ELECTRICITY NETWORKS ACCESS CODE 2004

SERVICE STANDARD PERFORMANCE REPORT

for the year ended 30 June 2016

SEPTEMBER 2016

Contents

1 Executive Summary

Western Power publishes the Service Standard Performance Report annually to detail its performance against the 17 Service Standard Benchmarks (**SSBs**) defined in Western Power's current approved Access Arrangement (**AA3**) . This information is published in accordance with the Electricity Networks Access Code 2004 (**Access Code**).

This report covers the period 1 July 2015 to 30 June 2016 (**2015/16 period**).

1.1 Introduction

Western Power's purpose is to connect people with electricity safely, reliably and affordably.

As a regulated business, Western Power is required to comply with a broad range of compliance obligations covering many facets of its activities. This report presents information on Western Power's reliability performance against levels agreed for AA3, which ends on 30 June 2017.

1.2 Reliability of supply

Reliability of supply reflects the service Western Power provides to its customers by measuring the reliability performance of its transmission and distribution networks.

As part of the AA3 Further Final Determination, Western Power is required to:

- maintain service at levels consistent with historical averages of the three years to 30 June 2012
- improve service levels only where this is of value to customers and can be done efficiently

The minimum levels of service required of Western Power are defined by 17 SSBs covering distribution and transmission reliability and security of supply, call centre and streetlight performance.

Western Power's obligations under its transmission and distribution licences require it to:

- meet the service levels defined by the SSBs
- publish the Service Standard Performance Report (**Report**) annually on SSB performance

1.3 The impact of investment on service level performance

Western Power's AA3 network investment program has a number of fundamental drivers, such as safety, growth, security of supply, asset condition and reliability.

Reliability service standards performance is influenced by all of these investment drivers, particularly those activities associated with network asset maintenance and replacement.

It is important to note that there can be a lag of 12 months or more before service levels begin to reflect the benefits of these works. This is particularly true for long feeders.

1.4 Performance summary

- Overall, reliability performance of the transmission and distribution networks improved, due largely to the reduction in the impact of environmental and other external factors, as well as improved maintenance and operational processes on the transmission network.
- Performance surpassed required levels in 16 of the 17 defined SSBs. The benchmark was not met for Average Outage Duration, which applies to the transmission network (see section 1.5 below for additional information for the reasons for not meeting the benchmark). As a result of the Average Outage Duration being below the required performance level, Western Power was non-compliant with section 11.1 of the Access Code.
- Performance exceeded target for 11 of the 14 SSBs subject to the Service Standard Adjustment Mechanism.
- Performance improved in 14 of the 17 SSBs.
- Overall, reliability performance of the transmission and distribution networks improved.

1.5 Rural Long SAIFI

Rural Long SAIFI improved and performed within the SSB for the 2015/16 period.

1.6 Future performance – Average Outage Duration

Priority has been placed on the maintenance, inspection and fault management on the regulated circuits that have the largest impact of Average Outage Duration.

2 Background

In accordance with section 11.1 of the Access Code, Western Power must provide reference services at a service standard at least equivalent to the service standard benchmarks set out in the access arrangement.

The Access Code, section 11.2, requires the Economic Regulation Authority (**Authority**) to annually publish Western Power's actual service standards performance against the service standard benchmarks.

The purpose of this report is to provide information on the actual service standards performance against the SSBs contained in Western Power's AA3, for the 2015/16 period.

The Western Power Network is defined by the Access Code as the portion of the South West Interconnected Network (**SWIN**) that is owned by the Electricity Network Corporation (**Western Power**). For the purposes of this Report and in referencing the Access Code, EDL1, ETL2 and AA3, the terms distribution network and transmission network are used throughout this Report.

The Western Power Network covers a geographic area from Kalbarri to Albany, and from Perth to Kalgoorlie (Figure 1) of 255,064 square kilometres. It has a diverse asset base which includes more than 800,000 poles and over 100,000 circuit kilometres of power lines.

The distribution network consists of over 800 feeders, connected to the transmission network at 156 terminal and zone substations, providing an electricity supply to over one million customers and over 250,000 streetlights.

Figure 1 - Map of the Western Power Network

3 How to read this report

In accordance with the Authority's Service Standard Performance Report Template:

- section 4 outlines and describes the reference services provided by Western Power relevant to the Access Code, section 11.1, within the AA3 period
- section 5 outlines and describes the SSBs relevant for the AA3 period
- section 6 outlines and describes the actual performance against the AA3 SSBs for the fourth year of AA3, namely the 2015/16 period
- section 7 outlines and describes the recognised exclusions defined for the AA3 SSBs
- section 8 outlines and describes the recognised events known as Momentary Interruptions, which are excluded from the AA3 SSBs
- section 9 outlines and describes the Service Standards Adjustment Mechanism (**SSAM**) relevant for AA3
- appendix A provides charts for each of the AA3 SSBs and targets with the trend of historical performance for the preceding five year period
- appendix B provides charts showing the trends over the past five years up to 30 June 2016, by key causes of interruptions (overhead equipment failure, unknown fault causes and lightning) which contribute to the distribution performance of the Western Power Network.

4 Reference services

Under AA3 and in accordance with the Access Code sections 5.1 and 11.1, Western Power provides reference services for entry, exit and bi-directional services.

There are:

- two *reference services*[1] at network *entry points* for *users* (entry services)
- 11 *reference services* at network *exit points* for *users* (exit services)
- four bi-directional *reference services* at network entry/exit points (bi-directional services).

4.1 Reference services for network entry points

An *entry service* is a *covered service* provided by Western Power at an *entry point* under which the *user* may transfer electricity into the network at the *entry point*.

An *entry point* is a point on a *covered network* identified as such in an *access contract* at which, subject to the *access contract*, electricity is more likely to be transferred into the network than transferred out of the network.

The following table lists the *entry point reference services*.

Table 1: Network entry point reference services

Reference Service		*Reference Service* Description
B1	Distribution *Entry Service*	An *entry service* combined with a connection service and a standard metering service at an *entry point* on the distribution system.
B2	Transmission *Entry Service*	An *entry service* combined with a connection service and a standard metering service at an *entry point* on the transmission system.

[1] All terms shown in italics refer to those terms as defined in the Access Code

4.2 Reference services for network exit points

An *exit service* is a *covered service* provided by Western Power at an *exit point* under which the *user* may transfer electricity out of the network at the *exit point*.

An *exit point* is a point on a *covered network* identified as such in an *access contract* at which, subject to the *access contract*, electricity is more likely to be transferred out of the network than transferred into the network.

The following table lists the *exit point reference services*:

Table 2: Network *exit point reference services*

Reference Service		*Reference Service* Description
A1	Anytime Energy (Residential) *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the low voltage (415 volts or less) distribution system.
A2	Anytime Energy (Business) *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the low voltage (415 volts or less) distribution system.
A3	Time of Use Energy (Residential) *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the low voltage (415 volts or less) distribution system.
A4	Time of Use Energy (Business) *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the low voltage (415 volts or less) distribution system.
A5	High Voltage Metered Demand *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the high voltage (6.6 kV or higher) distribution system.
A6	Low Voltage Metered Demand *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the low voltage (415 volts or less) distribution system.
A7	High Voltage Contract Maximum Demand *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the high voltage (6.6 kV or higher) distribution system
A8	Low Voltage Contract Maximum Demand *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the low voltage (415 volts or less) distribution system.
A9	Street lighting *Exit Service*	An *exit service* combined with a connection service at an *exit point* on the low voltage (415 volts or less) distribution system for the purpose of public street lighting, plus the service of the provision and maintenance of the streetlight.
A10	Un-Metered Supplies *Exit Service*	An *exit service* combined with a connection service at an *exit point* on the low voltage (415 volts or less) distribution system.
A11	Transmission *Exit Service*	An *exit service* combined with a connection service and a standard metering service at an *exit point* on the transmission system.

4.3 Reference services for bi-directional network entry and exit points

A bi-directional service is a *covered service* provided by Western Power at a bidirectional point under which the *user* may transfer electricity into and out of the network.

A bi-directional point is a point on a *covered network* identified as such in an *access contract* at which, subject to the *access contract*, electricity is both transferred into the network and transferred out of the network.

The following table lists the bi-directional point *reference services*.

Table 3: Network bi-directional *reference services*

Reference Service		*Reference Service* Description
C1	Anytime energy (residential) bi-directional service	A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system.
C2	Anytime energy (business) bi-directional service	A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system.
C3	Anytime energy (business) bi-directional service	A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system.
C4	Time of use (business) bi-directional service	A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system.

5 Current SSBs

Under AA3 and in accordance with the Access Code section 11.2, there are 17 SSBs which Western Power is required to monitor and meet. These measures set minimum service levels which need to be achieved by Western Power.

The SSBs and Service Standard Targets (**SSTs**) were agreed with the Authority in November 2012, as part of the AA3 Further Final Determination, after the commencement of the AA3 period.

The SSAM financial incentive scheme considers 14 of the 17 SSBs and provides rewards or penalties for performance against the SSTs.

The SSBs and SSTs were set on the basis of maintaining the levels of service performance throughout the AA3 period consistent with average service performance experienced by customers over the previous five years (except for SAIDI and SAIFI measures, which were based on three years).

5.1 Distribution network service standards

For the *reference services* A1 to A10, B1 and C1 to C4, the SSBs are expressed in terms of:

- System Average Interruption Duration Index (SAIDI).
- System Average Interruption Frequency Index (SAIFI).
- Call centre performance: – percentage of fault calls responded to in 30 seconds or less (after exclusions).

The SAIDI and SAIFI metrics are defined in accordance with the National Regulatory Reporting Requirements[2] (NRRR) and can be described as:

- SAIDI –Total number of minutes, on average, that a customer on a distribution network is without electricity in a year.
- SAIFI – The average number of times a customer's electricity supply is interrupted per year.

5.1.1 SAIDI

SAIDI, measured over a 12 month period, by NRRR definition is the sum of the duration of each customer interruption (customer minutes interrupted) - lasting more than one minute, attributable solely to the distribution network (after exclusions), divided by the average of the total number of connected customers at the beginning and the end of the reporting period.

The unit of measure is minutes per year and the lower the minutes per year, the higher the level of service performance.

The following exclusions apply to SAIDI:

- A Major Event Day (**MED**) in accordance with IEEE1366-2003 definitions.
- Interruptions shown to be caused by a fault or other event on the transmission network or a third party system (for instance, without limitation interruptions caused by an inter-trip signal, generator unavailability or a customer installation).

[2] National Regulatory Reporting for electricity distribution and retail businesses, Utility Regulators Forum discussion paper, March 2002

- Planned interruptions.
- Force majeure events.

The SSBs and SSTs expressed in terms of SAIDI for each year of the AA3 period are shown in Table 4.

Table 4: SAIDI SSBs and SSTs for each year ending 30 June

SAIDI	Minutes per year	
	SSB	SST
CBD	39.9	20.3
Urban	183.0	136.6
Rural Short	227.8	207.8
Rural Long	724.8	582.2

5.1.2 SAIFI

SAIFI, measured over a 12 month period, by NRRR definition is the total number of customer interruptions, lasting more than one minute, attributable solely to the distribution network (after exclusions), divided by the average of the total number of connected customers at the beginning and the end of the reporting period.

The unit of measure is interruptions per year and the lower the number of interruptions per year, the higher the level of service performance.

The exclusions for SAIDI discussed above, also apply to SAIFI.

The SSBs and SSTs expressed in terms of SAIFI for each year of the AA3 period are shown in Table 5.

Table 5: SAIFI SSBs and SSTs for each year ending 30 June

SAIFI	Interruptions per year	
	SSB	SST
CBD	0.26	0.14
Urban	2.12	1.36
Rural Short	2.61	2.27
Rural Long	4.51	4.06

5.1.3 Distribution network feeder classifications

The feeder classification, consistent with the NRRR, applied to Western Power's distribution network and used to report service standards performance in accordance with AA3, include: CBD; Urban; Rural Short; and Rural Long.

Definitions are provided in Table 6.

Table 6: Feeder classifications

Feeder Category	Description
CBD	A feeder supplying predominantly commercial, high-rise buildings, supplied by a predominantly underground distribution network containing significant interconnection and redundancy when compared to urban areas
Urban	A feeder, which is not a CBD feeder, with actual maximum demand over the reporting period per total feeder route length greater than 0.3 MVA/km.
Rural Short	A feeder which is not a CBD or urban feeder with a total feeder route length less than 200 km
Rural Long	A feeder which is not a CBD or urban feeder with a total feeder route length greater than 200 km

5.1.4 Call centre performance

Call centre performance, measured over a 12 month period, is the number of fault calls responded to in 30 seconds or less (after exclusions), divided by the total number of fault calls.

The unit of measure is percentage of calls per year and the higher the percentage of calls per year, the higher the level of service performance.

The following exclusions apply to call centre performance:

- Calls abandoned by a caller in four seconds or less of their postcode being automatically determined or when a valid postcode is entered by the caller.
- All telephone calls received on a MED which is excluded from SAIDI and SAIFI.
- A fact or circumstance beyond the control of Western Power affecting the ability to receive calls to the extent that Western Power could not contract on reasonable terms to provide for the continuity of service.

The SSB and SST expressed in terms of call centre performance for each year of the AA3 period are shown in Table 7.

