



Electricity Network Performance Report 2015/16

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Introduction

This report represents Ausgrid's Electricity Network Performance Report for the 2015/16 financial year. The report has been prepared in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (the Regulation) and follows the outline provided by the NSW Department of Industry (formerly NSW Trade & Investment) – Resources & Energy (the Department). The report is designed to report actual performance in the 2015/16 financial year against the relevant criteria and key performance indicators established in the Electricity Network Safety Management System (ENSMS). This report complements the relevant sections of the ENSMS and details Ausgrid's performance with respect to:

- Network Management
- Network Planning
- Asset Management
- Network Safety
- Customer Installations
- Contestable Works Scheme
- Bushfire Risk Management
- Public Electrical Safety Awareness
- Power Line Crossings of Navigable Waterways

1 Profile

1.1 Overview

Ausgrid's distribution network covers 22,275 square kilometres from Waterfall in Sydney's South, to Auburn in Western Sydney, Port Stephens to the North and the upper Hunter Valley. Ausgrid supplies electricity to almost 1.7 million customers in Sydney, the Central Coast and the Hunter Region in NSW. Its electricity network powers large and small businesses, as well as major industry including mining, shipping, trade, tourism, manufacturing and agriculture.

This report focuses on the performance of Ausgrid's network business which is responsible for the distribution of electricity within our network area (Figure 1).



Figure 1 – Ausgrid's Network Area

Ausgrid's principal activities include:

- The ownership and management of assets which make up the electricity distribution network
- The distribution of electricity to customers through our distribution network
- Infrastructure related construction and maintenance services
- A range of other services including streetlighting, customer connections, safety check ups, metering and 24 hour electrical repairs

Ausgrid's network is comprised of both transmission and distribution systems, with almost 50,000km of overhead lines and underground cables.

Transmission Network	Distribution Network
<ul style="list-style-type: none"> • 132kV lines that are operated in parallel to and in support of TransGrid's transmission network* • Substations which are connected to these lines* • A subtransmission system of 33kV, 66kV and 132kV assets 	<ul style="list-style-type: none"> • A high voltage distribution system of predominantly 11kV assets, as well as some 33kV, 22kV, 5kV and 12.7kV SWER (Single Wire Earth Return) assets • A low voltage distribution system of 400V assets (230V single phase)

Note: * Ausgrid operates an extensive network of 132kV assets which are directly connected to TransGrid's NSW main transmission network. Where these 132kV assets are operated in parallel, and provide transmission services to support TransGrid's network, they are defined as dual function assets under the National Electricity Rules, and are described as the transmission system in this report.

These assets are referred to throughout the report as "the network". Ausgrid's network customers are therefore customers who are connected to this network of assets. Table 1.1 sets out operator statistics in relation to Ausgrid's network.

Table 1.1 – Distributor Statistics

	Number at end of Previous Year	Number at end of Current Year
Distribution Customer Numbers (Total)	1,679,151	1,697,604 ¹
Distribution Customer Numbers – Sydney East Region	335,555	338,724
Distribution Customer Numbers – Sydney South Region	497,816	504,999
Distribution Customer Numbers – Sydney North Region	396,684	400,354
Distribution Customer Numbers – Newcastle Region	203,014	204,816
Distribution Customer Numbers – Central Coast Region	159,734	161,262
Distribution Customer Numbers – Lower Hunter Region	55,827	57,077
Distribution Customer Numbers – Upper Hunter Region	30,521	30,331
Maximum Demand (Aggregated System MW)	4,912	5,488
Feeder Numbers – CBD	56 ²	56 ²
Feeder Numbers – Urban	1,759	1,742
Feeder Numbers – Short Rural	335	379
Feeder Numbers – Long Rural	4	5
Energy Received by Dist Network to Year End (GWh)	26,700	26,699

	Number at end of Previous Year	Number at end of Current Year
Energy Distributed to Year End (Residential) (GWh)	8,521	8,514
Energy Distributed to Year End (Non-Residential Including un-metered supplies) (GWh)	17,110	17,103
Energy Distributed to Year End (GWh)	25,630	25,618
System Loss Factor (%)	4.01% ³	4.05% ³
Transmission System (km)	930	931
Transmission Substations (Number)	46	46
Sub Transmission System (km)	3,180 ⁴	3,162
Substations - Zone (Number)	191	188
Substations - Distribution (Number)	31,235	31,525
High Voltage Overhead (km)	10,061	10,049
High Voltage Underground (km)	8,096	8,176
Low Voltage Overhead (km)	19,466	19,269
Low Voltage Underground (km)	7,221	7,329
Poles (Number)	509,189	509,236
Streetlights (Number)	255,957 ⁵	256,583 ⁵
Employees (Full Time Equivalent Number)	4,567.9 ⁶	3,882.3 ⁶
Contractors (Full Time Equivalent Number)	222.1 ⁶	217.3 ⁶

Notes:

- 'Distribution Customer Numbers (Total)' includes a small number of customers that could not be assigned to a region.
- The CBD feeder count is as reported in reliability performance reports. The count of CBD feeders for reliability purposes is 56 and not 168 (which counts the three legs of the triplex feeder system as one feeder).
- 'System Loss Factor (%)' is the difference between energy received by the distribution network and energy received by customers (including un-metered supplies), divided by the energy received by the distribution network (allowing for embedded generation), expressed as a percentage.
- A data error identified in FY14/15 has been corrected in this report.
- The count of lights displayed includes Rate 1, Rate 2 and Rate 3 lights:
 - Rate 1 - Lights within our network; Lights funded and maintained by Ausgrid (Recorded in Ausgrid's asset database). There are currently 228,213 Rate 1 streetlights;
 - Rate 2 - Lights within our network; Lights funded by customer and maintained by Ausgrid (Recorded in Ausgrid's asset database). There are currently 22,748 Rate 2 streetlights;
 - Rate 3 - Lights within our network; Lights funded and maintained by customer (Recorded in Ausgrid's asset database), these lights are privately owned but are included in our database for the billing of energy consumption. There are currently 5,622 Rate 3 streetlights.
- Contractor FTE is based on all Agency/Labour hire staff employed by Ausgrid. The total Ausgrid Full Time Equivalent figure as at 30 June 2015 was 4,790.0. The total Ausgrid Full Time Equivalent figure as at 30 June 2016 was 4,099.6.

Additional Notes:

- Distances for overhead and underground lines are “circuit km”. A circuit is defined as an independently operable electric line of one or more phases.
- Asset counts and lengths do not include private assets.
- Low voltage overhead and underground lengths also includes streetlighting. For the 2014/15 financial year, length of OH streetlighting mains is 6,387km, and length of UG streetlighting mains is 1,302km. For the 2015/16 financial year, length of OH streetlighting mains is 6,180km, length of UG streetlighting mains is 1,283km.

1.2 Capital Works Program

Ausgrid invested over \$485 million in capital works and supporting the electricity network during 2015/16.

Major zone substation projects were completed at Belmore Park, Engadine, Metford and Paxton including sub-transmission feeders. A major refurbishment was completed at Drummoyne, and major equipment has been energised at Crows Nest, Canterbury and Port Hacking. and 132kV transmission feeders such as 9E3, 9Y4 and 9Y9/1 from Lindfield have also been energised during the financial year. Blended delivery contracts for two substation projects at Alexandria and Munmorah have been awarded with civil construction in progress at both the sites and tracking well against schedule and budget.

Table 1.2 – Capital Works Program Trend

Year	Previous Years				Current Year
	2011/12	2012/13	2013/14	2014/15	2015/16
Capital works program (\$M)	1,647.2	1,251.5	812.5	623.6	485.6

2 Network Management

2.1 Overview

In order to appropriately manage our electricity network, Ausgrid has implemented an Electricity Network Safety Management System (ENSMS) in accordance with the *Electricity Supply (Safety and Network Management) Regulation 2014* (the Regulation) and Australian Standard *AS5577 – Electricity Network Safety Management Systems*. The Ausgrid ENSMS came into effect on 1 March 2015.

In accordance with the Regulation, the ENSMS covers the following topics:

1. The safety and reliability of the electricity network;
2. The safety of electrical installations of customers connected to Ausgrid's electricity network;
3. Advice to the public about the hazards associated with electricity in relation to the network operator's network; and
4. Management of bush fire relating to electricity lines and other assets of Ausgrid's electricity network that are capable of initiating a fire.

The requirements of the Regulation are achieved by implementing the ENSMS in compliance with AS5577 to govern the design, construction, commissioning, operation, maintenance and decommissioning of the network in order to support:

- The safety of the public, and persons near or working on the network;
- The protection of property and network assets;
- Safety aspects arising from the protection of the environment, including protection from ignition of fires by electricity networks; and
- Safety aspects arising from the loss of electricity supply.

These goals are accomplished through risk assessments that identify hazards and the development of controls to prevent and mitigate these hazards and their outcomes. The result is a risk-based system to safely manage the electricity network.

2.1.1 Safety and Reliability of the Electricity Network

Ausgrid's commitment to the safety and reliability of its electricity network is outlined in the ENSMS. The ENSMS is a framework that governs the design, construction, commissioning, operation, maintenance and decommissioning of the network. This framework has been derived through risk assessment processes and incorporates the requirements of the 'Reliability and Performance Licence Conditions for Electricity Distributors' which have been issued by the NSW State Government and are monitored by IPART.

The ENSMS manages safety and reliability of the electricity network through the following controls:

- Policies and procedures for the planning and programming of network maintenance and augmentation;
- Minimum design and construction standards for electricity network assets;
- Minimum design standards for plant and equipment used by people undertaking work on or near the electricity network; and
- Minimum training standards and the application of Electrical Safety Rules for people undertaking work on or near the electricity network.

These policies, procedures, rules and standards allow for efficient and prudent investment in the network that achieves technical and regulatory obligations and meets customer expectations.

Most policies and procedures are internal Ausgrid documents, and can be accessed by its workers on its intranet. The Electrical Safety Rules, Network Standards and other relevant documentation can be accessed internally via the intranet or externally on Ausgrid's website. Literature on what customers can reasonably expect from their electricity supply can also be found on Ausgrid's website.

Details on network reliability can be found in **Chapter 4** while details on network safety can be found in **Chapter 5** of this report.

2.1.2 Customer Installation Safety Plan

The Ausgrid 'Customer Installation Safety Plan' aims to minimise the risk that customer installations are unsafe to connect to Ausgrid's electricity network, and does so by applying relevant standards and codes of practice through an audit regime for new or altered connections to Ausgrid's network.

This plan recognises that each year work is undertaken on electrical installations at thousands of customer installations throughout our distribution area. While Ausgrid has responsibility for maintaining the distribution network, including the poles and wires required for the connection of customer installations, all new and existing electrical work within a customer's electrical installation remains the responsibility of the customer and their installing electrical contractor.

Issues, initiatives and achievements relating to Ausgrid's customer installations during 2015/16 are outlined in **Chapter 6** of this report.

2.1.3 Public Electricity Safety Awareness Plan

The Ausgrid 'Public Electricity Safety Awareness Plan' aims to minimise the risk to the general public from electrical hazards. The plan accomplishes this through the following means:

- Raising awareness of electrical safety and the hazards related to Ausgrid's network assets and the distribution of electricity;
- Raising awareness of electrical safety amongst 'at risk' groups;
- Raising awareness of the safe use of electrical equipment; and
- Reminding the public of hazardous situations involving electricity.

Risk assessments and analysis of previous incidents are used to identify 'at risk' groups as well as network assets and situations that present a public risk. The Public Electricity Safety Awareness Plan outlines these 'at risk' groups and situations as well as the development of programs and associated communications methods and key messages to mitigate the identified risks.

A range of safety initiatives and programs undertaken over the past year are outlined in **Chapter 9** of this report.

2.1.4 Bushfire Risk Management Plan

The Ausgrid 'Bushfire Risk Management Plan' aims to minimise the risk of bushfire initiation as a result of interactions between the electricity network and its environment, which Ausgrid does by applying specific bushfire mitigation techniques in addition to the planning and design of the electricity network.

In preparation of the Bushfire Risk Management Plan, Ausgrid has taken into account relevant standards and codes of practice as referenced in the plan. The plan identifies key stakeholders and presents a framework for both Ausgrid and those stakeholders to maintain their electricity network assets, including those that are privately owned.

The plan outlines strategies and programs that are implemented to promote and measure the management of bushfire risks associated with electricity networks, as well as the actions taken if inadequate management has been identified.

Details of audits and initiatives undertaken in the last year to improve systems to manage bushfire risk within Ausgrid's network area are outlined in **Chapter 8** of this report.

2.2 Network Complaints

Table 2.1 – Complaints Performance Data

Year	Previous Years				Current Year
	2011/12	2012/13	2013/14	2014/15	2015/16
Complaints Total	1,471	1,973	1,509	5,406	7,485
Complaints per 1,000 Distribution Customers	0.89	1.2	0.91	3.22	4.41
Complaints regarding Vegetation Management	146	266	275	677	1,076

Table 2.2– Network Complaint Investigations Completed Current Year

	Number	Number Valid*
Voltage	47	15
Current	1	1
Other Quality	32	1
Reliability	72	17
Safety	0	0

* A complaint is valid where non-compliance with published service and network standards occurs.

Note:

1. The figure for 'Complaints Total' includes voltage, quality of supply & reliability, streetlighting, poles, graffiti and vegetation management complaints.
2. The reported volume of complaints since the 2014/15 period is higher than previous periods due to a new data collection and reporting method - customers now have the ability to enter streetlight notifications and complaints directly via the Ausgrid website, and numbers have significantly increased on previous periods as a result. A total of 3,843 complaints were lodged online during the 2014/15 financial year.

2.3 Customer Service Standards Reporting

In 2015/2016 financial year Ausgrid received 472 Customer Service Claims. This figure includes one invalid claim received in 2015/2016, which is not included in the Table 2.3.

In 2015/2016 financial year 293 claims were not eligible for payment.

Table 2.3 – Customer Service Standards 2015/16 Data

	Payments Given based on Interruption Duration (Total number)	Claims not Paid based on Interruption Duration (Total number)	Payments Given based on Interruption Frequency (Total number)	Claims not Paid based on Interruption Frequency (Total number)
Metropolitan	170	241	1	31
Non-Metropolitan	7	20	0	1

3 Network Planning

3.1 Overview

Ausgrid's network planning process aims to develop the most economical solutions (ie. those that maximise the net benefits over the planning horizon) to meet the needs of customers for a safe and reliability electricity supply.

Ausgrid's network planning approach is outlined in its Policy and Procedures Framework and is consistent with the principles of the NSW Government's Total Asset Management System.

Planning to invest in the network considers:

- Forecast peak demand and network capacity
- The condition of the existing network assets
- The reliability of the network
- New technology advances and their impact on the network
- The availability of cost effective non-network solutions
- Joint-planning with TransGrid and other networks to ensure efficiency of the overall integrated network, particularly in the Sydney metropolitan area.
- Stakeholder expectations in relation to community and environmental impacts

During the 2015/16 financial year we applied our new methodology for probabilistic risk assessment to investments in the Sydney CBD to optimise the timing of major projects and reduce our overall exposure to risk. In addition, we are in the process of centralising our low voltage (415V) planning function. This is expected to provide a more consistent and efficient process for planning overall, by leveraging off synergies with the process for planning the high voltage (11kV) network. Low voltage planning has previously been managed by officers in regional depots.

3.2 Design Planning Criteria Compliance Reporting

The Design Planning Criteria were contained in Schedule 1 of the Distribution Licence Conditions 2007. This schedule was repealed in the July 2014 Licence conditions, and therefore this section is no longer applicable.

3.3 Demand Management

In planning for a safe, reliable and cost effective network, Ausgrid investigates demand management options when assessing network needs.

The Electricity Supply Act 1995 requires that a Distribution Licence Holder must investigate whether it would be cost-effective to avoid or postpone extending or increasing the capacity of the network by implementing Demand Management (DM) strategies.

For all projects where the augmentation component of any of the credible network options have a capital cost in excess of \$5 million, the Regulatory Investment Test for Distributors (RIT-D) process will be followed to assess non-network solutions.

For augmentation projects with a capital cost less than \$5 million, Ausgrid investigates demand management options alongside network investments, and implements demand management options where they represent the least cost solution. These opportunities will be assessed on a case by case basis, taking into account the nature of the constraint and the characteristics of the supply area.

Ausgrid also considers demand management as a potential option where replacement projects have a capital cost in excess of \$2 million.

2015/16 Demand management activity

The number of viable opportunities for capital deferral through the implementation of demand management options has reduced significantly in the last few years, due to falling peak demand on the network and the consequent small number of demand driven capital projects currently scheduled for the forward planning period.

Ausgrid did not implement or investigate any new demand management projects in 2015/16.

4 Asset Management

4.1 Overview

Ausgrid has an organisation-wide focus on asset management, aimed at the effective management of assets through their complete life cycle. This includes design, procurement, maintenance, asset renewal, network augmentation, disposal, performance monitoring and continuous improvement. Ausgrid's asset management approach enables the competing requirements of the network to be managed through the systematic consideration and trade-off between risk, cost and performance, and is supported by an integrated asset management system. This balance supports Ausgrid's business objectives to deliver a safe, reliable and sustainable network in line with our customers' expectations.

The asset management strategies, models and processes adopted by Ausgrid are consistent with the elements of a total asset management system as identified in the NSW Government's Total Asset Management (TAM) Manual, and largely aligned with the requirements of *AS ISO 55001:2014 Asset Management – Management Systems – Requirements*.

4.2 Technical Service Standards

Ausgrid's objective is to achieve the best possible overall quality and reliability of our electricity network, given the condition and utilisation of network assets and the funding available to maintain and augment the electricity network. In addition, Ausgrid makes all reasonable and practicable efforts to ensure that in any financial year, it meets the targets set by the Department, in respect to reliability standards, quality standards and individual feeder standards.

Ausgrid's Network Standard NS 238 *Supply Quality*¹ sets out Ausgrid's standards for Network Reliability and Quality of Supply, that customers can expect from Ausgrid's network.

Further technical information relating to service standards of Ausgrid's network and supply commitments can be found on the Ausgrid website www.ausgrid.com.au or through the Ausgrid Contact centre on **13 15 35**.

4.3 Quality of Supply

4.3.1 Overview

Quality of Supply refers to the set of voltage characteristics as supplied to the customer at the Point of Supply in terms of magnitude, symmetry and waveform. Ausgrid aims at achieving the best possible overall supply quality on our electricity network, given the condition and utilisation of existing network assets, within the funding available to maintain and augment the electricity network.

4.3.2 Performance Data

4.3.2.1 Results from the Ausgrid Low Voltage Network Power Quality Survey

In 2012/13, Ausgrid began its annual Low Voltage Network Power Quality Survey that covers approximately 200 randomly selected Low Voltage customer sites. The measurement data used to assess the power quality performance of the low voltage network is obtained from portable power quality instruments.

The following sections describe the performance of the surveyed sites to the relevant standards:

a) Range of Supply Voltage

The Range of Supply Voltage compliance is evaluated against AS 61000.3.100, which states that the 99th percentile ($V_{99\%}$) and 1st percentile ($V_{1\%}$) of the 10min average voltage readings for a one week survey should be less than 253 Volts and greater than 216 Volts respectively.

