Service Standard Performance Report

For the period 1 July 2014 to 30 June 2015

September 2015

Table of 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**)[1].

This information is published in accordance with the *Electricity Networks Access Code 2004* (**Access Code**) and the requirements of Western Power's electricity transmission and distribution licences.

This report covers the period 1 July 2014 to 30 June 2015 (**2014/15 period**).

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 activity. Western Power recognises that compliance programs are critical to providing stakeholders with a transparent view of its performance in key areas.

This report contributes to this transparency by presenting information on Western Power's reliability performance against levels agreed for AA3, which ends on 30 June 2017.

Reliability of supply

Reliability of supply reflects the service Western Power provides to its customers by measuring the 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 the customer 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] Western Power's current approved Access Arrangement (AA3) for 1 July 2013 to 30 June 2017

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 up to 12 months before service levels begin to reflect the benefits of these works. This is particularly true for long feeders, due to the number of assets involved.

Performance summary

- Average service levels were maintained in many areas of the network, due largely to increased investment in the maintenance and replacement of overhead assets, particularly wood poles.
- Performance surpassed required levels in all SSBs.
- Performance exceeded target for eight (8) of the 14 SSBs subject to the Service Standard Adjustment Mechanism.
- Performance improved in nine (9) of the 17 SSBs.
- Overall, reliability performance of the transmission and distribution networks improved.

Future performance – Rural Long SAIFI

Although Rural Long SAIFI performed within the SSB for the 2014/15 period, the risk of not meeting the benchmark remains over the next five years. However, if Western Power continues to place further focus on the worst performing areas, Rural Long SAIFI is expected to improve and meet, or exceed, the SSB in future years.

2 Background

In accordance with its electricity transmission licence (**ETL2**)[2] and electricity distribution licence (**EDL1**)[3] and the Access Code[4], section 11.1, Western Power[5] 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**)[6] to 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 2014/15 period.

This Report is the third year of reporting service standards performance for AA3.

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, much of which is isolated and unpopulated. 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 155 terminal and zone substations, with approximately 67,000 distribution substations providing an electricity supply to over one million customers and over 250,000 streetlights.

[2] Electricity Industry Act 2004, Electricity Transmission Licence, Electricity Networks Corporation (t/a Western Power) ETL2, Version 6, 19 September 2012

[3] Electricity Industry Act 2004, Electricity Distribution Licence, Electricity Networks Corporation (t/a Western Power) EDL1, Version 7, 1 January 2013

[4] Electricity Industry Act 2004, Electricity Networks Access Code 2004 published by Western Australian Government

[5] Electricity Networks Corporation (t/a Western Power) ABN 18540492861

[6] Economic Regulation Authority established by the Economic Regulation Authority Act 2003

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 third year of AA3, namely the 2014/15 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 2015, 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*[7] 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.

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*:

[7] All terms shown in italics refer to those terms as defined in the Electricity Networks Access Code 2004

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[8] (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:

[8] National Regulatory Reporting for electricity distribution and retail businesses, Utility Regulators Forum discussion paper, March 2002 c Commonwealth of Australia

- 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).
- 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

5.1.1 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

5.1.1 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

5.1.1 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 Part 1.5 of 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 all of the 17 SSBs for the 2014/15 period and therefore was compliant with section 11.1 of the Access Code. Western Power's performance against each benchmark is shown in Table 13.

Table 13: Service Standard performance summary for the 2014/15 period

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

A subsequent data revision in the 2013/14 performance measures resulted in corrections in the following in Table 13:

- Urban SAIDI: from 107.3 to 107.4 minutes per year.
- Rural Short SAIDI: from 171.1 to 171.2 minutes per year.
- Rural Long SAIDI: from 672.7 to 673.8 minutes per year (also reflected in Figure 11).

The data revision also resulted in additional corrections in the following measures elsewhere in the report:

- Western Power Network SAIDI from 171 to 172 minutes per year (Table 17 and Figure 2).
- SSAM performance for 2013/14 period from $36,781,618 to $36,634,548 (Table 25).

The commentary and conclusions in the 2013/14 Service Standard Performance report remain unchanged.

6.1.1 Distribution network

Overall, the reliability performance of the distribution network improved during the 2014/15 period compared to the 2013/14 period.

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

- pole top fires
- equipment failures
- emergency outages due to hazardous conditions.

The overhead asset associated maintenance work programs, such as the wood pole replacement and associated asset maintenance work programs completed during the 2014/15 period, have contributed to the overall improvement in performance of the distribution network.

CBD, Rural Short and Rural Long SAIDI, and Urban SAIFI performed well within their prescribed benchmarks. However, switchgear failures and environmental factors were the primary contributor to the lower performance during the 2014/15 period compared to the 2013/14 period (see Table 14 for further detail).

6.1.2 Trends in interruption causes

The trend of overhead asset failure has been steadily declining over the past five years (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.

Although lightning activity increased slightly over the past 12 months it was not to the level experienced during the 2013/14 period. Overall, lightning activity on the distribution network has been volatile over the past five years (Appendix B, Figure 24).

6.1.3 Areas of focus

Periodic annual reviews of all the reliability metrics identify areas where more detailed analysis and investigation is required. The outcomes of the analysis and investigative work provide a greater understanding of what investment and maintenance activities are required in the network, with the greatest focus on the worst performing areas. Ongoing monthly assessments provide visibility of potential emerging issues in areas not identified through the annual review process. To date, the majority of these areas are on rural long feeders.

The completion of the 2014/15 work program focused on public safety which achieved high volumes of wood pole and conductor replacements, together with targeted bushfire mitigation programs such as insulator siliconing and vegetation management. This, combined with relatively favorable weather conditions, contributed to an overall improvement of reliability performance and enabled the business to achieve compliance with the SSBs for rural long feeders by 30 June 2015.

Continued investment in specific programs as well as proactive targeting of the worst performing areas will help maintain this performance in the short term. However, the overall aging profile of the Western Power Network and an enduring priority on public safety activities means that reliability performance will become more challenging to maintain in future years.

Sections 6.2, 6.3 and 6.4 provide explanatory details of Western Power's service standard performance against the SSBs, while Appendix A shows the recent five year trends of distribution network performance.

6.2 Distribution

Table 14: Distribution performance for the 2014/15 period

Service Standard	2014/15			Comments
	SSB	SST	Actual	
CBD SAIDI	39.9	20.3	26.2	Performance was better than the AA3 benchmark and worse than the 2013/14 period (18.3 minutes per year). The primary contributor to the worsening performance when compared to the 2013/14 period was an increase 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 connection numbers and the relatively long repair times for faults in an underground CBD network.
Urban SAIDI	183.0	136.6	103.0	Performance was better than the AA3 benchmark and better than the 2013/14 period (107.4 minutes per year). The primary contributors to an improvement in performance during the 2014/15 period were the decrease in the impact of cable failures and the number of emergency outages due to hazardous conditions. The primary contributors to the actual performance were overhead and underground equipment failures.
Rural Short SAIDI	227.8	207.8	182.6	Performance was better than the AA3 benchmark and worse than the 2013/14 period (171.2 minutes per year). The primary contributors to the worsening performance when compared to the 2013/14 period were an increase in the impact of bushfires and asset damage from third party machinery. The primary contributors to the actual performance were overhead and underground equipment failures and interruptions where the fault cause is unknown.
Rural Long SAIDI	724.8	582.2	677.5	Performance was better than the AA3 benchmark and worse than the 2013/14 period (673.8 minutes per year) The primary contributors to the worsening performance when compared to the 2013/14 period were an increase in the impact of lightning and bird and animal activity.

Service Standard	2014/15			Comments
	SSB	SST	Actual	
				The primary contributors to the actual performance were overhead equipment failures and interruptions where the fault cause is unknown. Western Power met the Rural Long SAIDI performance measure at the end of 2014/15.
CBD SAIFI	0.26	0.14	0.17	Performance was better than the AA3 benchmark and better than the 2013/14 period (0.20 interruptions per year). The primary contributor to an improvement in performance when compared to the 2013/14 period was a decrease in the impact of cable failures and interruptions where the fault cause is unknown. Note: The CBD SAIFI performance is volatile over short periods of time due to the effects of fewer connection numbers.
Urban SAIFI	2.12	1.36	1.09	Performance was better than the AA3 benchmark and better than the 2013/14 period (1.13 interruptions per year). The primary contributors to an improvement in performance over the 2013/14 period were the decrease in the impact of overhead switchgear failures and the number of emergency outages due to hazardous conditions. The primary contributors to the actual performance were overhead equipment failures, interruptions where the cause is unknown and bird and animal activity.
Rural Short SAIFI	2.61	2.27	1.98	Performance was better than the AA3 benchmark and worse than the 2013/14 period (1.83 interruptions per year). The primary contributors to the worsening performance when compared to the 2013/14 period were an increase in the impact of interruptions where the fault cause is unknown and asset damage from third party machinery. The primary contributors to the actual performance were overhead and underground equipment failures and interruptions where the cause is unknown.
Rural Long SAIFI	4.51	4.06	4.41	Performance was better than the AA3 benchmark and better than the 2013/14 period (4.98 interruptions per year). The primary contributors to an improvement in performance over the 2013/14 period were the decrease in the number of emergency outages due to hazardous conditions, pole top fires (in part due to remedial maintenance activities) and the impact of localised inclement weather.

Service Standard	2014/15			Comments
	SSB	SST	Actual	
				The primary contributors to the actual performance were overhead equipment failures, interruptions where the cause is unknown and lighting activity.
Call centre performance	77.5%	87.6%	93.7%	This year's performance of 93.7% of fault calls answered within 30 seconds exceeded the AA3 benchmark and was slightly better than in the 2013/14 period (92.8%). In March 2014 Western Power introduced a mobile phone friendly outage webpage. This has resulted in an increase in customers obtaining their power restoration information from our webpage. Reflecting customer transition to smart phones, this year mobile phones accessed the outage page on Western Power's website on 341,061 occasions, compared to 105,081 in the previous year. This contributed to a reduction in telephony fault calls. Western Power continues its promotion of media campaigns for customers to "Be storm ready" and to "Make the Safe call", with both aiming to increase community awareness for reporting faults. Further reflecting customer preferences, Western Power released a mobile phone application in November 2014, which enables proactive communication via SMS and push notifications to customers during power outages. This application has now been downloaded by approximately 10,000 customers.

6.3 Transmission

Table 15: Transmission performance commentary for the 2014/15 period

Service Standard	2014/15			Comments
	SSB	SST	Actual	
Circuit availability	97.7%	98.1%	98.5%	Performance was better than the AA3 benchmark and the 2013/14 period (98.0%). The Circuit Availability improved this period since the 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	6.9	Performance was better than the AA3 benchmark but was worse than the 2013/14 period (4.8 minutes per year). The primary contributors to worsening performance were: • Storm activity during February 2015 • Increased supply interruptions attributed to environmental factors and equipment failures (zone transformers). The supply restoration, utilising the network control Distribution Management System to re-establish customers via the distribution system, assisted in maintaining this measure at a low level.
System Minutes Interrupted Radial	5.0	1.9	1.6	Performance was better than the AA3 benchmark and the 2013/14 period (3.70 minutes per year).

Service Standard	2014/15			Comments
	SSB	SST	Actual	
Network				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	27	Performance was better than the AA3 benchmark but worse than the 2013/14 period (20 events per year), due to more incidents of zone substation and transformer failures in comparison to the previous year. The improved implementation of supply restoration processes through utilising the network control Distribution Management system, helped to maintain this measure at a low level.
Loss of supply events >1 system minutes interrupted	4	2	0	Performance was better than the AA3 benchmark and the 2013/14 period (1 event per year). 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.
Average Outage Duration	886	698	720	Performance was better than the AA3 benchmark and the 2013/14 period (795 minutes per year). The primary contributors to the performance were outages on two transmission lines caused by a conductor clearance issue and an issue with secondary equipment that were capped at 14 days. The performance improvement during the 2014/15 period is attributed to a large number of events with shorter outage duration minutes in comparison to 2013/14, as well as auto restoration mechanisms on the transmission network during storm activity in February 2015. 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 commentary for the 2014/15 period

	Service Standard	2014/15		Comments
		Benchmark	Actual	
Street lighting repair time	Metropolitan area	≤ 5 days	1.26	Performance was better than the AA3 benchmark but worse than the 2013/14 period (1.14 average business days). The change in performance was due to an increase in the number of faults reported by the public.
	Regional area	≤ 9 days	1.18	Performance was better than the AA3 benchmark but worse than the 2013/14 period (1.07 average business days). The change in performance was due to the bundled works program undertaken in the 2013/14 period not continuing in the 2014/15 period. However, lower volumes of work and established processes for regional areas ensured that performance remained within the benchmark.

6.5 Western Power Network performance

Western Power does not have SSB measures for the total network. However as shown in Table 17, the reliability performance of the network for the 2014/15 period improved when compared to the previous year.