Table 7: Call centre performance SSB and SST for each year ending 30 June

Call centre performance	Percentage of calls per year	
	SSB	SST
	77.5%	87.6%

5.2 Transmission network service standards

In respect of the *reference services* A11 and B2 available to users directly connected to the transmission network, the SSBs are described below.

5.2.1 Circuit Availability

Circuit Availability is the availability of the transmission network and is measured by the actual number of hours the transmission network circuits are available, divided by the total possible hours available (after exclusions).

The unit of measure is percentage of hours per year and the higher the percentage of hours per year, the higher the level of service performance.

The following exclusions apply to circuit availability:

- Interruptions on non-transmission primary equipment (primary equipment operating at voltages less than 66 kV, including zone substation power transformers).
- Unregulated transmission network assets.
- Supply interruptions shown to be caused by a fault or other event on a '3rd party system' e.g. inter-trip signal, generator outage, customer installation.
- Force majeure events.
- Duration of planned interruptions for major construction work, including periods where availability is temporarily restored, is to be capped at 14 days in calculating transmission line availability.

The SSBs and SSTs expressed in terms of Circuit Availability for each year of the AA3 period are shown in Table 8.

Table 8: Circuit Availability SSB and SST for each year ending 30 June

Circuit Availability	Percentage of hours per year	
	SSB	SST
	97.7%	98.1%

5.2.2 System Minutes Interrupted

System Minutes Interrupted is the summation of Mega Watt (**MW**) minutes of unserved energy at substations which are connected to the transmission network (meshed or radial) divided by the system peak MW.

The unit of measure is minutes per year and the lower the minutes per year, the higher the level of service performance.

The following exclusions apply to System Minutes Interrupted:

- Unregulated transmission network assets.
- Supply interruptions shown to be caused by a fault or other event on a '3rd party system' e.g. inter-trip signal, generator outage, customer installation.
- Force majeure events.

The SSBs and SSTs expressed in terms of System Minutes Interrupted for each year of the AA3 period are shown in Table 9. Note there are no SSTs for system minutes interrupted for the Meshed network.

Table 9: System Minutes Interrupted SSBs and SSTs for each year ending 30 June

System Minutes Interrupted	Minutes per year	
	SSB	SST
Meshed	12.5	N/A
Radial	5.0	1.9

5.2.3 Loss of Supply Event Frequency

Loss of Supply Event/Frequency is the frequency of unplanned customer interruption events where the loss of supply:

- exceeds 0.1 system minutes interrupted
- exceeds 1.0 system minutes interrupted.

The unit of measure is number of events per year and the lower the number of events per year, the higher the level of service performance.

The exclusions applied to System Minutes Interrupted also apply to Loss of Supply Event Frequency. In addition, planned interruptions and interruptions with a duration lasting less than one minute are excluded.

The SSBs and SSTs expressed in terms of Loss of Supply Event Frequency for each year of the AA3 period are shown in Table 10.

Table 10: Loss of Supply Event Frequency SSBs and SSTs for each year ending 30 June

Loss of Supply Event Frequency	Number of events per year	
	SSB	SST
> 0.1 system minutes interrupted	33	24
> 1 system minutes interrupted	4	2

5.2.4 Average Outage Duration

Average Outage Duration is total number of minutes duration of all unplanned interruptions on the transmission network divided by the number of unplanned interruption events (after exclusions).

The unit of measure is minutes per year and the lower the minutes per year, the higher the level of service performance.

The exclusions that apply to Loss of Supply Event Frequency also apply to Average Outage Duration. In addition, any event contribution to Average Outage Duration is capped at 14 days.

The SSBs and SSTs expressed in terms of Average Outage Duration for each year of the AA3 period are shown in Table 11.

Table 11: Average Outage Duration SSB and SST for each year ending 30 June

Average Outage Duration	Minutes per year	
	SSB	SST
	886	698

5.3 Street lighting repair time

For the *reference service* A9, the SSBs are expressed in terms of street lighting repair time.

Street lighting repair time is the average number of business days to repair a faulty streetlight.

The unit of measure is average number of business days and the lower the average number of business days, the higher the level of service performance.

The following exclusions apply to street lighting repair time:

- Force majeure events.
- Streetlights for which Western Power is not responsible for maintenance.

The SSBs expressed in terms of street lighting repair time for each year of the AA3 period are shown in Table 12. Note there are no SSTs for this reference service.

Table 12: Street lighting repair time SSBs for each year ending 30 June

Street lighting repair time	SSB – average number of business days
Metropolitan area	5
Regional area	9

5.3.1 Areas

The areas defined for street lighting repair times are defined as follows:

Metropolitan area

The areas of the State defined in the *Code of Conduct for the Supply of Electricity to Small Use Customers 2014*.

Regional area

All areas in the Western Power Network other than the metropolitan area.

6 Actual service standard performance

6.1 Summary of service standards performance

Western Power met 16 of the 17 SSBs for the 2015/16 period and therefore was non-compliant with section 11.1 of the Access Code. The benchmark was not met for Average Outage Duration, which applies to the transmission network. Western Power's performance against each benchmark is shown in Table 13.

Table 13: Service Standard performance summary for the 2015/16 period

			SSB	SST	2012/13 actual	2013/14 actual	2014/15 actual	2015/16	
								Actual	Benchmark met?
Distribution	SAIDI	CBD	39.9	20.3	7.6	18.3	26.2	22.6	√
		Urban	183	136.6	102.7	107.4	103.0	91.3	√
		Rural Short	227.8	207.8	181.4	171.2	182.6	168.4	√
		Rural Long	724.8	582.2	685.4	673.8	677.5	582.6	√
	SAIFI	CBD	0.26	0.14	0.03	0.20	0.17	0.10	√
		Urban	2.12	1.36	1.16	1.13	1.09	0.91	√
		Rural Short	2.61	2.27	2.17	1.83	1.98	1.75	√
		Rural Long	4.51	4.06	4.91	4.98	4.41	3.99	√
	Call Centre Performance		77.50%	87.60%	90.60%	92.80%	93.70%	91.4%	√
Transmission	Circuit Availability		97.70%	98.10%	98.40%	98.04%	98.5%	98.7%	√
	System Minutes Interrupted	Meshed Network	12.5	N/A	4.5	4.8	6.9	6.8	√
		Radial Network	5	1.9	2.3	3.7	1.6	0.5	√
	Loss of Supply Events	>0.1 system minute interrupted	33	24	13	20	27	17	√
		>1 system minute interrupted	4	2	2	1	0	1	√
	Average Outage Duration		886	698	866	795	720	1,265	X
Street lighting repair time	Metropolitan area		5 days	N/A	1.23	1.14	1.26	1.55	√
	Regional area		9 days	N/A	2.01	1.07	1.18	0.89	√

6.1.1 Distribution network

The reliability performance of the distribution network improved during the 2015/16 period compared to the 2014/15 period.

Factors primarily contributing to this overall improvement include a reduction in the impact of:

- environmental factors
- equipment damage from vehicle collisions
- emergency outages due to hazardous conditions.

All distribution measures performed well within their prescribed benchmarks.

6.1.2 Trends in interruption causes

The trend of overhead asset failure has been constant over the 2015/16 period after four years of decline (Appendix B, **Figure 22**). The reduction of overhead asset failures is expected to continue through the ongoing implementation of the applicable asset strategies via approved asset maintenance and replacement programs.

The trend of faults where the cause is unknown has remained consistent over the past 12 months (Appendix B, **Figure 23**). As the business continues to increase its customer-focus, greater emphasis is being placed on identifying the root cause of outages affecting customers.

Lightning activity has been volatile over the past five years, however it was not to the high level experienced during the 2012/13 period. (Appendix B, **Figure 24**).

6.1.3 Areas of focus

The following activities have been undertaken to mitigate the risk of Average Outage Duration poor performance to ensure it meets the AA3 benchmark for future years:

- Key primary equipment has been inspected and tested in the substations to mitigate the possibility of similar failures in the future.
- Existing asset strategies to minimise risk of failure are currently under review.
- Review of the management of forced and planned outages.
- Review of fault management to minimise equipment disconnections and minimise restoration times.
- Prioritising and addressing identified defects on the regulated circuits which have the largest impact on Average Outage Duration.

The 2015/16 work program focused on public safety achieving the highest volume conductor replacements in Western Power's history. In addition, the work program delivered high volumes of wood pole replacements and reinforcements, successfully acquitting the EnergySafety Order on Rural Wood Poles, together with targeted bushfire mitigation programs such as insulator siliconing and vegetation management. These programs also benefit reliability and when combined with small scale investments targeted at customer interruptions, has resulted in an improving performance for all feeder categories.

Rural Long performance, in particular, has seen a continuation of the improving trend with SAIFI performance now surpassing both the service standard benchmark and target. During the 2015/16 period, Western Power continued the "Hotspot" approach identifying, investigating and improving performance of lower performing areas of the distribution network. Ten reliability studies were completed in the year.

6.2 Distribution

Table 14: Distribution performance and commentary for the 2015/16 period

Service Standard	2015/16			Comments
	SSB	SST	Actual	
CBD SAIDI	39.9	20.3	22.6	Performance was better than the AA3 benchmark and better than the 2014/15 period (26.2 minutes per year). The primary contributors to the improvement in performance when compared to the 2014/15 period were a decreases in the impact of emergency outages due to hazardous conditions, and switchgear failures on the underground network. Note: The CBD SAIDI performance is volatile over short periods of time due to the combined effects of fewer connections and the relatively long repair times for faults in an underground CBD network.
Urban SAIDI	183.0	136.6	91.3	Performance was better than the AA3 benchmark and better than the 2014/15 period (103.0 minutes per year). The primary contributors to an improvement in performance during the 2015/16 period were the decrease in asset damage from vehicle collisions and environmental conditions. The primary contributors to the actual performance were overhead and underground equipment failures.
Rural Short SAIDI	227.8	207.8	168.4	Performance was better than the AA3 benchmark and better than the 2014/15 period (182.6 minutes per year). The primary contributors to an improvement in performance during the 2015/16 period were the decrease in the impact of environmental conditions and emergency outages due to hazardous conditions. The primary contributors to the actual performance were overhead and underground equipment failures and interruptions where the fault cause was unknown.
Rural Long SAIDI	724.8	582.2	582.6	Performance was better than the AA3 benchmark and better than the 2014/15 period (677.5 minutes per year). The primary contributors to an improvement in performance during the 2015/16 period were the decrease in the impact of underground cable failures and bird and animal activity. The primary contributors to the actual performance were overhead equipment failures and interruptions where the fault cause was unknown.
CBD SAIFI	0.26	0.14	0.10	Performance was better than the AA3 benchmark and better than the 2014/15 period (0.17 interruptions per year). The primary contributors to the improvement in performance when compared to the 2014/15 period were a decreases in the impact of emergency outages due to hazardous conditions and switchgear failures on the underground network. Note: The CBD SAIFI performance is volatile over short periods of time due to the effects of having fewer CBD connections.

Service Standard	2015/16			Comments
	SSB	SST	Actual	
Urban SAIFI	2.12	1.36	0.91	Performance was better than the AA3 benchmark and better than the 2014/15 period (1.09 interruptions per year). The primary contributors to an improvement in performance over the 2015/16 period were the decrease in the impact of asset damage from vehicle collisions and bird and animal activity. The primary contributors to the actual performance were overhead equipment failures, interruptions where the cause was unknown and bird activity
Rural Short SAIFI	2.61	2.27	1.75	Performance was better than the AA3 benchmark and better than the 2014/15 period (1.83 interruptions per year). The primary contributors to an improvement in performance during the 2015/16 period were the decrease in the impact of outages where the cause could not be identified, and environmental conditions. The primary contributors to the actual performance were overhead and underground equipment failures and interruptions where the cause was unknown.
Rural Long SAIFI	4.51	4.06	3.99	Performance was better than the AA3 benchmark and better than the 2014/15 period (4.41 interruptions per year). The primary contributors to an improvement in performance during the 2015/16 period were the decrease in the impact of environmental conditions and underground cable failures. The primary contributors to the actual performance were overhead equipment failures, interruptions where the cause was unknown and lighting activity.
Call centre performance	77.5 %	87.6%	91.4%	This year's performance of 91.4% of fault calls answered within 30 seconds was better than the AA3 benchmark, but was a slight reduction from the 2014/15 period (93.7%). Use of communication channels other than telephone as a form of self-service continues to be a focus in improving service and reducing the amount of calls that Western Power receives. This year customers obtained information about power outages by visiting Western Power's mobile friendly website 508,000 times, compared with 341,000 in the previous year. Customers using the Western Power outage App now total 23,800 compared with 10,000 as at July 2015. The App provides updates about planned and unplanned outages, by proactively messaging customers. Western Power continued to educate customers with public safety campaigns "Be storm ready" and "Make the Safe call", both aiming to increase community awareness for reporting faults.

