Attachment 5.02

Network Performance Reports

May 2014

Contents

1. 2009/10 Ausgrid Network Performance Report

EnergyAustralia®

2009/10 Network Performance Report

INTRODUCTION

This report represents EnergyAustralia's Electricity Network Performance Report for the 2009/10 financial year. The report has been prepared in accordance with the Electricity Supply (Safety and Network Management) Regulation 2008 and follows the outline provided by Industry and Investment NSW. The report details EnergyAustralia's performance with respect to:

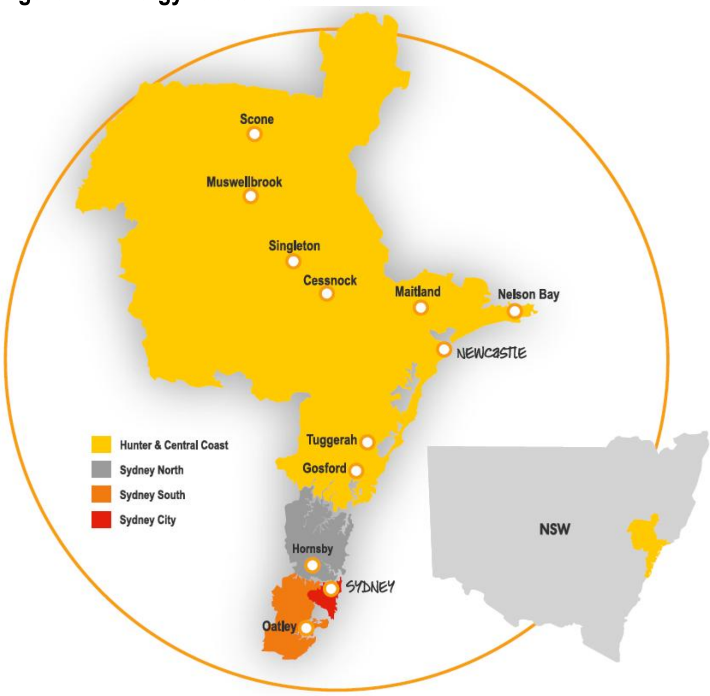
- Network Management;
- Network Planning;
- Asset Management;
- Network Safety;
- Customer Installations;
- Accredited Service Provider Scheme;
- Bushfire Risk Management;
- Public Electrical Safety Awareness; and
- Compliance with the NSW Maritime electricity industry code "Crossings of NSW Navigable Waters'.

This report has been independently appraised by Sinclair Knight Merz (SKM) in accordance with the Appraisal Guidelines contained in Appendix E.

1 PROFILE

EnergyAustralia has been operating for more than 100 years and is the largest energy network in Australia with over 1.6 million network customers. Our network area reaches as far north as the Upper Hunter Valley as far south as Waterfall and to Auburn in Sydney's west. In 2009/10 EnergyAustralia supplied more than 30,430 GWh of electricity to its network customers. This report focuses on the performance of EnergyAustralia's network business which is responsible for the distribution of electricity within our network area (Figure 1).

Figure 1 – EnergyAustralia's Network Area



EnergyAustralia's principal activities include:

- The ownership and management of assets which make up the electricity distribution network;
- Infrastructure related construction and maintenance services;
- Purchasing and supplying energy; and
- A range of other services including street lighting, customer connections, safety check ups, energy reviews, metering and 24 hour electrical repairs.

EnergyAustralia provides power to more than 1.6 million network customers living and working across our network area. Our network area covers an area of 22,275 square kilometres, and includes some of the most densely populated, fastest growing areas of New South Wales.

EnergyAustralia's distribution network includes:

- a subtransmission system of 33kV, 66kV and 132kV assets;
- a high voltage distribution system of 5kV, 11kV and 22kV assets;
- a low voltage distribution system of 240V and 415V assets; and
- over 49,400 km of overhead lines and underground cables.

EnergyAustralia's network includes 43 transmission substations, 185 zone substations, and 30,261 distribution substations, which together supply our 1.6 million plus customers. Table 1.1 sets out operator statistics in relation to EnergyAustralia's network.

Table 1.1 – Network Operator Statistics	Number at 30 June 2009	Number at 30 June 2010
Distribution Customer Numbers (Total) [1]	1,591,372	1,605,635
Distribution Customer Numbers – Sydney East Region [1]	315,447	317,715
Distribution Customer Numbers – Sydney South Region [1]	471,016	474,516
Distribution Customer Numbers – Sydney North Region [1]	378,072	382,153
Distribution Customer Numbers – Newcastle Region [1]	194,226	196,174
Distribution Customer Numbers – Central Coast Region [1]	155,154	156,384
Distribution Customer Numbers – Lower Hunter Region [1]	49,238	50,135
Distribution Customer Numbers – Upper Hunter Region [1]	28,219	28,558
Maximum Demand (Aggregated System MW)	5,918	5,609
Energy Received by Dist Network to Year End (GWh)	32,289	31,812
Energy Distributed to Year End (Residential) (GWh)	9,897	9,251
Energy Distributed to Year End (Non-Residential) (GWh)	20,886	21,187
Energy Distributed to Year End - Sydney East Region (GWh)	7,658	7,540
Energy Distributed to Year End - Sydney South Region (GWh)	6,834	6,792
Energy Distributed to Year End - Sydney North Region (GWh)	5,709	5,645
Energy Distributed to Year End – Newcastle Region (GWh)	3,663	3,573
Energy Distributed to Year End – Central Coast Region (GWh)	1,939	1,902
Energy Distributed to Year End – Lower Hunter Region (GWh)	3,513	3,492
Energy Distributed to Year End – Upper Hunter Region (GWh)	1,466	1,493
System Loss Factor (%)	4.66%	4.32%
Transmission System (km)	885	962
Transmission Substation (Number) [2]	41	43
Subtransmission System (km)	3,685	3,641
Substation - Zone (Number)	177	185
Substation - Distribution (Number)	29,974	30,261
High Voltage Overhead (km) [3]	10,290	10,227
High Voltage Underground (km) [3]	7,071	7,178
Low Voltage Overhead (km) [3]	21,156	20,895
Low Voltage Underground (km) [3]	6,459	6,539
Pole (Number)	502,126	510,217 [5]
Streetlights (Number) [4]	249,292	250,143
Employees (Full Time Equivalent Number)	5,546	5,780
Contractors (Full Time Equivalent Number)	518	545