Table 17: Overall reliability performance of the network

		2013/14	2014/15
Distribution	SAIDI[9]	172	169
	SAIFI	1.62	1.56
Transmission - System Minutes Interrupted[10]		8.56	8.47

For the distribution network, SAIDI improved by two per cent and SAIFI improved by four per cent. System minutes interrupted for the transmission network improved by one per cent. Overall, customers received a supply from the network 99.93%[11] of the time during 2014/15, the same as the 2013/14 period.

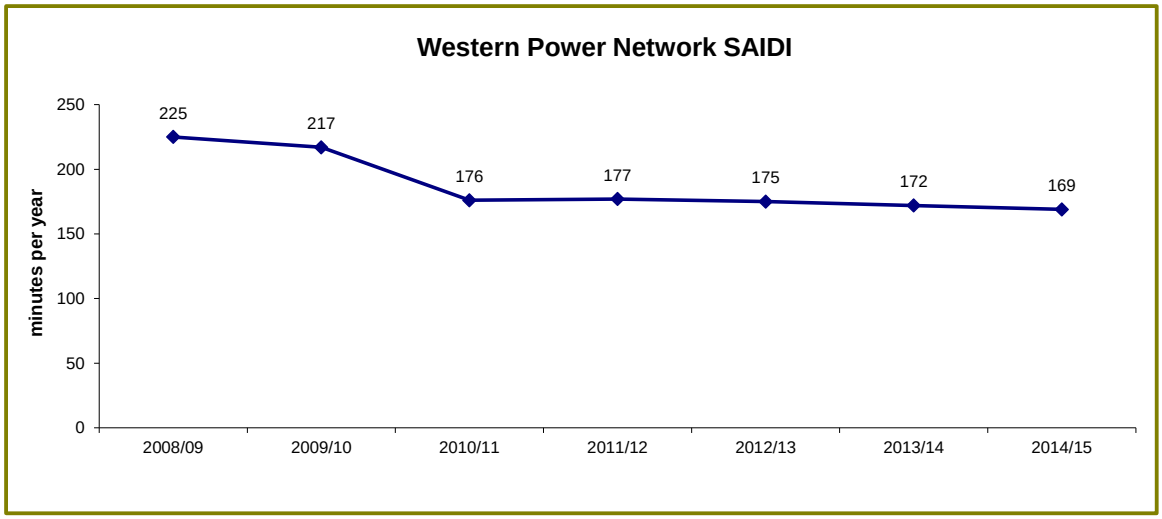

Figure 2: Distribution network SAIDI (7 year history)

[9] 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.

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

[11] Includes transmission and distribution performance and does not factor in any exclusions

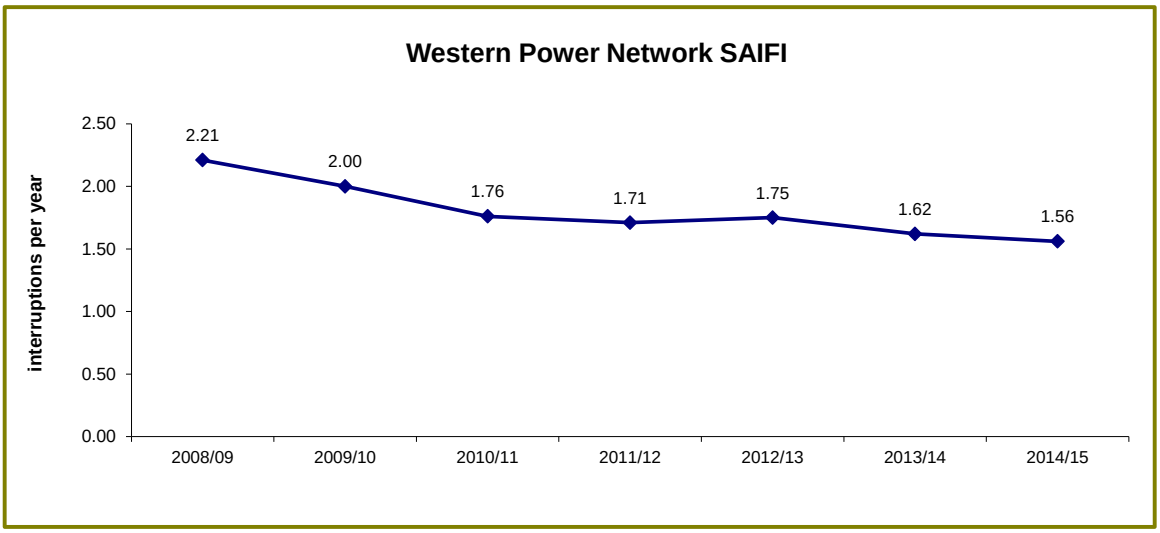

Figure 3: Distribution network SAIFI (7 year history)

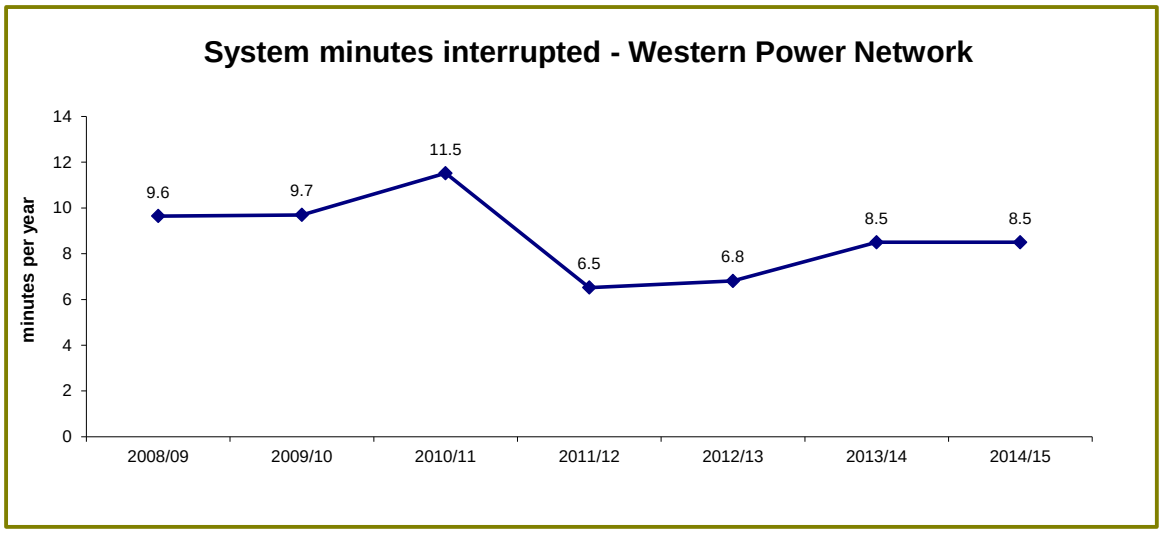

Figure 4: Transmission network SAIFI (7 year history)

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 2014/15 period, the distribution performance service standards in terms of SAIDI and SAIFI exclude the interruptions described below.

7.1.1 Major Event Days

The exclusion of MEDs classified in accordance with IEEE 1366-2003 applies to SAIDI and SAIFI performance for each feeder classification and call centre performance.

There were six days during the 12 months to 30 June 2015 that exceeded the daily MED threshold of 5.55 minutes. Table 18 shows:

- SAIDI (minutes per year) and SAIFI (interruptions per year), which have been excluded from the 2014/15 period due to these six MEDs
- Call centre performance (percentage call 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
SAIDI	CBD	1	0	0
	Urban	54	25	39
	Rural Short	73	74	44
	Rural Long	117	401	220
SAIFI	CBD	0.04	0.00	0.00
	Urban	0.21	0.13	0.22
	Rural Short	0.28	0.21	0.31
	Rural Long	0.50	0.61	0.78
Call centre performance		78.60%	92.8%	92.9%

1. 7 July 2014

(SAIDI = 6.80 minutes, SAIFI = 0.050 interruptions, Call centre performance = 92.7%)

Two cold fronts brought strong winds and thunderstorms across parts of the Western Power, resulting in damage to overhead network assets and more than 44,000 customers with supply interruptions, peaking at over 25,000 customers around 22:00 hours.

Most customers impacted were in the Perth metropolitan area, with customers also impacted in the South West region. Interruptions lasted an average two hours and 16 minutes with supply to the majority of customers restored the following day.

2. 29 January 2015

(SAIDI = 12.56 minutes, SAIFI = 0.061 interruptions, Call centre performance = 95.7%)

Lightning activity resulted in multiple faults on the Western Power Network. Over 60,000 customers were affected predominantly in the Perth Metropolitan area, with the peak number being over 29,000 around 05:15 hours.

The largest interruption was the Belmont substation blackout, in which approximately 12,000 customers in the Cities of Belmont and Bayswater were affected for up to five hours.

Supply to customers was interrupted for an average of three and a half hours with around 1,600 customers without supply for more than 12 hours.

3. 1 to 3 February 2015

(1 February: SAIDI = 10.65 minutes, SAIFI = 0.040 interruptions, Call centre performance = 86.4%)

(2 February: SAIDI = 13.04 minutes, SAIFI = 0.065 interruptions, Call centre performance = 95.2%)

(3 February: SAIDI = 6.71 minutes, SAIFI = 0.057 interruptions, Call centre performance = 93.4%)

Thunder storms resulted in multiple faults on the Western Power Network during these three days. Over 120,000 customers were affected predominantly in the Perth Metropolitan, Mid-West and Wheatbelt regions for an average interruption duration of three hours, with the peak number being over 23,000 around 01:15 hours on 2 February.

Customers were without power predominantly due to the following causes:

Lightning activity

Most customers experienced interruptions due to lightning activity during these three days. The most significant interruption was at 07:07 hours on 3 February, when a lightning strike caused a section of the transmission network to be islanded from the rest of the Network, resulting in loss of supply to more than 15,000 customers in the Mid-West and Wheatbelt regions.

Pole top fire activity

There was pole top fire activity caused by rainfall from the thunderstorm activity. Most of the 26,000 customers impacted were in the Perth Metropolitan and Peel regions.

Bushfires

There were a number of bushfires affecting the Western Power Network during these three days. The fire with the largest impact in terms of duration was in the Northcliffe area, resulting in damaged distribution network infrastructure. Western Power was required to replace 135 poles and over 120 customers in Northcliffe and surrounding areas were without power for up to 15 days.

4. 24 February 2015

(SAIDI = 5.57 minutes, SAIFI = 0.017 interruptions, Call centre performance = 94.0%)

Equipment failure in the Northam zone substation resulted in blackouts of the Cunderdin and Kellerberrin zone substations. In addition, a truck brought down conductors on the Great Southern Highway outside of York.

More than 15,000 customers were affected, predominantly in the Wheatbelt region, with each interruption lasting an average of five hours.

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
SAIDI	CBD	4	0	0
	Urban	4	10	17
	Rural Short	7	12	17
	Rural Long	29	14	31
SAIFI	CBD	0.18	0.00	0.00
	Urban	0.16	0.20	0.25
	Rural Short	0.13	0.25	0.22
	Rural Long	0.34	0.32	0.34

7.1.1 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
SAIDI	CBD	2	3	3
	Urban	5	2	4
	Rural Short	5	4	7
	Rural Long	7	9	5
SAIFI	CBD	0.01	0.02	0.01
	Urban	0.09	0.03	0.04
	Rural Short	0.08	0.08	0.04
	Rural Long	0.11	0.13	0.09

These third party network supply interruptions include:

- generator failures on 28 July 2014, 9 November 2014 and 18 May 2015 resulting in the automatic de-energisation of circuits to stabilise the frequency on the transmission network
- over 3,000 faults attributed to customer installations or other third party equipment.

7.1.2 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
SAIDI	CBD	24	19	4
	Urban	67	70	55
	Rural Short	144	259	151
	Rural Long	206	328	413
SAIFI	CBD	0.18	0.03	0.02
	Urban	0.21	0.23	0.17
	Rural Short	0.47	0.77	0.45
	Rural Long	0.68	0.93	1.20

7.1.3 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 2014/15 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 – 4 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 2014/15 period.

7.2.3 Extra ordinary 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 2014/15 period, there were seven events on the transmission network that were classified as *force majeure*, with all the events due to major bushfires in the Boddington area. The bushfires, from the 30th January 2015 to 4th February 2015, resulted in total outage duration and lines unavailability of 5,654 minutes.

During the bushfire activity, Western Power's transmission network supplying Boddington Gold Mine suffered multiple disruptions. The disruptions lasted for extended periods, as restoration efforts were inhibited by a total fire ban and site access restrictions, prohibiting Western Power access to its network assets.

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
Number of planned interruptions	14	22	10

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[12], 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 2014/15 period data

During the 2014/15 period, there were approximately 2,700 momentary interruptions recorded on the network, affecting on average 610 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 2014/15 period for each of the distribution feeder classifications. This data is inclusive off all momentary interruptions on the distribution network.

Table 23: Momentary interruptions per customer for the 2014/15 period

	Momentary interruptions per customer
CBD	0.01
Urban	0.80
Rural Short	1.84
Rural Long	6.91

[12] 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[13] for the SSAM target for eight out of the 14 SSB measures subject to this financial incentive scheme.