6.3 Transmission

Table 15: Transmission performance and commentary for the 2015/16 period

Service Standard	2015/16			Comments
	SSB	SST	Actual	
Circuit availability	97.7%	98.1%	98.7%	Performance was better than the AA3 benchmark and the 2014/15 period (98.5%). The circuit availability improved during the 2015/16 period, as plant involved in major unplanned outages was returned to service. Improved maintenance coordination and planning, contributed to circuit availability performance being better than the benchmark. The performance excludes extended planned interruptions for major construction work greater than 14 circuit unavailability days (refer to section 7.3.2 for details).
System Minutes Interrupted Meshed Network	12.5	N/A	6.8	Performance was better than the AA3 benchmark and the 2014/15 period (6.9 minutes per year). The improved performance was due to utilising the network control Distribution Management System to restore customers via the distribution system.
System Minutes Interrupted Radial Network	5.0	1.9	0.5	Performance was better than the AA3 benchmark and the 2014/15 period (1.60 minutes per year). Asset failures continue to affect radial circuits that do not have the capability to temporarily restore customer supply via distribution systems. Also, some circuits in the radial network are highly susceptible to environmental events.
Loss of supply events >0.1 system minutes interrupted	33	24	17	Performance was better than the AA3 benchmark and the 2014/15 period (27 events per year). The improved performance was due to utilising the network control Distribution Management System to restore customers via the distribution system.
Loss of supply events >1 system minutes interrupted	4	2	1	Performance was better than the AA3 benchmark and worse than the 2014/15 period (0 events per year) due to a transformer tripping at Manjimup (which was caused by water ingress) while the other transformer was out of service due to a planned outage. The utilization of the network control Distribution Management system and nomination of single large-customers as non-referenced service helped to keep this performance at minimal level.

Service Standard	2015/16			Comments
	SSB	SST	Actual	
Average Outage Duration	886	698	1,265	Performance was worse than the AA3 benchmark and the 2014/15 period (720 minutes per year) due to transformer failures, as well as a cable failure, which were capped at 14 days. Average outage duration performance is highly volatile and cannot be directly compared between different time periods.

6.4 Street lighting repair time

Table 16: Street lighting repair time performance and commentary for the 2015/16 period

	Service Standard	2015/16		Comments
		SSB	Actual	
Street lighting repair time	Metropolitan area	≤ 5 days	1.55	Performance was better than the AA3 benchmark but worse than the 2014/15 period (1.26 average business days). The change in performance was due to an increase in the number of faults reported by the public in combination with lower resources allocated to repair the faults. Although the number of faults is expected to increase over the 2016/17 period, the performance is expected to remain within the benchmark.
	Regional area	≤ 9 days	0.89	Performance was better than the AA3 benchmark and better than the 2014/15 period (1.18 average business days). Although the number faults is expected to increase over the 2016/17 period, the performance is expected to remain within the benchmark.

6.5 Western Power Network Performance

Western Power does not have a SSB measure for the total network. However as shown in Table 17, the reliability performance of the network for the 2015/16 period improved when compared to the previous year.

Table 17: Overall reliability performance of the network

		2014/15	2015/16
Distribution	SAIDI[3]	169	152
	SAIFI	1.56	1.37
Transmission - System Minutes Interrupted[4]		8.47	7.29

For the distribution network, SAIDI improved by 10 per cent and SAIFI improved by 12 per cent. System minutes interrupted for the transmission network improved by nine per cent.

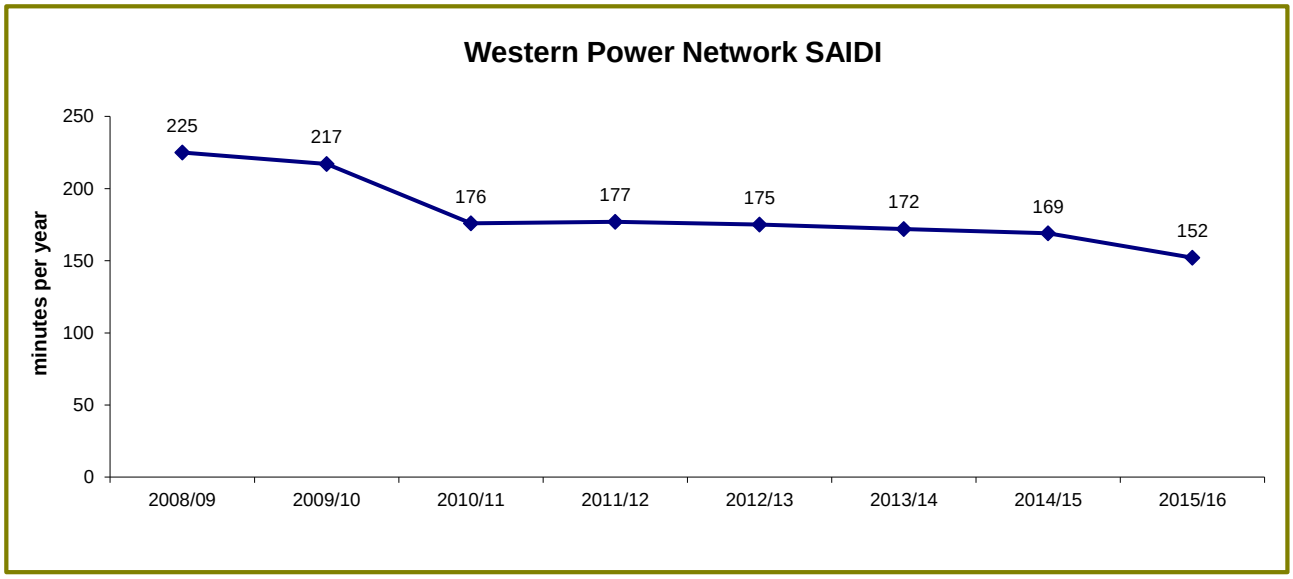

Figure 2: Distribution network SAIDI (7 year history)

[3] The SAIDI figures here are based on the same rules as defined in AA3, it is not comparable to other published SAIDI figures – namely Western Power's State of the Infrastructure and corporate annual reports.

[4] System Minutes Interrupted for the whole transmission network has never been a reporting measure in either the current or any previous Access Arrangement.

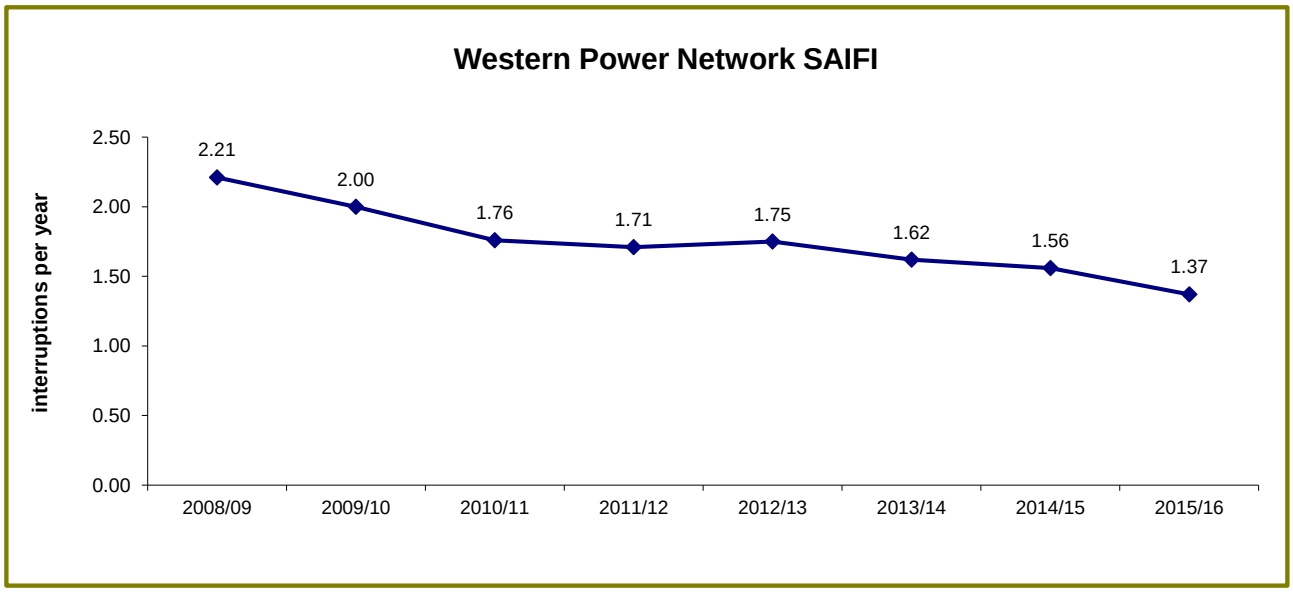

Figure 3: Distribution network SAIFI (7 year history)

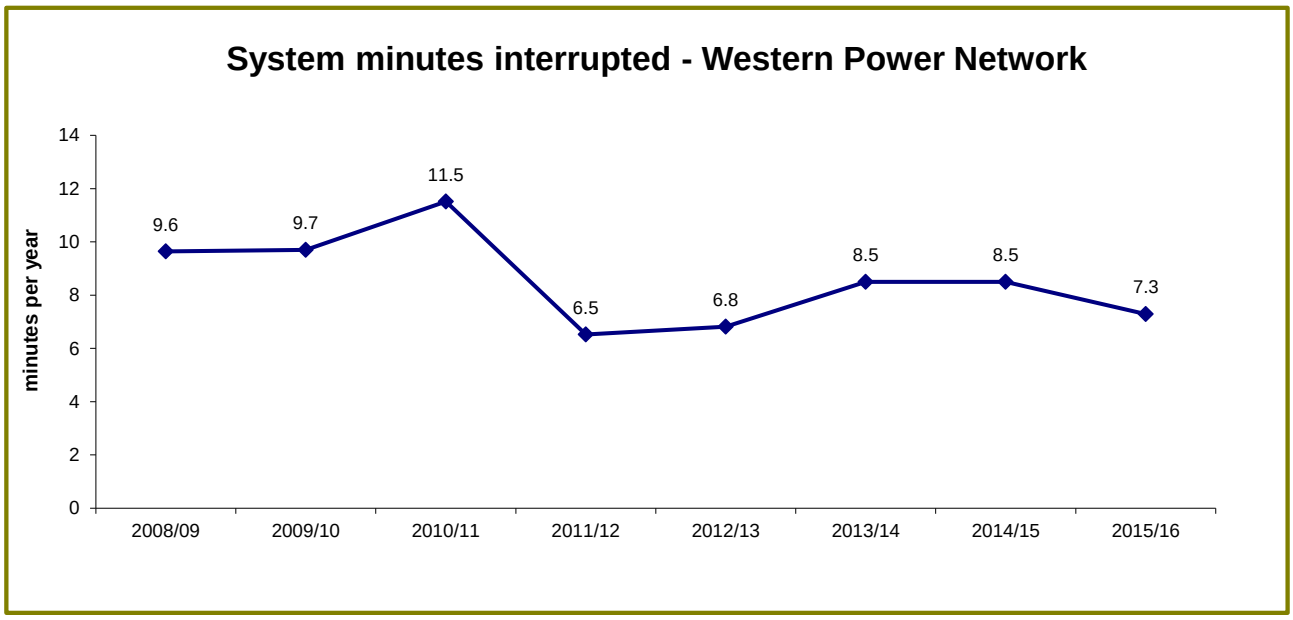

Figure 4: Transmission network SAIFI (7 year history)

7 Exclusions from SSB performance

As outlined in section 5, the service standards and the SSAM financial incentive scheme, provide for certain events to be excluded from the distribution and transmission reference service performance.

7.1 Distribution performance – SAIDI, SAIFI

Based on the exclusions described in section 5.1, for the 2015/16 period, the distribution performance service standards in terms of SAIDI and SAIFI excluded the interruptions described below.

7.1.1 Major Event Days (MEDs)

The exclusion of MEDs classified in accordance with IEEE 1366-2003 (*Guide for Electric Power Distribution Reliability Indices*) applies to SAIDI and SAIFI performance for each feeder classification and call centre performance.

There were six days during the 2015/16 period that exceeded the daily MED threshold of 5.27 minutes.

Table 18 shows:

- SAIDI (minutes per year) and SAIFI (interruptions per year), which have been excluded from the 2015/16 period due to these six MEDs.
- Call centre performance (percentage calls per year), which is the percentage number of fault calls responded to in 30 seconds or less against the total number of fault calls during these six MEDs.

Table 18: SAIDI, SAIFI and call centre performance exclusions due to MEDs

		2012/13	2013/14	2014/15	2015/16
SAIDI	CBD	1	0	0	6
	Urban	54	25	39	39
	Rural Short	73	74	44	175
	Rural Long	117	401	220	152
SAIFI	CBD	0.04	0.00	0.00	0.00
	Urban	0.21	0.13	0.22	0.17
	Rural Short	0.28	0.21	0.31	0.40
	Rural Long	0.50	0.61	0.78	0.61
Call centre performance		78.6%	92.8%	92.9%	90.0%

7.1.1.1 November 22, 2015

(SAIDI = 8.05 minutes, SAIFI = 0.044 interruptions, Call centre performance = 86.8%)

Due to operational practices enforced from a Total Fire Ban on this day as well as a bushfire, over 42,000 customers were interrupted, with the majority in the Peel and Perth Metropolitan regions, with each interruption lasting an average of three hours.

7.1.1.2 January 7-9, 2016

(7 January: SAIDI = 25.32 minutes, SAIFI = 0.021 interruptions, Call centre performance = 94.9%)
(8 January: SAIDI = 5.72 minutes, SAIFI = 0.024 interruptions, Call centre performance = 92.6%)
(9 January: SAIDI = 5.35 minutes, SAIFI = 0.016 interruptions, Call centre performance = 99.0%)

Over 50,000 customers were affected on the Western Power Network for an average of nearly 10 hours during these three days. While most customers were affected in the Perth Metropolitan area and Wheatbelt, customers in the South West and Peel regions were most affected in terms of total outage minutes.