In the survey, all sites met the $V_{1\%}$ limit and 91% of sites met the $V_{99\%}$ limit. The high $V_{99\%}$ figure is a consequence of the network being historically designed for a nominal 240V range. As stated in previous reports, Ausgrid is currently undertaking a 230V migration program which comprises:

- adjustment of zone substation voltage regulation settings to lower the 11kV distribution supply; and

¹ <http://www.ausgrid.com.au/Common/Industry/Network-documentation/Network-standards.aspx>

- adjustment of tap changer settings at the distribution substations to lower the voltage on the low voltage feeders (this is an ongoing activity and is not expected to be completed until the next regulatory period).

The table below shows the increasing number of sites meeting the 253 volt compliance limit over time (see also section 4.3.2.2)

Table 4.3.1 – Network survey supply voltage (Sites meeting V99% limit of 253 Volts)

2012/13	2013/14	2014/15	2015/16
70%	80%	86%	91%

b) Voltage Unbalance

The results of the survey show that voltage unbalance for all measured sites with three phase connections was within the compatibility level of 3% as specified in AS/NZS 61000.2.2.

c) Harmonic Content of the Voltage Waveform

The Total Harmonic Distortion (THD) measured to AS/NZS 61000.2.2 as a sum of the powers of all harmonic voltages present compared to the fundamental (50 Hz) voltage. The results of the survey show that the THD for all measured sites was within the compatibility level of 8%.

Table 4.3.2 – Network survey: Maximum Total Harmonic Distortion (THD)

2012/13	2013/14	2014/15	2015/16	Compatibility level
3.6%	4.5%	5.0%	4.6%	8.0%

All individual harmonics met compatibility levels, with the exception of the 15th (750 Hz) and 21st (1050 Hz) harmonics. Exceeding the compatibility levels for these harmonics is not seen as significant issue, as these harmonics do not generally create issues for equipment operation. The 15th and 21st harmonics are close to the Customer Load Control (“Ripple Signal”) transmission frequency used for off peak hot water control, resulting in high readings for these harmonics.

Table 4.3.3 Network survey: Percentage of sites within compatibility level for individual harmonics

Harmonic	2013/14	2014/15	2015/16	Compatibility level
15 th	70%	64%	58%	0.4%
21 st	>95%	95%	82%	0.3%

d) Voltage Fluctuations (Flicker)

Flicker is the term used to describe visible change in brightness of a lamp due to rapid voltage changes, generally caused by sudden changes in loads. It is measured as short term flicker and long term flicker according to AS/NZS 61000.2.2.

Short Term Flicker (P_{ST})

The results of the survey show that 94% of sites met the Short Term (P_{st}) compatibility level for Flicker of 1.0.

Table 4.3.4 – Network survey: Sites meeting Short Term Flicker (P_{st}) compatibility level

2012/13	2013/14	2014/15	2015/16	Compatibility level
95%	97%	93%	94%	1.0

Long Term Flicker (P_{LT})

The results of the survey show that 90% of sites met the Long Term compatibility level (P_{lt}) for flicker of 0.8.

Table 4.3.5 – Network survey: Sites meeting Long Term Flicker (P_{lt}) compatibility level

2012/13	2013/14	2014/15	2015/16	Compatibility level
90%	93%	83%	90%	0.8

The number of sites meeting the long term flicker compatibility level has improved compared to the last year and returned to the survey average of approximately 90%. The inspection of data from the sites with higher flicker levels revealed that a number of them are connected downstream from Electric Arc Furnaces or located in close proximity to large fluctuating loads such as construction sites, which have been known to inject high levels of flicker onto the network

4.3.2.2 Results from Distribution Monitoring and Control Program (DM&C²)

A set of comparative data, recorded in the first week in May for the years 2012 to 2016 for a sample set of up to 1,071 Distribution Transformers, was analysed for Voltage performance.

For Voltage, the results indicate a steady decline for the median and 99th percentile values between 2012 and 2016, consistent with Ausgrid's ongoing migration to the current 230V standard. On average, the voltage median (50th percentile) dropped by 0.8 volts per year and the 99th percentile by 1.1 volts per year.

Table 4.3.6– Results from DM&C voltage survey for first week in May each year

Year	2012	2013	2014	2015	2016
Number of Sites used in Analysis ¹	641	1,083	1,080	1,076	1,071
$V_{50\%}$ ²	248.8V	248.3V	247.8V	246.2V	245.6V
$V_{99\%}$ ³	258.3V	257.0V	256.4V	254.1V	253.8V

Notes:

1. Some sites have been excluded from the original sample of 1,090 due to insufficient data.
2. 50% of the $V_{50\%}$ values of the monitored sites are below this value.
3. 95% of the $V_{99\%}$ readings of the monitored sites are below this value.

Over time, as Ausgrid progresses its plan to reduce the average network voltage through the 230 volt migration project, a further increase in compliance is expected to be observed.

² DM&C – devices installed in a number of Ausgrid's distribution substations that remotely monitor voltages and currents and provide capability for real time remote control of related HV switchgear via wireless communication.

4.4 Distribution Reliability

4.4.1 Overview

Ausgrid's reliability performance for 2015/16 is compliant with the NSW Reliability and Performance Licence Conditions (July 2014). The year commenced with better than average results in the July – September quarter, however performance in subsequent quarters was around the average of the past five years. In particular, a higher than usual number of significant storms impacted the network, notably the 14 January lightning storm and the 4-5 June East Coast Low. This led to a high number of days excluded under the Major Event Day criterion. The normalised (ie excluding major event days and excluded events) SAIDI was average compared to the last 5 years, however normalised SAIFI (System Average Interruption Frequency Index) was notable as the second best on record after 2014/15.

During the past year, 53 feeders exceeded the individual feeder reliability thresholds and required investigation - this number exceeded the 2014/15 period. These 53 feeders comprised of 46 Urban feeders (87%), and 7 Short Rural feeders (13%). This proportion is similar to the mix of feeders on Ausgrid's network where 80% are Urban, 17% Short Rural, 2.6% CBD and 0.2% Long Rural feeders. It is also similar to the mix of customers, with 81% being supplied by Urban feeders and 16% on Short Rural feeders. The reliability results indicate that poor performance as measured against the standards is relatively evenly distributed across the network, and is not confined to a particular feeder category.

The majority of feeders that have exceeded the thresholds in the past year have been due to one-off events, and have been managed through corrective maintenance such as vegetation trimming or animal proofing. This has reduced the requirement to utilise capital projects to address specific identified issues.

This data has been prepared in accordance with the 'Reliability and Performance Licence Conditions' imposed by the Minister for Energy in 2007 and updated in July 2014, and the standards issued by the 'Steering Committee on National Regulatory Reporting Requirements' (SCNRRR).

Organisational trends are detailed in section 4.4.2, while performance for each feeder category and the organisational performance overall for this year are detailed in section 4.4.3. Feeder category performance trends are detailed in section 4.4.4, including commentary on excluded events.

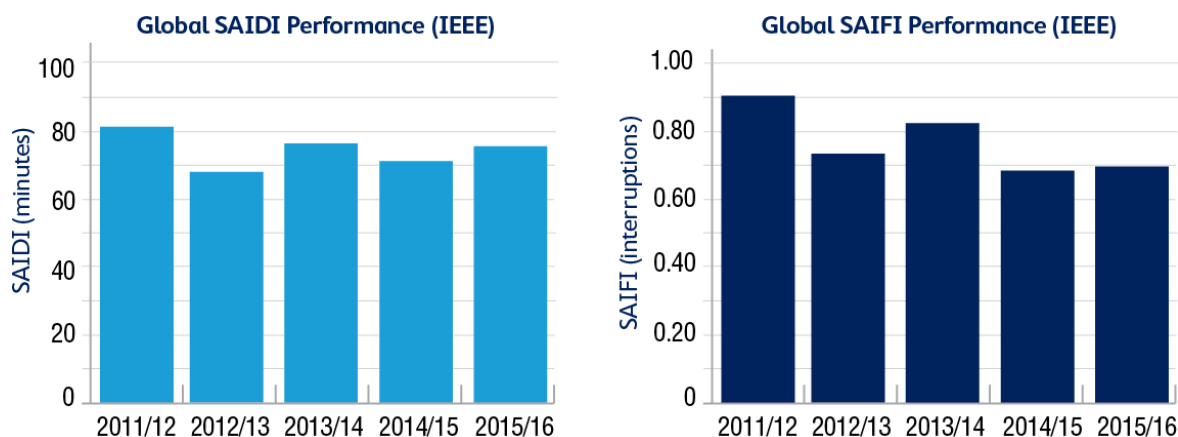
4.4.2 Organisational Performance (Normalised) Trend

Table 4.1 – Organisational Performance Trends (Normalised)

Year	Previous Years				Current Year
	2011/12	2012/13	2013/14	2014/15	2015/16
SAIDI (minutes)	82.09	67.77	76.66	71.60	76.01
SAIFI (interruptions)	0.91	0.73	0.83	0.68	0.70

Table 4.1 data representing SAIDI and SAIFI is also shown graphically below.

Figure 4.1 – Organisational Performance Trends (Normalised)



4.4.2.1 Comment on Performance

Ausgrid's reliability performance for 2015/16 is compliant with the NSW Reliability and Performance Licence Conditions (July 2014). Ausgrid has maintained reliability performance at approximately the level of the past five years. Between October and January, as well as June, the network was impacted by an above average number of intense wind, rain and lightning storms, which had a negative impact on reliability. There were eight (8) Major Event Days in total for the year, mostly due to adverse weather impacting the network.

Historical reliability performance has been re-calculated due to data improvements across all years. As a consequence reliability figures may be different from figures provided in past reports.

4.4.3 Organisational Detailed Performance Current Year

Reliability data sets for SAIDI and SAIFI are reported for the whole organisation and feeder categories in Table 4.2.

Table 4.2 – Organisational Detailed Performance Current Year

Sustained Interruption Data Sets		Whole Organisation and Feeder Category				
Category		ORG*	CBD	Urban	Short Rural	Long Rural
Customer Numbers		1,697,536	31,051	1,388,473	275,691	2,321
SAIDI (minutes)	Overall	177.21	55.45	146.51	323.22	2,625.07
	Planned	33.22	46.03	19.61	83.11	1,999.32
	Unplanned	143.95	9.42	126.90	239.92	625.75
	Normalised	76.01	9.42	65.36	131.72	590.40
SAIFI (interruptions)	Overall	1.02	0.11	0.87	1.77	6.12
	Planned	0.09	0.09	0.05	0.25	2.90
	Unplanned	0.92	0.02	0.83	1.49	3.23
	Normalised	0.70	0.02	0.62	1.15	3.19

Notes:

*ORG Refers to the average performance of the organisation overall.

- Customer numbers as at the end of June 2016 for the purposes of reliability indices only. Refer to Table 1.1 for the total of customers served.
- Overall performance represents the total performance experienced by our customers, irrespective of cause or origin of the fault.
- Planned and Unplanned performance is the Distribution Network Interruptions (DNI) that have all the excluded interruptions removed, except for Major Event days, as defined in Attachment A, in accordance with the "Steering Committee on National Regulatory Reporting Requirements" (SCNRRR) standards i.e. excludes TransGrid and load shedding events, Emergency Services instructed events and momentary interruptions.
- Normalised Distribution Network (NDN) performance is the DNI performance with the Major Event Days excluded, and represents the events that Ausgrid is expected to manage and be responsible for. The Major Event Days that have been excluded are defined in Table 4.7.

4.4.4 Reliability Report against Standards

Table 4.3 – CBD Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2011/12	2012/13	2013/14	2014/15	2015/16
SAIDI (minutes)	Actual	5.28	38.45	4.56	8.73	9.42
	Target	45	45	45	45	45
SAIFI (interruptions)	Actual	0.04	0.12	0.01	0.09	0.02
	Target	0.30	0.30	0.30	0.30	0.30

Table 4.4 – Urban Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2011/12	2012/13	2013/14	2014/15	2015/16
SAIDI (minutes)	Actual	72.16	56.39	64.69	58.50	65.36
	Target	80	80	80	80	80
SAIFI (interruptions)	Actual	0.80	0.65	0.74	0.57	0.62
	Target	1.20	1.20	1.20	1.20	1.20

Table 4.5 – Short Rural Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2011/12	2012/13	2013/14	2014/15	2015/16
SAIDI (minutes)	Actual	155.96	147.08	156.54	151.98	131.72
	Target	300	300	300	300	300
SAIFI (interruptions)	Actual	1.69	1.41	1.45	1.39	1.15
	Target	3.20	3.20	3.20	3.20	3.20

Table 4.6 – Long Rural-Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2011/12	2012/13	2013/14	2014/15	2015/16
SAIDI (minutes)	Actual	516.28	536.57	440.05	349.17	590.40
	Target	700	700	700	700	700
SAIFI (interruptions)	Actual	4.86	2.57	3.09	2.19	3.19
	Target	6	6	6	6	6

4.4.4.1 Comment on Performance

All feeder category performances were compliant against the Licence Conditions for 2015/16. Long Rural feeder performance was higher in 2015/16 compared to the previous five years, however there are so few long rural feeders that results can fluctuate dramatically year to year. A great outcome was achieved for Short Rural feeders with the best result for the last 5 years. Both CBD and Urban performance comfortably met their respective targets.

Historical reliability performance has been re-calculated due to data improvements across all years. As a consequence reliability figures may be different from figures provided in past reports.

4.4.4.2 Excluded Events

Each excluded interruption during 2015/16 is listed in Table 4.7, with a description of the basis on which the event meets the exclusion criteria. Events which occur on a Major Event Day are combined into a single row entry.

Table 4.7 – Excluded Interruptions for Current Year

Date of Event	Description of Event	Number of Customers Interrupted	Maximum Duration of Interruption (minutes)	Effect of Event on SAIDI Figure (minutes)	Basis for Exclusion
20/07/2015	Load Shed – Other Auth. Request	1	58	0.0000	Load Shed - Other Auth. Request
22/07/2015	Load Shed – Other Auth. Request	2	395	0.0005	Load Shed - Other Auth. Request
28/07/2015	Load Shed – Other Auth. Request	2	90	0.0001	Load Shed – Other Auth. Request
09/09/2015	Load Shed – Other Auth. Request	15	919	0.0082	Load Shed – Other Auth. Request
12/10/2015	Load Shed – Other Auth. Request	2	783	0.0009	Load Shed – Other Auth. Request
28/11/2015	Transmission / Bulk Supply	7,762	5	0.0214	Transmission / Bulk Supply
18/12/2015	Load Shed – Other Auth. Request	259	30	0.0046	Load Shed – Other Auth. Request
29/01/2016	Load Shed – Other Auth. Request	1	584	0.0003	Load Shed – Other Auth. Request
14/08/2015	Major Event Day (Cause: Equipment failure impacting Ausgrid’s network)	37,349	1,228	7.77	Exceeds Major Event Day Threshold (T_{med}) 2.84
10/09/2015	Major Event Day (Cause: Third party excavation impacting Ausgrid’s network)	31,927	1,022	5.87	Exceeds Major Event Day Threshold (T_{med}) 2.84
09/12/2015	Major Event Day (Cause: Lightning storm impacting Ausgrid’s network)	35,537	2,093	3.81	Exceeds Major Event Day Threshold (T_{med}) 2.84
14/01/2016	Major Event Day (Cause: Lightning storm impacting Ausgrid’s network)	81,209	27,070	19.54	Exceeds Major Event Day Threshold (T_{med}) 2.84
29/01/2016	Major Event Day (Cause: Lightning storm impacting Ausgrid’s network)	39,364	3,946	4.60	Exceeds Major Event Day Threshold (T_{med}) 2.84
30/01/2016	Major Event Day (Cause: Lightning storm impacting Ausgrid’s network)	74,381	2,728	6.58	Exceeds Major Event Day Threshold (T_{med}) 2.84
04/06/2016	Major Event Day (Cause: Gale force winds and heavy rain impacting Ausgrid’s network)	20,589	6,997	3.00	Exceeds Major Event Day Threshold (T_{med}) 2.84
05/06/2016	Major Event Day (Cause: Gale force winds and heavy rain impacting Ausgrid’s network)	52,306	14,185	16.77	Exceeds Major Event Day Threshold (T_{med}) 2.84

4.4.5 Performance against Individual Feeder Standards

The objective of this section is to ensure that feeders performing unsatisfactorily (i.e. outside of the performance criteria for that feeder type) are reported publicly and their performance tracked until performance is again satisfactory. The figures contained in Table 4.8 represent the Licence Condition standards for each feeder type.

Table 4.8 – Individual Feeder Standards for Exception Reporting Specified in the Licence Conditions Applicable to your Organisation

	Feeder Categories			
Category	CBD	Urban	Short Rural	Long Rural
SAIDI	100	350	1000	1400
SAIFI	1.4	4	8	10

Table 4.9 – Individual Feeder Performance against the Standard Summary

June 2016 Report	Feeder Type			
	CBD	Urban	Short Rural	Long Rural
Feeders (Total Number each Type)	56	1,742	379	5
Feeders that Exceeded the Standard During the Year (Total Number)	0	69	10	0
Feeders Not Immediately Investigated (Total Number)	0	0	0	0
Feeders Not Subject to a Completed Investigation Report by Due Date (Total Number)	0	0	0	0
Feeders Not Having Identified Operational Actions Completed by Due Date (Total Number)	0	0	0	0
Feeders Not Having a Project Plan Completed by Due Date (Total Number)	0	0	0	0

As required in clause 16.2 (b) and (c) of the Licence Conditions, each feeder currently exceeding the Individual Feeder Standard is analysed, and an investigation report identifying the causes and, as appropriate, any action required to improve the poor performance is reported in the next quarterly performance report. All actions required were completed in the relevant timeframes.

Table 4.9 details the number of feeders that have exceeded the thresholds, and the compliance to the required actions that arise from these events. Specific details of the feeders are included in Attachment E.

Overall, the percentage of poor performing feeders in each feeder category is relatively low.

In summary, 79 feeders have had values above the limits in the past 12 months. 53 went over the limits during the year and required investigations, and 40 feeders exceeded the thresholds specified in the Licence Conditions as of 30 June 2016.

All compliance actions were completed within the required timeframes.

4.5 Transmission Reliability

4.5.1 Transmission Reliability Performance Data

Table 4.10 – Transmission Circuit Availability (%) Trend

Objective	Previous Years				Current Year
	2011/12	2012/13	2013/14	2014/15	2015/16
No target established	96.17	96.20	96.80	96.82	96.95

There has been an increase in circuit availability from the previous year's result, with a 0.13 per cent increase in availability. This result has been influenced by an overall increase in the amount of reportable transmission feeders together with a number of outages associated with maintenance and replacement programs such as the steel lattice tower refurbishments on 910, 911, 916, 917 feeders, and isolating switch replacement at Bunnerong STS.