Improvements were achieved for call centre performance through redistribution of staff within the call centre and increased provision of self-service information for customers.

Table 24 shows the results of the SSAM performance for the 2014/15 period, with a comparison of SSAM for the 2012/13, 2013/14 and 2014/15 periods, shown in Table 25.

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

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

Table 24: Service Standard Adjustment Mechanism results for the 2014/15 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	26.2	-5.9	-$400,120
		Urban		$529,816	$529,816	183	136.6	103.0	33.6	$17,801,818
		Rural Short		$223,472	$223,472	227.8	207.8	182.6	25.2	$5,631,494
		Rural Long		$65,219	$65,219	724.8	582.2	677.5	-95.3	-$6,215,371
	SAIFI	CBD	per 0.01 SAIFI event	$87,081	$87,081	0.26	0.14	0.17	-0.03	-$261,243
		Urban		$548,988	$548,988	2.12	1.36	1.09	0.27	$14,822,676
		Rural Short		$222,511	$222,511	2.61	2.27	1.98	0.29	$6,452,819
		Rural Long		$101,725	$101,725	4.51	4.06	4.41	-0.35	-$3,560,375
	Call centre performance		per 0.1%	-$41,495	-$41,084	77.5%	87.6%	93.7%	-6.10%	$2,531,195
									Total distribution penalty/reward	**$36,802,893**
Transmission	Circuit Availability		per 0.1%	-$817,186	-$408,593	97.7%	98.1%	98.5%	-0.40%	$3,268,744
	System minutes interrupted -radial network		per system minute	$105,443	$172,039	5.0	1.9	1.6	0.3	$31,633
	Loss of supply event frequency	>0.1 system minutes	per loss of supply event	$36,319	$27,240	33	24	27	-3	-$81,720
		>1 system minutes		$163,437	$163,437	4	2	0	2	$326,874
	Average outage duration		per duration minute	$3,477	$2,495	886	698	720	-22	-$54,890
									Total transmission penalty/reward	**$3,490,641**
									Total penalty/reward for 2014/15	**$40,293,534**

Table 25: Service Standard Adjustment Mechanism results for the 2012/13, 2013/14 and 2014/15 periods

	Service Standard		Penalty (-) or Reward (+)		
			2012/13	2013/14	2014/15
Distribution	SAIDI	CBD	$861,276	$135,634	-$400,120
		Urban	$17,960,762	$15,470,627	$17,801,818
		Rural Short	$5,899,661	$8,179,075	$5,631,494
		Rural Long	-$6,730,601	-$5,974,060	-$6,215,371
	SAIFI	CBD	$957,891	-$522,486	-$261,243
		Urban	$10,979,760	$12,626,724	$14,822,676
		Rural Short	$2,225,110	$9,790,484	$6,452,819
		Rural Long	-$4,577,625	-$4,577,625	-$3,560,375
	Call centre performance		$1,244,850	$2,157,740	$2,531,195
Total distribution penalty/reward			**$28,821,084**	**$37,286,113**	**$36,802,893**
Transmission	Circuit Availability		$2,451,558	-$408,593	$3,268,744
	System minutes interrupted -radial network		-$68,816	-$309,670	$31,633
	Loss of supply event frequency	>0.1 system minutes	$399,509	$145,276	-$81,720
		>1 system minutes	$0	$163,437	$326,874
	Average outage duration		-$419,160	-$242,015	-$54,890
Total transmission penalty/reward			**$2,363,091**	**-$651,565**	**$3,490,641**
Total penalty/reward			**$31,184,175**	**$36,634,548**	**$40,293,534**

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

The following graphs show the actual performance of the service standards for the six financial years up to 2014/15, 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 Figure 12 show the SAIDI and SAIFI of the CBD, Urban, Rural Short and Rural Long networks.