Customers were without power primarily due to the following causes:

- Bushfires

  There was a bushfire affecting the Western Power Network during these three days in the Waroona area due to a lightning strike. Approximately 70,000 hectares where burnt, with around 1,000 poles and 50km of overhead conductor damaged and having to be replaced. The fire affected over 14,000 customers in the Peel and South West regions.

  Five generators were deployed in key critical areas where it was safe to restore customer supplies. However, due to the extent of the network damage, as well as crews being unable to safely access many areas, some customers were without power for extended periods.

- Lightning activity

  Lightning activity caused interruptions to approximately 34,000 customers in the Perth Metropolitan area and the Wheatbelt.

7.1.1.3 February 8, 2016

(SAIDI = 5.93 minutes, SAIFI = 0.051 interruptions, Call centre performance = 86.6%)

Over 34,000 customers were affected on the Western Power Network for an average of two hours. Overall, customers in the South West, Perth Metropolitan and Peel regions were the most affected during the day.

The main cause of the outage duration minutes was due to network outages from a bushfire in the Harvey area, which affected customers in the South West and Peel regions.

7.1.1.4 May 21, 2016

(SAIDI = 33.99 minutes, SAIFI = 0.110 interruptions, Call centre performance = 80.0%)

Over 114,000 customers were affected on the Western Power Network for an average of over five hours, although many customers experienced far longer interruptions.

Customers in the South West, Perth Metropolitan and Peel regions were the most affected during the day.

The main cause of customer interruptions was storm damage to overhead network assets caused by a cold front passing across the coast.

7.1.2 Transmission network interruptions

The SAIDI (minutes per year) and SAIFI (interruptions per year) that were excluded due to supply interruptions caused by the transmission network are outlined in Table 19.

Table 19: SAIDI and SAIFI exclusions due to transmission network interruptions

		2012/13	2013/14	2014/15	2015/16
SAIDI	CBD	4	0	0	0
	Urban	4	10	17	8
	Rural Short	7	12	17	24
	Rural Long	29	14	31	40
SAIFI	CBD	0.18	0.00	0.00	0.00
	Urban	0.16	0.20	0.25	0.13
	Rural Short	0.13	0.25	0.22	0.29
	Rural Long	0.34	0.32	0.34	0.75

7.1.3 Other third party network interruptions

The SAIDI (minutes per year) and SAIFI (interruptions per year) that were excluded due to supply interruptions caused by generator unavailability or customer equipment are outlined in Table 20.

Table 20: SAIDI and SAIFI exclusions due to other third party network interruptions

		2012/13	2013/14	2014/15	2015/16
SAIDI	CBD	2	3	3	2
	Urban	5	2	4	3
	Rural Short	5	4	7	2
	Rural Long	7	9	5	4
SAIFI	CBD	0.01	0.02	0.01	0.02
	Urban	0.09	0.03	0.04	0.02
	Rural Short	0.08	0.08	0.04	0.02
	Rural Long	0.11	0.13	0.09	0.06

These third party network supply interruptions include:

- generator failures on 20 September 2015 and 15 December 2015 resulting in the automatic de-energisation of circuits to stabilise the frequency on the transmission network
- over 2,600 faults attributed to customer installations or other third party equipment.

7.1.4 Planned interruptions

The SAIDI (minutes per year) and SAIFI (interruptions per year) that were excluded due to planned supply interruptions required to undertake safe work activities on the distribution network and mitigate the risk of unplanned interruptions, are outlined in Table 21.

Table 21: SAIDI and SAIFI exclusions due to planned interruptions

		2012/13	2013/14	2014/15	2015/16
SAIDI	CBD	24	19	4	21
	Urban	67	70	55	44
	Rural Short	144	259	151	148
	Rural Long	206	328	413	448

SAIFI	CBD	0.18	0.03	0.02	0.06
	Urban	0.21	0.23	0.17	0.14
	Rural Short	0.47	0.77	0.45	0.41
	Rural Long	0.68	0.93	1.20	1.26

7.1.5 Force Majeure

There were no events on the distribution network that were classified as force majeure.

7.2 Distribution performance – Call centre performance

Based on the exclusions described in section 5.1, for the 2015/16 period, the distribution performance service standards in terms of call centre performance exclude the fault call non-compliances as indicated below:

7.2.1 Abandoned calls – four seconds or less

These calls are currently not captured or recorded within Western Power's systems.

7.2.2 Major Event Days

See 7.1.1 for the details of the MEDs for the 2015/16 period.

7.2.3 Extraordinary events

There were no extraordinary events on the distribution network affecting the call centre performance.

7.3 Transmission performance

Based on the exclusions described in section 5.2, the transmission performance for the AA3 period excludes the interruptions described below.

7.3.1 Force Majeure

During the 2015/16 period, there were 80 events on the transmission network that were classified as force majeure, with all the events due to a major bushfire in the Waroona and Yarloop area. The bushfire started on 5 January 2016 and resulted in total outage duration and lines unavailability of 15,338 minutes.

The bushfire had a severe impact on the supply of electricity to the south west area of the Western Power Network, causing extensive damage to assets on the transmission network, including 88 poles that needed to be replaced. The loss of lines directly affected by the fire resulted in subsequent network outages, including a number of transmission circuits.

The disruption to customers lasted for extended periods, as restoration efforts were impeded by a total fire ban and site access restrictions, prohibiting Western Power access to its network assets. Repairs could not occur until it was safe to do so under the direction of the Department of Fire and Emergency Services.

7.3.2 Planned interruptions - major construction work exceeding 14 days

In calculating circuit availability, planned interruptions for major construction work are capped at 14 days. Table 22 shows the number of planned supply interruptions for major construction work that exceeded the 14 day cap in each financial year of the AA3 period.

Table 22: Planned interruptions for major construction work exceeding 14 days

	2012/13	2013/14	2014/15	2015/16
Number of planned interruptions	14	22	10	19

8 Momentary interruptions

8.1 Background

Momentary interruptions are interruptions that last one minute or less and are subsequently excluded from the AA3 SSBs.

As part of the AA3 decision process[5], the Authority required that Western Power begin recording data for momentary interruptions.

Data will be collected for the remainder of the AA3 period so that Western Power will be in a stronger position to consider its inclusion as an SSB in future regulatory periods.

8.2 2015/16 period data

During the 2015/16 period, there were approximately 3,100 momentary interruptions recorded on the network, affecting on average 570 customers per interruption. Most of these interruptions occurred on the Rural Long network.

Table 23 shows the average number of momentary interruptions per customer for the 2015/16 period for each of the distribution feeder classifications. This data is inclusive of all momentary interruptions on the distribution network.

Table 23: Momentary interruptions per customer for the 2015/16 period

	Momentary interruptions per customer
CBD	0.04
Urban	0.77
Rural Short	2.04
Rural Long	6.90

[5] The Authority's Final Decision - September 2012, paragraphs 1957- 1961, http://www.erawa.com.au/cproot/10737/2/20120905%20-%20D94955%20-%20Final%20Decision%20on%20Proposed%20Revisions%20to%20the%20Access%20Arrangement%20for%20the%20Western%20Power%20Network%20-%20Published%20Version.pdf

9 Service standard adjustment mechanism

9.1 Overview

The Authority applies a financial reward or penalty to Western Power in relation to the actual performance for 14 SSBs through the SSAM.

The SSAM applies to the SSBs for SAIDI, SAIFI, Circuit Availability, call centre performance, System Minutes Interrupted - radial, Loss of Supply Event Frequency and Average Outage Duration.

A reward or penalty is calculated based on the difference between the actual performance and the SST and capped at the SSB, as outlined in AA3.

9.2 Actual performance

Western Power has met or exceeded the expected level of performance[6] for the SSAM target for 11 out of the 14 SSB measures subject to this financial incentive scheme.

Table 24 shows the results of the SSAM performance for the 2015/16 period, with a comparison of SSAM for the 2012/13 to 2015/16 periods, shown in Table 25.

All values are expressed in real dollars as at 30 June 2012.

[6] The SSAM target was set at a 50% probability of achieving for the AA3 period

Table 24: Service Standard Adjustment Mechanism results for the 2015/16 period

	Service Standard		Incentive Rate			SSB	SST	SSA	SSD	Penalty (-) or Reward (+)
			$ unit rate	Reward	Penalty					
Distribution	SAIDI	CBD	per SAIDI minute	$67,817	$67,817	39.9	20.3	22.6	-2.3	-$155,979
		Urban		$529,816	$529,816	183	136.6	91.3	45.3	$24,000,665
		Rural Short		$223,472	$223,472	227.8	207.8	168.4	39.4	$8,804,797
		Rural Long		$65,219	$65,219	724.8	582.2	582.6	-0.4	-$26,088
	SAIFI	CBD	per 0.01 SAIFI event	$87,081	$87,081	0.26	0.14	0.10	0.04	$348,324
		Urban		$548,988	$548,988	2.12	1.36	0.91	0.45	$24,704,460
		Rural Short		$222,511	$222,511	2.61	2.27	1.75	0.52	$11,570,572
		Rural Long		$101,725	$101,725	4.51	4.06	3.99	0.07	$712,075
	Call centre performance		per 0.1%	-$41,495	-$41,084	77.5%	87.6%	91.4%	-3.8%	$1,576,810
Total distribution penalty/reward (capped at 5% distribution revenue at risk)										**$46,645,954**
Transmission	Circuit Availability		per 0.1%	-$817,186	-$408,593	97.7%	98.1%	98.7%	-0.60%	$4,903,116
	System minutes interrupted - radial network		per system minute	$105,443	$172,039	5.0	1.9	0.5	1.4	$147,620
	Loss of supply event frequency	>0.1 system minutes	per loss of supply event	$36,319	$27,240	33	24	17	7	$254,233
		>1 system minutes		$163,437	$163,437	4	2	1	1	$163,437
	Average outage duration		per duration minute	$3,477	$2,495	886	698	1,265	-188	-$469,060
Total transmission penalty/reward (capped at 1% transmission revenue at risk)										**$2,906,413**
Total penalty/reward for 2015/16										**$49,552,367**

Table 25: Service Standard Adjustment Mechanism results for the 2012/13 to 2015/16 periods

	Service Standard		Penalty (-) or Reward (+)			
			2012/13	2013/14	2014/15	2015/16
Distribution	SAIDI	CBD	$861,276	$135,634	-$400,120	-$155,979
		Urban	$17,960,762	$15,470,627	$17,801,818	$24,000,665
		Rural Short	$5,899,661	$8,179,075	$5,631,494	$8,804,797
		Rural Long	-$6,730,601	-$5,974,060	-$6,215,371	-$26,088
	SAIFI	CBD	$957,891	-$522,486	-$261,243	$348,324
		Urban	$10,979,760	$12,626,724	$14,822,676	$24,704,460
		Rural Short	$2,225,110	$9,790,484	$6,452,819	$11,570,572
		Rural Long	-$4,577,625	-$4,577,625	-$3,560,375	$712,075
	Call centre performance		$1,244,850	$2,157,740	$2,531,195	$1,576,810
Total distribution penalty/reward			**$28,821,084**	**$34,239,948**	**$36,802,893**	**$46,645,954**
Transmission	Circuit Availability		$2,451,558	-$408,593	$3,268,744	$4,903,116
	System minutes interrupted - radial network		-$68,816	-$309,670	$31,633	$147,620
	Loss of supply event frequency	>0.1 system minutes	$399,509	$145,276	-$81,720	$254,233
		>1 system minutes	$0	$163,437	$326,874	$163,437
	Average outage duration		-$419,160	-$242,015	-$54,890	-$469,060
Total transmission penalty/reward			**$2,363,091**	**-$651,565**	**$3,214,306**	**$2,906,413**
Total penalty/reward			**$31,184,175**	**$33,588,383**	**$40,017,199**	**$49,552,367**

Appendix A.Service standard performance graphs – 2008/09 to 2016/17

The following graphs show the actual performance of the service standards for the seven financial years up to 2015/16, and the SSBs and SSTs (if applicable) during the AA3 period. Where relevant, the AA2 SSBs have been included to demonstrate trends. Details and further information regarding AA2 performance has been provided in previous Service Standard Performance Reports throughout the AA2 period.

Distribution performance

Figure 5 to **Error! Reference source not found.** show the SAIDI and SAIFI of the CBD, Urban, Rural Short and Rural Long networks.