Table 4.11 – Network Reliability Trend

Objective	Previous Years				Current Year
	2011/12	2012/13	2013/14	2014/15	2015/16
Network Reliability (Off Supply Event Numbers)	0	0	5	3	5

There were five transmission related loss of supply events this year:

- An earth wire failure resulted in the trip of Feeder 916 (Sydney South – Cronulla - Kurnell). The trip occurred during a planned outage on feeder 280 (Port Hacking - Kirrawee), resulting in an interruption to Cronulla and Kirrawee zone substations (ZS).
- An underground cable fault resulted in the trip of 92G (Top Ryde – Lane Cove). The trip occurred during a planned outage on feeder 92F (Mason Park – Top Ryde), resulting in an interruption to Top Ryde ZS.
- A cable dig in on Feeder 92J (Meadowbank – Lane Cove) resulted in an interruption to Meadowbank ZS. Feeder 90X (Meadowbank – Mason Park) was out of service at the time.
- Feeder 95Z (Somersby – Mt Colah) tripped during strong storm conditions resulting in an interruption to Somersby ZS. Feeder 95E (Gosford – Somersby) was out of service at the time.
- A staff error whilst undertaking network switching operations on Feeder 917 (Sydney South – Gwawley Bay – Kurnell) resulted in an interruption to Gwawley Bay ZS.

Table 4.12 – Outage (Un-Planned) Average Duration (Minutes) Trend

Objective	Previous Years				Current Year
	2011/12	2012/13	2013/14	2014/15	2015/16
No target established	5,810	4,734	1,249	2,201	2,126

This table reports on the average duration of transmission asset outages, irrespective of whether supply to customers is lost or not. This year's average unplanned outage duration has decreased from last year's figure. Similar to last year, the major contributors were 132kV oil insulated cable defects and their long duration repair times. The most notable of these has been the repair of leaks in oil filled cables 90X which took two months to repair. In addition to this, protection communication defects on 91X and 91Y resulted in these feeders being out of service for close to two months.

Table 4.133 – Connection Point Numbers Current Year

Ausgrid has seven transmission customers, supplied from 19 connection points. This is a decrease of one customer and five connection points from the previous year.

	Year
Number of Connection Points (Total number)	19

Table 4.14 – Connection Point Interruptions (Unplanned) Current Year

There were no transmission customer connection point interruptions in 2015/2016.

Connection Point	Interruption Number	Interruption Duration Total (Minutes)
-	-	-

Note: This table provides a listing of customer connection points off supply events.

5 Network Safety

5.1 Overview

Ausgrid is committed to workplace and public safety. To meet our objectives in this regard, as well as relevant legislative and regulatory compliance requirements, we have implemented a number of safety programs and initiatives, both in relation to the safe operation of the network and workplace safety. These programs are summarised below.

5.1.1 Safe Operation of the Network

Ausgrid has identified safety as a key network risk. To manage this, Ausgrid has undertaken strategic risk analysis of the types of hazardous events that may occur.

Ausgrid has identified various broad categories of risk relating to the safe operation of the network. At a strategic level, these are addressed in our duty of care plans. The planned programs of work documented in our duty of care plans are a key organisational safeguard against network safety risk.

In addition to these planned asset-related programs of work, Ausgrid has implemented various procedures and processes at an operational level for enhancing network safety, including:

- An Incident Management System for managing network incidents and network emergencies that enable rapid response to hazardous situations.
- Formal safety procedures and systems applicable when working on or near the network. This has both network safety and workplace safety implications.

5.1.2 Workplace Safety

Ausgrid has workplace safety obligations to its workers under the Work Health and Safety Act 2011 NSW (NSW WHS Act) and the Work Health and Safety Regulation 2011 (NSW) (WHS Regulation). Successful implementation of workplace safety processes and procedures also impacts more generally on network safety and contributes to the safe operation of the network.

Ausgrid has numerous policies and procedures in place to ensure safe work practices. Ausgrid conducts programs to identify workplace safety risks, and implements initiatives to address these risks to ensure ongoing compliance with its workplace safety obligations, and consistent application of its commitment to safety.

Ausgrid documents how safety is managed throughout the business in the Be Safe management system. Our “Be Safe” system is based on:

- Eliminating hazards or managing risks and practices in order to prevent harm to our people and our community;
- Striving for a positive safety culture and ensuring active participation, consultation and contribution in the promotion and development of business decisions and measures that aim to improve health, safety and welfare in the workplace;
- Providing the necessary training, supervision and instruction to ensure that no one is injured at work and we all return safely to our home and families every day;
- Developing strategies to minimise key safety risks and continually improve our safety performance;
- Undertaking fitness for work activities to protect our workers at their workplaces;
- Actively responding to all incidents and ensuring timely and effective incident management that promotes early and sustainable return to duties;
- Monitoring our commitment through regular performance reporting;
- Complying with all relevant laws and regulations and where practicable, industry codes of practice standards and other relevant requirements;
- Applying responsible standards where legislation or mandatory standards do not exist; and
- Promoting visible safety leadership to inspire people at all Ausgrid workplaces to work safely.

Ausgrid's safety objectives are to ensure that those working on or near the network are competent to do so, and can do so in the intended safe manner; and compliance with the WHS Act and WHS Regulation, which require employers such as Ausgrid to identify foreseeable hazards, assess the risks of these hazards and eliminate or control these risks and review these controls.

5.1.3 Public Safety

Ausgrid's Public Electrical Safety Awareness Plan educates the general public, the construction industry and emergency services of the risks of working near network assets and the requirement for people working near those assets to be appropriately qualified and authorised (where required). Ausgrid has the following processes in place to meet these objectives:

- Hazard assessment forms and safe work method statements have been developed in consultation with staff. External parties (such as Accredited Service Providers and contractors) are required to develop their own procedures and forms to submit to Ausgrid;
- Competency-based training (based on relevant national training packages and in accordance with the principle outlined in Section 8 of the National Electricity Network Safety Code "ENA Doc 01-2008");
- Induction training for all new employees (both employees and contractors) is carried out in accordance with our BeSafe WHS System;
- Accreditation of service providers undertaking contestable work meets the Electricity Supply (Safety and Network Management) Regulation 2014 and the rules for Accreditation of Providers of Contestable Services, as administered by the Department;
- Audit inspection of works in progress to monitor Accredited Service Provider (ASP) compliance with Ausgrid's Electrical Safety Rules;
- Report accidents and incidents, as specified by the Department under the Significant Electrical Network Incidents reporting system (including those required under the Electricity 'Consumer Safety' Regulation 2006); and
- Report customer installation incidents to NSW Fair Trading (in accordance with the Electricity 'Consumer Safety' Act 2004).

In addition to the activities listed above, Ausgrid has a number of procedures, standards and requirements that help to ensure everyone working on or near our network is competent and remains safe. These include:

- Training and competency requirements;
- Training records management;
- Procedures and training for working on live electricity assets;
- Safety equipment design, use and maintenance standards;
- Provision of recorded asset information (maps and drawings) for underground assets via the Dial Before You Dig Service, including general safety precautions via reference to Network Standard NS156.

5.2 Public Reportable Safety Incidents

Ausgrid reported 122 Reportable Safety Incidents involving the public in 2015/16, as summarised in Table 5.1. Of the 122 Public Reportable Safety Incidents, one incident involving contact with the electrical network resulted in an injury that required treatment above a precautionary electrocardiogram (ECG). This incident is described in further detail in 0.

SENIs are analysed by Ausgrid to inform the development of its Public Electricity Safety Awareness Plan and campaigns to address the most significant issues for public safety such as preventing contact with overhead conductors and underground network assets. Ausgrid continues its efforts to reduce these occurrences through the Public Electrical Safety Awareness Campaign, which utilises a range of topical media releases and a variety of advertising mediums to alert the public to the risks involved when in proximity to the electricity network.

Table 5.1 – Public Reportable Safety Incidents

Year	Previous Years			Current Year
	2012/13	2013/14	2014/15	2015/16
Non-Fatal	143	126	136	122
Fatal	0	0	0	0
Total	143	126	136	122

Incident 1 – Toronto 3 September 2015

A vehicle driven by a member of the public in Toronto struck an overhead low voltage service. The damaged service struck another member of the public within the vicinity and caused a laceration to the face and head. The injured member of the public was taken to hospital by ambulance for treatment.

5.3 Worker Reportable Safety Incidents

Ausgrid reported 50 Reportable Safety Incidents involving workers, contractors, ASPs in 2015/16, as summarised in Table 5.2. Of the 50 Worker Reportable Safety Incidents, one incident involving contact with the electrical network resulted in an injury that required treatment above a precautionary electrocardiogram (ECG). This incident is described in further detail in 0.

Table 5.2 – Worker, contractor and ASP Reportable Safety Incidents

Year	Previous Years				Current Year
	2011/12*	2012/13	2013/14	2014/15	2015/16
Workers	27	39	24	28	28
Contractors	2	16	16	14	18
ASPs	1	8	6	11	4
Total	30	63	46	53	50

*Note: Results from 2011/12 is a combined result following a change to the SENI reporting scheme for Q4 of that financial year.

Incident 1 – Arncliffe 1 July 2015

A worker, working on a faulty low voltage fuse at a kiosk in Arncliffe, received minor burns to their hand due to an arc flash caused by contact between a live low voltage conductor and the frame of the fuse holder. The worker received first aid for the injuries.

5.4 Major Incident Reports

Ausgrid's Incident Management System (IMS) provides an organisation wide system for managing incidents of all types and severity. The IMS documents the procedures followed by Ausgrid in terms of reporting major and high severity incidents to the Minister for Energy, as required under the Design, Reliability and Performance Licence Conditions. The IMS does this by linking definitions of incident severity to the Licence Conditions, and by stipulating the reporting timeframes by incident severity.

During the 2015/16 period, there were four Major and three Emergency classified incidents which required the Minister for Energy to be notified in accordance with the Design, Reliability and Performance Licence Conditions.

Incident 1 – Loss of Kirrawee ZS & Cronulla ZS – Friday 14 August 2015 – Major Incident.

A Major Network Incident was declared when 132kV feeder 916 (Sydney South BSP – Kurnell South ZS – Cronulla ZS) tripped at 10:11hrs whilst the 132kV feeder 280 was out of service for planned works. 37,317 customers at Kirrawee and Cronulla Zone Substations were interrupted. The trip was due to the overhead earth wire failing at a termination.

Incident 2 – Loss of Meadowbank ZS – Thursday 10 September 2015 – Emergency Incident.

An Emergency Network Incident was declared when 132kV feeder 92J (Lane Cove STSS – Meadowbank ZS) tripped at 14:56hrs whilst the 132kV feeder 90X was out of service for oil cable repairs. 29,440 customers at Meadowbank Zone Substation were interrupted. The trip was due to cable strike.

Incident 3 – 16 December Kurnell Storm – Wednesday 16 December 2015 – Emergency Incident.

An Emergency Network Incident was declared when a localised tornado lead to a loss of supply to Kurnell South Zone Substation. 132kV Feeder 916 (Sydney South BSP – Cronulla ZS – Kurnell South ZS) tripped due to the storm at 10:46hrs. The storm cause significant damage to Old Kurnell and New Kurnell Zone Substation sites. 1014 customers at Kurnell Zone Substation were interrupted.

Incident 4 – 14 January Storm – Thursday 14 January 2016 – Major Incident.

A Major Network Incident was declared when a severe storm impacted the Sydney and Hunter / Central Coast areas leading to a loss of supply to approximately 102,000 customers, with 61,000 experiencing a sustained delay.

Incident 5 – Loss of Port Hacking STS – Saturday 30 January 2016 – Emergency Incident.

An Emergency Network Incident was declared when the 132kV feeders 912 (Sydney South BSP – Port Hacking STS), 285 (Menai ZS – Engadine ZS), 289 (Engadine ZS – Port Hacking STS), tripped due to lightning during a storm. Approximately 51,000 customers at Jannali ZS, Miranda ZS, Lucas Heights ZS, Engadine ZS, and Caringbah ZS were interrupted.

Incident 6 – 5 June East Coast Low – Sunday 5 June 2016 – Major Incident.

A Major Network Incident was declared when an East Coast low pressure system and storm conditions resulted in significant network damage throughout Ausgrid's franchise area, commencing the morning of Saturday 4 June through to late evening of Sunday 05 April. Approximately 86,000 customers were without supply across the Ausgrid Network.

Incident 7 – Lifting Operations Injury – Thursday 23 June 2016 – Major Incident.

A Major Network Incident was declared when an Ausgrid employee suffered a serious hand injury while performing work on a steel streetlight standard. The staff member received first aid on scene before being transported to hospital.

6 Customer Installations

From January 2000, Ausgrid has maintained a computer database (SAP – CCS) for recording installation work notified by electrical contractors. The database is also used for selecting work on an audit basis for inspection.

Submission of a *NSW Fair Trading Certificate of Compliance – Electrical Work (CCEW)* form for notification has been required since January 2007. The purpose of the installation inspection is to verify compliance of electrical contractor's work with AS/NZS3000 - Wiring Rules, the Service and Installation Rules of NSW and any other relevant standards. Ausgrid's installation inspection audit process targets electrical contractor's who's previous work has been found to contain major safety breaches (major defects) as detailed in the Code of Practice for Installation Safety Management. Electrical contractors with higher major defect rates are inspected more often. The reliability of the data collected and the reported using SAP – CCS has been verified by external audit of Ausgrid's previous annual Electricity Network Performance reports.

The major causes of customer electric shocks fell into three specific categories; faulty neutral connections (16.79%), failure of part of the installation (18%) and faulty consumers mains (10%).

Ausgrid has continued an extensive program to replace all at risk aged service lines, and carrying out neutral integrity tests at targeted customer installations in conjunction with the Sydney Water mains replacement program.

6.1 Reports against Customer Installation Safety Plans

Table 6.1 – Installation Inspections Trend

Year	Previous Years				Current Year
	2011/12	2012/13	2013/14	2014/15	2015/16
Number of Notifications (CCEW)	58,364	55,156	49,443	59,554	58,613
Number of Inspections	25,258	15,814	16,799	18,480	17,976
Installation Inspection Rate (%)	43.28%	28.67%	33.98%	31.03%	30.67%
Major Safety Defect Rate (%)	3.97%	4.07%	2.27%	4.96%	1.95%
Safety Breach Notices Issued (%)	10.22%	17.53%	10.76%	10.90%	11.88%
Number of Warnings Issued	14	14	9	6	8
Reports to Fair Trading (No.)	13	18	7	8	6
Number of Audits by Distributor	5	3	3	3	3

The number of notifications (CCEW) of electrical installation work from electrical contractors has decreased, and Ausgrid's inspection rate has also slightly decreased. Ausgrid implemented a new grading system for electrical contractors, where poor performers are inspected more frequently, and there has been an increase in mandatory inspections being carried out. This grading system has been refined over a number of months to ensure the correct inspection ratios are attributed to electrical contractors.

The major defect rate of 1.95% is less than last year (4.96%). The most common major defects were found to be 'overloaded equipment', 'no overcurrent or RCD device' and 'exposed live terminals'.

Ausgrid has continued to assist NSW Fair Trading with their electrical contractor compliance campaigns by providing CCEW notification data when requested as part of our Memorandum of Understanding (MoU) for

mutual cooperation on electrical installation safety matters. The number of referrals to NSW Fair Trading for 2015-16 was 8, and we will continue providing information to the department.

In February 2016 the *Electricity Supply (Advanced Meters) Bill 2016* was passed. This legislation enabled the customer driven rollout of advanced meters in NSW and the responsibility for the safety and compliance of advanced meters (type 1 - 4) was transferred to NSW Fair Trading.

From 1 July 2016 all type 1 - 4 metering will not be inspected by DNSPs, and will be under the control of NSW Fair Trading. This legislation change occurred by transferring the type 1 to 4 electricity meter management from the Electricity Supply Act to the Electricity (Consumer Safety) Act.

The legislation amendments also affected the *Electricity Supply (Safety and Network Management) Regulation 2014* by removing the need for a Customer Installation Safety Plan to be incorporated into the DNSPs management plans. It also placed increased responsibility on customers in bushfire prone areas to ensure they maintain their electricity assets (e.g. private poles and overhead conductors).

Ausgrid is represented on related Australian Standards committees such as AS/NZS3000, AS/NZS 3002, AS2067, AS/NZS4777 series, AS/NZS5033 and AS/NZS3017 as well as on the Service and Installation Rules of NSW committee to ensure the focus on customer installation safety is maintained and improved.

Ausgrid and Sydney Water are jointly funding the testing of each installation neutral connection impacted by their water main replacement program. Sydney Water and Ausgrid renewed their MoU which outlines the testing and cost sharing arrangements. Suspected faults are investigated by Ausgrid staff and rectified where necessary.

6.2 Customer Installation Shock Reports

Table 6.2 – Customer Installation Shock Reports Trend

	Previous Years				Current Year
Year	2011/12	2012/13	2013/14	2014/15	2015/16
Shocks on Customer's Premises (Number Reported)	389	331	316	364	268

During 2015/16, there were nine fatalities from seven incidents. The major factors in these fatalities were suspected suicides (3), interfering with installation wiring (1), incorrect wiring (3) and no apparent cause (2). This is a significant increase in electrocutions, up from one (suspected suicide) last year.

Despite these incidents, the number of electric shocks reported this year decreased significantly (26.37%) compared to 2014/15. Ausgrid continues to run a public electricity safety awareness program and advertising campaigns highlighting the inherent dangers of electricity and precautions that should be taken. Ausgrid has a well-established service wire replacement program that targets aged assets and high risk areas to assist in the reduction of electric shocks attributed to failures of network neutral connections.

An analysis of customer installation shock investigations in 2015/16 follows similar trends to previous years. Electric shock investigations found the most common causes were:

- Faulty neutral connections related to the network (22.76%) (61 in total, down from 82 in FY14/15)
- Defective customer installation earthing (6.72%) (18 in total, down from 19 in FY14/15)
- Insufficient insulation resistance on the customer's installation (6.34%) (17 in total, down from 27 in FY14/15)

Shocks related to defective earthing and insufficient insulation resistance are generally the result of aged customer electrical installations. Ausgrid has documented the ongoing maintenance requirements of home owners through its ES1 Premises Connection Assets document (Clause 2.9).

7 Contestable Works Scheme

7.1 ASP Authorisations

Table 7.1 - ASP Authorisations

Year	Previous Years				Current Year
	2011/12	2012/13	2013/14	2014/15	2015/16
ASP1 Authorisations	1	1	999	960	826
ASP2 Authorisations	724 ²	740 ²	587 ³	638 ³	705

Notes:

1. Level 1 ASP authorisations were not reported prior to the 2015/16 period, so data back to 2013/14 has been provided for comparison.
2. Level 2 ASP initial authorisations and reauthorisations have been consolidated. These were reported separately in previous reports.
3. These figures are now supplied by Ausgrid's Electrical Safety and Authorisations section. For consistency they have been back dated to 2013/14. The original Level 2 ASP authorisation figures provided for 2013/14 and 2014/15 have been amended to reflect the data from SAP.

7.1.1 Level 1 ASP Authorisations

It can be seen that there was a slight decline from 2013/14 to 2014/15. This could be contributed to the introduction of Ausgrid's Level 1 ASP Authorisation Agreement in June 2013 for Level 1 ASP companies working on Ausgrid's network. In addition, it also introduced the requirement of a \$50,000 (minimum) bank guarantee to warrant works performed on the Ausgrid network. Some existing Level 1 ASPs discontinued competing in the contestable market in Ausgrid's network area and therefore their individuals were not reauthorised.