Figure 13 shows the call centre performance

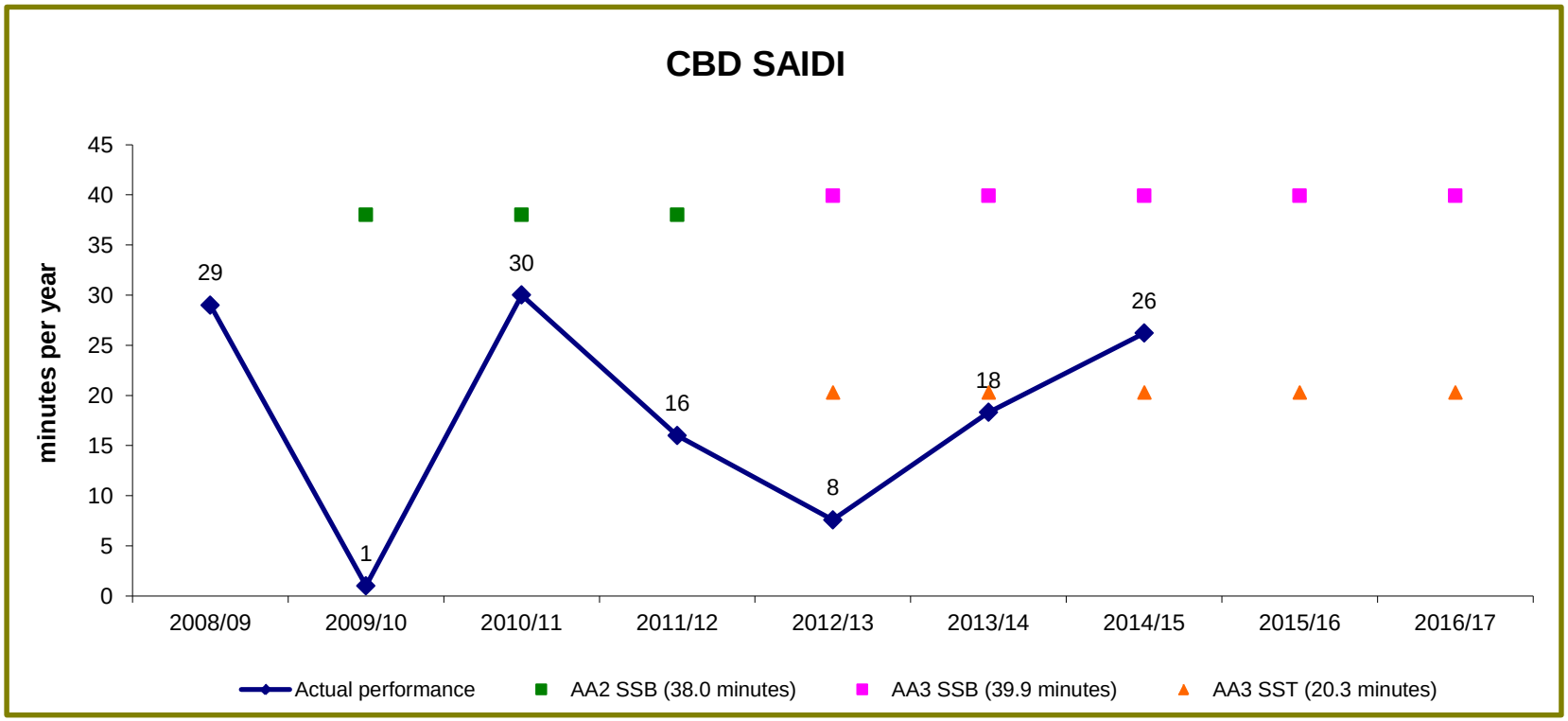

Figure 5: CBD SAIDI

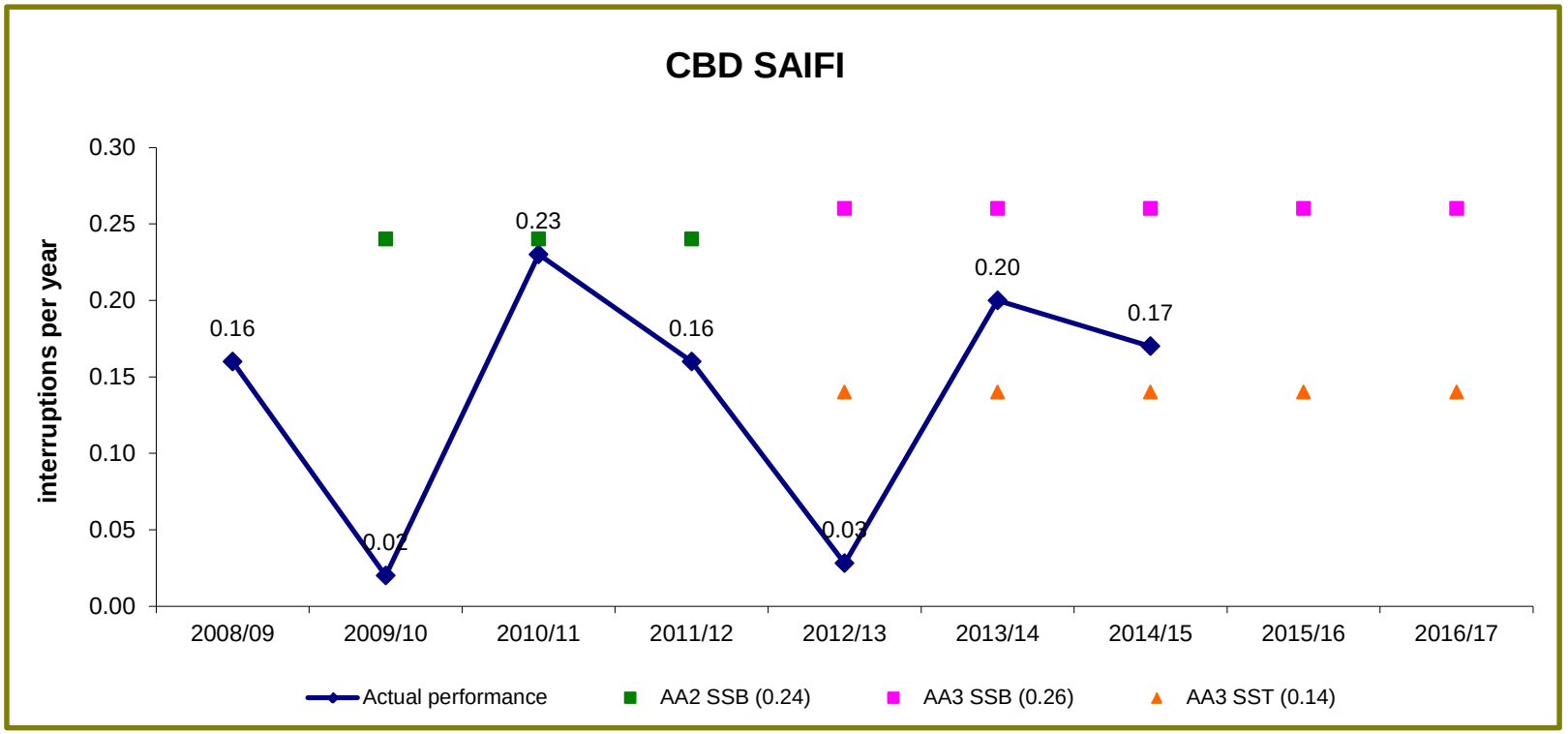

Figure 6: CBD SAIFI

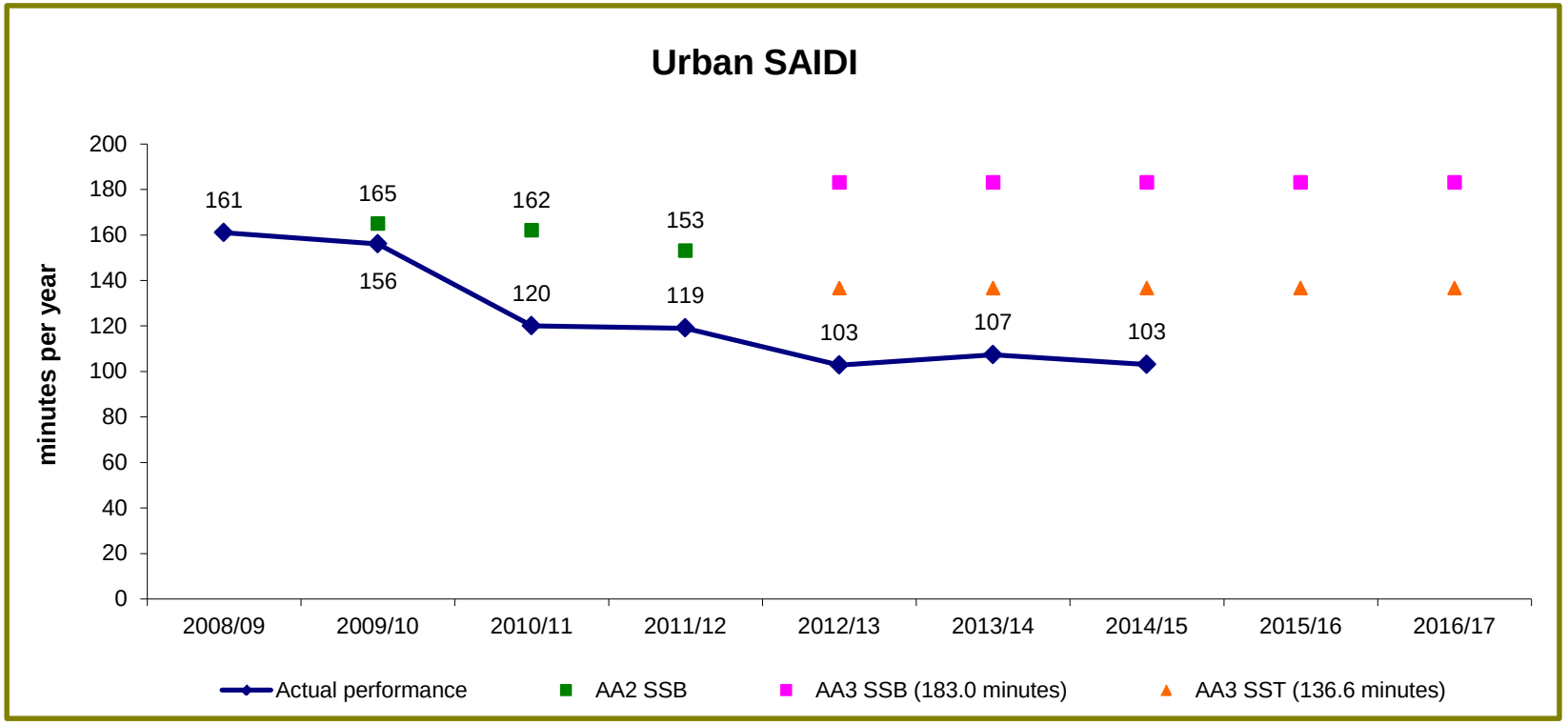

Figure 7: Urban SAIDI

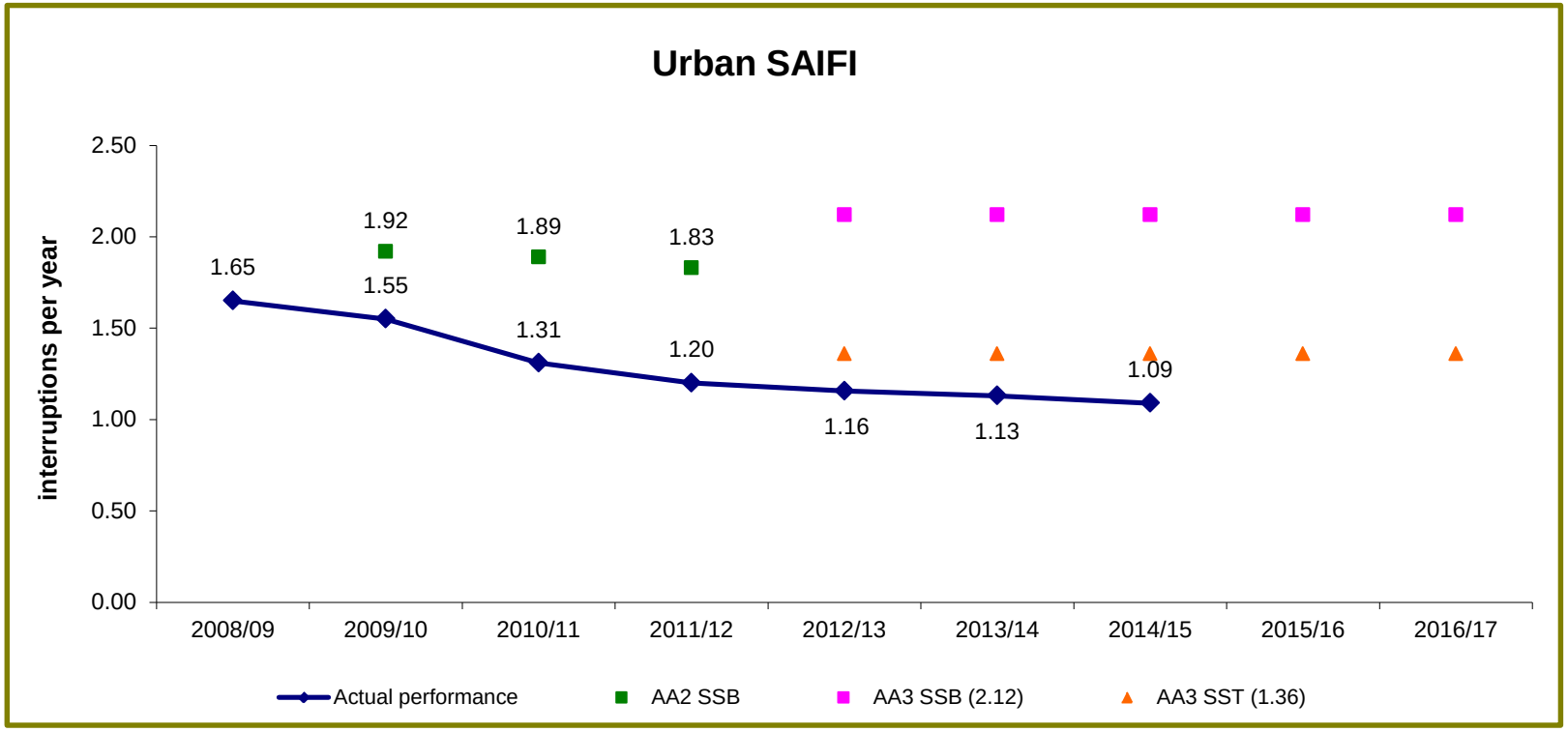

Figure 8: Urban SAIFI

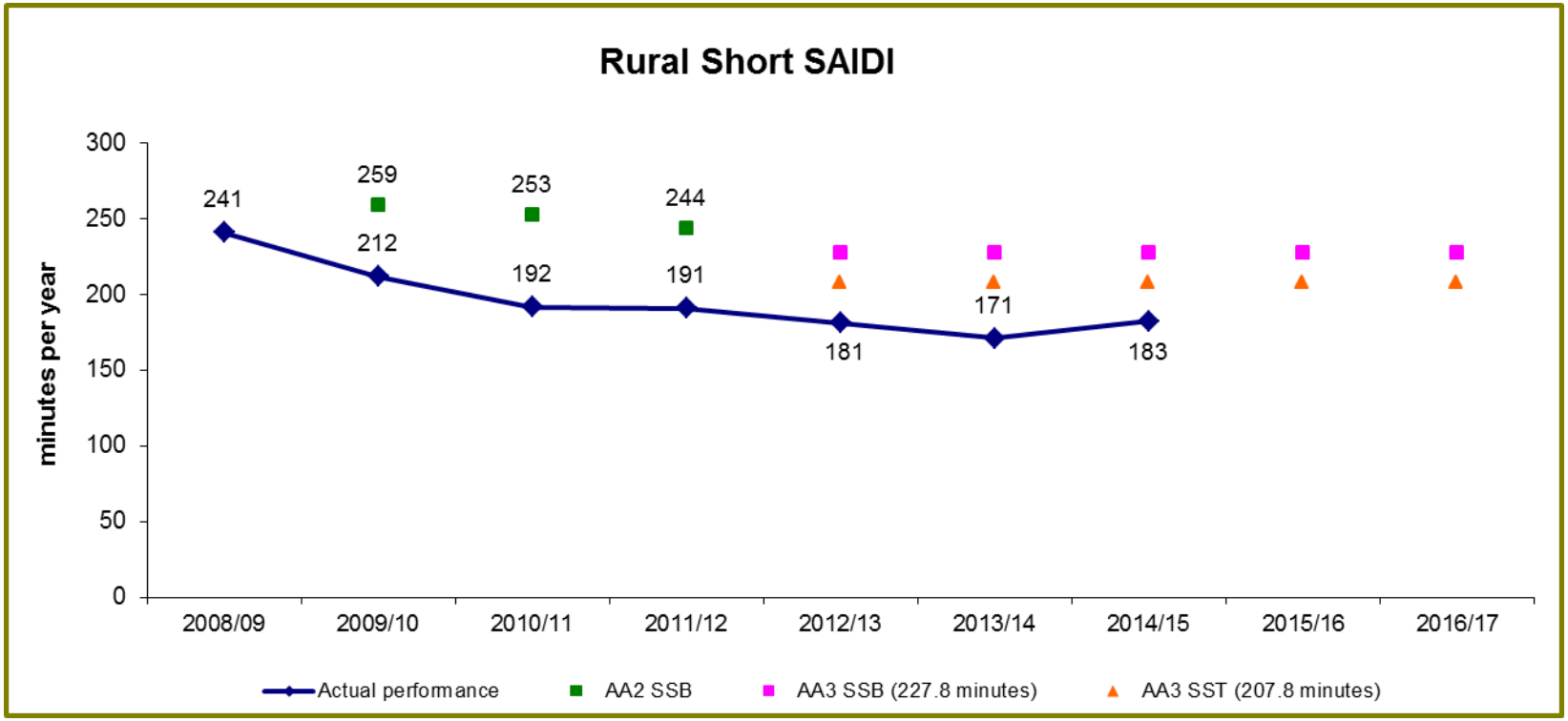

Figure 9: Rural Short SAIDI

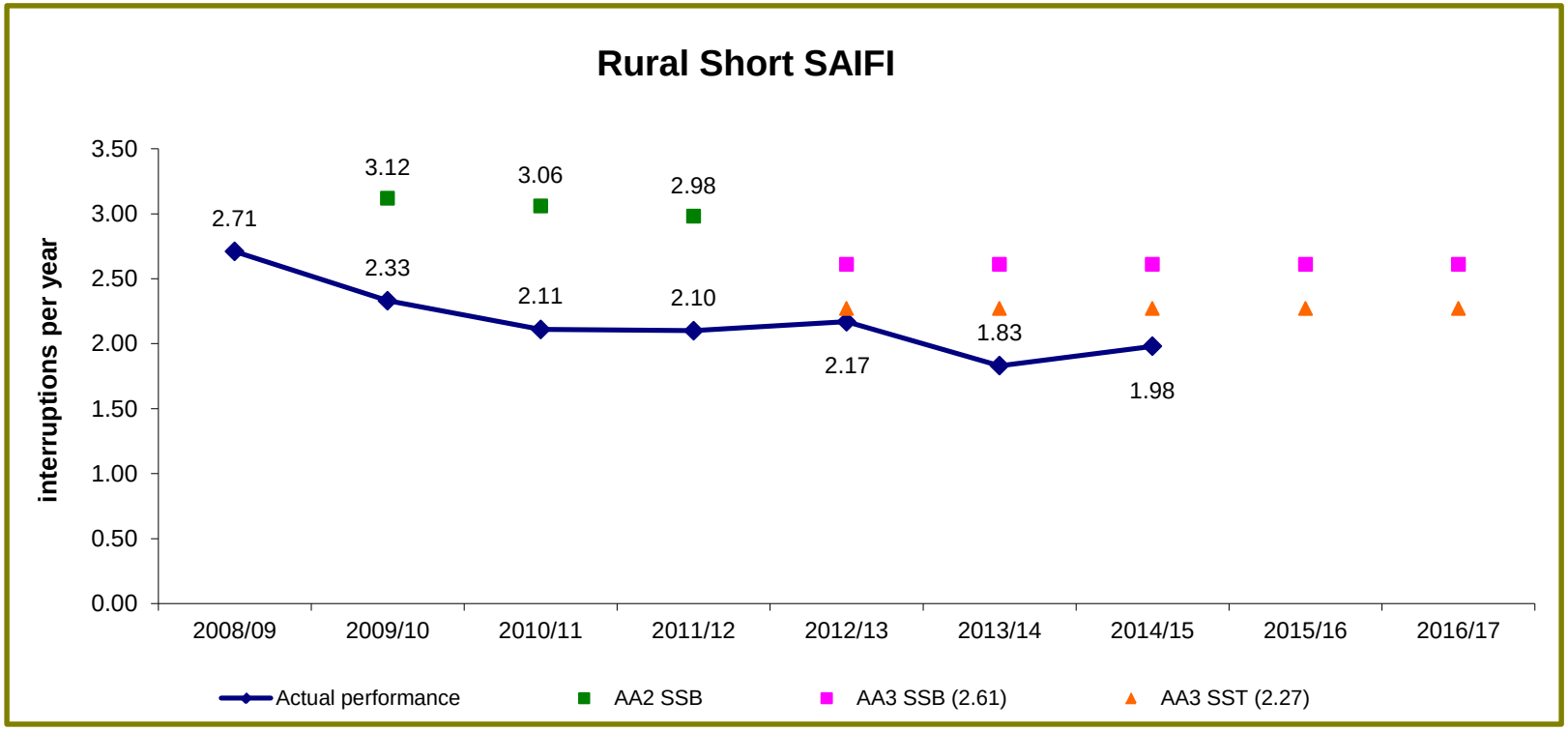

Figure 10: Rural Short SAIFI

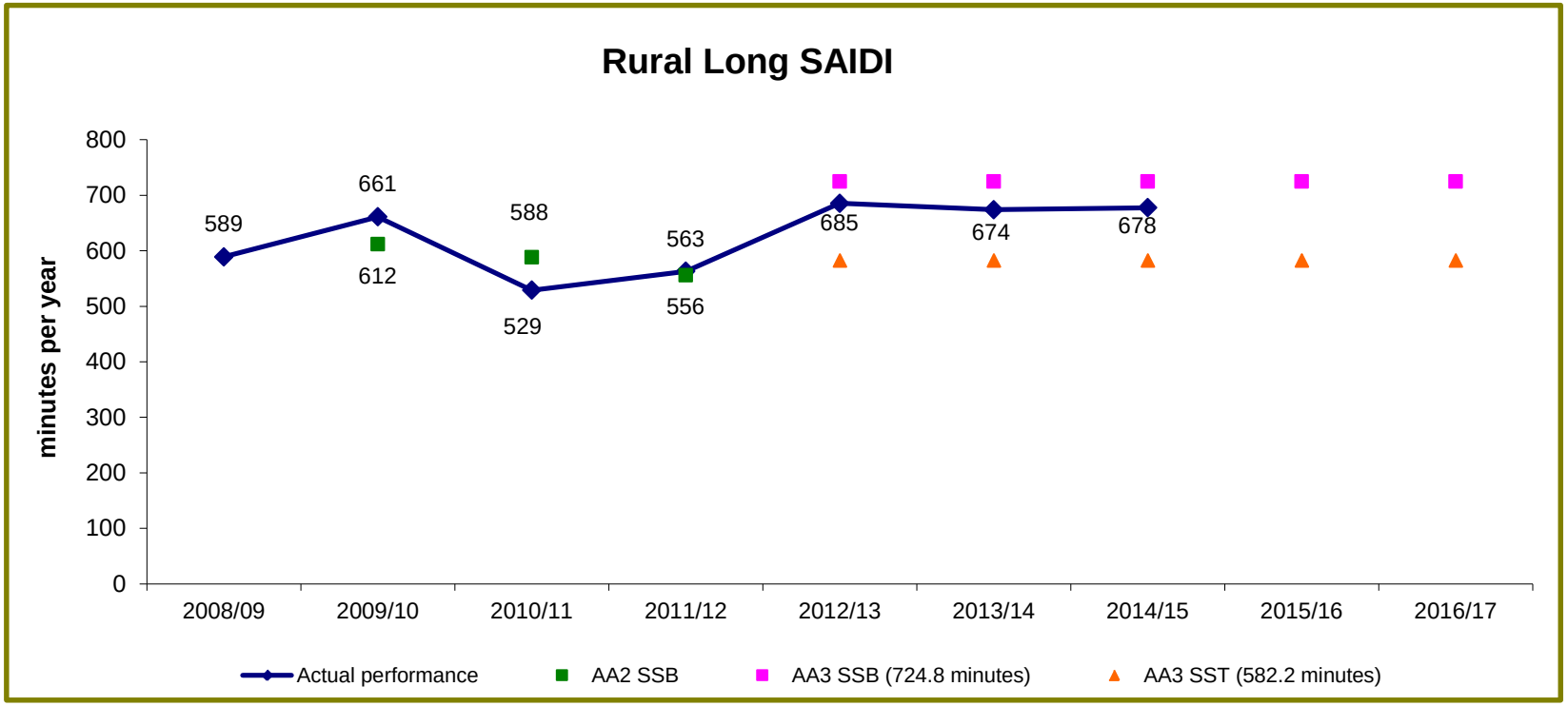