Figure 13 shows the call centre performance

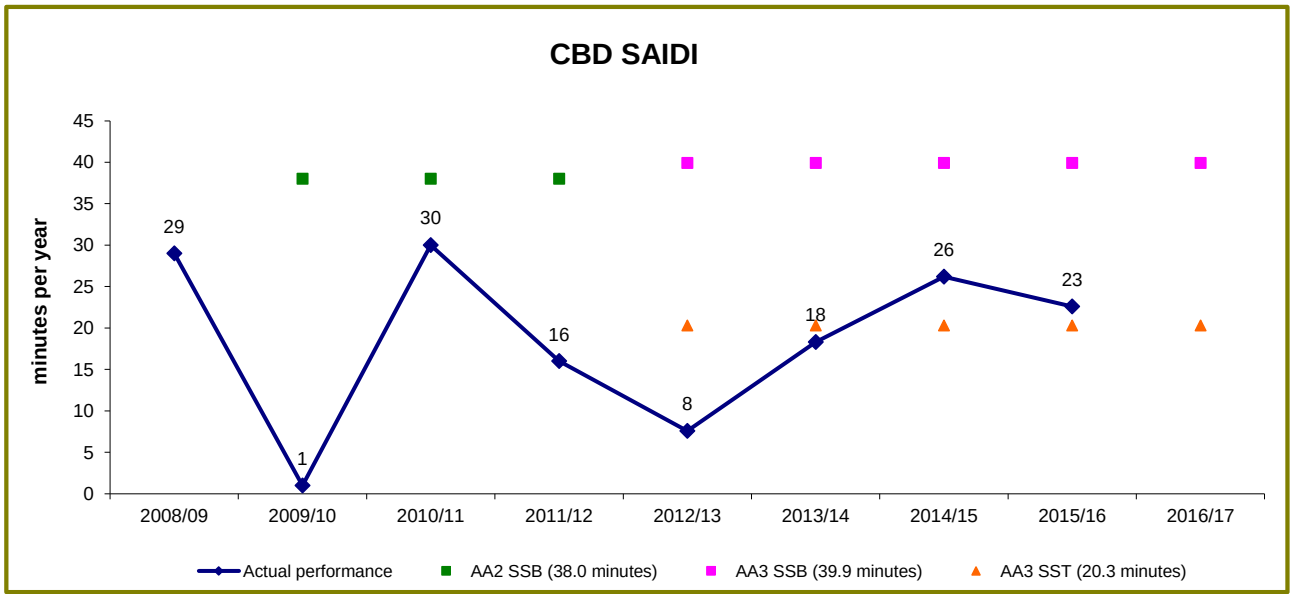

Figure 5: CBD SAIDI

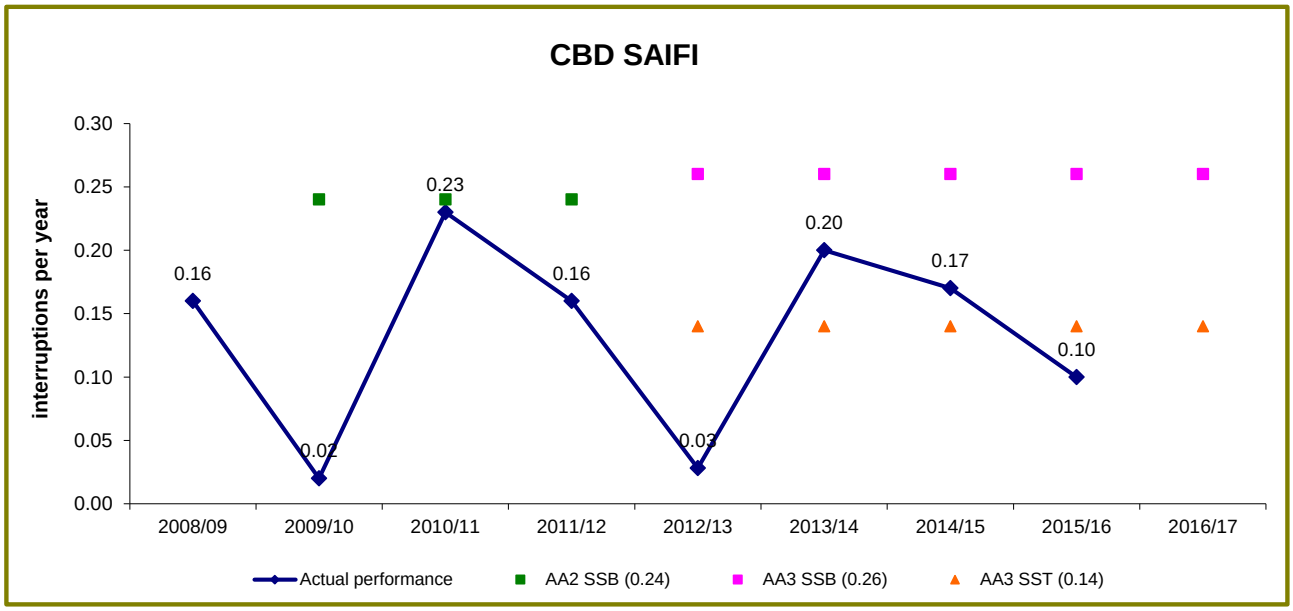

Figure 6: CBD SAIFI

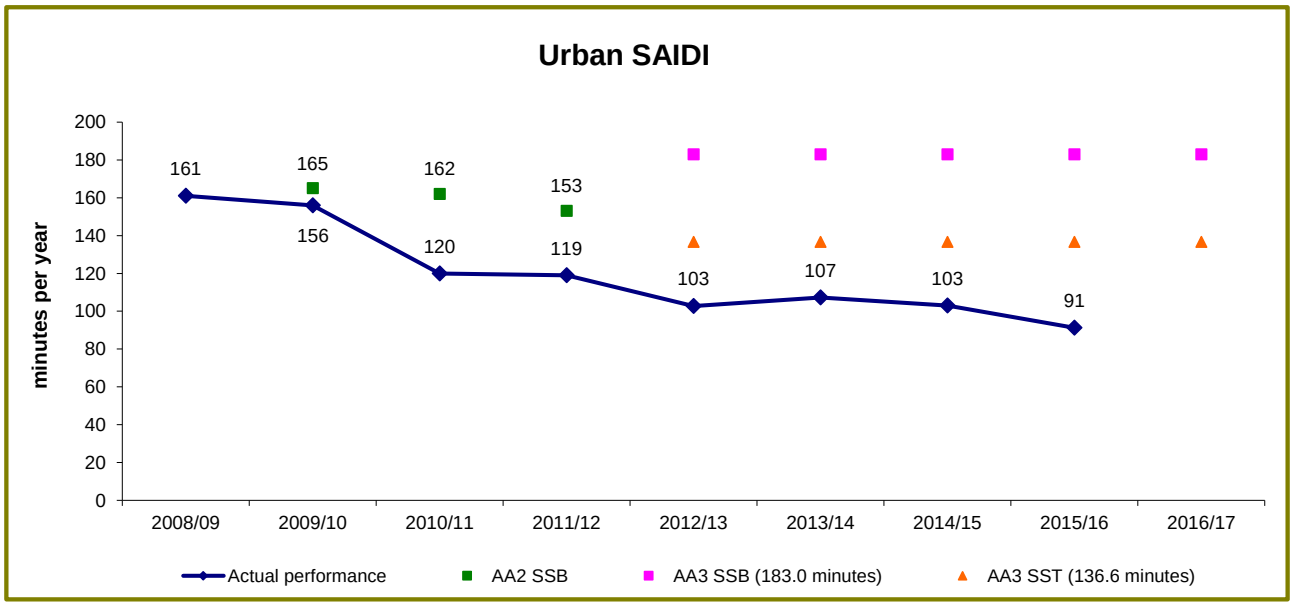

Figure 7: Urban SAIDI

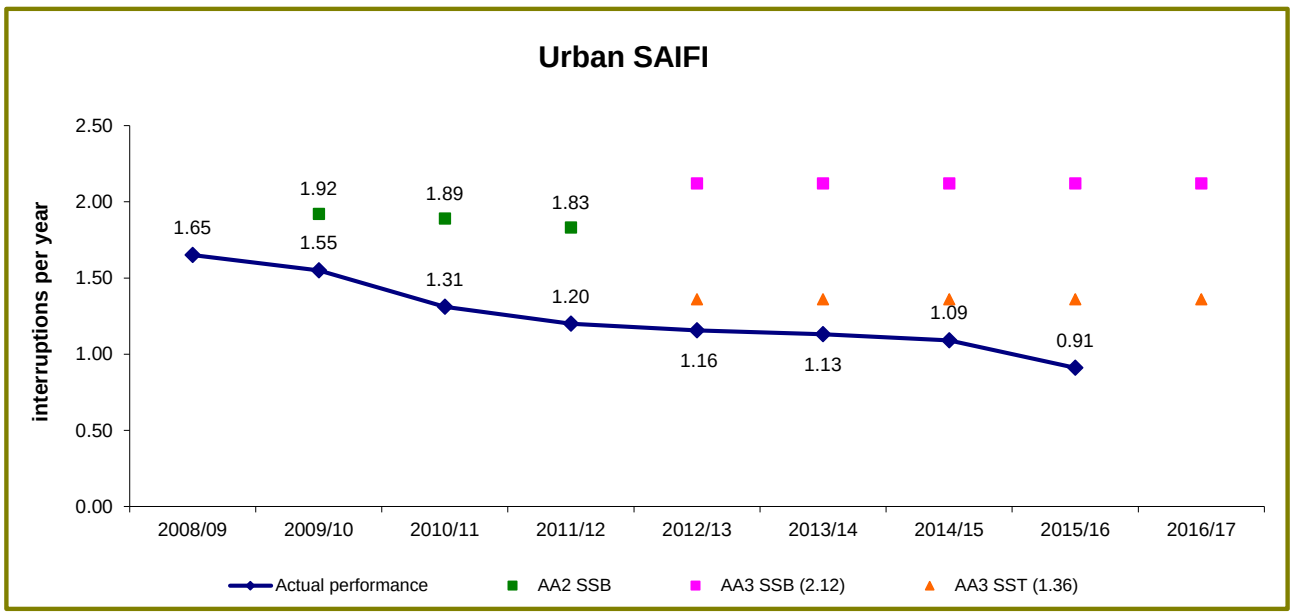

Figure 8: Urban SAIFI

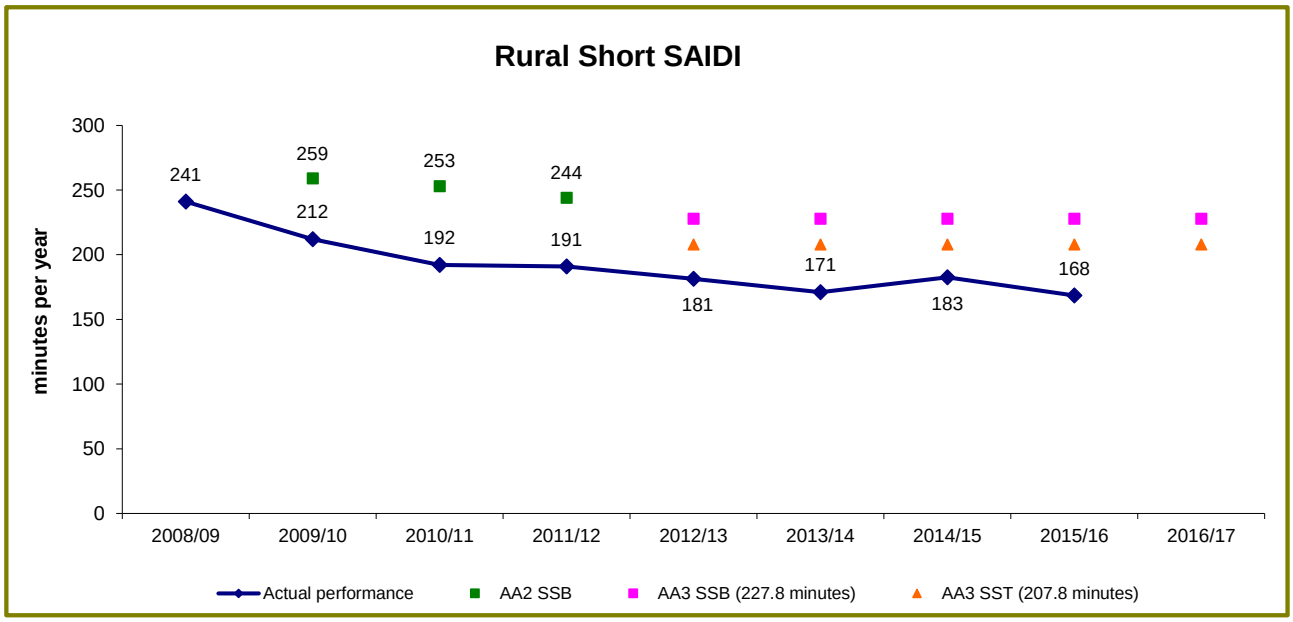

Figure 9: Rural Short SAIDI

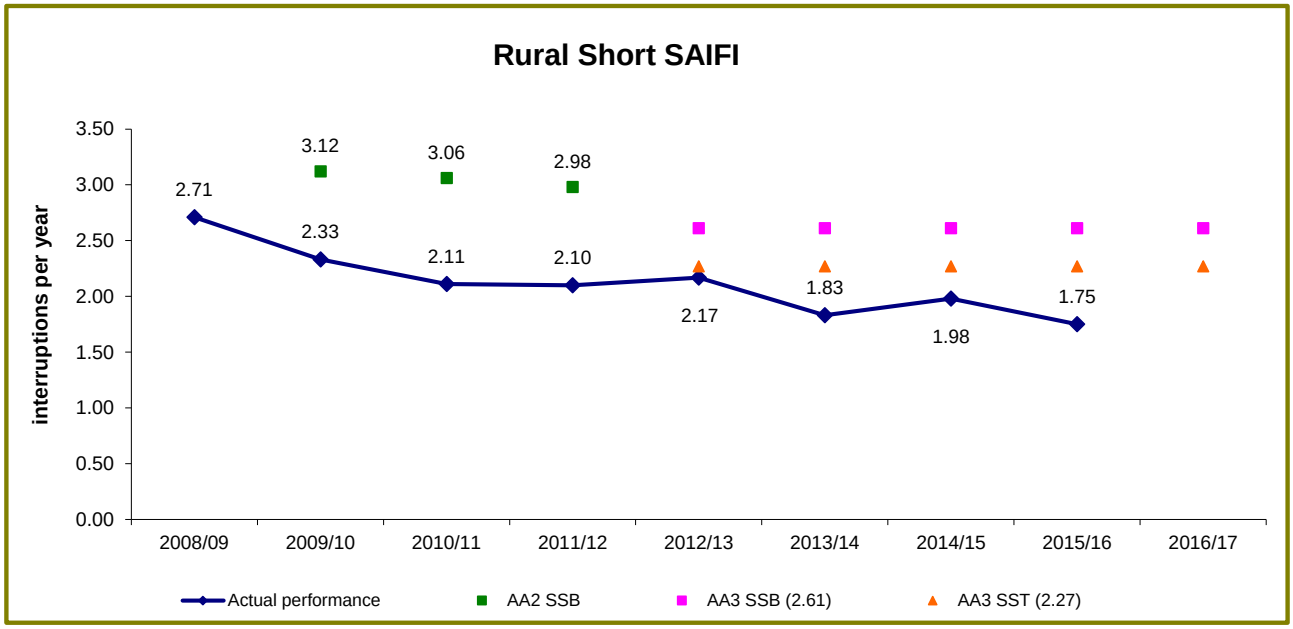

Figure 10: Rural Short SAIFI