Between 2014/15 to 2015/16 the authorisation numbers declined by a further (13.96%) which could be attributed to the increase of the Australia Energy Regulator (AER) approved authorisation fee. Ausgrid has subsequently observed an increase in civil companies, who were authorised under multiple companies, obtain their own ASP Accreditation with the NSW Department of Industry and sought Level 1 Company Authorisation with Ausgrid.

7.1.2 Level 2 ASP Authorisations

Ausgrid witnessed another year of increased Level 2 ASP authorisations, with an increase by 10.5% from FY 2014/15. Much of this increase was experienced late in the financial year with the commencement of the Advanced Metering roll out which, prior to 1 July 2016, required persons installing Advanced Metering to be an authorised Level 2 ASP. Another explanation could be contributed to the requirement to be a Level 2 ASP for the connection of NBN customers.

Ausgrid anticipates a significant reduction in Level 2 ASP authorisations due to the removal of the requirement to be an Level 2 ASP to install Advanced Metering (type 1 – 4) from 1 July 2016 and the impending introduction of competitive framework for metering services by the Australian Energy Market Commission (AEMC). This initiative aims to provide electricity customers with more choice and reduced costs and will remove Level 2 ASP Category 4 from the Scheme rules from 1 December 2017.

7.2 Contestable Works

Table 7.2 - Contestable Works Trend

Year	Previous Years								Current Year	
	2011/12		2012/13		2013/14		2014/15		2015/16	
Category	Int	Ext	Int	Ext	Int	Ext	Int	Ext	Int	Ext
Network Connection Work (Level 1 ASPs)										
Project approvals	10	449	4	486	3	602	5	695	20	809
Projects completed	3	415	4	392	3	272	11	449	29	819
No. of projects with initial major defects	0	110	0	64	0	161	0	216	0	241
Customer Connection Work (Level 2 ASPs)										
Notifications (NOSW)	8,340	63,971	3,023	66,878	1,913	65,897	1,012	56,383	1,005	58,756
Projects inspected by the DNSP	1,877	25,951	718	19,437	584	21,376	357	14,733	225	12,906
No. of projects with initial major defects	28	291	0	232	1	269	0	367	0	163
Network Design Work (Level 3 ASPs)										
Designs Certified	42	552	12	638	2	594	2	727	0	945

Note: "Int" refers to contestable work done by the distributor's ASP entity, and "Ext" refers to work done by independent ASPs.

Notification refers to a notice from an ASP to the distributor of work being carried out.

7.2.1 Level 1 Contestable Work

There was an increase (82.41%) in work being carried out by external Level 1 ASPs, the amount of projects completed by this sector was 819. This increase can be attributed to NBN make ready and fibre installation work, which Ausgrid also competed in. There were 29 contestable projects carried out by internal (Ausgrid) service providers in the period, which is an increase from 11 last year.

An analysis of the contestable works trends in FY2015-16 shows an increase (18.43%) in the total number of project notifications (approvals) associated with Level 1 contestable work compared to FY2014-15.

7.2.2 Level 2 Contestable Work

Ausgrid carried out 13,131 inspections of Level 2 ASP (internal and external) work for compliance with the standards. This is a 12.98% decrease from FY2014-15, which can be attributed to a change in Ausgrid's auditing regime.

Figures obtained for Level 2 contestable work show an increase (4.12%) in the total number of notifications (NOSW) compared to FY2014-15.

Ausgrid carried out 911 safety compliance audits of Level 2 ASPs when work was being completed, which is an increase (3.40%). This maintains ASP Compliance and Practices' focus on the auditing process, completing correct data capture and relevant reporting from FY2014-15.

Table 7.2 – External Level 2 ASP Compliance Statistics

	Previous Years				Current Year
Year	2011/12	2012/13	2013/14	2014/15	2015/16
Number of infield level 2 safety audits	421	449	477	881	911

7.2.3 Level 3 Contestable Work

Ausgrid carried out 945 certifications of Level 3 (internal and external) designs in FY2015/16. This represents a 29.63% increase from FY2014/15. This change can be attributed to an increase in customer connection applications.

There were no designs undertaken by internal (Ausgrid) service providers in the period, which decreased from two in the last period.

7.3 ASP performance

7.3.1 Level 1 ASP performance

Ausgrid found it necessary to implement disciplinary/corrective action on six (6) occasions as a result of unsafe practices by external ASPs. The most common incidents were attributed to incorrect commissioning techniques including testing, not identifying hazards when working on Ausgrid's network and mechanical failure.

7.3.2 Level 2 ASP performance

Ausgrid conducted 82 corrective/disciplinary interviews, and eight Level 2 ASP authorisations were suspended for non-compliance or failure to renew authorisation by the annual date. This is a decrease (20.00%) from last year's suspensions.

Table 7.3 – External Level 2 ASP Investigation and Corrective Action Statistics

	Previous Years				Current Year
Year	2011/12	2012/13	2013/14	2014/15	2015/16
Number of disciplinary investigations/interviews	161	59	52	57	82
Number of ASP suspensions	82	11	18	10	8

7.4 Other ASP related information

7.4.1 Level 1 ASP

Ausgrid facilitated the Level 1 ASP seminar with excellent attendance. The seminar presented and discussed information relating to Connection Policy – Connection Charges, planned interruption notification, safety, Geographical Information Systems (GIS) field recordings, authorisation and project planning.

Ausgrid provides important information to Level 1 ASPs via safety alerts (29), general information notices (36) and notifications of changes to policy, Network Standards and Electrical Supply Standards. These included potential safety hazards associated with hazards when working aloft, connecting/disconnecting supplies and Ausgrid continued to communicate their identified nine fatal risks.

7.4.2 Level 2 ASP

Ausgrid facilitated two Level 2 ASP seminars with excellent attendance at both. The seminar presented and discussed information relating to authorisation, Ausgrid's Code of Conduct and business ethics, NBN connections, Level 2 ASPs assistance with storm response, the cessation of the NSW Solar Bonus Scheme and the impending Australian Energy Market Commission (AEMC) contestable metering changes.

8 Bush Fire Risk Management

Ausgrid's Bushfire Risk Management Plan forms part of our Electricity Network Safety Management System. Strategies documented within the Bushfire Risk Management Plan are intended to:

- Ensure public safety;
- Establish standards for vegetation management near electricity lines (particularly in bushfire prone areas);
- Reduce interruptions to electricity supply that are related to vegetation; and
- Minimise the possibility of fire ignition by electricity lines and associated equipment.

The following information details Ausgrid's performance against our Bushfire Risk Management Plan, as well as initiatives to further reduce bushfire risk to a level which is as low as reasonably practical.

8.1 Pre-season Bushfire Patrols of Ausgrid Assets

Pre-bushfire season patrols of Ausgrid poles, overhead lines and associated assets are undertaken annually in accordance with Ausgrid's Network Technical Maintenance Plan (TMP). During 2015/16 Ausgrid continued to identify bushfire-prone areas from maps certified by the Commissioner for the Rural Fire Service (RFS)³.

Patrols of Ausgrid assets in bushfire-prone areas were performed using a combination of tactics including LIDAR⁴, aerial patrols utilising high-definition photography (59,000 spans flown) and ground-based patrols. Ausgrid patrolled more than 125,000 poles and almost 7,800kms⁵ of overhead mains in bushfire-prone areas to identify defects which pose potential bushfire risks ahead of the bushfire season. Table 8.1 shows the level of completion of these patrols. Inspection resource constraints, due to commencement of private mains patrols, resulted in only 86% of patrols of Ausgrid assets being completed prior to the start of the bushfire season however the remaining patrols of Ausgrid assets were completed by early November 2015.

Table 8.1 – Bushfire risk management

	Previous Years				Current Year
Year	2011/12	2012/13	2013/14	2014/15	2015/16
Assets in bush fire prone areas checked by pre-summer inspection %	100%	100%	100%	100%	86%
Private lines in bush fire prone areas checked by pre-summer inspection %	Not discernible	Not discernible	Not discernible	Not discernible	73%
Fire ignitions by network assets (Number)	14	7	39 ¹	144 ¹	86 ¹
Complaints from the public regarding preparation for the bush fire season ⁶	Not discernible	Not discernible	Not discernible	Not discernible	Not discernible

Note 1: The increase in the number of fire ignitions from 2013/14 to 2014/15 is due to an improved process for reporting of network related fires. Ausgrid has continued to use this method and the decrease in the number of fire ignitions from 2014/15 is likely a result of significantly wetter spring and summer periods in the Ausgrid

³ These maps were updated from RFS information in March 2015, and have been updated again during 2016.

⁴ Light detection and ranging (LIDAR) is a technology which uses pulses from an infrared laser attached to a helicopter to measure vegetation clearances to overhead lines.

⁵ For the 2014/15 ENPR Ausgrid understated the route length patrolled as 4,000km due to a calculation error.

⁶ The majority of the bushfire preparation relates to vegetation clearing. Our complaints systems does not provide accurate details in regard to vegetation clearing complaints that relate specifically to bushfire season preparation.

service area. Of the fires reported during 2015/16, 44 were contained to the asset and 42 fires spread beyond the asset. The fire count includes fires in substations and underground systems as well as overhead assets.

Table 8.2 provides a summary of the number of defects identified and rectified in bushfire-prone areas during 2015/16. 1,049 high-priority defects were outstanding at the start of the 2015/16 bushfire season however, 865 of these were within their risk priority based time for rectification. This large quantity was primarily caused by an influx of defects identified during aerial patrols shortly before the start of the bushfire season. Ausgrid has enhanced the data entry procedures for defects and commenced patrols earlier to allow for timely completion of patrols and repairs to improve readiness for the 2016/17 bushfire season. Due to differing defect priorities, not all defects identified during 2015/16 fall due for completion within the 2015/16 year, therefore quantities in Table 8.2 will not directly summate.

Table 8.2 – Bushfire-prone areas: corrective maintenance for 2015/16

Number of defects	Total
Outstanding prior to 2015/16	553
Identified during 2015/16	14,875
Rectified during 2015/16	14,201
Outstanding at end of 2015/16	529

During the lead up and within the bushfire risk period. Ausgrid’s Senior Management continues to be informed of progress in relation to completion of pre-bushfire season patrols and private mains audits, the level of outstanding corrective work in bushfire areas and other bushfire preparedness information. These statistics are also included in the monthly reporting process.

8.2 Auditing Private Mains

Ausgrid’s policy for the management of overhead private and shared mains was finalised during 2015/16 following community consultation. Senior Management steering committee and implementation working groups were established to determine a standard approach to commonly experienced technical, legal and process issues. The steering committee identified 13 high level actions to achieve successful implementation of Ausgrid’s private mains policy. All these actions have been completed and are now considered ‘business as usual’ processes.

Ausgrid commenced identification and ground-based pre-bushfire season audits of private mains in bushfire areas during 2014/15. At the commencement of the 2015/16 audits, 39,807 private poles were recorded in Ausgrid’s Geographic Information System (GIS) in bushfire-prone areas. The 2015/16 private mains audits were performed using either aerial patrols in areas where helicopters can fly (approximately 18,000 poles) or ground-based patrols in ‘no-fly’ areas (remainder). 100% of aerial patrols of private poles were completed prior to the start of the bushfire season.⁷ Ground-based patrols of approximately 9,000 poles were also completed by this date, resulting in an overall completion rate of 73% for ground patrols. The remaining ground-based patrols were completed by November. An additional 1,750 private poles were identified during these audits, and GIS has been updated to reflect 41,564 known private poles in bushfire-prone areas.

Private mains audits are being incorporated into Ausgrid’s TMP. Defect issuing and follow-up processes have been implemented to ensure risks identified on private mains within bushfire-prone areas are addressed in an appropriate timeframe in accordance with the legislation. Repairs or replacement of private mains will be at the owner’s cost in accordance with the *NSW Electricity Supply Amendment (Bush Fire Hazard Reduction) Act 2014*.

⁷ Private poles subject to aerial patrol also had a ground-based inspection carried out at a later date.

Table 8.3 – Private mains audits

Year	2011/12	2012/13	2013/14	2014/15	2015/16
Complaints regarding preparation for the BF season	Not discernible	Not discernible	Not discernible	Not discernible.	21 ⁸

8.3 Bushfire Risk Management Audits

Two bushfire risk management audits were undertaken during 2015/16:

- (1) An audit by the Ausgrid Internal Audit team in September 2015.
- (2) An audit by EcoLogical Australia on behalf of the NSW Independent Pricing and Regulatory Tribunal (IPART) in March 2016.

The audit by the Ausgrid Internal Audit team tested the level of operational compliance with our Bushfire Risk Management Plan. The audit by IPART was undertaken following the NSW Government's transfer of the electricity safety and reliability regulatory functions for NSW to IPART during 2015. The IPART audit tested the adequacy of Ausgrid's incorporation of various statutory and regulatory requirements (concerning bushfire risk mitigation) in our Electricity Network Safety Management System (ENSMS), specifically those relating to the adequacy, implementation and ultimate compliance with the NSW *Electricity Supply (Safety and Network Management) Regulation 2014* ('the Regulation') and Australian Standard 5577-2013: *Electricity Network Safety Management Systems* (AS5577).

There was a high level of alignment between the findings in the two audits pertaining to Ausgrid's risk management for private mains, including high voltage customers (HVCs), although there were differences for other improvement opportunities due to variances in audit scopes.

Both audits identified minor non-compliances, in that risk mitigation and defect processes for private mains need to be improved, and that reporting was to be established to give senior management visibility of this risk. In regard to HVCs, both audits identified that improvements were required to ensure that HVCs are aware of their obligations in regard to bushfire risk management and that this is included in their HVC installation safety management plans (ISMP's). Both audits also identified minor non-compliances pertaining to lack of completion of inspections and defect rectification prior to the nominal start of the bushfire season (1 October) as well improvements required for procedures relating to defect prioritisation and defect data entry.

The IPART audit found that Ausgrid complied with the majority of the audit criteria. It identified a number of areas where Ausgrid was assessed as having major non-compliances with sections of the Regulation and AS5577. The major non-compliances were in regard to:

- Formal safety assessment (Section 4.3.2 of AS5577) – the 'bow tie' bushfire risk assessment undertaken by Ausgrid was found to be at too high a level and did not appropriately consider bushfire likelihood, consequence and residual risk, and was also insufficient in regard to quantification of risk using bushfire behaviour and bushfire attack assessment tools and spatial data.
- Risk assessment of assets within bushfire-prone areas (Section 7 of the Regulation) – the identification of bushfire-prone assets based on bushfire-prone land maps certified by the Commissioner for the RFS was found to be inadequate and too crude for risk-based prioritisation.

In response to the findings in these two Audits, prior to the 2016/17 bushfire season Ausgrid;

- Will undertake a formal safety assessment of network-related bushfire risk to ensure compliance with Section 4.3.2 of AS5577.
- Will assess the need to develop a bushfire risk model compliant with Section 7 of AS5577 which takes into consideration spatial data and other consequence factors to enhance prioritisation of bushfire risk mitigation work. This assessment is pending the outcome of the formal safety assessment and the controls it may call on to appropriately manage bushfire risk.

⁸ Complaints in regard to private mains may be related to bushfire preparedness works or installation safety risks (not bushfire risk) identified during audits or general complaints. The quantity reported is based on information from our contact centre complaints system only.

- Will be testing and verifying previously implemented private mains processes during the 2016/17 audits and any improvement required will be undertaken by the relevant implementation working group.
- Will review processes regarding HVCs, including the process to inform each HVC of their obligations in regard to bushfire risk mitigation and to seek verification from them that this has been included in their ISMP to comply with their HV connection agreement with Ausgrid and other NSW regulations and codes.
- Will establish an overhead lines defect library – Ausgrid is currently finalising an ‘Overhead lines defect library’ document aligned to our line inspection procedure and network defect prioritisation framework.
- Will establish a ‘Bushfire Risk Management Committee’ with executive membership to oversee bushfire risk strategy as well as enhancing reporting to Senior Management in regard to bushfire risk and private mains.
- Will review the commencement dates of pre-bushfire season patrols of network assets and private mains to enable their completion and high-priority defect rectification prior to commencement of the bushfire season.
- Has reviewed our network policy in regard to disabling automatic reclosing of high-voltage overhead mains on total fire ban (‘TOBAN’) days when there are outstanding high-priority defects on those mains.

8.4 Renewal Programs

Renewal programs are capital programs to renew equipment help Ausgrid to reduce the bushfire risk associated with its electricity network. Many of these programs will continue over multiple regulatory periods due to the size of the network. Some of the renewal programs which help reduce bushfire risk are listed below:

- Replacement of thin overhead conductors with steel strands due to age-related corrosion.
- Replacement of air break switches with a type which encapsulates arcing from switching operations.
- Replacement of PVC-insulated low-voltage overhead service wires.
- Installation of low-voltage spreaders where it is identified that low-voltage overhead mains could clash.
- Refurbishment of access tracks to powerlines – this benefits Ausgrid as well as the RFS during times of bushfire by providing improved access to fight fires.
- Refurbishment of defined 33kV, 66kV and 132kV lines.
- Engineering audit and risk mitigation of high-voltage overhead mains spans longer than 300 metres.

8.5 Communicating with Customers

During 2015/16, Ausgrid targeted landowners located in bushfire-prone areas in the Hunter, Central Coast and Sydney regions with a communications campaign that included radio and newspaper advertisements. The campaign also included a direct mail-out and letter-box drop of the Ausgrid brochure titled “Private poles and powerlines: Bushfire safety for property owners.” This brochure outlines:

- Contact details (phone and website) for the RFS to enable the customer to assess whether their property is located within a bushfire-prone area;
- The responsibilities of the landowners with respect to the ownership of private poles and mains;
- What to look for with respect to the inspection of private mains; and
- A reference to the Ausgrid website for contact details of vegetation and electrical contractors who can inspect or repair private powerlines.

Ausgrid also communicated with customers and stakeholders as part of the development and implementation of the private mains policy. This includes providing information and seeking feedback about the policy and upcoming bushfire safety inspections via advertisements, media and social media, and Ausgrid’s website.

8.6 Liaison and Consultation with Fire Services and Others

Ausgrid continues to liaise and share information with the RFS and Fire & Rescue NSW, as well as local councils, National Parks and Wildlife Service and other stakeholders. RFS is a statutory authority with the

responsibility and expertise to co-ordinate emergency planning and prevention of bushfires within NSW, as well as coordinating fire-fighting efforts when bushfire events occur. While Ausgrid has already established sound relationships with this authority, further collaboration will be undertaken during 2016/17 to enhance information transfer so that Ausgrid has the most up-to-date information for bushfire risk mitigation activities as well as for other operational safety reasons.

Ausgrid participates in RFS Regional Bushfire Management Committees across its supply area. These forums give focus to parts of our network that need a higher priority of protection in the event of a bushfire, as well as providing feedback to Ausgrid from the other authorities and local councils of assets that have an impact on the other authorities operating effectively.

The Ausgrid network control rooms have procedures in place to monitor weather, fire movement and bushfire danger ratings from RFS information sources and through direct communication with RFS Controllers. Ausgrid uses this information to proactively switch our network to mitigate network operational risks caused by fire impact and to ensure staff and public safety. These procedures include advising staff of TOBAN days via SMS messaging to prevent them performing high risk tasks which may initiate a fire and disabling automatic reclosing on overhead mains on TOBAN days. These procedures are in addition to the Ausgrid Incident Management System.