Figure 11: Rural Long SAIDI

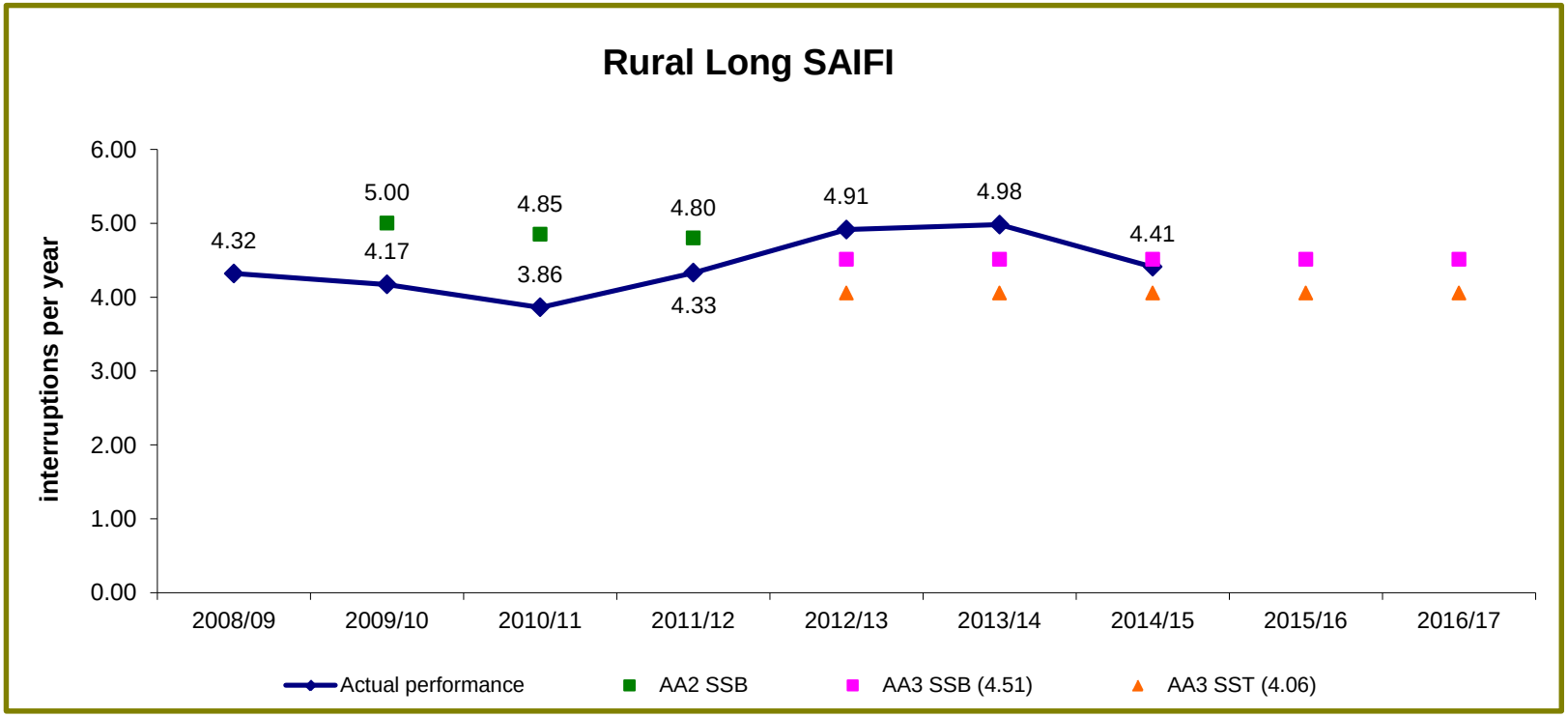

Figure 12: Rural Long SAIFI

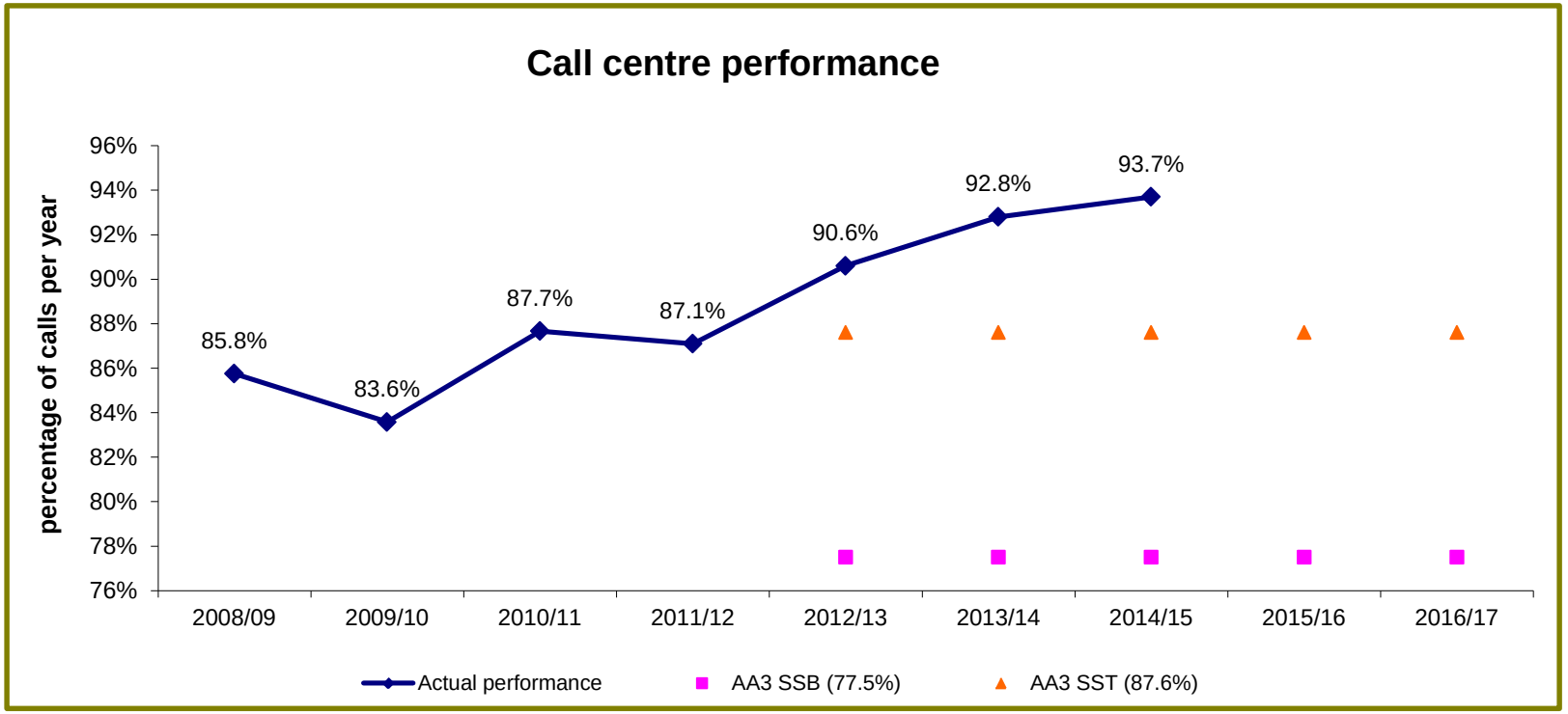

Figure 13: Call centre performance

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

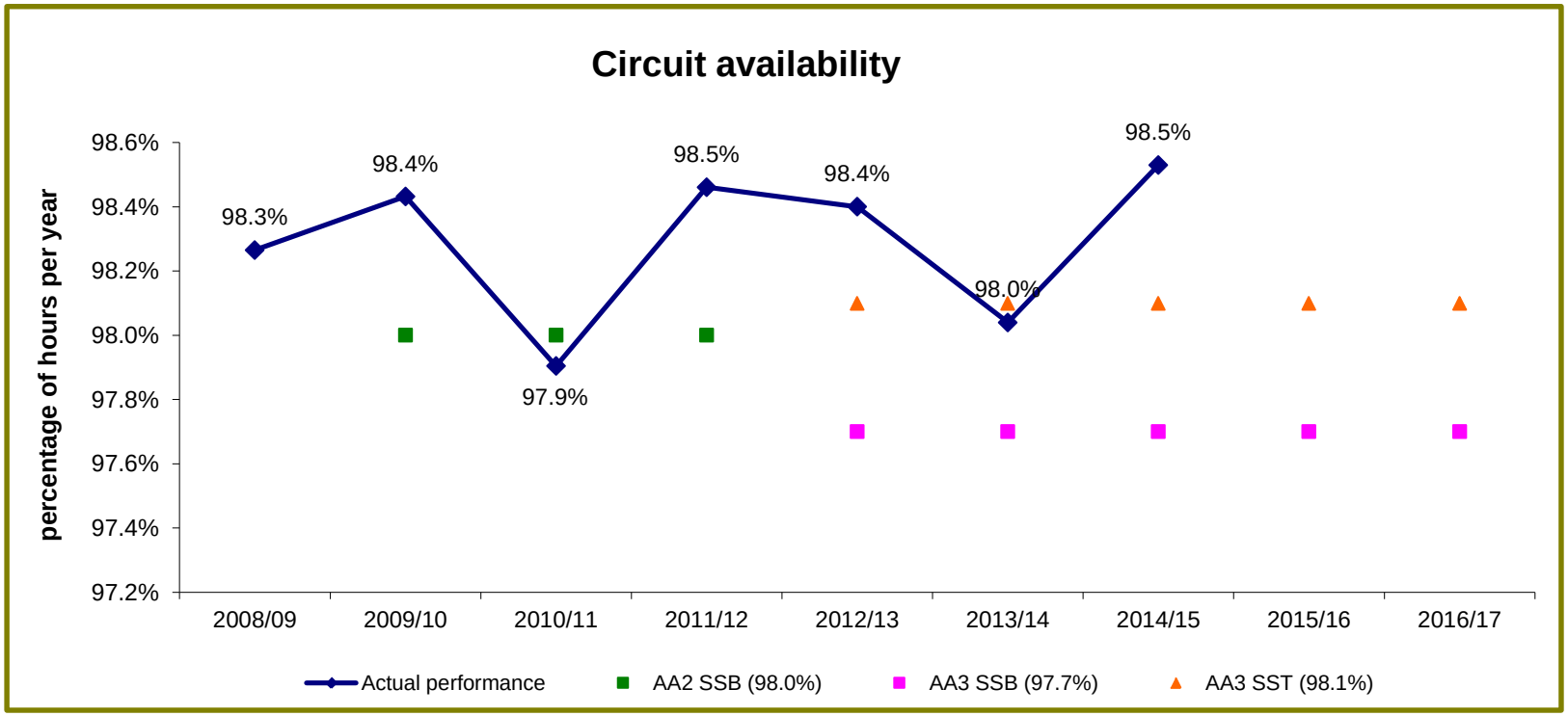

Figure 14: Circuit availability

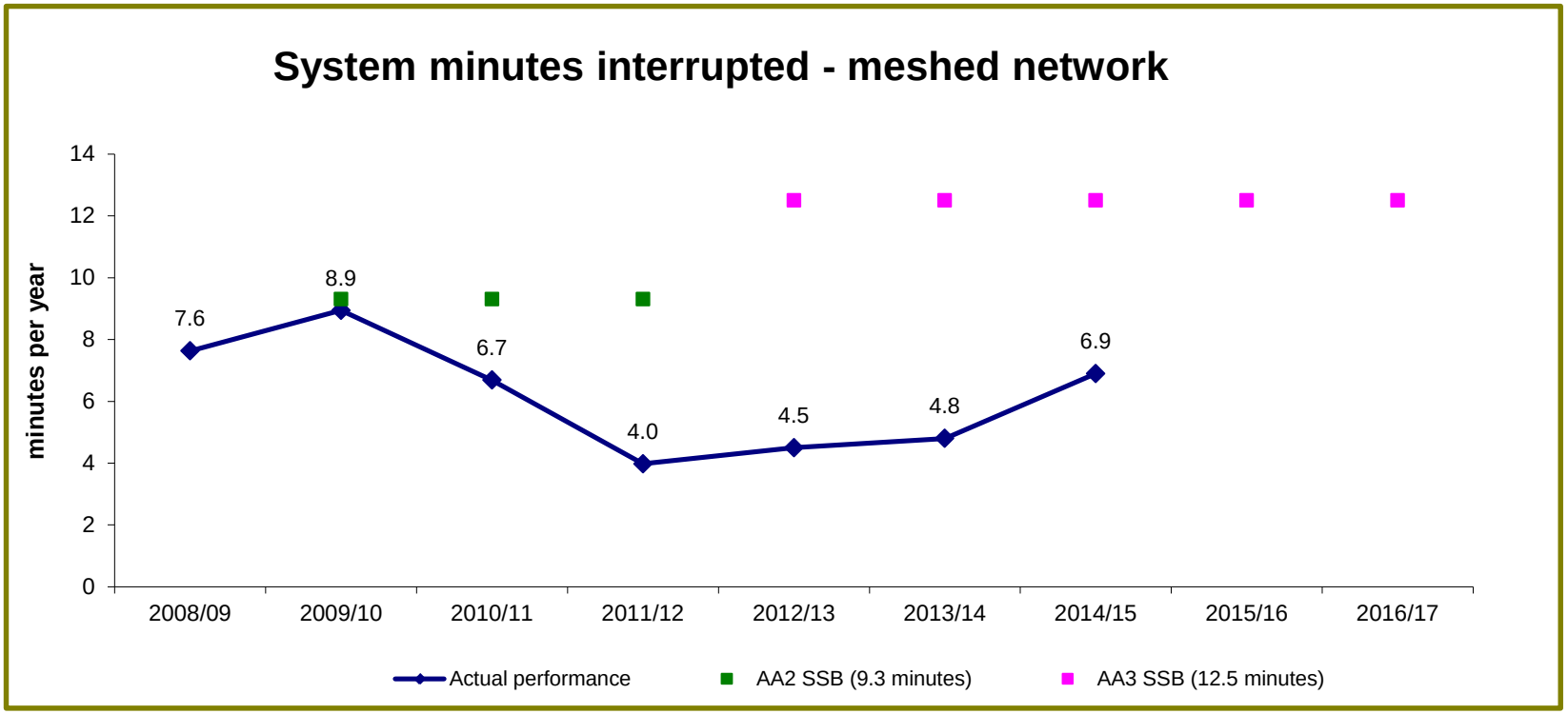

Figure 15: System minutes interrupted – meshed network

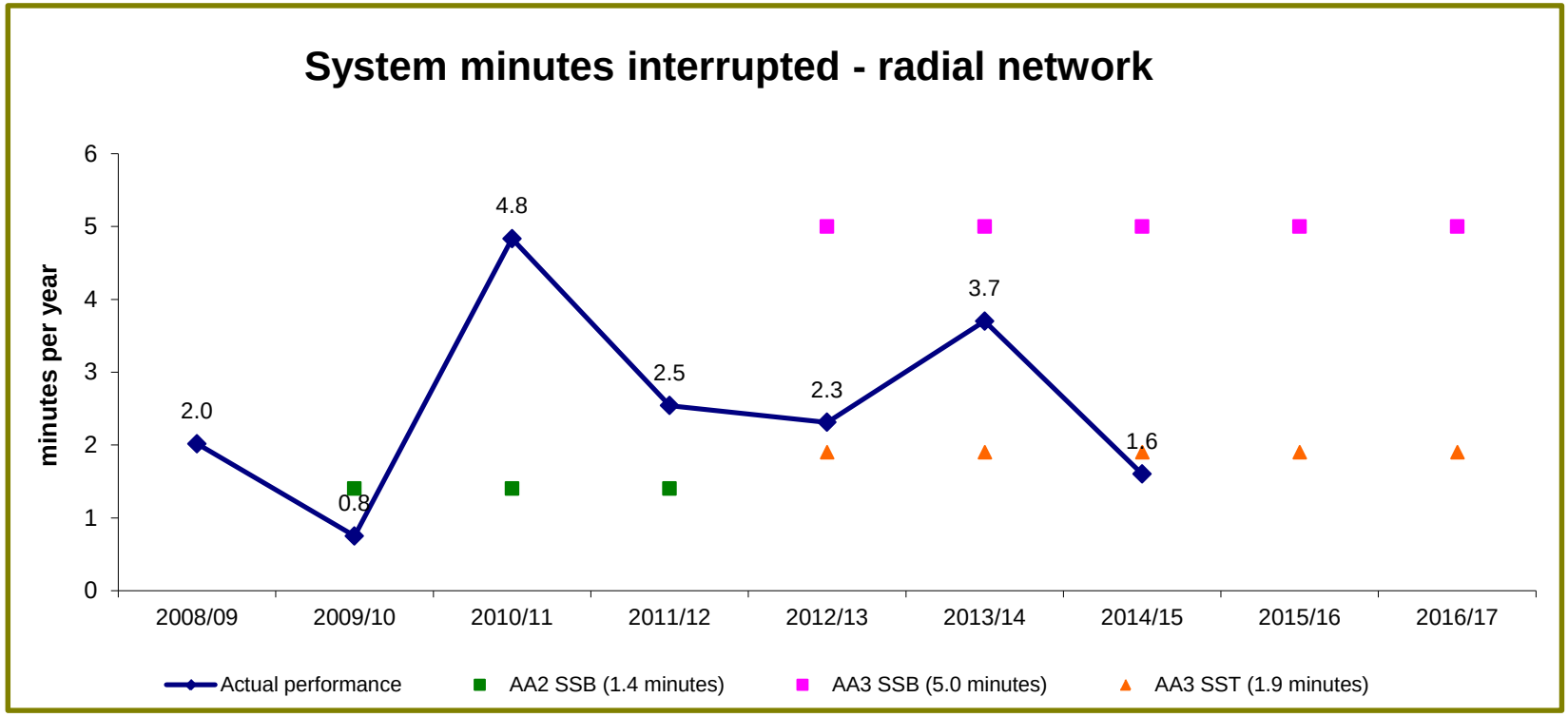

Figure 16: System minutes interrupted radial network