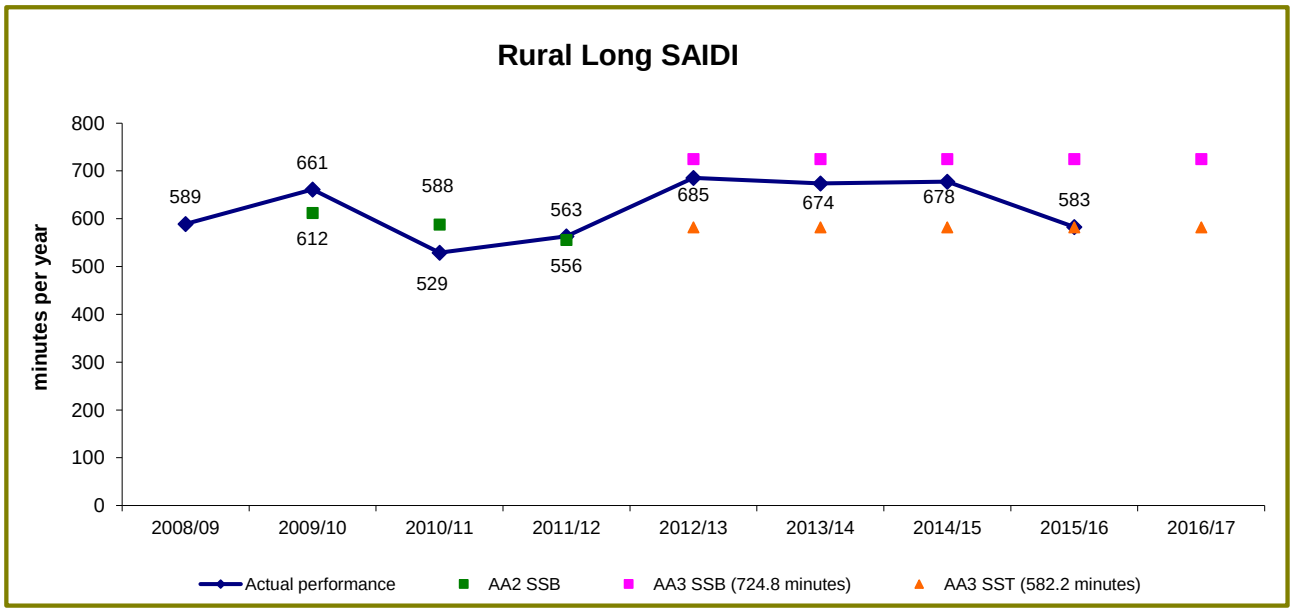

Figure 11: Rural Long SAIDI

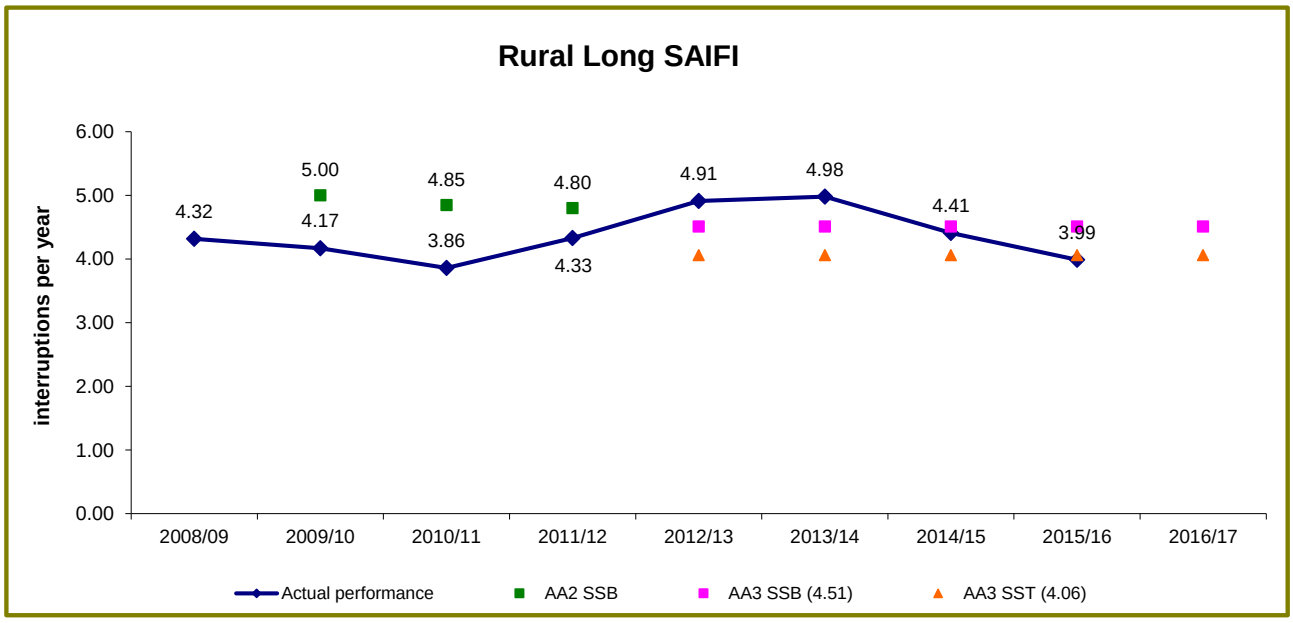

Figure 12: Rural Long SAIFI

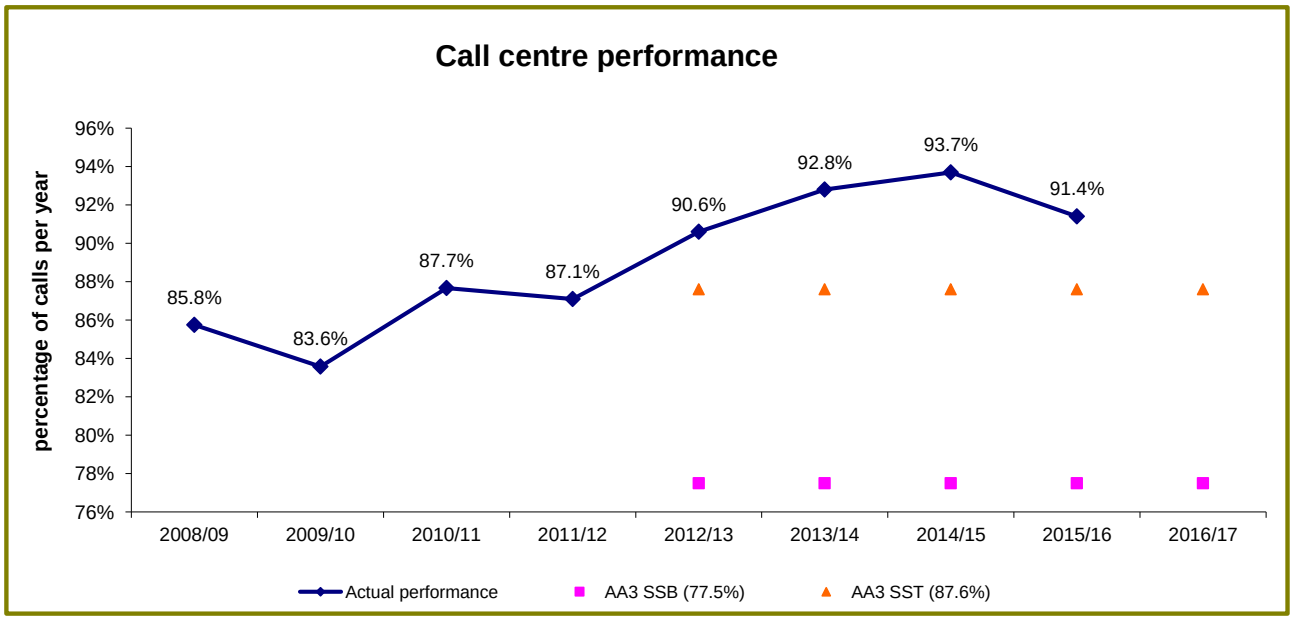

Figure 13: Call Centre Performance

Transmission performance

Figure 14 shows the circuit availability

Figure 15 and Figure 16 show the system minutes interrupted for the meshed and radial networks

Figure 17 and Figure 18 show the loss of supply event frequency for > 0.1 and > 1 system minutes