9 Public Electrical Safety Awareness

Ausgrid is committed to raising public awareness about the risks associated with the transmission and distribution of electricity and the steps the community can take to help stay safe around the electricity network. This commitment is demonstrated through the development and implementation of a Public Electrical Safety Awareness Plan (PESAP). This section describes the PESAP program in 2015/16.

Key Issues

PESAP programs are designed to highlight the risks associated with the distribution of electricity on the network's assets (i.e. powerlines and substations) and to educate the public about how to avoid dangerous situations.

The risks outlined in the PESAP have been identified as potentially hazardous to the public require ongoing communication, education and awareness to reduce the risk of injury.

9.1 PESAP Programs

Outlined in Table 9.1 are the PESAP programs implemented by Ausgrid during 2015/16, including a description of each program, its target market and its key messages. Ausgrid monitors electrical safety incidents, and adapts programs as required to reduce the likelihood of incidents occurring.

Table 9.1: PESAP Program 2015/16

Overhead Powerline Safety	
Target Group	<ul style="list-style-type: none"> Tradespeople, outdoor workers, truck drivers, machinery operators, crane operators, construction workers, scaffolders, painters, etc. General community.
Messages	<ul style="list-style-type: none"> Have up-to-date maps/diagrams showing the location of powerlines on the property/worksites, also indicating safe traffic paths. Ensure operators are aware of the height and reach of their machinery in both stowed and working positions. Assign a competent safety observer to each work team to guide machinery movements near overhead powerlines. Where possible, provide ground barriers and make overhead powerlines inaccessible at ground level. Lower all machinery to the transport position when relocating every time. Work away from powerlines not towards. Ensure maintenance of machinery and activities are carried out well away from powerlines. Powerline heights vary so do a visual inspection before passing under or near them. Set-up or build structures well away from powerlines.
Program Overview	<ul style="list-style-type: none"> Ausgrid's Overhead Powerline Safety campaign specifically targets outdoor workers and tradespeople to raise awareness of the dangers associated with overhead powerlines and educate them about safe behaviours and work practices. The campaign included a mix of 30 and 10-second pre-recorded and live radio advertisements across metro and regional stations, an online banner ad displayed on Ausgrid's website homepage, and two paid Facebook posts boosted to target audiences. Ausgrid featured on the NSW Safety Construction Site Guide 2015/16, including a new short animated video. Content was distributed to around 4,000 construction sites and industry body members in print and was also shared and used on digital platforms.

Analysis	<ul style="list-style-type: none"> • The ‘What do we have to do to get you to look up’ radio campaign ran in March 2016. A consolidated strategic media plan was produced and resulted in almost 700 radio advertisements over a two-week period. The paid Facebook posts performed well, with the ‘Tipper Truck’ post reaching more than 167,000 people and had 3,709 post engagements over 7 days. • An overhead powerline safety message was also included in Ausgrid’s ongoing radio safety campaign.
Underground Cables	
Target Group	<ul style="list-style-type: none"> • Tradespeople, outdoor workers, machinery operators, construction workers, scaffolders, painters etc. • General community.
Messages	<ul style="list-style-type: none"> • Always Dial Before You Dig (DBYD). • Make sure that you have the latest cable plan available. • Keep a copy of the cable plan on site at all times. • Make sure the excavation work is conducted or directed by staff who are trained to read the plan. • Hand dig until the exact location of the cable has been established. • Have on site at all times a first aid kit and a person trained in resuscitation. • Have emergency contact numbers on site. • Comply with all Safework requirements and codes.
Program Overview	<ul style="list-style-type: none"> • Ausgrid’s underground cable safety program is an educational awareness campaign that targets outdoor workers and tradespeople about the dangers associated with digging and working near underground cables and the precautions that need to be taken to avoid cable strikes. • The campaign included a mix of 30 and 10-second pre-recorded and live radio advertisements across metro and regional stations, an online banner ad displayed on the home page of the Ausgrid website, and 2 paid Facebook posts boosted to target audiences. • Presentations from Ausgrid staff were delivered to key target audiences at DBYD and Safework events.
Analysis	<ul style="list-style-type: none"> • The ‘See what’s down there before you dig’ campaign ran in February 2016. A consolidated strategic media plan was produced and resulted in almost 600 radio advertisements across Ausgrid’s metro and regional areas. • The paid Facebook ‘Mail Box’ post reached more than 158,000 people and had 1,056 post engagements over 7 days. • An underground cable safety message was also included in Ausgrid’s ongoing radio safety campaign.

Electricity safety for school students	
Target Group	Children from Kindergarten to Year 10
Messages	<ul style="list-style-type: none"> • Play in open spaces away from electricity poles, towers and powerlines. • Stay away from electricity substations and power equipment. • Never put a metal object in a toaster or power point. • Know what to do in an emergency. • Keep water away from electrical appliances and power cords. • If you see a dangerous situation, tell an adult.
Program Overview	<p>Electricity Safety Week for Years K-6</p> <ul style="list-style-type: none"> • Seeks to raise awareness of the hazards associated with electricity and teaches students how to stay safe around it. Resources are developed in conjunction with the Department of Education and Communities to meet the technology and Personal Development, Health and Physical Education (PDHPE) curriculum requirements for years K-6 and include an Electricity and Safety Lesson Unit for stage 3, a Lesson Book for K-6 and four interactive SMART Notebook lessons. Ausgrid also provides registered primary schools with a pack containing student prizes, posters, stickers and merit certificates. <p>High School Electricity Resource for Years 7-10</p> <ul style="list-style-type: none"> • An interactive online site provides students with information to complete a mandatory science research assignment on electricity and reinforces key messages by encouraging safe behaviour.
Analysis	<p>Electricity Safety Week (ESW) for Years K-6</p> <ul style="list-style-type: none"> • The program engaged more than 75,000 students from 802 primary schools (94%) across Ausgrid's network area. • Formal feedback provided by 22% of registered schools indicated that 94% of teachers believe ESW activities helped their students be safer around electricity. Teacher commentary pointed to strong examples of behavioural change in students. <p>High School Electricity Resource for years 7 - 10</p> <ul style="list-style-type: none"> • 91% of high schools in the Ausgrid network area registered for the support pack in 2015. This is the highest engagement to date. • Formal feedback provided by 21% of registered schools indicated that 92% of teachers believed that their students were engaging in the safety messages of the program.
Substation and Electrical Safety	
Target Group	Community - children living and playing near substations.
Messages	<ul style="list-style-type: none"> • Don't enter a substation. • Don't try to retrieve anything that has gone over a substation fence – call us and we'll get it for you. • Call Ausgrid if you see anyone climbing over fences. • Obey substation warning signs. • Be aware of electrical dangers.
Program Overview	These safety messages form the key component of all Ausgrid education school programs. Safety posts on social media ahead of school holidays also reinforced these messages.
Analysis	Key messages in Ausgrid educational resources for primary and high school students, and social media posts ahead of school holiday reminded parents, carers and children to stay safe and keep away from electrical infrastructure.

Do-it-yourself (DIY)	
Target Group	Home renovators, home handymen, men and women aged 20-55 years
Messages	<ul style="list-style-type: none"> • Do-it-yourself (DIY) electrical work is not only dangerous, it's illegal. • Always contact a licensed electrical contractor.
Program Overview	<ul style="list-style-type: none"> • Following a successful 'Don't Die from DIY' paid social media campaign targeting DIYers who may be tempted to do their own electrical work, a digital video campaign was run over Easter 2016 and was served across desktop and mobile channels. • A dedicated Ausgrid website page.
Analysis	<ul style="list-style-type: none"> • The paid video campaign resulted in 750,000 fully played video views, 1,600 clicks through to the website to find out more and 905 visits to the home page. A DIY safety message was also included in our ongoing radio safety campaign.
Storm Safety	
Target Group	General community
Messages	<ul style="list-style-type: none"> • Keep a battery-powered torch and radio handy. • Clear your yard of loose items and prune trees. • Unplug sensitive electrical devices. • Listen to your radio for power restoration updates and safety advice • Be careful of electrical hazards hidden in storm debris, like fallen powerlines. • Always assume fallen powerlines are live and stay well clear.
Program Overview	The storm safety campaign is an integrated communications approach that promotes the need for ongoing preparedness in the event of a storm and provides updates and key safety messages during and after storm events. The integrated approach includes paid radio, media releases, website and social media.
Analysis	<ul style="list-style-type: none"> • The storm safety radio campaign ran for one week in October/November 2015. A consolidated strategic media plan was produced and resulted in almost 400 10-second pre-record and live radio reads across Ausgrid's metro and regional areas. • Proactive storm safety alerts through media releases, Facebook and Twitter. • Safety tile on the home page of the Ausgrid website and a dedicated storm safety section, including downloadable brochure.
Fallen Powerlines	
Target Group	General community
Messages	<ul style="list-style-type: none"> • Assume fallen powerlines are live • Stay well clear and contact Ausgrid on 13 13 88.
Program Overview	Covered in Ausgrid's Storm Safety and Electricity Safety for Students Campaigns.
Analysis	Proactive storm safety alerts through Facebook, Twitter and Ausgrid's ongoing radio safety campaign. Results from Ausgrid's Electrical Safety Survey (conducted in April 2014) showed a high understanding of dangers associated with fallen powerlines.

Bushfire Risk Management	
Target Group	Private pole owners
Messages	<ul style="list-style-type: none"> • If your property has private powerlines you have a legal obligation to ensure these powerlines and poles do not cause a fire or other hazard. • Private pole owners are responsible for the safe operation and maintenance of their electrical installations. Ausgrid expects that this includes regular inspections, testing and maintenance work, including keeping vegetation a safe distance, to help prevent them from becoming a bushfire risk.
Program Overview	<ul style="list-style-type: none"> • Ausgrid distributes bushfire risk management information which outlines customers' obligations regarding safe management of their electrical installations via direct mail, newspaper advertisements, radio, social media and its website.
Analysis	<ul style="list-style-type: none"> • Bushfire safety brochure distributed to more than 58,000 properties in bushfire-prone areas in the Hunter, Central Coast and Sydney. • Newspaper advertisements were placed in Early General News sections of 14 targeted suburban and metro newspapers, covering up to 1.5 million customers. This meets the requirement for broad coverage across Ausgrid's network area. • Radio campaign ran in September 2015. A consolidated strategic media plan was produced and resulted in almost 1,000 30 second and 10 second radio advertisements in high risk regions of Newcastle, the Hunter Valley and the Central Coast. • Paid and earned social media posts to drive traffic to the bushfire safety webpage and online vegetation reporting tool.

9.1.1 Additional Sources of Information

A significant amount of information and downloads relating to preventing and managing electrical hazards is on Ausgrid's website. All paid campaigns were also supported by messages via Ausgrid's established social media channels and media releases and comments targeted at traditional media.

9.1.2 Additional PESAP Initiatives

In addition to the programs outlined in the 2015/16 PESAP, Ausgrid undertook the following additional programs outlined in Table 9.2 during 2015/16.

Table 9.2: Additional PESAP Initiatives

Overhead Powerline, Underground Cable and within Clearances Safety	
Additional Program	Key stakeholder engagement
Description and Rationale	A series of engagement initiatives were undertaken to share our public safety messages and resources with key industry stakeholders this year. These included presentations and meetings with Safe Work NSW, Endeavour Energy, Essential Energy, and DBYD.

10 Powerline Crossings of Navigable Waterways

Electricity cables and wires which cross navigable waters can pose a safety hazard to the people who use the waterways. The most significant potential hazards are posed by live overhead electricity crossings. Masts, crane jibs, aerials and the like may contact the overhead electricity cables and anchors may become entangled with submarine cables. Such events may cause damage to the vessel, serious injury to the occupants and even death. Another consequence is damage to the electricity infrastructure and loss of supply.

Due to the inherent dangers NSW Maritime have introduced an electricity industry code “Crossings of NSW Navigable Waters”. This code was introduced in December 2008 and requires a risk management approach to the planning, installation, maintenance and modification of crossings. The aim of the risk assessment is to ensure that foreseeable risks associated with crossings, particularly those relating to navigation safety, are as low as reasonably practicable and that appropriate steps are taken to prevent fatalities and injuries to people and / or damage to property and interruption to the supply of electricity.

10.1 Risk Assessment

Ausgrid ensures that all new electricity crossings of navigable waterways include a risk management assessment, conducted to a standard equal or better than AS/NZS 4360:2004 – Risk Management. Where the risk assessment indicates that a proposed overhead crossing poses an ‘intolerable’ risk which cannot be removed, the crossing is redesigned as a submarine crossing.

Ausgrid has completed a full survey and risk assessment of all existing power line crossings of navigable waterways as required by the code. A total of 47 water crossings were assessed as having either an ‘extreme’ or ‘high’ risk and which required risk treatments to reduce the risk to an acceptable level.

10.2 Water Crossing Program Progress

The total number of overhead and submarine power line water crossings, across navigable waterways, from Ausgrid records, is shown in the following table.

Table 10.1 – Powerline Crossings of Navigable Waterways Summary

	Existing (number)	New (number)	Incidents (number)	Crossings Reconstructed (number)	Crossings Identified as requiring conversion to Submarine Crossings (number)
Overhead Crossings	275 (inc 28 dual circuit OH crossings)	0	0	3	0
Submarine Crossings	79	0	0	0	0
Bridge Crossings	16	0	0	0	0

Ausgrid has completed the upgrade of navigable waterway crossing warning signs to comply with the code and a design review of all 47 “extreme” and “high” risk water crossings at the applicable distribution and transmission voltages. Ausgrid is also progressively updating the signage associated with the remaining navigable waterway crossings to show the maximum vessel clearance heights, as required by Australian Standard AS 6947-2009 *Crossing of Waterways by Electricity Infrastructure*. Additional advisory warning signs have also been installed at public launching sites within 5km of these water crossings.

There are 14 navigable waterway crossings which are deemed to involve “Private” poles/mains. In March 2015, Ausgrid published a company policy titled “*Management of Overhead Private and Shared Mains*” (Document No. NW000-Y0045) which outlines how the company intends to negotiate transfer of ownership of Consumers’

mains crossing navigable waterways to Ausgrid owned distribution network assets. Negotiation with property owners is presently underway. Designs for nine water crossings involving “Private” mains have been drafted and pending the outcome of negotiations with the affected property owners, the designs can be issued for construction.

In 2014/15 the risk mitigation design work for the “extreme” and “high” risk water crossings was completed and the resultant construction work has continued through 2015/16. The crossings for which risk mitigation work was completed this year are shown in Table 10.2 below.

Table 10.2 – Risk Mitigation work completed in 2015/16

Crossing	Description of Work
EA008	Risk accepted by management. Only minor encroachment (700mm) into 2.2m safety margin. Crossing height to be raised whenever the next opportunity presents itself (e.g. whenever one of the poles on either side is required to be replaced) as per the risk assessment.
EA235	Mains removed
EA403	New pole installed and overhead mains raised to give clearance according to Code.
EA413	New poles installed and overhead mains replaced and raised to give clearance according to Code.
EA419	New poles installed and overhead mains replaced and raised to give clearance according to Code.

There are 16 navigable waterway crossings, including 7 privately owned, still requiring risk mitigation work. A project for each site has been created in Ausgrid’s Asset Management database (SAP) and issued to the various delivery partners. Progress of these projects will be managed via SAP system reporting and bi-monthly project meetings with the relevant stakeholders.

10.3 New Crossings

In 2015/16 no new waterway crossings were constructed, however new information came to light regarding two existing crossings which resulted in their level of assessed risk being changed from “Low” to “Extreme”. The crossings concerned are: EA235 and EA236, Avoca Lagoon. EA235 has subsequently been removed completely to mitigate the risk associated with that crossing, and EA236 is currently being modified to mitigate the risk.

10.4 Water Crossing Incidents

In 2015/16 there were no recorded incidents involving a navigable waterway crossing.

10.5 Water Crossing Incident Management

All incidents, including those involving power line crossings, are managed through Ausgrid’s Incident Management System. Our Incident Management System details the requirement to notify NSW Maritime’s relevant Regional Manager within 24 hours of any incident involving a vessel and a crossing and which results in fatality or serious injury to any person. This is in accordance with a Protocol between Ausgrid and NSW Maritime for incident reporting and analysis.

Inspection and maintenance of Ausgrid’s power line crossings, including waterway crossing signs and their associated support structures, is performed in accordance with Ausgrid’s Network Maintenance Plan. The Plan describes the inspection and maintenance activities required on these assets, as determined by the Maintenance Requirements Analysis process. The resulting inspection and maintenance program has been developed in accordance with industry best practice and is a combination of Patrols for Line Inspection, Pole and Steel Towers and Structures, base line examination of pole structures and vegetation management activities.

Typically the inspection patrols for line inspection and pole inspection are based on a five yearly inspection cycle. This is further enhanced by the Vegetation Management Program which is aimed at keeping vegetation at the required clearances at all times.

11 CEO Declaration

Ausgrid

ELECTRICITY NETWORK PERFORMANCE REPORT 2015/16

Declaration by (Acting) Chief Executive Officer

In submitting this Electricity Network Performance Report (the Report), I declare that the Report:

1. Complies with reporting requirements prescribed under the *Electricity Supply (Safety and Network Management) Regulation 2014*, and the "Distribution Network Service Provider Annual Report Outline" (the Outline), as provided by the Department.
2. Has been reviewed and signed off by internal management; and in my opinion, there are reasonable grounds to believe the data, and notes in respect of data contained in this Report, give a true and fair view of the organisation's performance in respect of the matters contained in the Outline.

NAME: TREVOR MARK ARMSTRONG

SIGNATURE: 
(ACTING) CHIEF EXECUTIVE OFFICER

DATE: 23. 11. 16

Attachment A: Distribution Reliability of Supply: Definitions and Notes

This report has been prepared in accordance with the 'Reliability and Performance Licence Conditions' imposed by the Minister for Energy on 1 July 2014 and the standards issued by the 'Steering Committee on National Regulatory Reporting Requirements' (SCNRRR).

Note 1: Where a distributor is unable to report in accordance with these definitions (e.g. estimating customer numbers interrupted where distributors' information systems do not provide connectivity data that links individual customers to the part of the physical network necessary to accurately calculate reliability measures), this must be noted in the annual report, together with a report on plans and expected timeframe to fix the problem. Where exact data is not available, estimates should be made together with the methodology for making estimates. Where appropriate, estimated reliability ranges could be provided.

A **Distribution Network** is a system of electricity lines and associated equipment at nominal voltages of up to and including 132kV, used for the distribution of electricity.

The distribution network generally ends where the service line connects to the customer's electrical installation. For an overhead service line, this is generally at the first connection on the customer's property. For an underground service line, this is generally at either the pit or pillar located near the property boundary or at the first connection on the customer's property. The distribution network for this purpose does not include the meter, service fuses or other service equipment on the customer's side of the consumer's terminals.

Note: A distribution network does not include assets operating as part of the South-East Australian interconnected transmission network.