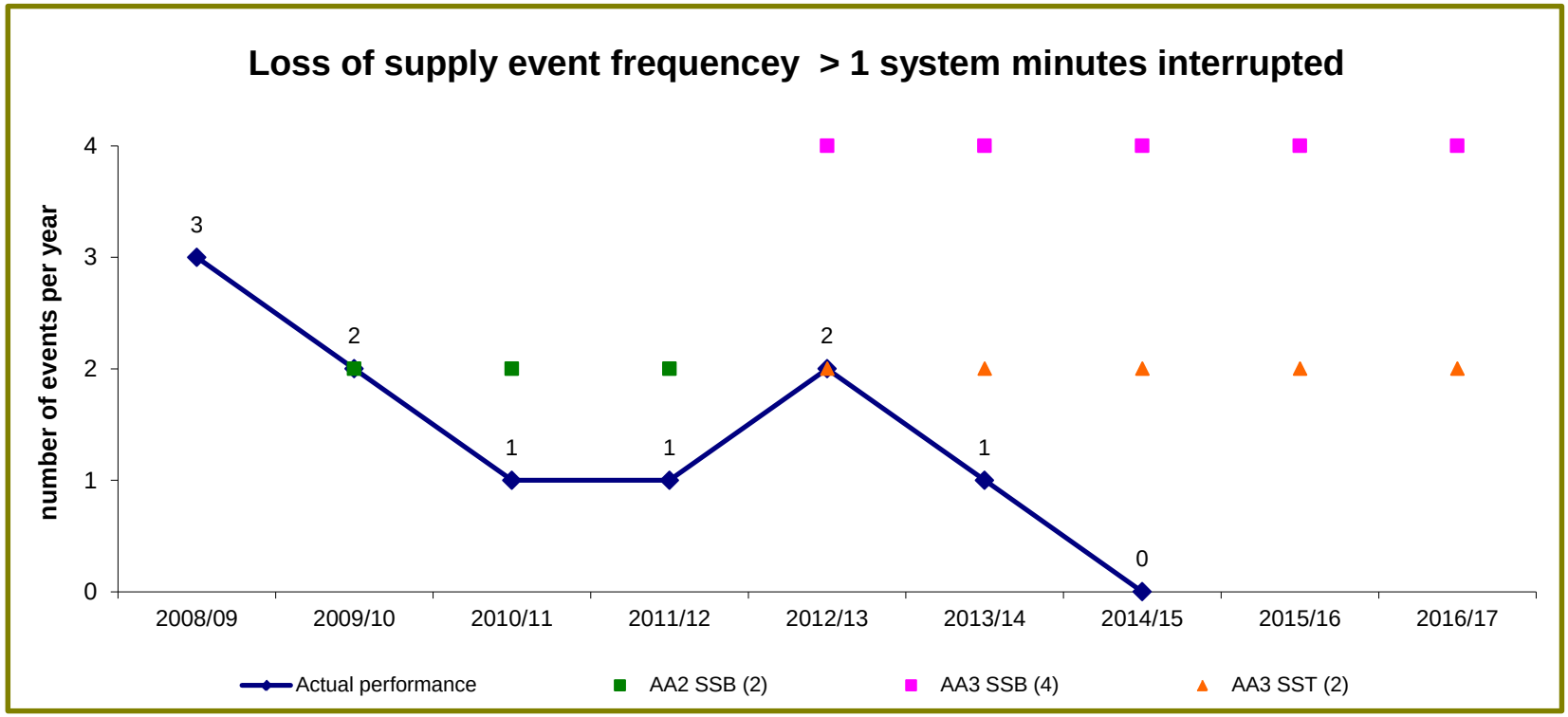

Figure 17: Loss of supply event frequency > 1 system minutes interrupted

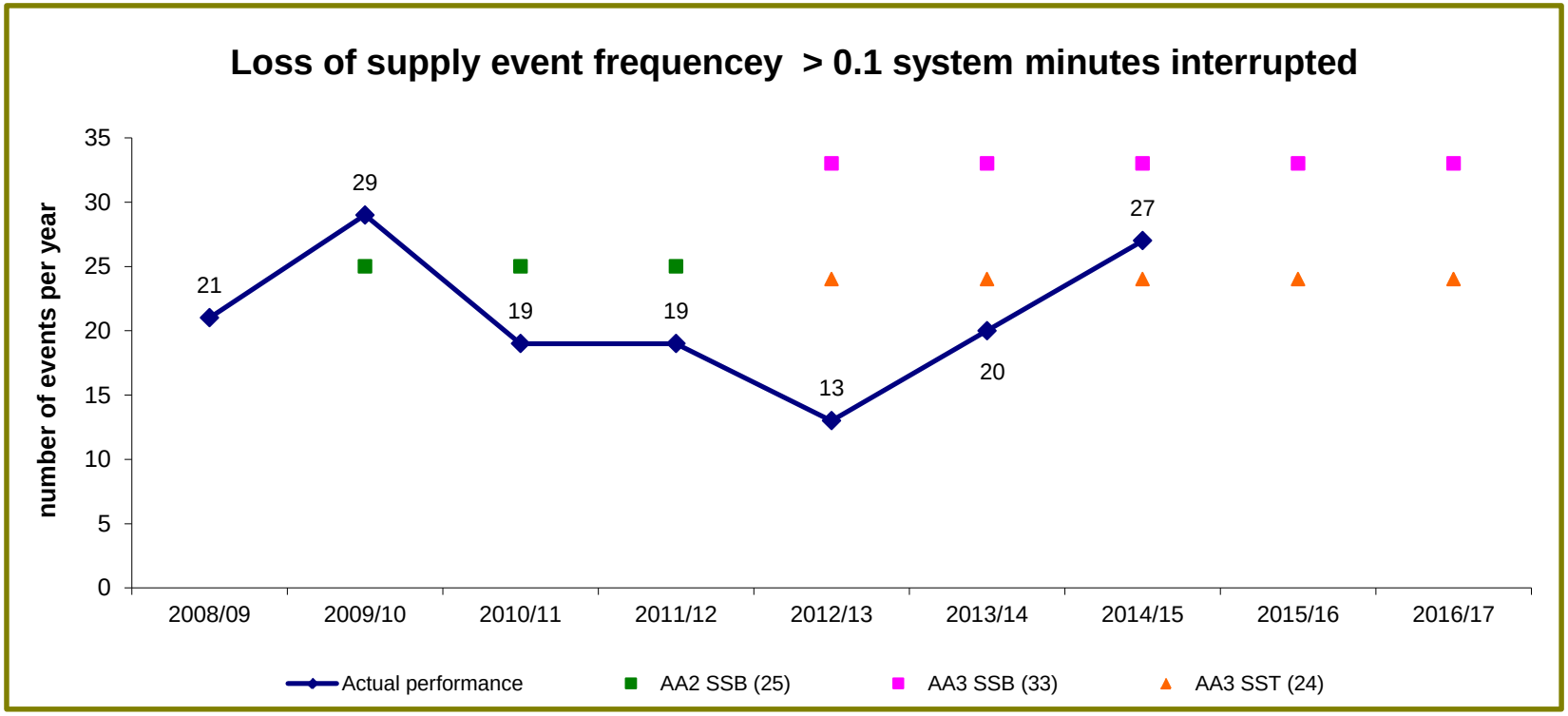

Figure 18: Loss of supply event frequency > 0.1 system minutes interrupted

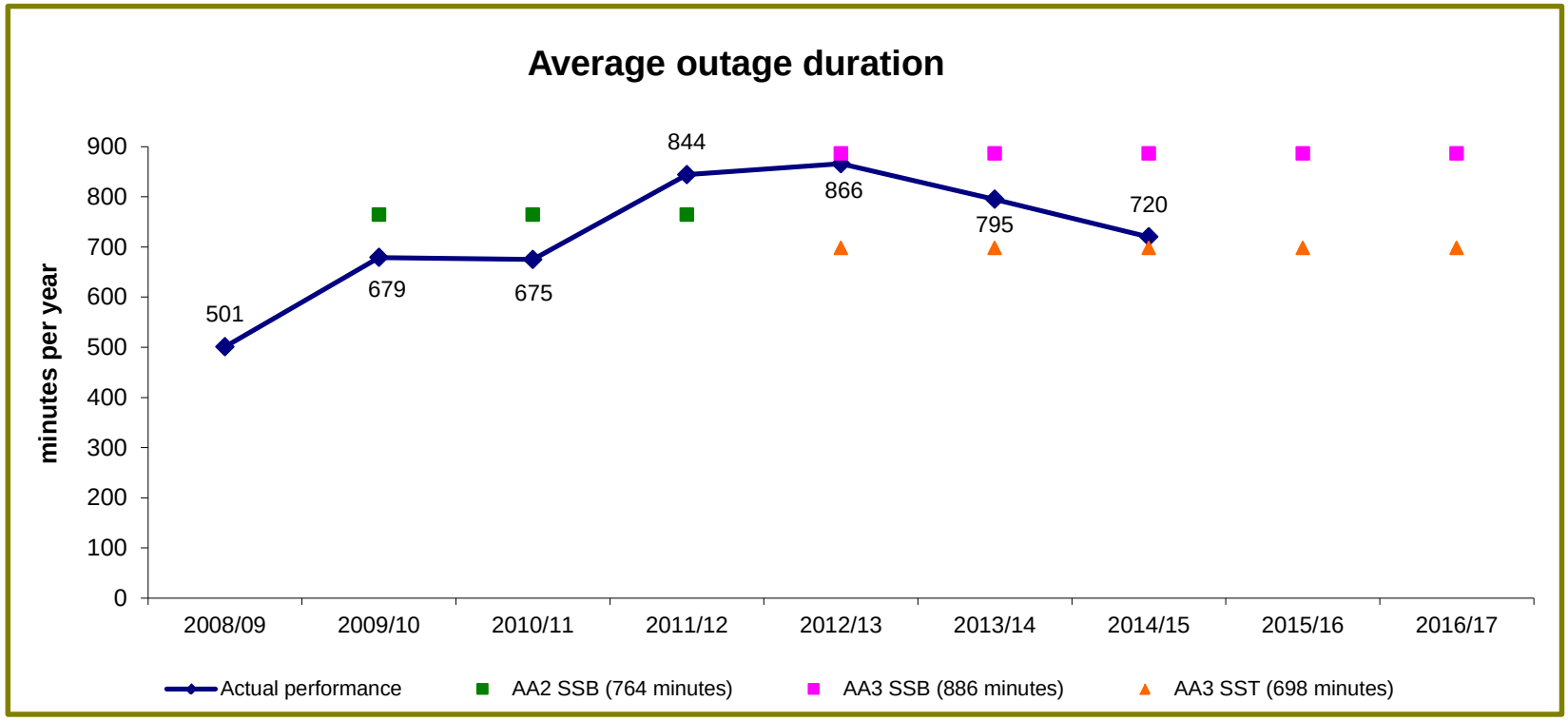

Figure 19: Average outage duration

Street lighting repair time

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

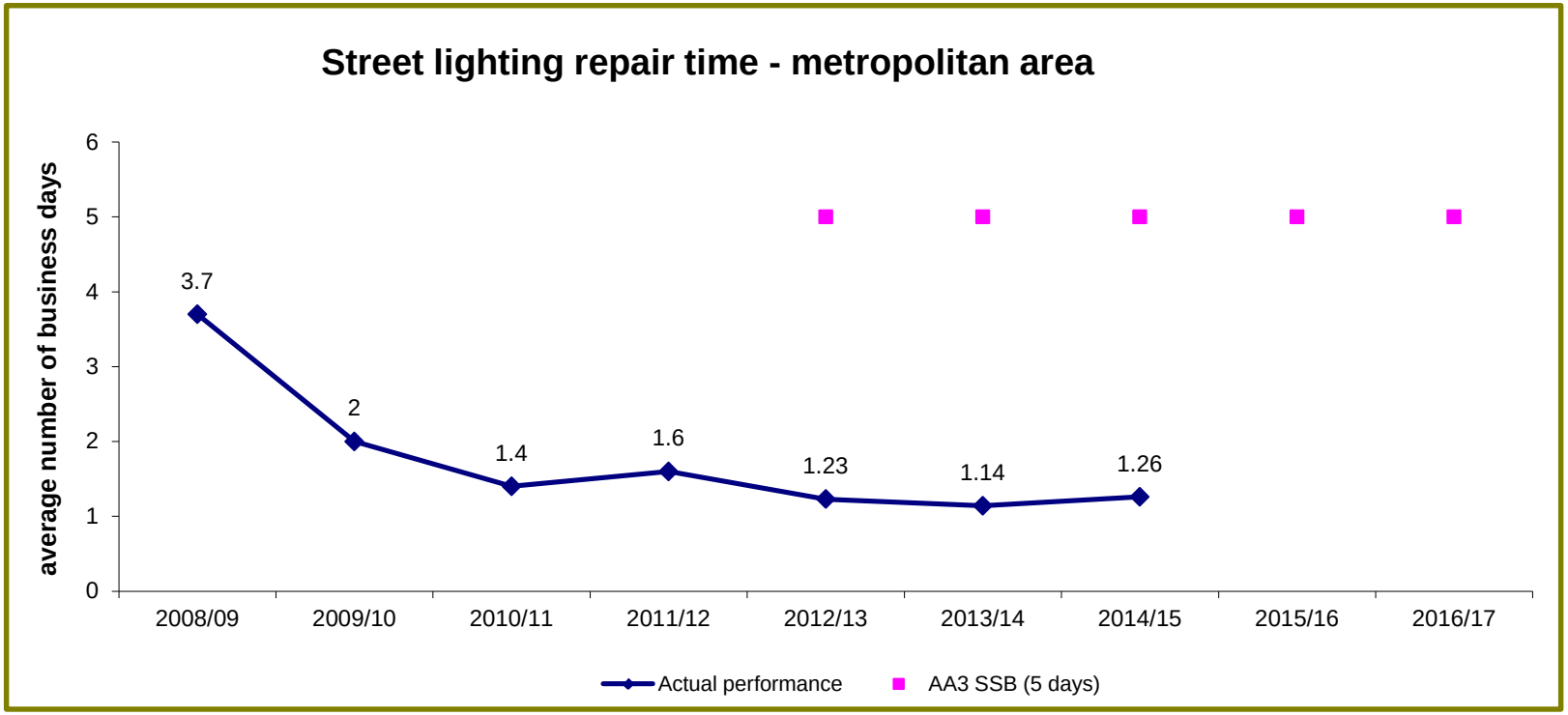

Figure 20: street lighting repair time – Metropolitan area