Figure 19 show the average interruption duration

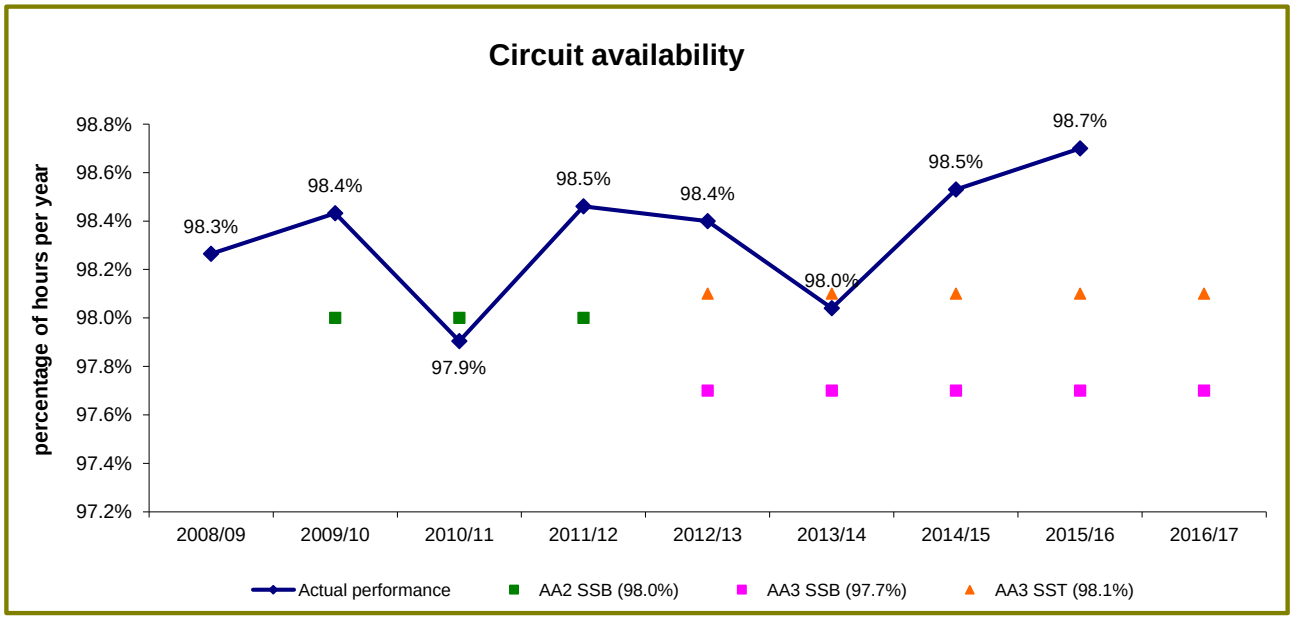

Figure 14: Circuit availability

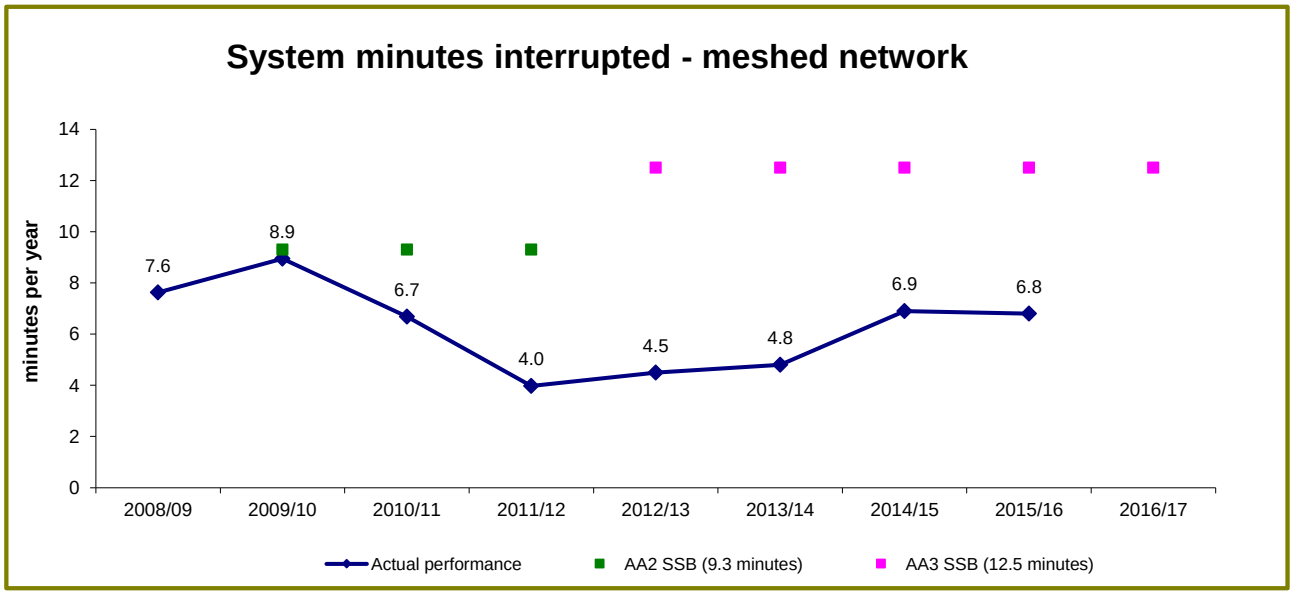

Figure 15: System minutes interrupted – meshed network

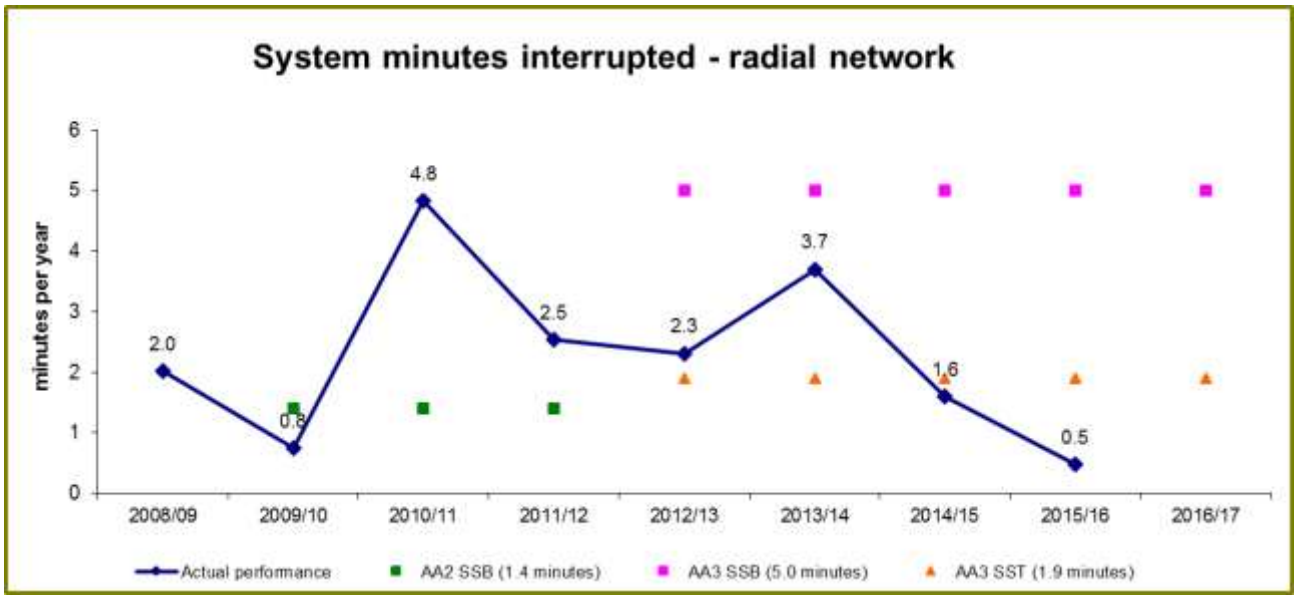

Figure 16: System minutes interrupted – radial network

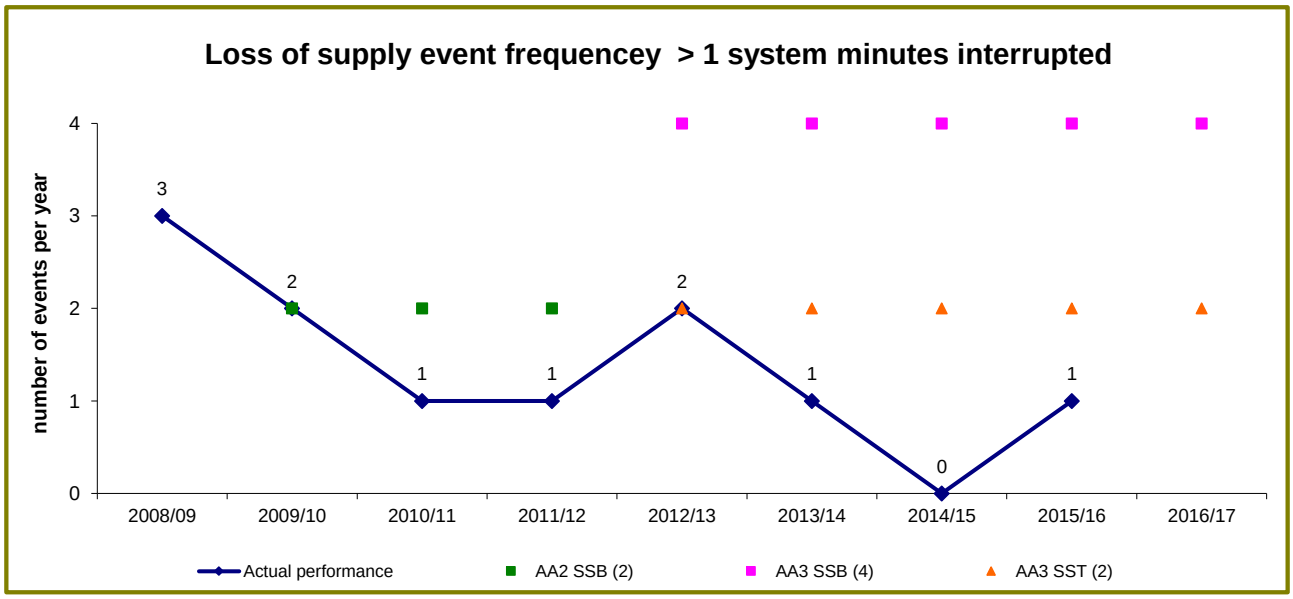

Figure 17: Loss of supply event frequency > 1 system minutes interrupted

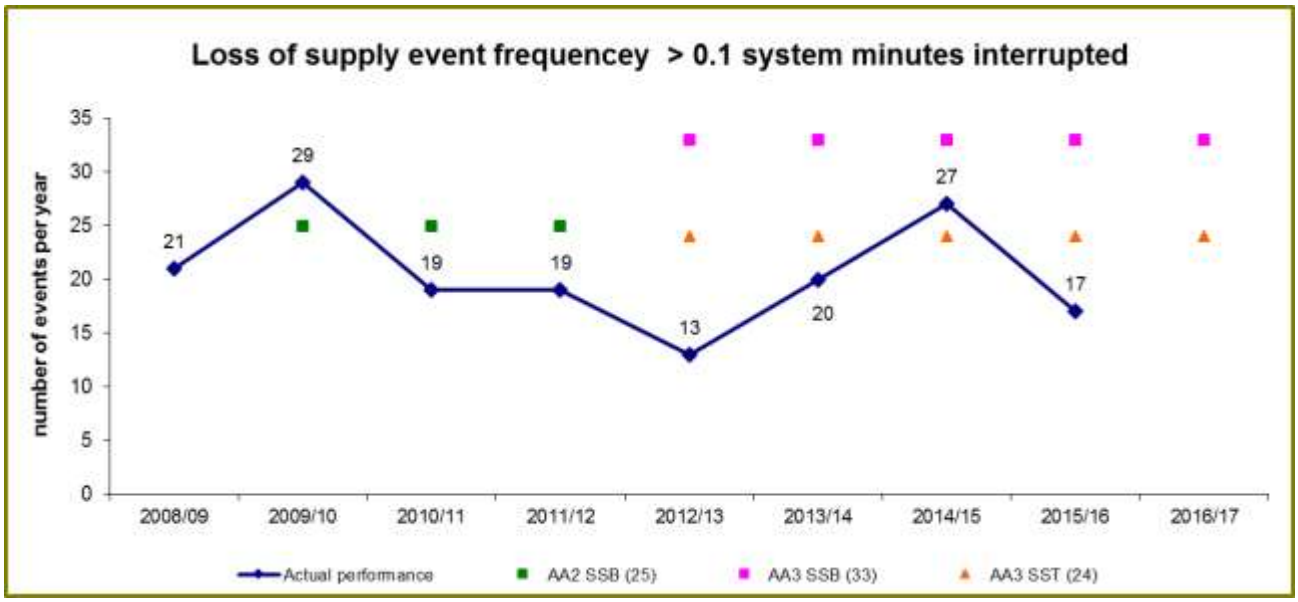

Figure 18: Loss of supply event frequency > 0.1 system minutes interrupted

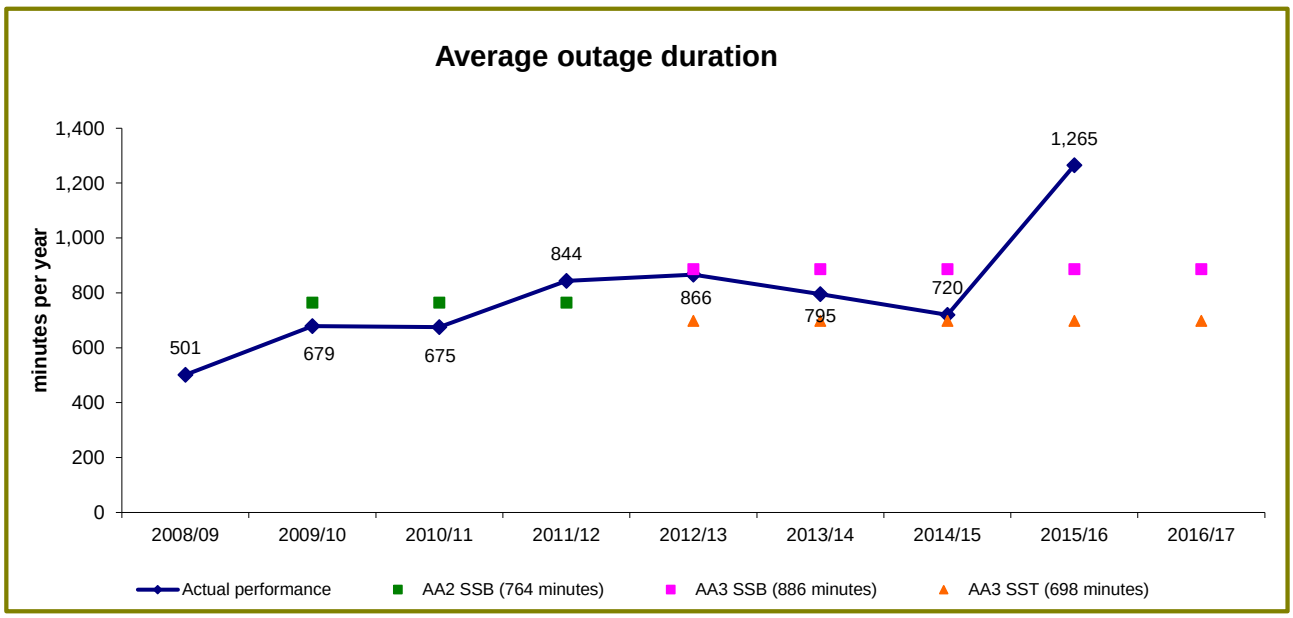

Figure 19: Average outage duration

Street lighting repair time

Figure 20 and Figure 21 show the street lighting repair time for the metropolitan and regional areas