A **Distribution Customer** means a metered entity who receives electricity supply at a point of connection from a distribution network and who has been assigned a unique National Metering Identifier (NMI) or an agreed point of supply otherwise. See note 4 below.

Reliability Measures

Index	Definition
SAIDI System Average Interruption Duration Index	The sum of the duration of each sustained customer interruption (in minutes), divided by the total number of distribution customers. SAIDI excludes momentary interruptions (one minute or less duration).
SAIFI System Average Interruption Frequency Index	The total number of sustained customer interruptions, divided by the total number of distribution customers. SAIFI excludes momentary interruptions (one minute or less duration).
MAIFI_e Momentary Average Interruption Frequency Index	The number of momentary interruption events (faults) per year (of one minute or less) divided by the number of customers (averaged over the financial year) of that licence holder. In calculating MAIFI _e , each reclose operation of an automatic reclose device is not counted as a separate interruption. The successful automatic restoration of supply after any number of reclose attempts (1, 2, 3, 4 etc.) is counted as one Momentary Incident (MAIFI _e). The operations of a number of reclose devices in series due to a transient fault should thus be combined and counted as one event. The relevant clauses of scheduled interruptions may be applied.

Notes

- (1) A customer interruption is any loss of electricity supply to a customer associated with an outage of any part of the electricity supply network of more than 1 second, including outages affecting a single premise. The customer interruption starts when recorded by equipment such as SCADA or, where such equipment does not exist, at the time of the first customer call relating to the network outage. An interruption may be planned or unplanned. Each individual customer interruption is assigned to the high voltage feeder that carries the supply of electricity to that customer.
- (2) Customer Installation faults are no longer classified as excluded events by Ausgrid, consistent with the both the AER's STPIS rules and SCNRRR definitions. Ausgrid had 150 customer installation faults for 2015/16.
- (3) Ausgrid's reliability metrics are calculated using daily customer counts, rather than using the average of the number of customers at the beginning and the end of the reporting period. Ausgrid has consistently adopted this approach because average customer counts do not result in stable metrics suitable for trend analysis due to the constant adding, removing and reconfiguring of feeders.
- (4) Un-metered streetlighting supplies are excluded.
- (5) Ausgrid does not exclude inactive accounts. There are natural time delays in updating customer account details into the real-time Outage Management System, particularly where Ausgrid relies on information from other electricity Retailers. Ausgrid considers the recording of reliability performance for all active premises (whether the premise is vacant or not) to be a practical administrative outcome.

This action has little effect on reported reliability performance. The inclusion of vacant premises increases both the customers affected (numerator) and the customer base (denominator) of the Indices calculations.

Reliability Data Sets – Sustained Interruptions

Title	Data Set
Overall interruptions	All sustained interruptions including transmission, directed load shedding, planned and unplanned.
Planned interruptions only	Excludes:
Unplanned interruptions	<ul style="list-style-type: none">• Transmission outages, and• directed load shedding.
Normalised	Further excludes those outages which are defined as 'excluded interruptions'.

Notes

- (1) Distribution network interruptions are disaggregated into planned and unplanned interruptions. Planned interruptions are those for which the required notice has or should have been given.
- (2) Normalised interruptions are calculated by subtracting allowable excluded interruptions from unplanned interruptions.
- (3) Details of all events which result in excluded interruptions, including the overall SAIDI impact (distribution unplanned), are to be reported.
- (4) Sustained Interruption means an interruption of duration in excess of one minute.
- (5) The following types of interruptions (and no others) are excluded interruptions:
 - (a) an *interruption* of a duration of one minute or less;

- (b) an interruption resulting from:
 - (i) load shedding due to a shortfall in generation;
 - (ii) a direction or other instrument issued under the National Electricity Law, Energy and Utilities Administration Act 1987, the Essential Services Act 1988 or the State Emergency and Rescue Management Act 1989 to interrupt the supply of electricity;
 - (iii) automatic shedding of load under the control of under-frequency relays following the occurrence of a power system under-frequency condition described in the Power System Security and Reliability Standards made under the National Electricity Rules;
 - (iv) a failure of the shared transmission system;
- (c) a planned interruption;
- (d) any interruption to the supply of electricity on a licence holder's distribution system which commences on a major event day;
- (e) an interruption caused by a customer's electrical installation or failure of that electrical installation.

Major event day

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Explanation and purpose

The following process ("**Beta Method**") is used to identify *major event days* which are to be excluded from the *reliability standards* and *individual feeder standards*.

Its purpose is to allow major events to be studied separately from daily operation, and in the process, to better reveal trends in a daily operation that would be hidden by the large statistical effect of major events.

A *major event day* under the Beta Method is one in which the daily total system (i.e. not on a *feeder type basis*) SAIDI value ("**daily SAIDI value**") exceeds a threshold value, T_{MED} . The SAIDI is used as the basis of determining whether a day is a *major event day* since it leads to consistent results regardless of utility size and because SAIDI is a good indicator of operational and design stress.

In calculating the daily total system SAIDI, any *interruption* that spans multiple days is deemed to accrue on the day on which *the interruption* begins. That is, all minutes without supply resulting from an *interruption* beginning on a *major event day* are deemed to have occurred in the *major event day*, including those minutes without supply occurring on following days.

Determining a major event day

The *major event day* identification threshold value T_{MED} is calculated at the end of each *financial year* for each *distributor* for use during the next *financial year* as follows:

- (a) Collect daily SAIDI values for the last five financial years. If fewer than five years of historical data are available, use all available historical data for the lesser period.
- (b) Only those days that have a daily SAIDI value will be used to calculate the T_{MED} (i.e. days that did not have any interruptions are not included).
- (c) Take the natural logarithm (\ln) of each daily SAIDI value in the data set.
- (d) Find α (Alpha), the average of the logarithms (also known as the log-average) of the data set.
- (e) Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.
- (f) Complete the major event day threshold T_{MED} using the following equation:

$$T_{MED} = e(\alpha + 2.5\beta)$$

- (g) Any day with daily SAIDI value greater than the threshold value T_{MED} which occurs during the subsequent financial year is classified as a major event day.

Treatment of a major event day

To avoid doubt, a *major event day*, and all *interruptions* beginning on that day, are excluded from the calculation of a *distributor's SAIDI* and *SAIFI* in respect of all of its *feeder types*.

Feeder classifications

Feeder category	Description
CBD Sydney	A <i>feeder</i> forming part of the triplex 11kV cable system supplying predominantly commercial high-rise buildings, within the City of Sydney.
Urban	A <i>feeder</i> , which is not a <i>CBD Sydney feeder</i> , with actual maximum demand over the reporting period per total feeder route length greater than 0.3 MVA/km.
Short Rural	A <i>feeder</i> which is not a <i>CBD Sydney feeder</i> or <i>Urban feeder</i> with total feeder route length less than 200 km.
Long Rural	A <i>feeder</i> which is not a <i>CBD Sydney feeder</i> or <i>Urban feeder</i> with total feeder route length greater than 200 km.

Notes

- (1) Short Rural feeders may include feeders in urban areas with low load densities.
- (2) Back up feeders should be given the same classification as the normal supply feeder.
- (3) The classification of Ausgrid's approximately 2,180 high voltage distribution feeders into the categories CBD, Urban, Short Rural and Long Rural is reviewed at the start of each annual reporting period. To cater for augmentation work through the year, new feeders are classified at the time of commissioning.

Attachment B: Transmission Reliability: Network Indices

Operating at nominal voltages of 220 kV and above plus:

- (a) any part of a network operating at nominal voltages between 66 kV and 220 kV that operates in parallel to and provides support to the higher voltage transmission network; and
- (b) any part of a network operating at nominal voltages between 66 kV and 220 kV that is not referred to in paragraph (a) but is deemed by the AER to be part of the transmission network.

Indices

Transmission Circuit Availability (%)

Transmission circuit availability is measured as a percentage of the total possible circuit hours that would be available if no outages of circuits occurred.

$$\% \text{ Availability} = 1 - \frac{\text{Sum (Number of transmission circuit outage hours)}}{\text{Total possible circuit hours available}}$$

Circuits include regulated overhead lines and underground transmission cables.

Number of transmission circuit outage hours means in relation to each circuit, the number of hours during each reporting period in which a circuit was unavailable because of planned, un-planned, forced and emergency outages.

Total possible circuit hours available is the number of circuits multiplied by 8,760 hours.

System Reliability (Unplanned Off Supply Event Numbers)

System reliability is measured by numbers of off supply events, either as:

Measure A: Number of events per annum greater than 0.05 up to 0.40 *system minutes*; and

Measure B: Number of events per annum greater than 0.40 system minutes;

OR

Measure C: Total number of events per annum.

$$\text{System minutes} = \frac{(\text{Total MWh unsupplied} \times 60)}{\text{MW peak demand}}$$

MWh unsupplied is the energy not supplied during the 'off supply' period.

Where restoration or loss of supply is multi-staged, the total MWh unsupplied is the sum of MWh unsupplied over the various stages until restoration of full supply.

MW peak demand means the maximum aggregated electricity demand recorded at entry points to the TransGrid transmission network and interconnector connection points during the year.

- Note:
- 1. TransGrid will report Measures A & B
 - 2. Ausgrid will report Measure C.

Outage (Un-Planned) Duration Average (Minutes)

$$\text{Measure} = \frac{\text{Aggregate minutes duration of all unplanned plant outages}}{\text{Number of unplanned plant outage events}}$$

The summation of all the unplanned outage duration times for the reporting period, divided by the number of unplanned plant outage events during the period, where:

Outage duration time for an item of plant starts when an outage occurs and ends when TransGrid either returns the item to service or the item is repaired, switching instructions are completed and the item is ready for energisation.

Unplanned Off Supply Events for Transmission Connection Points (Number and Duration)

Operators are to provide a tabulated list of 'off supply' events.

Exclusions

Outage data does not include transient outages of less than one minute; outages caused by a third party; force majeure events. Long duration outages are capped, Ausgrid at 14 days and TransGrid at 7 days.

Connection Point

"The agreed point of supply established between Network Service Provider(s) and another Registered Participant, Non-Registered Customer or franchise customer."

Note: 1. The definition for Connection Point is taken from the National Electricity Rules and the terms within the definition have the meanings defined in that Code.

