adelaide Metropolitan Area



Appendix 6: Network reliability performance measures

The Commission assesses performance of Low Reliability Distribution Feeder (**LRDF**), which are the parts of the network that experience frequent and protracted outages. This element of performance reporting provides some assurance that SA Power Networks is giving due consideration to poorly performing parts of its network.

A LRDF within a particular region is defined as an individual feeder with normalised duration of interruptions (**USAIDI**) performance approximately twice as high as the USAIDI target for that feeder class for two consecutive financial years. LRDFs are often located in rural or remote parts of the network where restoration activities following a fault can often be influenced by difficult terrain or long distances that need to be patrolled to locate and repair the fault.

Remediation of LRDFs is dependent, to a degree, on the extent of the benefit gained relative to the cost of the work. Understandably, there will be situations where the costs far outweigh the benefits. There will remain parts of the network with lower reliability, and the Commission will continue to report on performance of those. To some extent, GSL payments serve to balance the impact of lower reliability performance for the affected customers.

Appendix 7: South Australia's electricity transmission network and regulatory framework

ElectraNet Pty Ltd (**ElectraNet**) is the monopoly service provider of electricity transmission services in South Australia.

The electricity transmission network in South Australia extends across approximately 200,000 square kilometres, and includes 88 high voltage substations and 5,600 route kilometres of transmission lines. The transmission network transports electricity from generators at voltages of 275 kV and 132 kV to the State's lower-voltage distribution network (owned and operated by SA Power Networks) and to some large industrial customers.

The Commission, as a part of its licensing function, is able to set certain regulatory obligations, including transmission network reliability standards, through the Electricity Transmission Code. As a condition of its licence, ElectraNet must comply with the Electricity Transmission Code.

As a monopoly service provider, ElectraNet is subject to economic regulation in respect of the revenue it is permitted to earn from South Australian consumers. The Australian Energy Regulator is responsible for administering that regulatory regime under the National Electricity Rules (**NER**).

The Electricity Transmission Code forms a part of the broader regulatory scheme for electricity transmission in the NEM. The NER establish technical standards, dealing with matters such as network frequency, system stability, voltage quality and fault clearance. The Commission's role is confined to the development and administration of reliability standards, which are jurisdictional standards that align with, and complement, the NER technical standards. These reliability standards, set for the 2013 to 2018 regulatory period, are set out in the Electricity Transmission Code.

The Commission sets service standards, in the Electricity Transmission Code, for mandated exit point reliability, the obligation to restore supply within specified timeframes in the event of an outage and the requirement to provide redundant capacity so that supply is continuous even if one part of the network fails. Each exit point category has specific reliability and supply restoration standards. Exit points are the connections between ElectraNet's transmission network and its customers, such as SA Power Networks or, in a small number of cases, directly connected customers.

Category 1 has the lowest reliability and supply restoration requirements and Category 5 has the highest requirements. The standards require, in effect, a level of security (also referred to as redundancy) to be built into ElectraNet's transmission system so that it can, in most cases, maintain a continuous electricity supply. Further, when network elements fail, the standards require remediation within specified timeframes. The categorisation of exit points is based on periodic assessments as to whether or not the costs of augmenting each exit point are outweighed by the value to customers of the increased reliability that would result.

Other reliability metrics

The Commission monitors other transmission network reliability metrics that impact South Australian customers, notably:

- ▶ number of power system incidents – where the transmission network supply is interrupted, usually as a result of a power line tripping.
- ▶ System Minutes Off Supply (SMOS) attributed to power system incidents - a measure of transmission network unavailability. It is an indicator of the service level of the transmission network in supplying energy to network customers.

Appendix 8: South Australia's gas distribution and regulatory framework

Australian Gas Networks Ltd (**Australian Gas Networks**) is the monopoly service provider of reticulated natural gas distribution services in South Australia.

The South Australian gas distribution network, which comprises 8,186 km of gas mains, serves over 441,913 customers. Australian Gas Networks distributed over 31,093 terajoules of gas to customers in 2016-17. The Commission's powers and functions in relation to Australian Gas Networks are contained in the Gas Act 1997 (**Gas Act**) and the Essential Services Commission Act 2002 (**ESC Act**). The Commission's regulatory requirements for Australian Gas Networks are set out in the terms and conditions of its gas distribution licence, the Gas Distribution Code and Gas Guideline No. 1 - Distribution.

Australian Gas Networks is required to meet service standards relating to minimising gas leaks. These service standards were set for the 2016 to 2021 regulatory period. The Gas Distribution Code also requires Australian Gas Networks to maintain gas pressure in the system, maintain the capability of the distribution system, and to maintain a Gas Measurement Management Plan and a Safety, Reliability, Maintenance and Technical Management Plan.

As a monopoly service provider, Australian Gas Networks is subject to economic regulation in respect of the revenue it is permitted to earn from South Australian consumers. The Australian Energy Regulator is responsible for administering that regulatory regime. The five-year regulatory determination period ended on 30 June 2016, and a new five year regulatory period commenced on 1 July 2016.



The Essential Services Commission
Level 1, 151 Pirie Street Adelaide SA 5000
GPO Box 2605 Adelaide SA 5001
T 08 8463 4444

E escosa@escosa.sa.gov.au | W www.escosa.sa.gov.au