Note:

The street lighting repair time service standard benchmark was defined using different regions in the AA2 period.

The actual performance values shown in Figure 19 reflect a retrospective calculated value to match the AA3 period benchmarks.

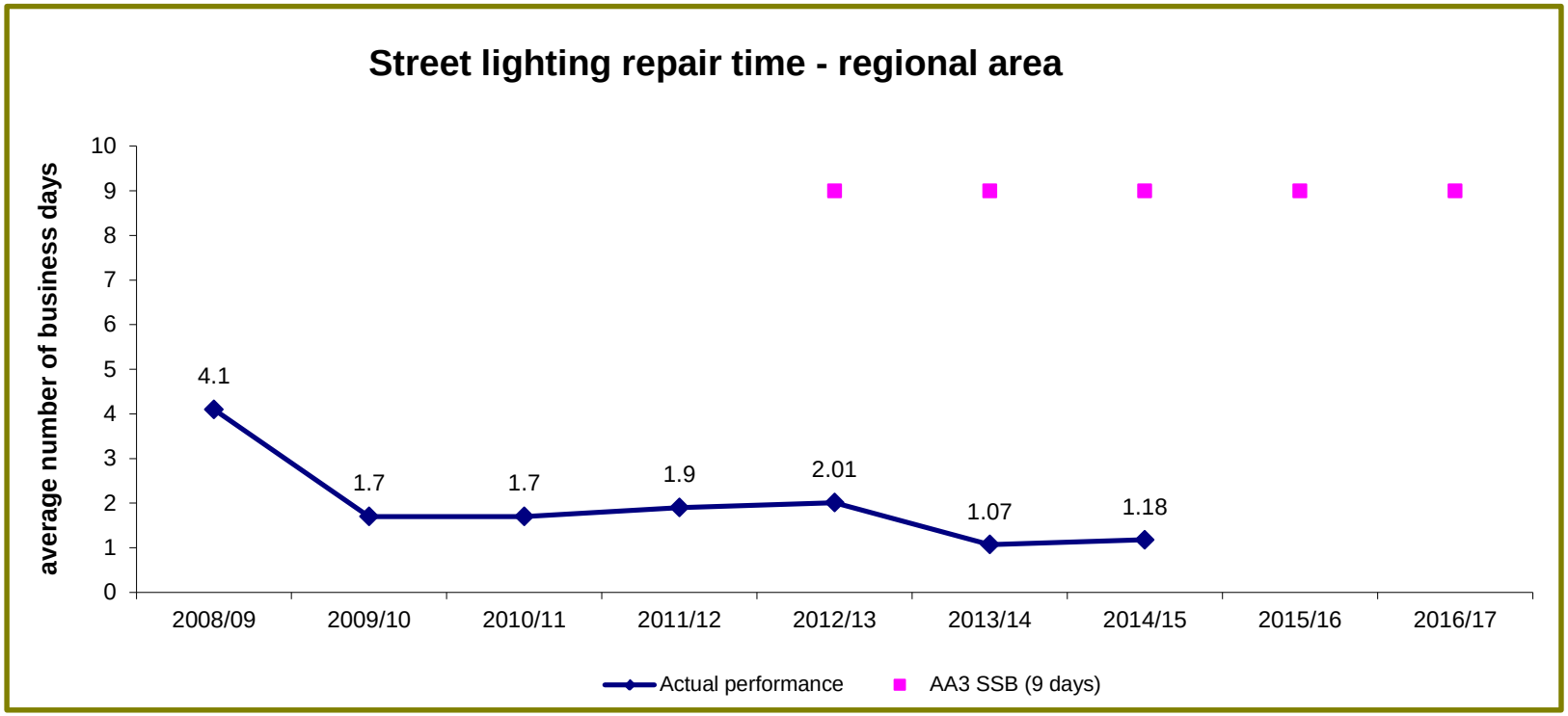

Figure 21: Street lighting repair time – Regional area

Note:

The street lighting repair time service standard benchmark was defined using different regions in the AA2 period.