2. The connection points for the Ausgrid distribution network are not to be included

Attachment C: Safety

Annual Reporting of Accidents and Incidents

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
1	1/07/2015	Worker	A worker, working on a faulty low voltage (LV) fuse at a kiosk in Arncliffe, received minor burns to their hand due to an arc flash caused by contact between a live LV conductor and the frame of the fuse holder.	The worker received first aid for his injuries.
2	3/05/2015	Public worker	A public worker using a concrete cutter whilst carrying out works struck a service line (SL) cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
3	11/07/2015	Public general	A member of the public cutting down a tree at Bateau Bay, a tree fell onto LV mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
4	8/07/2015	Public worker	A public worker tree trimming at Hamilton East, fell a tree branch onto service wires causing them to clash. No injuries were reported.	Staff attended site, made safe and carried out repairs.
5	17/07/2015	Contractor	A contractor conducting pole inspections at Kurri Kurri, struck an LV underground overhead (UGOH) cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
6	20/07/2015	Worker	A technician installing a service when he brushed the neutral service tap onto the C phase distributor wire. This action caused an arc flash. No injuries were reported.	Staff attended site, made safe and carried out repairs.
7	20/07/2015	Public worker	A public worker was observed at Freshwater operating a crane within minimum safe work distances. No injuries were reported.	Work was stopped.
8	22/07/2015	Public worker	A public worker tree trimming at Auburn, contacted service wires causing them to fall to the ground. No injuries were reported.	Staff attended site, made safe and carried out repairs.
9	11/06/2015	Public worker	A public worker lawn mowing at Magenta, struck and damaged two LV pillars. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
10	23/07/2015	Contractor	A contractor undertaking routine vegetation maintenance contacted and severed a service wire. No injuries were reported.	Work was ceased immediately, Staff attended site and identified service cable hanging from tree. Site made safe and contractors notified resident and Supervisor
11	6/07/2015	Public worker	A public worker installing fencing at Belmore, struck an underground (UG) high voltage (HV) cable, causing a fault. No injuries were reported.	Staff attended site, made safe and carried out repairs.
12	5/08/2015	Public worker	A public worker travelling with the tipper ascended on a farm at Belford, contacted overhead (OH) HV mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
13	3/08/2015	Public worker	A public worker excavating at Manly, exposed and continued to work around live underground 11kV cables at a construction site. No injuries were reported.	Staff attended site, isolated the areas, and issued a warning letter to the public worker.
14	10/08/2015	Worker	A worker carrying out a service wire replacement at Engadine, caused a clash of live LV conductors. No injuries were reported.	Incident was reported to the supervisor and the control room.
15	31/07/2015	Public worker	A public worker using a removable ramp at Zetland, contacted a pillar causing damage.	Staff attended site, made safe and carried out repairs.
16	18/08/2015	Public worker	A public worker excavating at Sydney CBD, struck an earth cable for a smart pole, damaging conduit. No injuries were reported.	Staff attended site, made safe and carried out repairs.
17	21/08/2015	Ausgrid Service Provider (ASP)	An ASP carrying out a pole replacement at Brooklyn, failed to remove LV bonds and lowered a live LV conductor to the ground. No injuries were reported.	Staff escalated the issue and dispatched an Operator to attend site.
18	24/08/2015	Public general	A member of the public used a chainsaw to cut down a pole in an attempt to steal copper at Doyalson, causing the attached pole mounted transformer and live HV conductors to fall to the ground. No injuries were reported.	Staff attended site, made safe and carried out repairs.
19	18/08/2015	Public worker	A public worker excavating at Lisarow, struck an UG HV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
20	27/08/2015	Public worker	A public worker was reported by a worker to be working within LV clearances at Bexley. No injuries were reported.	Workers stopped work on site and put on appropriate PPE before continuing work.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
21	13/08/2015	Public worker	A public worker tree trimming at West Ryde, fell a tree onto service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
22	21/08/2015	Public worker	A public worker excavating at Homebush, struck an UG HV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
23	28/08/2015	Public worker	A public worker operating a crane at Pyrmont came into contact with service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
24	21/07/2015	Public worker	A public worker excavating at Darling Point, struck a service cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
25	20/08/2015	Public worker	A public worker excavating at Macquarie Park, struck a street light standard, causing it to snap. No injuries were reported.	Staff attended site, made safe and carried out repairs.
26	3/09/2015	Public general	A member of the public travelling in a vehicle in Toronto, struck a OH LV service. The damaged service struck another member of the public within the vicinity and caused a laceration to the face and head.	The injured member of the public was taken to hospital by ambulance. The incident was reported to staff who made the area safe and carried out repairs.
27	5/09/2015	Public worker	A public worker undertaking plumbing work at Woronora Heights, cut an UG HV cable, that was mistaken for a water pipe. At the time of the incident the HV cable was isolated and under access for Ausgrid works. No injuries were reported.	Staff attended site, made safe and carried out repairs.
28	7/09/2015	Public worker	A public worker cut away a property's service wire at Cronulla, without authorisation and left service wire tails unsafe. No injuries were reported.	Staff attended site, made safe and carried out repairs.
29	12/08/2015	Public worker	A public worker excavating at Darlington, struck a cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
30	15/09/2015	Worker	Workers, while working aloft in an EWP at Lambton, experienced a suspected hydraulic failure which resulted in the elevated work platform (EWP) descending into live LV mains. No injuries were reported.	Staff made the site safe, carried out repairs and is currently investigating the incident.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
31	17/09/2015	Contractor	A Contractor carrying out a cross arm replacement at Allambie Heights, caused a clash of live LV conductors. No injuries were reported.	Staff conducted a lamp test between B and C phases, conductors de-energised. Fuses blown at pole transformer. C phase recovered and made safe. Operator gave all clear, fuses replaced and mains re-energised.
32	10/09/2015	Public worker	A public worker excavating as part of works to install a storm water pipe at Gladesville, struck a feeder. No injuries were reported.	Staff attended site, made safe and carried out repairs.
33	12/09/2015	Public general	A member of the public excavating at his property at Bankstown, struck a service cable causing an outage. No injuries were reported.	Staff attended site, made safe and carried out repairs.
34	16/09/2015	Public worker	A public worker excavating at Lidcombe, struck an LV service cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
35	2/10/2015	Public worker	A public worker tree trimming at Strathfield, came into contact with service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
36	25/09/2015	Public worker	A public worker undertaking drilling at Burwood, struck an UG cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
37	25/07/2015	Public worker	A public worker cutting down a tree at Pymble, a tree fell onto LV mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
38	18/08/2015	Public worker	A public worker excavating at a construction site at Lisarow, struck an LV service cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
39	12/10/2015	Worker	A worker undertaking LV jointing at Kirribilli inadvertently shorted A Phase to B phase, causing an arc flash. No injuries were reported.	Incident was reported to the supervisor and the control room.
40	12/10/2015	Public general	A member of the public installed a sign at Boolaroo that came into contact with a street light conductor. No injuries were reported.	Staff attended site and removed the sign.
41	21/10/2015	Contractor	A contractor investigating a cable fault at Normanhurst, felt an electric shock when his hand brushed against a live cable while he was clearing soil from around a cable with his hand. The tested voltage was 53V. No other injuries were reported.	Contractor was transported to hospital for precautionary ECG. Safe Work NSW was notified of the incident.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
42	7/10/2015	Public general	A member of the public worker tree trimming at Weston, a tree fell onto LV mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
43	9/10/2015	Public worker	A public worker excavating at Lidcombe, struck a cable, damaging outer sheathing. No injuries were reported.	Staff attended site, made safe and carried out repairs.
44	9/10/2015	Public worker	A public worker excavating at Tempe, struck a SL cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
45	15/10/2015	Public worker	A public worker excavating at Woy Woy, came into contact with LV mains causing C phase to fall to the ground and also causing damage to the neutral. No injuries were reported.	Staff attended site, made safe and carried out repairs.
46	7/10/2015	Public worker	A public worker excavating at Narara, struck an UG LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
47	17/06/2015	Public worker	A public worker under boring at The Entrance North, struck an UG HV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
48	16/10/2015	Public worker	A public worker excavating at Matraville, came into contact with mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
49	20/10/2015	Public worker	A public worker undertaking demolition works at a construction site at Lakemba, came into contact with LV cables. No injuries were reported.	Staff attended site, made safe and carried out repairs.
50	25/10/2015	Public worker	A public worker undertaking works at Mayfield West, knocked over a streetlight standard with a piece of their machinery. No injuries were reported.	Staff attended site, made safe and carried out repairs.
51	3/11/2015	Worker	A worker in the process of replacing a customer's service during service wire replacement program at Miranda, confused neutral and C phase causing damage to customer's water meter connection. No injuries were reported.	Staff isolated supply, contained site and carried out repairs.
52	28/10/2015	Public worker	A public worker excavating at Leichhardt, came into contact with an earth cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
53	27/10/2015	Public worker	A public worker excavating at a building site at Ultimo, came into contact with a LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
54	10/11/2015	Worker	A worker, while installing a maximum demand indicator on a pole top substation at Berkley Vale, caused an arc flash when a connection wire contacted a live bushing. No asset damage or injuries occurred.	Workers stopped work and reported the incident.
55	13/11/2015	Public general	A member of the public tree trimming at Bronte, was reported to be trimming within safe clearances and using unsafe equipment. No injuries were reported.	Member of the public stopped work, incident escalated.
56	13/11/2015	Public worker	A public worker using a jackhammer at Chatswood, struck an UG LV service cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
57	12/11/2015	Public worker	A public worker excavating at Bellevue Hill, came into contact with a service cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
58	3/11/2015	Public worker	A public worker excavating at Muswellbrook, came into contact with an UG LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
59	20/08/2015	Public worker	A public worker carrying out concrete removal at Bankstown, caused an underground cable strike to HV and LV cables when a pit lid was dislodged and fell into the live cables. No injuries were reported.	Staff attended site, made safe and carried out repairs.
60	13/11/2015	Public worker	A public worker carrying out waste removal at Concord, caused a clash between an Optus cable and OH LV mains when a bin was lifted into the Optus cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
61	27/11/2015	Public worker	A public worker operating an excavator at the Hanson Quarry site at Somersby made contact with the energised OH 11kV. No injuries were reported.	Staff attended site, made safe and carried out repairs.
62	24/11/2015	Public worker	A Public Worker using a jackhammer at Kurnell, struck an UG LV service cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
63	2/12/2015	Public worker	An unknown Public Worker dismantled a switchboard and removed the earthing system from an abandoned factory in Olympic Park without authorisation.	Staff reported the hazard and made site safe.
64	1/12/2015	Public worker	A public worker erected scaffolding at a building site in Kogarah within clearances. No injuries were reported.	Staff instructed the builders to stop works. Work was only allowed to proceed after isolation.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
65	8/12/2015	Public worker	A public worker damaged a pillar at Brookvale while using an excavator. It is suspected that the pillar was damaged with the intention to force emergency removal of the asset. No injuries were reported.	Staff notified Safe Work NSW of the incident and completed emergency repairs.
66	18/11/2015	Public general	A member of the public installing a fence at Medowie, contacted LV UG distributor cable causing an open circuit and damages. No injuries were reported.	Staff attended site, made safe and carried out repairs.
67	24/11/2015	Public worker	A public worker excavating at Shortland, pulled out HV earth from the ground. No injuries were reported.	Staff attended site, made safe and carried out repairs.
68	18/11/2015	Public worker	A public worker excavating at Adamstown, came into contact with a tree which then fell into live mains causing damage. No injuries were reported.	Staff attended site, made safe and carried out repairs.
69	25/11/2015	Public worker	A public worker tree trimming at East Gosford, fell a tree into service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
70	9/12/2015	Worker	A worker carrying out repairs at Darlinghurst Zone Substation, breached safe working distances to a live 11KV busbar. No injuries were reported.	Incident was escalated and is under investigation.
71	10/12/2015	Public general	A service wire failed at Allambie Heights, falling onto a travelling vehicle. No injuries were reported.	Emergency Services Officers attended to make site safe.
72	13/12/2015	Public general	A member of the public received a shock from a fallen service wire at Summer Hill. At the time the customer was attempting to restrain the fallen wire to the pole. No further injuries were reported.	Staff site attended site and made safe and checked on the member of the public's welfare.
73	14/12/2015	Contractor	A contractor carrying out a pole change over at Beverly Hills struck an UG LV cable. No injuries were reported.	Work was stopped and the incident was reported to Staff.
74	8/12/2015	Worker	A worker in the process of isolating an 11kV feeder at Macquarie Park Zone Substation, received an electric shock when his hand contacted an unearthed feeder phase spout.	Worker was taken to hospital for a precautionary ECG.
75	8/12/2015	Public worker	A public worker, excavating at Gordon, contacted an UG LV service. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
76	14/12/2015	Public worker	A public worker using a bobcat to remove rubbish at Croydon park, contacted LV OH service wires with the load. No injuries were reported.	Staff attended site, made safe and carried out repairs.
77	17/12/2015	Worker	A worker while conducting a pole replacement at Ingleside, contacted OH LV with the crane. No injuries were reported.	Staff attended site, made safe and carried out repairs.
78	17/12/2015	Contractor	A contractor while carrying out vegetation management at Sawyers Gully, contacted OH LV wires with a tree branch. No injuries were reported.	Staff attended site, made safe and carried out repairs.
79	18/12/2015	Public Worker	A public worker, while lifting metal sheeting using a crane at Kurnell, was reported to have come within 1m of OH LV. No injuries were reported.	Staff instructed the crane operator to stop works and to revise the lifting plan to work outside of Minimum Safe Working Distances.
80	20/12/2015	Public Worker	A public worker, while diverting water mains as part of a project in the CBD, damaged an underground conduit.	Public Workers carried out repairs, Staff were unable to assess adequacy of repair.
81	22/12/2015	Worker	A substation technician received an electric shock while pulling out a lighting fuse at a kiosk substation in Maroubra during maintenance work. The worker was admitted to hospital for an ECG and further tests. An incident investigation is in progress.	Staff attended site, made safe and carried out repairs.
82	7/12/2015	Public Worker	A public worker while excavating at Heddon Greta, struck an earthing cable for a substation. No injuries were reported.	Staff attended site, made safe and carried out repairs.
83	16/12/2015	Public worker	A public worker lifted their crane into OH LV mains at Maroubra. No injuries were reported.	Staff attended site, made safe and carried out repairs.
84	5/01/2016	Public general	A member of the public, stepped onto a fallen streetlighting neutral conductor at Rose Bay, and received an electric shock. At the time the neutral conductor was also in contact with an OH LV distributor. No further injuries were reported.	Staff attended site, made safe, carried out repairs, and also recommended to the person to receive medical attention.
85	18/12/2015	Public worker	A public worker, unloading from a Hiab truck in Gilleston Heights, contacted an OH LV cable with the truck. No injuries were reported.	Staff attended site, made safe and carried out repairs.
86	16/12/2015	Public general	A member of the public received a shock from a fallen streetlight conductor at Malabar while cleaning their gutters during a storm.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
87	8/01/2016	Worker	A LV OH main fell and was caught on a vehicle at Silverwater. The vehicle was being driven by an Ausgrid worker. No injuries were reported.	Staff and Emergency Services made safe.
88	12/01/2016	Worker	Workers manoeuvring an EWP at St Peters struck an OH LV service, causing fallen wires and an arc flash at the point of attachment (POA). No injuries were reported.	Staff attended site, made safe and carried out repairs.
89	21/01/2016	Worker	A worker installing a temporary insulation on distributor wires to remove tree branch from low voltage mains at Jannali, caused the mains to clash. This caused C phase to then fall onto a parked car. No injuries were reported.	Staff attended site, made safe and carried out repairs.
90	22/01/2016	Public Worker	A public worker, working at Meadowbank reported receiving an electric shock when pushing away a live low voltage distributor wire that was in contact with his utility with his hard hat. No further injuries were reported.	Staff attended site and made safe. On inspection of the area, staff found the distributor wire was brought down by a tree branch. The distributor was at 239V potential and had been tapped to the distributor pole.
91	10/12/2015	Public Worker	A public worker excavating at Rouse Hill, struck a cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
92	25/08/2015	Public general	An unknown member of the public, cut a pole at Doyalson with a chainsaw. No injuries were reported.	Staff attended site, made safe and carried out repairs.
93	3/02/2016	Public Worker	A public worker, installing a communications pit at East Maitland, struck an UG LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
94	3/02/2016	Public Worker	A public worker using an underborer at Strathfield, struck a cable joint, causing a failure. No injuries were reported.	Staff attended site, made safe and carried out repairs.
95	3/02/2016	Worker	A worker performing a LV change over at Alexandria, caused a mains clash, causing blown fuses and damage to mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
96	16/02/2016	Contractor	A contractor tree trimming at Surry Hills, caused a clash of live LV conductors and wires down. No injuries were reported.	Staff attended site, made safe and carried out repairs.
97	17/02/2016	Contractor	A contractor tree trimming at Milson Passage, caused a branch to fall onto OH HV mains, causing an arc. No injuries were reported.	Contractor stopped work. Incident is being investigated.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
98	17/02/2016	Contractor	A contractor tree trimming at Cams Wharf, caused a branch to fall onto street light mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
99	17/02/2016	Worker	A worker carrying out LV cable jointing at Tamarama, received an electric shock to the hand. The worker was taken to hospital for a precautionary electrocardiogram (ECG). No other injuries were reported.	Site was made safe and the worker was taken to hospital by ambulance.
100	8/01/2016	Public worker	A public worker using an underboarer at Kincumber, struck an 11kV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
101	13/01/2016	Public worker	A public worker excavating at Windale, exposed pillar box and caused street light to lean. No injuries were reported.	Staff attended site, made safe and carried out repairs.
102	20/02/2016	Public worker	A public worker tree trimming at Maroubra, caused a branch to fall onto service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
103	19/02/2016	Public worker	A public worker operating a crane at Silverwater, contacted with ABC. No injuries were reported.	Staff attended site, made safe and carried out repairs.
104	23/02/2016	Public general	A member of the public reported that they received a shock from a pillar at New Lambton Heights. The cover on the pillar was found to have been melted due to a hot connection. No further injuries were reported.	Staff attended site, made safe and carried out repairs.
105	25/02/2016	Contractor	A contractor tree trimming at Berowara Creek, caused a tree branch to fall and contact OH mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
106	1/03/2016	Contractor	A contractor while excavating at Hunters Hill, damaged an UG LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
107	3/03/2016	Public Worker	A public worker excavating a building site at Mascot, struck OH mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
108	20/02/2016	Public Worker	A public worker using a jack hammer at Hurstville, struck a cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
109	25/02/2016	Public Worker	A public worker operating a crane at Lane Cove, came into contact with 11kV mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
110	3/03/2016	Worker	A worker excavating around a street light standard at Kariong, struck a LV cable. No injuries were reported.	Workers made safe and carried out repairs.
111	8/03/2016	Public Worker	A public worker operating a crane at Turrella came into contact with OH HV. No injuries were reported.	Staff attended site, made safe and carried out repairs.
112	9/03/2016	Contractor	A contractor tree trimming at Cabartia came into contact with an OH LV. No injuries were reported.	Staff attended site, made safe and carried out repairs.
113	2/03/2016	Public general	A member of the public reported to have received a shock from a street light standard at Kyeemagh. No other injuries were reported.	The member of the public was advised to seek medical attention and the street light standard was repaired.
114	5/03/2016	Public Worker	A public worker operating an excavator at Zetland, contacted street light mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.
115	11/03/2016	Contractor	A contractor tree trimming at Redfern caused a tree branch to come into contact with SW. No injuries were reported.	Staff attended site, made safe and carried out repairs.
116	17/03/2016	Contractor	A contractor while digging a joint bay at Pyrmont, received an electric shock. The contractor then received a second electric shock from contacting the excavator while exiting the joint bay. Preliminary information indicators that a test voltage was applied and caused the shock.	The contractor received a precautionary ECG. No further injuries were reported.
117	17/03/2016	Contractor	A contractor tree trimming at Woronora caused a tree branch to come into contact with SW. No injuries were reported.	Staff attended site, made safe and carried out repairs.
118	18/03/2016	Public Worker	A public worker erected scaffolding within safe working distances to OH LV mains. No injuries were reported.	Staff organised for the site to be made safe and reported the incident to Safe Work NSW.
119	18/03/2016	Public Worker	A public worker erected scaffolding within safe working distances to OH LV mains. No injuries were reported.	Staff organised for the site to be made safe and reported the incident to Safe Work NSW.
120	18/03/2016	Public Worker	A public worker erected scaffolding within safe working distances to OH LV mains. No injuries were reported.	Staff organised for the site to be made safe and reported the incident to Safe Work NSW.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
121	21/03/2016	Worker	A worker while replacing the fuse for a streetlight circuit at Avoca, experienced an arc flash caused by a connection error. No injuries were reported.	Site was made safe and the incident was reported to the Supervisor.
122	15/03/2016	Public Worker	A public worker installing a fence at Darling Point, struck a LV cable. No injuries were reported	Staff attended site, made safe and carried out repairs.
123	14/03/2016	Public Worker	A public worker operating an excavator at Menai, contacted an UG cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
124	16/02/2015	Public Worker	A public worker using a Boring machine at Brookvale, cut through a HV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
125	11/02/2016	Public Worker	A public worker operating a concrete truck at Mt Kuringai, struck OH service wires with the boom. No injuries were reported.	Staff attended site, made safe and carried out repairs.
126	24/03/2016	Public Worker	A public worker, demolishing a house at Newtown, caused a service wire to fall. No injuries were reported.	Staff attended site and made safe.
127	31/03/2016	Public Worker	A public worker excavating at Telarah, contacted a HV substation earth. No injuries were reported.	Staff attended site, made safe and carried out repairs.
128	1/04/2016	Worker	A worker, whilst connecting droppers from 33kV Sealing Ends to overhead busbar, connected only one of two connections leaving the second braid touching earth causing a phase to earth fault when switching feeder back into Service. No injuries reported.	Staff made safe and carried out repairs.
129	14/01/2016	Public Worker	A public worker operating an underborer to install communication conduit at Malabar, contacted a HV feeder. No injuries were reported.	Staff attended site, made safe and carried out repairs.
130	8/04/2016	Public Worker	A public worker laying a concrete slab at Hurstville, cut away a street light standard without authorisation. No injuries were reported.	Staff attended site, made safe and carried out repairs.
131	17/03/2016	Public Worker	A public worker excavating at Zetland, contacted a HV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
132	6/04/2016	Public Worker	A public worker excavating at Caringbah, contacted a LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
133	5/04/2016	Public Worker	A public worker excavating at North Sydney, caused mains to clash. No injuries were reported.	Staff attended site, made safe and carried out repairs.
134	5/04/2016	Public general	A member of the public tree trimming at Croydon, came into contact with service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
135	29/03/2016	Public worker	A public worker erected scaffolding within safe working distances to OH LV mains. No injuries were reported.	Staff organised for the site to be made safe and reported the incident to Safe Work NSW.
136	4/04/2016	Public worker	A public worker brought down LV with an excavator. No injuries were reported.	Staff attended site, made safe and carried out repairs.
137	6/04/2016	Public worker	A public worker tree trimming at Valentine, came into contact with service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
138	13/04/2016	Public worker	A public worker, contracted to the contacted an 11kV feeder at Sydney CBD while lifting a pit roof with a crane, brickwork has fallen and broken conduit, exposing 11kV. No injuries were reported.	Staff attended site, made safe and carried out repairs.
139	18/04/2016	Worker	A worker undertaking a service wire replacement at Greenacre inadvertently shorted A Phase to B phase, causing an arc flash. No injuries were reported.	Staff attended site, made safe and carried out repairs.
140	14/04/2016	Public worker	A public worker brought down LV with an excavator. No injuries were reported.	Staff attended site, made safe and carried out repairs.
141	15/04/2016	Public worker	A public worker excavating at Lane Cove, contacted a LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
142	15/04/2016	Public worker	A public worker brought down service wires with an excavator. No injuries were reported.	Staff attended site, made safe and carried out repairs.
143	13/04/2016	Public worker	A public worker excavating around a pit at Sydney, contacted a HV ductline. No injuries were reported.	Staff attended site, made safe and carried out repairs.
144	26/04/2016	Public worker	A public worker tree trimming at Engadine, came into contact with service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
145	29/04/2016	Public worker	A public worker excavating at North Sydney, struck a pole and caused a mains to clash that resulted in burnt down mains. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
146	10/05/2016	Worker	A worker while carrying out a live service transfer at Bondi, created a short circuit. No injuries were reported.	Staff attended site, made safe and carried out repairs.
147	5/05/2016	Worker	A worker created a reverse polarity connection at Kirribilli. This error was discovered by other staff at a later date during an investigation of a cable fault. No injuries were reported.	Staff attended site, made safe and carried out repairs.
148	9/05/2016	Public worker	A public worker excavating at Alexandria, struck an UG cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
149	9/05/2016	Public worker	A public worker installing a phoneline duct at Redfern, struck an UG LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
150	17/03/2016	Public worker	A public worker tree trimming at Branxton, caused a tree branch to fall onto an OH LV service.	Staff attended site, made safe and carried out repairs.
151	27/04/2016	Public worker	A public worker underboring at Mayfield West, struck an UG cable conduit.	Staff attended site, made safe and carried out repairs.
152	3/05/2016	Public worker	A public worker excavating at Alexandria, struck an UG earthing cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
153	12/05/2016	Public worker	A public worker while driving at Lochinvar, struck an OH service wire. No injuries were reported.	Staff attended site, made safe and carried out repairs.
154	18/05/2016	Public worker	A Public Worker conducting tree trimming at Kingsgrove, caused damage to OH LV service wires. No injuries were reported.	Staff attended site, made safe and carried out repairs.
155	31/03/2016	Public worker	A Public Worker was found to have moved a live 11kV UG feeder in the Sydney CBD without isolation and authorisation. No injuries were reported.	Staff attended site, made safe and carried out repairs.
156	6/04/2016	Worker	A worker caused a small arc flash at Woy Woy while cutting a SL conductor that was thought to be isolated, but was incorrectly identified in Geographical Information Systems (GIS) plans. No injuries were reported.	Staff attended site, made safe and carried out repairs.
157	28/04/2016	Worker	A worker caused a small arc flash at Mosman during preparations of live cable cutting when the ratchet cutter slipped and made contact with the neutral core. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
158	20/05/2016	Public worker	A public worker cutting conduit in a pit at Wallsend, struck an UG SL cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
159	19/01/2016	ASP	An ASP completing a directional under bore at Medowie, struck an UG earthing cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
160	31/05/2016	Contractor	A contractor caused a clash of conductors at Blakehurst after striking a pole with the EWP that was at the worksite. No injuries were reported.	Staff attended site, made safe and carried out repairs.
161	15/05/2016	Public general	A member of the public, installing a steel rod into the ground at Neutral Bay, struck an UG LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
162	5/06/2016	Worker	A worker while attending to wires down incident at Turramurra during a storm, received a shock from a fallen OH LV distributor that moved in high winds.	The worker received a precautionary ECG and no further injuries were reported.
163	8/06/2016	Contractor	A contractor while excavating at Auburn for a pole replacement, struck an UG LV cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
164	10/06/2016	Contractor	A contractor while carrying out a pole inspection at Maitland, struck a LV UGOH. No injuries were reported.	Staff attended site, made safe and carried out repairs.
165	11/06/2016	Public general	A member of the public, struck a pole with a vehicle at Singleton, causing HV mains to fall onto the vehicle. No injuries were reported.	Staff attended site, made safe and carried out repairs.
166	10/06/2016	ASP	An ASP making a LV connection at Muswellbrook, created an incorrect phase connection. No injuries were reported.	Staff attended site, made safe and carried out repairs.
167	16/06/2016	ASP	An ASP created a cross polarity connection at a premises at Mortdale. No injuries were reported.	Staff attended site, made safe and carried out repairs.
168	19/06/2016	Worker	A worker entering a LV pit at Ultimo, received a LV shock from a potentially damaged cable.	The worker received a precautionary ECG and no further injuries were reported.
169	23/06/2016	Worker	A worker replacing a LV fuse assembly on a PT at Singleton, caused a flashover when his ratchet made contact between A phase and Neutral. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Dept Record no	Date of incident	Party involved	Details of incident	Corrective action
170	23/06/2016	Worker	A worker, stripping cable at Bellevue Hill, cause a flashover when he made contact with a live core. No injuries were reported.	Staff attended site, made safe and carried out repairs.
171	24/05/2016	Public Worker	A public worker, while installing a guard rail at Newcastle, struck an UG streetlight cable. No injuries were reported.	Staff attended site, made safe and carried out repairs.
172	24/06/2016	Public Worker	A public worker lifted a HIAB crane in LV mains at Croydon Park. No injuries were reported.	Staff attended site, made safe and carried out repairs.