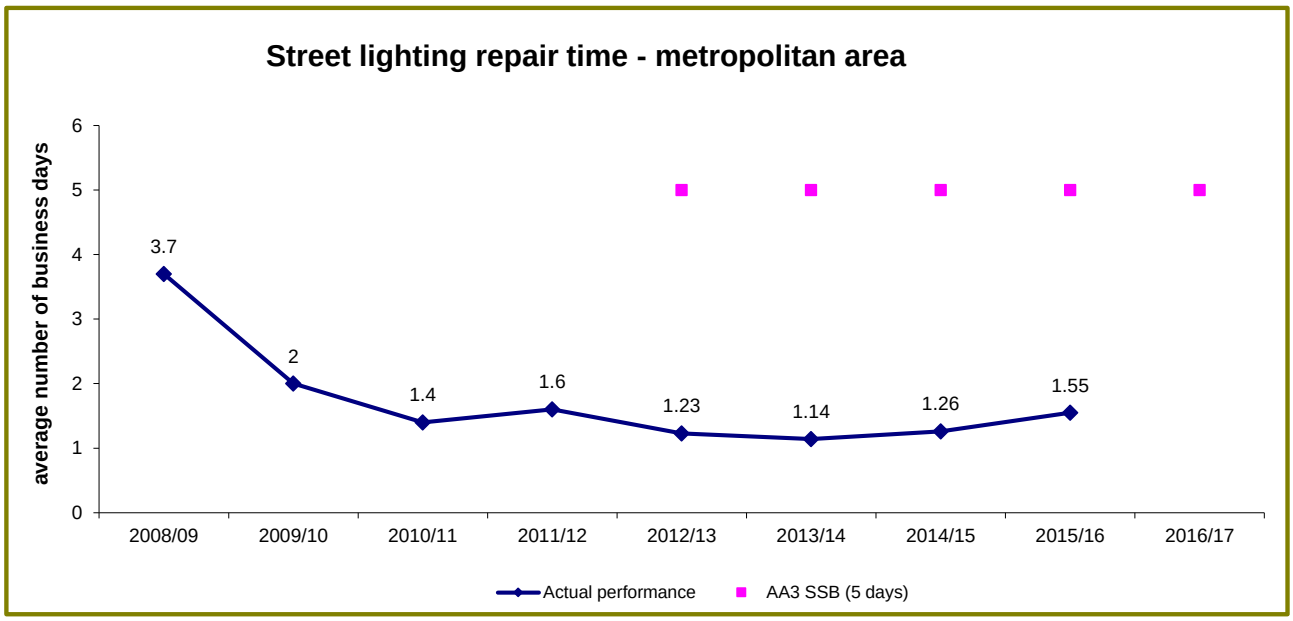

Figure 20: street lighting repair time – Metropolitan area

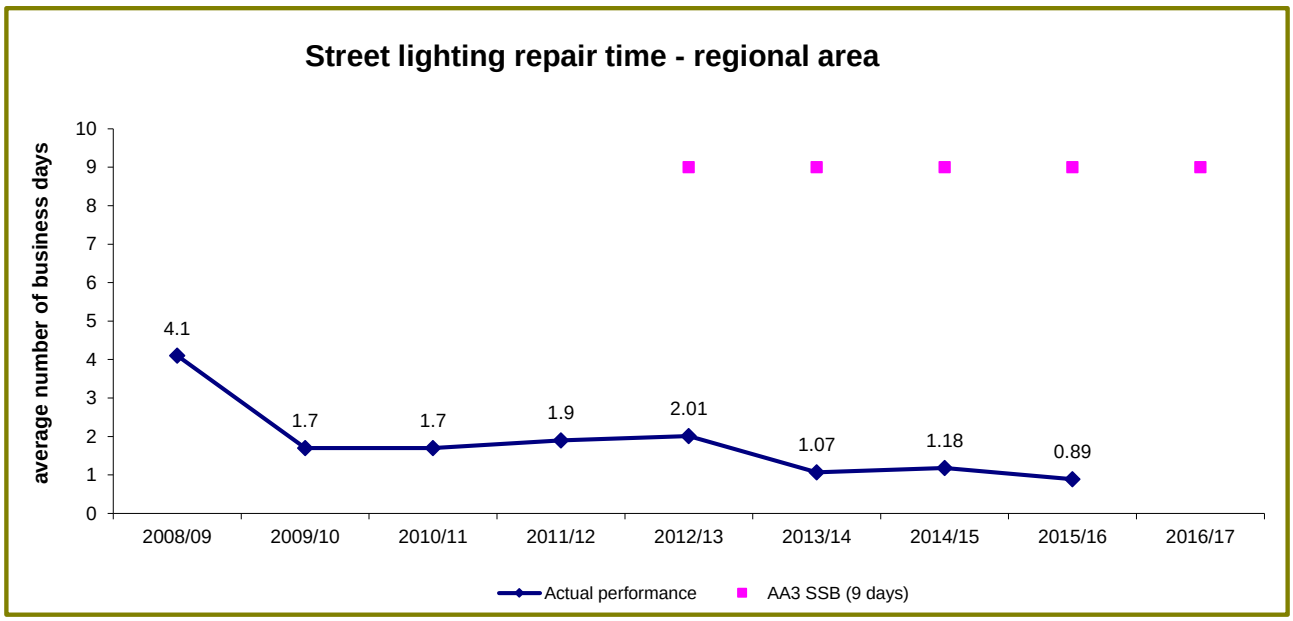

Figure 21: street lighting repair time – Regional area

Appendix B. Trends of fault causes for Network SAIFI

The following graphs show the trends, over the past six years up to June 2016, by key causes of interruptions (overhead equipment failure, unknown fault causes and lightning) which contribute to the Network SAIFI

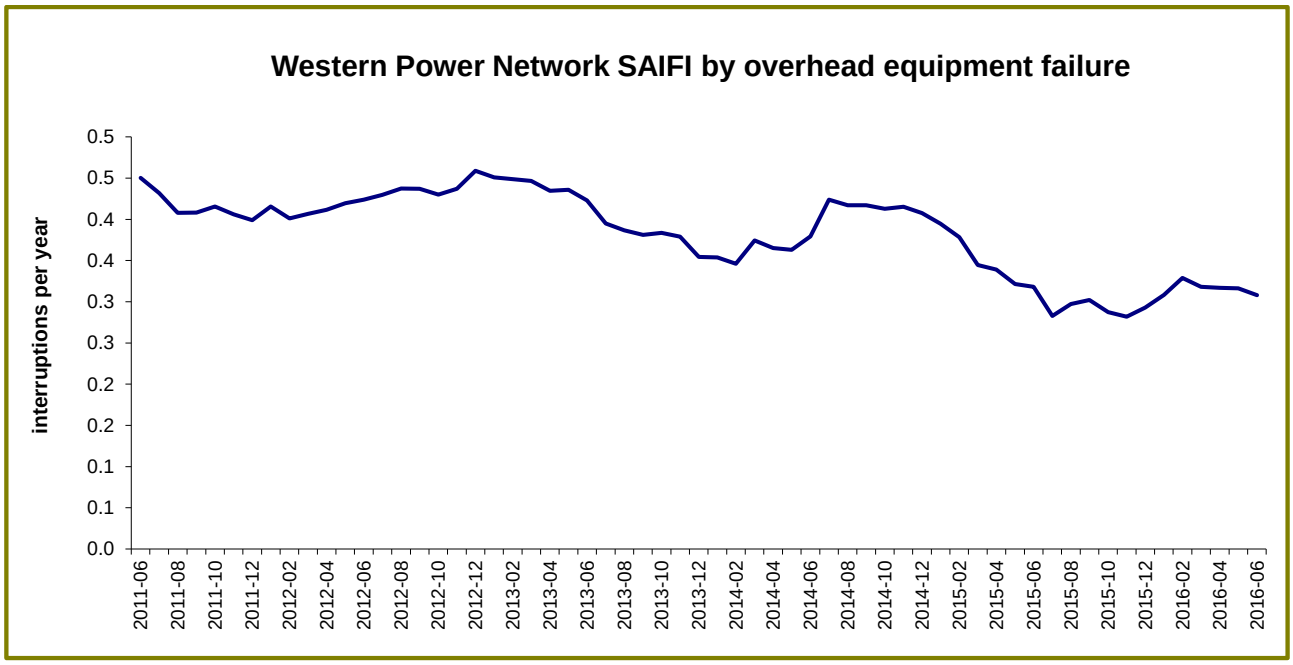

Figure 22 - Network SAIFI – overhead equipment failure cause trend

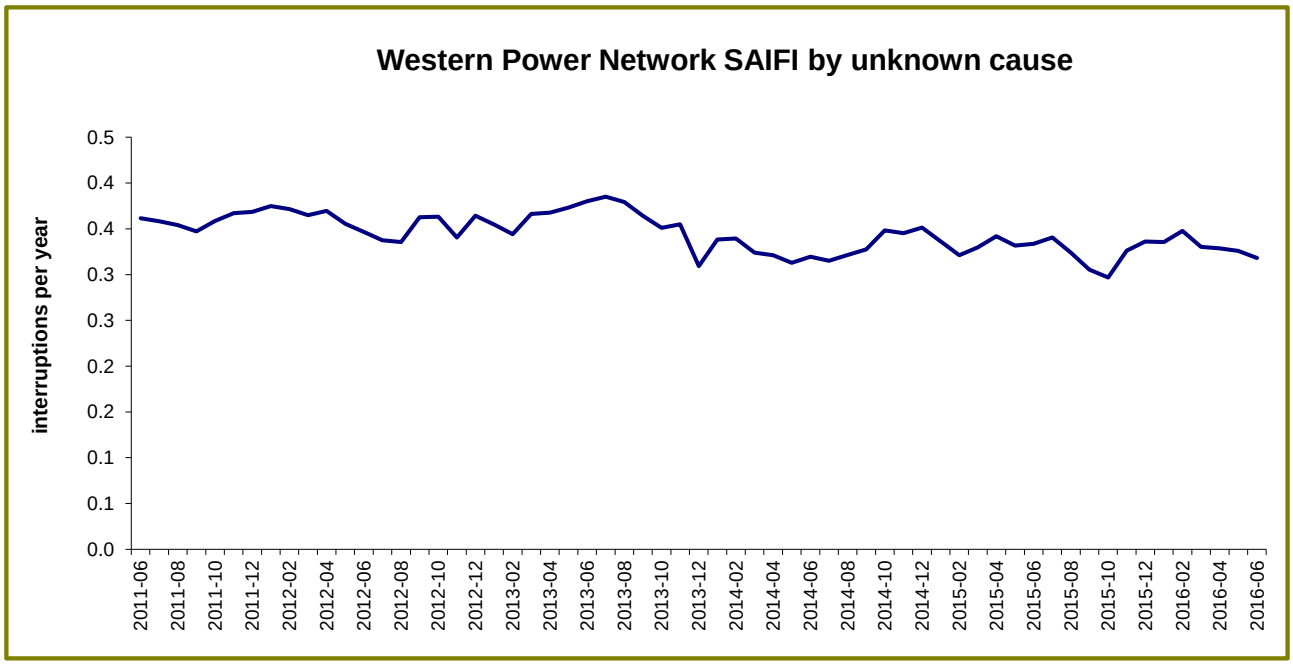

Figure 23 - Network SAIFI – unknown cause trend

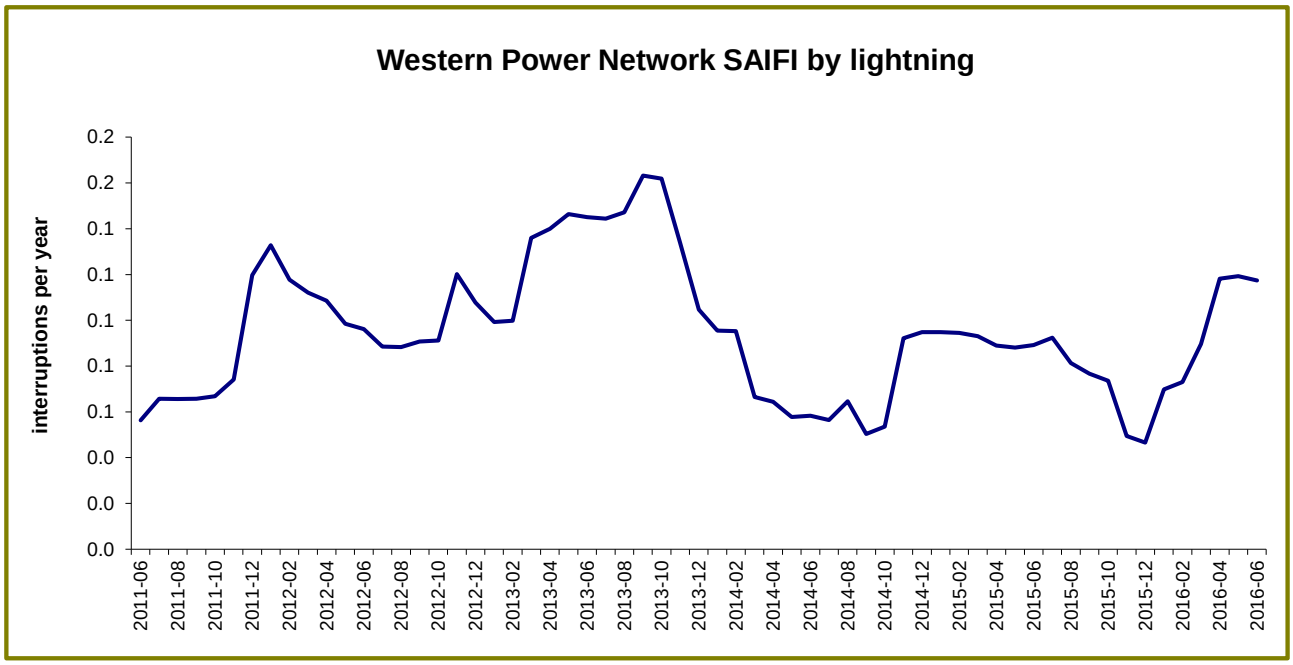

Figure 24 - Network SAIFI –lightning cause trend