The actual performance values shown in Figure 20 reflect a retrospective calculated value to match the AA3 period benchmarks.

Appendix B. Trends of fault causes for Network SAIFI

The following graphs show the trends, over the past five years up to June 2015, by key causes of interruptions (overhead equipment failure, unknown fault causes and lightning) which contribute to the Network SAIFI.

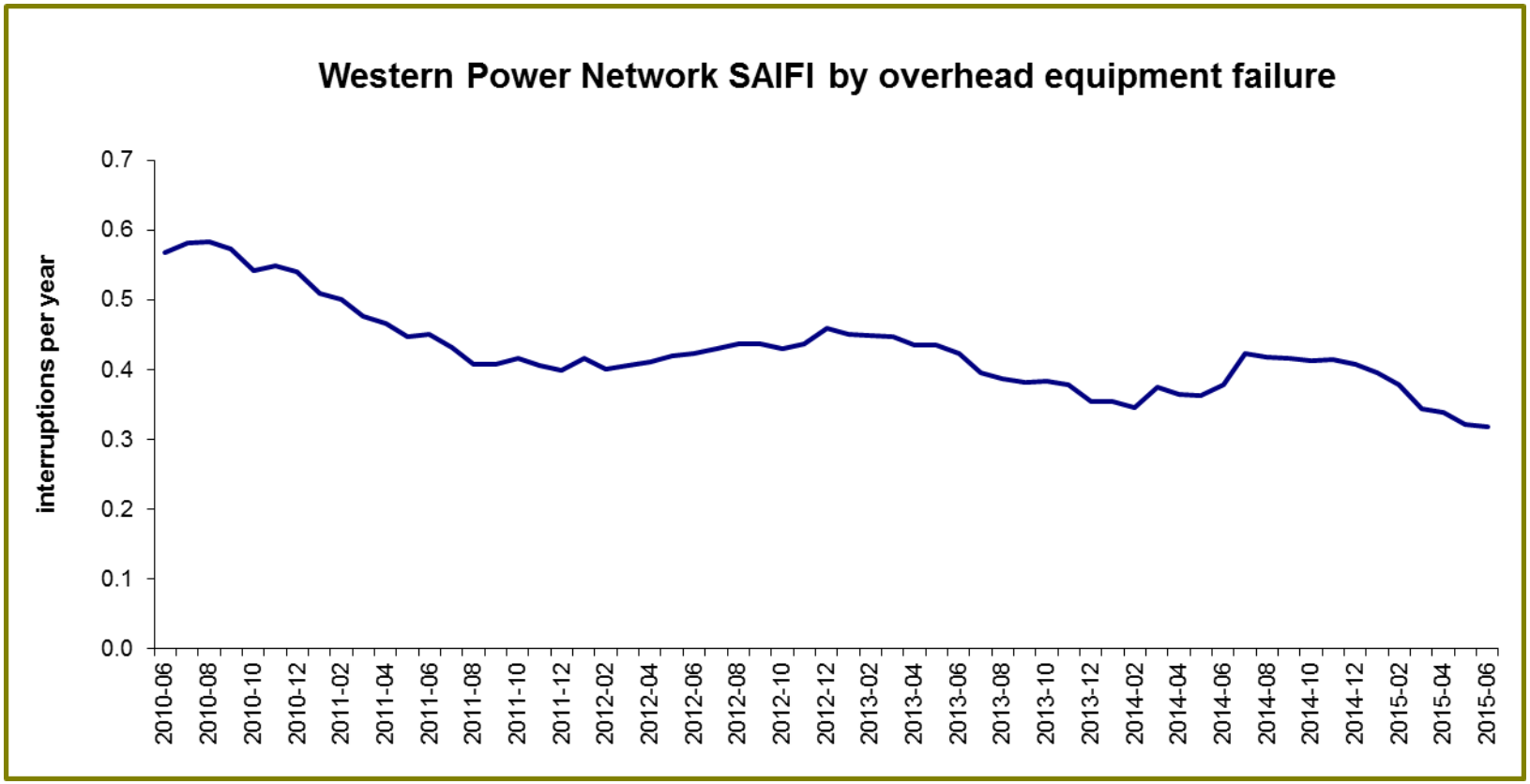

Figure 22 - Network SAIFI – overhead equipment failure cause trend

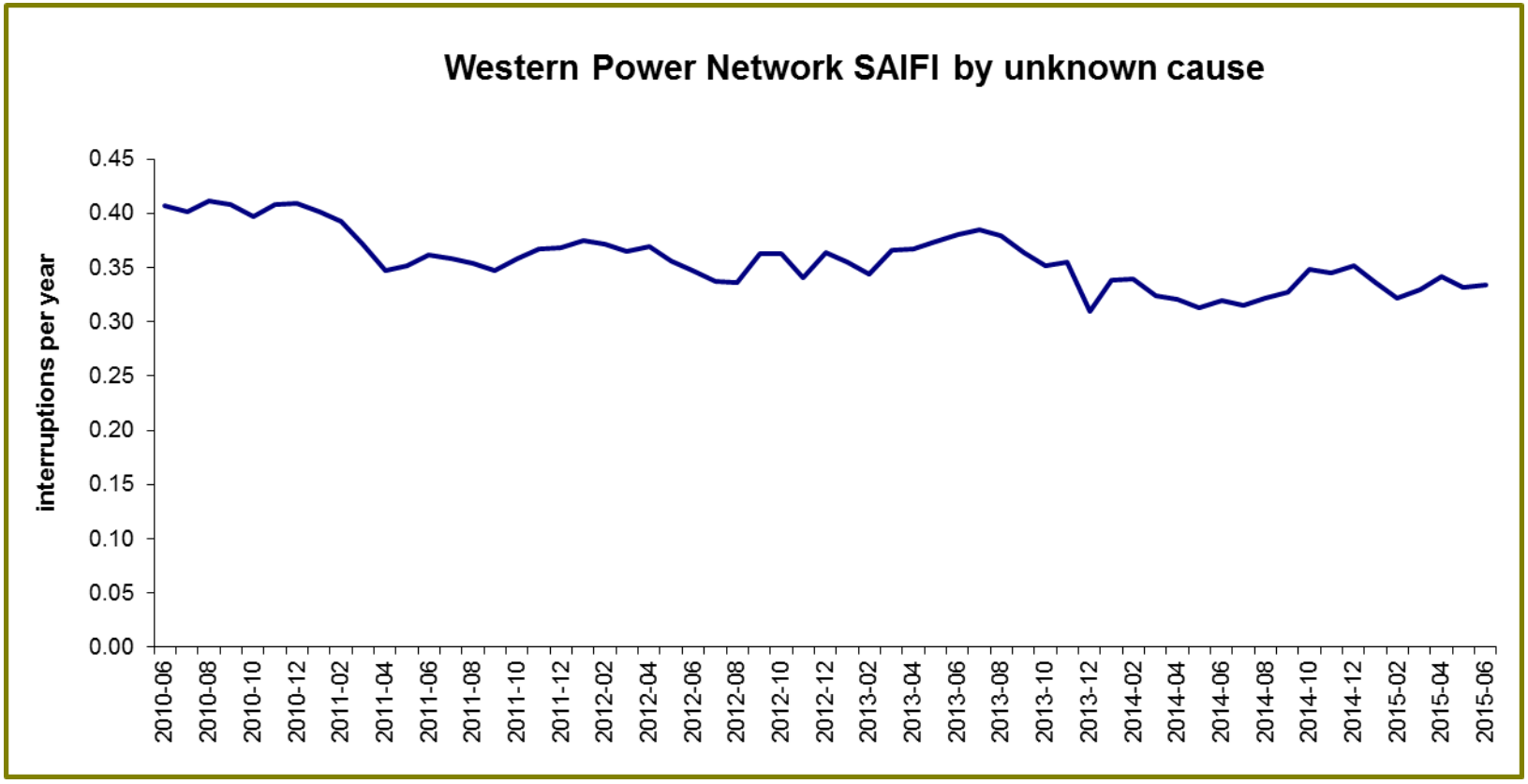

Figure 23 - Network SAIFI – unknown cause trend

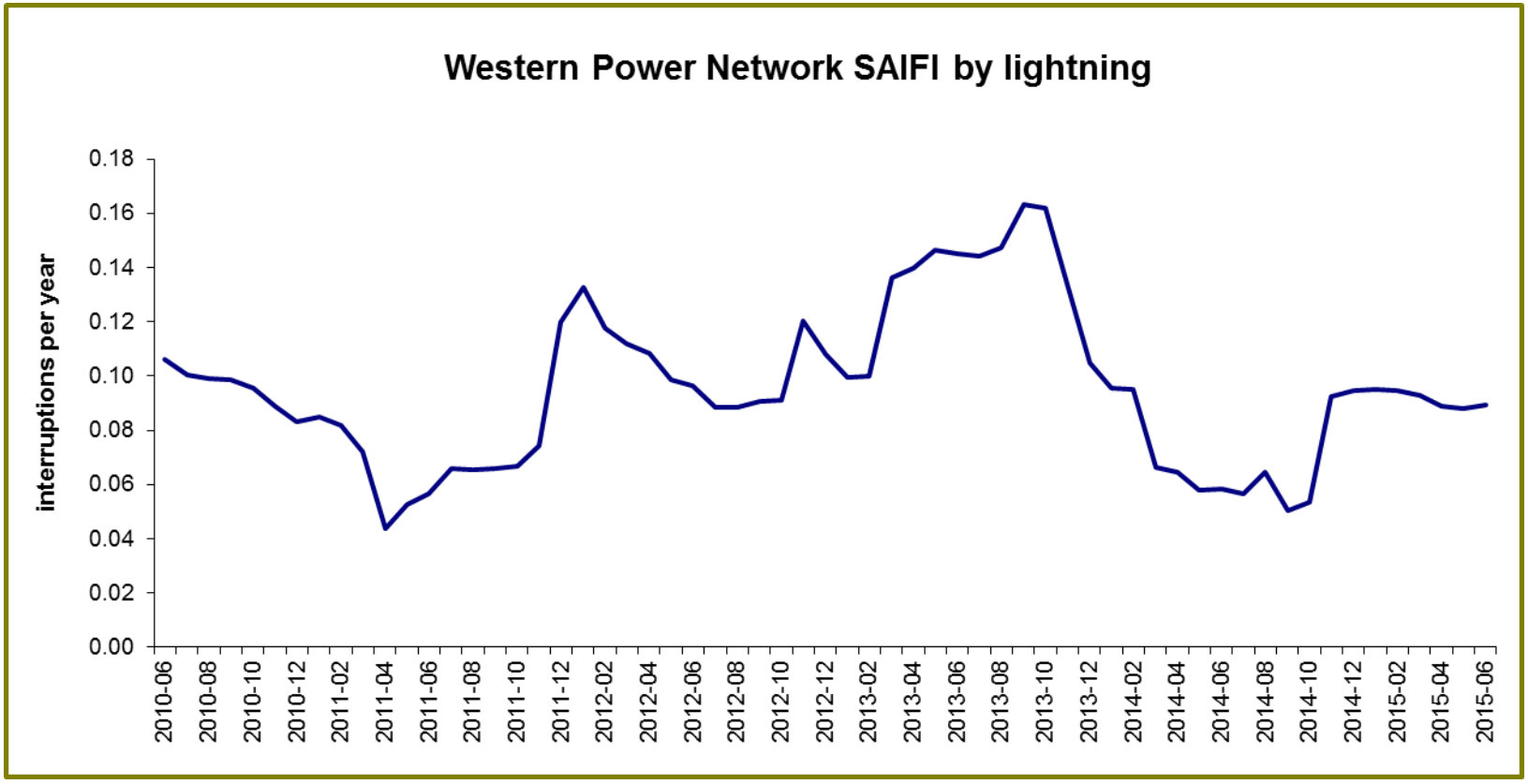

Figure 24 - Network SAIFI –lightning cause trend