Attachment D: Definitions

D1 Network Safety Context

ASP: A person contracted directly by a distribution customer to undertake contestable services, includes distributor employees or contractors carrying out contestable services.

Contestable Service: Means:

- (a) Any service provided for the connection of customers to the *electricity network*, and
- (b) Any service comprising work relating to an extension of an *electricity network* or an increase in the capacity of an *electricity network*.

Distributor: Means the owner, controller or operator of an *electricity distribution network*.

Distributor Contractor: Means persons employed by contractors or sub-contractors engaged by a *Distributor* to carry out work for the *Distributor* in any capacity. ASPs when contracted by the *distributor* to carry out network work shall be included in this category.

Distributor Employee: Means a person engaged by a *Distributor* under a contract of employment or apprenticeship. This may include permanent, part-time, casual or temporary staff.

Network Worker: Means persons employed or contracted by the *Distributor* (includes *Distributor Employees* and *Network Contractors*).

Public: Means persons other than Network Workers and ASPs.

D2 Customer Installations Context

Audit is defined as a review of the distributor's system of ensuring compliance with Legislation, Standards and Service and Installation Rules, installations, installing contractors and inspectors, as a check on the operation of installation safety management systems.

Major Safety Breach in a customer's installation occurs when an inspection or test of an electrical installation by or for the distributor detects a serious departure from the SAA Wiring Rules presenting an immediate danger to life, health or property. At least one of the following would be present:

- Exposed live parts
- Earthing system defects
- Insufficient insulation resistance
- Overloaded equipment
- Inadequate protection
- Incorrect polarity
- Unsuitable equipment.

Customer Installation Shock is defined as any electric shock reported to the distributor as received by a person on a customer's premises and not involving the electricity supply network.

NOTE: A shock received as a result of a faulty network neutral connection is to be reported as a Network Incident/Accident. Faulty neutral connections at the point of attachment or customer's switchboard are considered to not involve the electricity supply network and therefore should be included here.

Inspection is defined as being an especially careful examination by a person representing the distributor who has sufficient knowledge and experience. It may include testing where appropriate, of completed Authorised Work to ensure it complies with the Service and Installation Rules and the distributor's network standards and specifications. Inspections are generally carried out on an audit basis in accordance with the past performance results of the installing contractor.

Attachment E: Feeders which exceeded Individual Feeder Standards

The following tables summarise the reportable feeders which have exceeded the individual feeder standards as defined in the Licence Conditions. Individual feeders remain on this list until the rolling annual performance has been below the standard for a continuous 12 month period.

The categories of remedial actions proposed or taken are defined as follows:

Monitor – the feeder has been investigated and no further action is required to improve the feeder performance.

Performance Under Review – the feeder has exceeded the relevant individual feeder thresholds in the most recent quarterly report and is yet to be investigated.

Work Issued – the feeder has been investigated and remedial action has been identified to improve the feeder performance.

Performance Corrected – the feeder has been investigated and remedial action has been completed. The feeder performance has improved to be within the threshold.

Work Completed - The feeder has been investigated and remedial action has been completed. The feeder has not yet improved to be within the threshold.

CBD Feeder Category

Feeder Name	Location	Customer Count	km	Date of First Non-Compliance	SAIDI Present	SAIFI Present	SAIDI at First Non-Compliance	SAIFI at First Non-Compliance	Description of Non-Compliance and Reason	Remedial actions proposed or taken including timetable
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Urban Feeder Category

Feeder name	Location	Customer Count	km	Date of First Non-Compliance	SAIDI Present	SAIFI Present	SAIDI at First Non-Compliance	SAIFI at First Non-Compliance	Description of Non-Compliance and Reason	Remedial actions proposed or taken including timetable
ZN36300:PA3	BALGOWLAH NORTH	2012	11	Dec-13	404.52	4.61	289.56	4.06	Frequency over index	Monitor
ZN12620:PA3	NORAVILLE	1056	5	Jun-14	422.80	3.05	479.92	2.10	Duration over index	Monitor
ZN12620:PA7	NORAVILLE	2159	9	Jun-14	536.47	4.07	470.69	3.18	Duration over index	Monitor
ZN14143:PA6	SOMERSBY	51	12	Sep-14	332.10	4.59	464.91	1.04	Duration over index	Monitor
ZN2466:PA12	FLEMINGTON	418	4	Dec-14	108.37	1.00	460.92	1.00	Duration over index	Monitor
ZN384:PA41	CAMPERDOWN	487	1	Dec-14	18.58	0.13	818.55	0.88	Duration over index	Monitor
ZN711:PA16	BLACKWATTLE BAY	285	2	Dec-14	0.82	0.00	1464.50	2.02	Duration over index	Monitor
ZN847:PA21	HORNSBY	1329	9	Dec-14	267.39	2.62	518.43	3.05	Duration over index	Performance Corrected
ZN874:PA24	CONCORD	42	3	Dec-14	0.00	0.00	421.99	2.66	Duration over index	Performance Corrected
ZN965:PA4	PENNANT HILLS	1106	12	Dec-14	82.32	1.06	446.51	3.93	Duration over index	Performance Corrected
ZN10991:PA13	BLAKEHURST	1134	4	Mar-15	298.82	3.07	412.60	4.10	Duration over index	Performance Corrected
ZN1290:PA12	LEIGHTONFIELD	1052	8	Mar-15	23.57	0.14	536.04	2.16	Duration over index	Performance Corrected
ZN1290:PA13	LEIGHTONFIELD	161	4	Mar-15	65.35	0.39	535.72	2.52	Duration over index	Monitor
ZN1788:PA21	MATRAVILLE	35	4	Mar-15	71.57	0.94	538.50	1.79	Duration over index	Monitor
ZN931:PA26	DARLINGHURST	253	2	Mar-15	0.00	0.00	719.80	0.74	Duration over index	Monitor
ZN1193:PA12	LINDFIELD	1320	10	Jun-15	24.11	0.26	360.42	3.67	Duration over index	Performance Corrected
ZN1290:PA1	LEIGHTONFIELD	1134	5	Jun-15	74.82	0.10	391.19	2.06	Duration over index	Performance Corrected
ZN1290:PA11	LEIGHTONFIELD	7	2	Jun-15	0.00	0.00	770.38	1.88	Duration over index	Performance Corrected
ZN1290:PA2	LEIGHTONFIELD	644	6	Jun-15	2.56	0.01	375.35	2.00	Duration over index	Performance Corrected

Feeder name	Location	Customer Count	km	Date of First Non-Compliance	SAIDI Present	SAIFI Present	SAIDI at First Non-Compliance	SAIFI at First Non-Compliance	Description of Non-Compliance and Reason	Remedial actions proposed or taken including timetable
ZN1290:PA4	LEIGHTONFIELD	1170	7	Jun-15	157.43	2.09	386.26	2.07	Duration over index	Performance Corrected
ZN1290:PA9	LEIGHTONFIELD	75	3	Jun-15	0.00	0.00	372.11	1.97	Duration over index	Performance Corrected
ZN15011:PA10	BEACON HILL	1482	11	Jun-15	11.05	1.02	157.34	4.01	Frequency over index	Monitor
ZN262:PA33	MARRICKVILLE	191	2	Jun-15	92.22	1.01	500.69	0.78	Duration over index	Monitor
256:80635	ADAMSTOWN 132	530	4	Sep-15	1.39	0.01	350.06	1.01	Duration over index	Monitor
ZN14891:PA14	WYONG	463	20	Sep-15	201.10	2.10	389.51	3.69	Duration over index	Performance Corrected
ZN15010:PA12	CAREEL BAY	80	0	Sep-15	170.84	1.98	397.90	3.00	Duration over index	Monitor
ZN2196:PA5	MILPERRA	1583	12	Sep-15	105.36	0.91	370.11	3.80	Duration over index	Monitor
ZN12660:PA10	WOY WOY	1771	14	Sep-15	33.43	0.32	211.95	4.70	Frequency over index	Performance Corrected
ZN2310:PA65	PUNCHBOWL	2226	11	Sep-15	155.69	2.04	248.63	4.12	Frequency over index	Monitor
227:13018	AVONDALE 33	601	9	Dec-15	526.02	2.92	548.89	3.09	Duration over index	Work Completed
ZN9252:PA25	JANNALI	870	11	Dec-15	465.91	4.51	560.86	4.51	Duration over index	Monitor
ZN10995:PA2	RIVERWOOD	2369	8	Dec-15	181.48	1.11	461.65	2.80	Duration over index	Monitor
ZN10999:PA7	KOGARAH	1004	5	Dec-15	450.13	1.89	450.07	1.89	Duration over index	Monitor
ZN1287:PA4	REVESBY	984	8	Dec-15	427.43	1.28	404.14	1.17	Duration over index	Monitor
ZN1290:PA10	LEIGHTONFIELD	37	2	Dec-15	47.65	0.92	372.06	1.94	Duration over index	Monitor
ZN12620:PA13	NORAVILLE	409	5	Dec-15	504.77	3.62	484.87	4.16	Duration over index	Monitor
ZN15009:PA3	MANLY	811	3	Dec-15	588.58	2.18	424.04	1.76	Duration over index	Monitor
ZN15010:PA5	CAREEL BAY	907	5	Dec-15	221.69	2.14	381.18	3.44	Duration over index	Performance Corrected

Feeder name	Location	Customer Count	km	Date of First Non-Compliance	SAIDI Present	SAIFI Present	SAIDI at First Non-Compliance	SAIFI at First Non-Compliance	Description of Non-Compliance and Reason	Remedial actions proposed or taken including timetable
ZN901:PA8	SURRY HILLS	700	4	Dec-15	129.74	1.24	380.74	1.43	Duration over index	Monitor
ZN9037:PA2	MIRANDA	1044	6	Dec-15	304.99	6.11	272.82	4.05	Frequency over index	Monitor
ZN2635:PA65	EPPING	218	4	Dec-15	590.59	1.97	590.59	1.97	Duration over index	Monitor
ZN36100:PA1	ROSE BAY	841	4	Dec-15	291.07	1.06	444.70	2.17	Duration over index	Monitor
ZN9534:PA15	KURNELL SOUTH	59	3	Dec-15	1404.46	0.97	1428.68	0.98	Duration over index	Monitor
ZN9534:PA17	KURNELL SOUTH	683	5	Dec-15	2640.40	1.03	2641.56	1.07	Duration over index	Monitor
ZN9245:PA34	ENGADINE	1631	15	Dec-15	400.39	3.06	380.41	2.10	Duration over index	Monitor
ZN384:PA66	CAMPERDOWN	9	3	Dec-15	605.33	2.67	542.56	2.11	Duration over index	Monitor
202:34254	NEWCASTLE CBD 33	2012	9	Mar-16	321.61	3.24	442.12	3.30	Duration over index	Monitor
ZN10990:PA11	ARNCLIFFE	2026	8	Mar-16	582.44	3.90	498.69	3.08	Duration over index	Monitor
ZN12640:PA10	UMINA	1674	7	Mar-16	451.75	3.80	394.78	3.05	Duration over index	Work Completed
ZN3155:PA21	DOUBLE BAY	486	3	Mar-16	106.50	0.23	355.01	0.39	Duration over index	Monitor
ZN3425:PA18	CASTLE COVE	576	4	Mar-16	814.64	1.00	814.64	1.00	Duration over index	Monitor
ZN3472:PA29	SEFTON	691	5	Mar-16	334.56	3.29	397.16	3.45	Duration over index	Monitor
ZN35800:PA21	BANKSTOWN	289	5	Mar-16	472.84	0.96	590.85	1.81	Duration over index	Monitor
ZN7481:PA3	DARLING HARBOUR 132 11kV	555	1	Mar-16	659.62	0.34	658.43	0.34	Duration over index	Monitor
ZN9037:PA8	MIRANDA	1655	8	Mar-16	273.04	3.07	358.00	3.09	Duration over index	Monitor
ZN931:PA11	DARLINGHURST	1290	2	Mar-16	352.13	1.52	434.33	1.53	Duration over index	Monitor
ZN10996:PA12	ROCKDALE	1088	8	Mar-16	362.86	3.24	375.15	3.29	Duration over index	Monitor

Feeder name	Location	Customer Count	km	Date of First Non-Compliance	SAIDI Present	SAIFI Present	SAIDI at First Non-Compliance	SAIFI at First Non-Compliance	Description of Non-Compliance and Reason	Remedial actions proposed or taken including timetable
ZN9245:PA44	ENGADINE	1080	7	Mar-16	432.14	3.63	402.94	2.63	Duration over index	Monitor
ZN9245:PA45	ENGADINE	942	7	Mar-16	408.18	3.21	376.67	2.19	Duration over index	Monitor
264:81232	RAYMOND TERRACE 33	811	12	Jun-16	360.66	2.22	360.66	2.22	Duration over index	Performance under Review
ZN10990:PA6	ARNCLIFFE	1117	3	Jun-16	361.30	2.14	361.30	2.14	Duration over index	Performance under Review
ZN10995:PA13	RIVERWOOD	1313	6	Jun-16	372.30	2.27	372.30	2.27	Duration over index	Performance under Review
ZN10999:PA36	KOGARAH	2398	4	Jun-16	383.19	3.76	383.19	3.76	Duration over index	Performance under Review
ZN2473:PA33	NORTH SYDNEY	65	0	Jun-16	1427.32	0.86	1427.32	0.86	Duration over index	Performance under Review
ZN2635:PA39	EPPING	430	4	Jun-16	361.93	0.91	361.93	0.91	Duration over index	Performance under Review
ZN35900:PA20	POTTS HILL	997	7	Jun-16	452.97	3.18	452.97	3.18	Duration over index	Performance under Review
ZN9035:PA11	CARINGBAH	1955	7	Jun-16	178.25	4.06	178.25	4.06	Frequency over index	Performance under Review
ZN9035:PA2	CARINGBAH	676	5	Jun-16	138.34	4.00	138.34	4.00	Frequency over index	Performance under Review
ZN9037:PA9	MIRANDA	825	5	Jun-16	167.91	4.10	167.91	4.10	Frequency over index	Performance under Review

Short Rural Feeder Category

Feeder Name	Location	Customer Count	km	Date of First Non-Compliance	SAIDI Present	SAIFI Present	SAIDI at First Non-Compliance	SAIFI at First Non-Compliance	Description of Non-Compliance and Reason	Remedial actions proposed or taken including timetable
ZN12630:PA22	PEATS RIDGE	576	74	Dec-13	880.6	5.13	1787.2	3.79	Duration over index	Performance Corrected
807:74179	DENMAN 66	135	58	Mar-15	538.7	2.46	1389.9	8.86	Duration over index	Monitor
814:82283	ABERDEEN 66	181	74	Mar-15	89.7	0.54	1221.2	7.76	Duration over index	Monitor
ZN2400:PA11	BEROWRA	697	23	Jun-15	228.9	0.98	1021.6	3.13	Duration over index	Performance Corrected
526:34639	ROTHBURY 132 11KV	258	52	Dec-15	1983.2	5.16	1822.0	4.91	Duration over index	Work Issued
ZN14143:PA17	SOMERSBY	739	65	Dec-15	639.6	5.44	1257.0	5.51	Duration over index	Work Completed
ZN9534:PA11	KURNELL SOUTH	248	2	Dec-15	1626.7	1.00	1633.3	1.00	Duration over index	Monitor
516:48065	LEMINGTON 66	40	31	Mar-16	3465.7	5.50	3378.9	5.34	Duration over index	Monitor
516:48067	LEMINGTON 66	281	79	Mar-16	2173.7	2.84	2218.2	3.13	Duration over index	Monitor
514:18137	NEWDELL 66	246	92	Mar-16	1376.4	6.76	1306.2	5.67	Duration over index	Monitor

Long Rural Feeder Category

Feeder Name	Location	Customer Count	km	Date of First Non-Compliance	SAIDI Present	SAIFI Present	SAIDI at First Non-Compliance	SAIFI at First Non-Compliance	Description of Non-Compliance and Reason	Remedial actions proposed or taken including timetable
-	-	-	-	-	-	-	-	-	-	-

Attachment F: Guidelines for the Reporting of Demand Management

Demand Management Projects and Negotiation Outcomes to be Reported:

- Projects that have been investigated by the distributor in response to expected network constraints and which have either been approved for implementation (Table 3.5) or determined to be non viable (Table 3.6).
- Projects are to be reported once only (in the year in which implementation commenced).
- Projects are only to be reported if they have resulted in an actual reduction in demand on the network. Where reductions are not permanent, the expected duration of the reduction must be indicated.
- Negotiations with existing or new customers which result in actual reductions in the customer's demand requirements may be reported as a Negotiation Outcome.
- Capacitor installations located either at the customer's premises or on the network may be reported as they will provide a reduction in kVA demand, and will also provide loss reduction. Reporting is only permitted, however, where the installation occurs as a direct result of intervention by the distributor.
- Expenditure on Frequency Injection (FI) control systems may be reported if the installation does achieve real demand reduction results. For example, simple replacement of time clocks with an FI system may perhaps more appropriately be regarded as simply continuation of the "status quo" and be without any overall additional demand reduction and would not be reported.

Demand Management Activities not to be Reported:

- Network configuration changes (e.g. alter feeder open points) are not to be reported, as negligible demand reduction and expenditure is likely to occur.
- Acceptance of additional risk and therefore deferring projects does not reduce demand, and is not to be reported.
- Discussions which reduce the stated demand of the customer by the clarification of loading information, but do not change the type or size of actual equipment to be connected are not DM and should not be reported.
- Investigations which have not progressed to approval or rejection are not to be reported in this report (information on these may be required in other forums).

Costs and Benefits, Reporting Format:

- Costs and benefits to be reported in Present Value (PV) terms using Treasury guidelines and best estimates of years of deferment, and expected savings.
- Capital deferral and operating expenditure savings are to be combined. Operating expenditure savings are generally small relative to capital deferral and can be negative where projects are deferred and older assets must be maintained.
- Where the period of deferment is altered due to external causes, i.e. change in general economic conditions, then no alteration in reporting is required. However, a new strategy which further extends the period of deferment of a particular project, may be reported, list only the additional incremental savings.
- Projects which continue over several years are to be reported in Table 3.5 in one year only (preferably in the year of commencement of implementation). All costs which are estimated to be incurred in the future should be included in the PV figure for costs of the strategy.
- Some projects may have benefits which are difficult to quantify. These intangible benefits should be described in qualitative terms.

Reporting on Non-viable Projects:

- A number of investigations may not proceed. These are also to be reported in line with the obligations to carry out DM investigations before investing in network expansion. They give an indication of the level of DM activity being undertaken.



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