1 Including un-metered supplies.
2 Including subtransmission switching stations (SWS).
3 Distances for overhead and underground lines are circuit kilometres.
4 The number of streetlights includes all streetlights owned by EnergyAustralia as well as those owned by customers but maintained by EnergyAustralia, and streetlights owned and maintained by customers.
5 From this year (2010) the pole figures includes steel pillar standards.

In 2009/10, EnergyAustralia continued its massive capital expenditure program - $1.32 billion for the twelve months which was in line with the previous year.

The highlight of the expenditure during 2010 was the progress on CityGrid. This is a $1 billion upgrade of the network supplying Sydney's central business district. It involves the construction of five major substations and about six kilometres of dedicated underground tunnels that will carry high voltage cables to connect the substations. The project will create a 132kV supply ring beneath the city and it will help protect the city's electricity supply from cable digs - a source of two interruptions to the city's electricity supply in 2008/09.

EnergyAustralia plans to spend an average of $1.6 billion per annum in new and replacement capital works over the next four years. The Australian Energy Regulator (AER) has approved this level of investment in the network and has accepted its prudency and engineering quality. The AER's determination for EnergyAustralia's revenue for the coming period will provide the income necessary to support the capital expenditure.

Over the next four years, we will deliver:

- Three new CBD zone substations;
- 30 new zone substations;
- Replace much of the 132kV cable system; and
- Replace many 11kV system distribution centres.

We are not replacing like with like; we are deploying smart sensors and operating technology to enable better control and capital utilisation of the 11kV and low voltage system. In time we will know as much about the performance of these elements of our system as we now know about our subtransmission system.

The major upgrade of the electricity network also creates opportunities to make the network smarter by integrating new communication technology into the mainstream network. This includes a network of small sensors in distribution substations, zone substations and a specialised wireless network to connect them. Smart meters, with built in communications, will be installed in future years to connect homes and businesses with the smart network.

EnergyAustralia undertakes $5 million of work in streets and neighbourhoods throughout our service area every day. We work to ensure we deliver this work safely and responsibly while managing the risk of outages and the amenity impact on our community.

EnergyAustralia provides street lighting services to 41 councils and other customers throughout its electricity network. There were over 250,000 streetlights connected to the electricity network at the end of 2009/10. EnergyAustralia responded to over 17,000 streetlight faults during the year, including 17,246 overhead and 518 underground faults.

The street light globes are systematically replaced throughout the EnergyAustralia network to help prevent faults before they occur and reduce maintenance costs. An estimated 100,000 globes were replaced during the year. About 16,800 energy efficient streetlights were installed, with 25 per cent of all streetlights, or more than 60,000 streetlights across the electricity network now energy efficient. In January 2010, EnergyAustralia began a trial with the City of Sydney Council to test a new type of energy efficient streetlight.

EnergyAustralia takes steps to keep the public and electrical workers safe at all times. Electrical facilities and equipment are secured and public awareness campaigns are regularly conducted highlighting the hazards of live electricity. There were no fatalities across the EnergyAustralia electricity network in 2009/10. However, there were four serious safety incidents involving the public in this period, two more than the previous year.

There were 344 reported electric shocks on private premises in 2009/10, compared to 309 the previous year. About 14 per cent of electric shocks on private premises across the EnergyAustralia network were caused by defective neutral wires. This compares to 11 per cent last year.

Theft and vandalism pose one of the greatest risks to public safety. In 2009/10, there were 75 incidents of theft at EnergyAustralia depots and substations at a cost of almost $82,000. This was a decrease of 33 per cent or about $152,000, on the previous year. Police worked with EnergyAustralia to investigate 33 illegal entries at depots and major substations.

In November 2009, the NSW Government announced a new Solar Feed-In Tariff to be administered by NSW electricity distribution companies. The scheme began on 1 January, 2010 and distributors were given six months to have it fully implemented. At the end of the reporting period a total of 18,231 photovoltaic systems were connected or waiting connection in premises throughout the EnergyAustralia network. There was a total capacity of approximately 31 MW of renewable energy connected to the electricity network from these systems by 30 June, 2010. This compares to about 3,000 photovoltaic systems installed at the end of 2008/09. The first domestic wind turbine was also connected to the EnergyAustralia network at premises in Aberdeen in the Upper Hunter.

Our continuing efforts in the areas of community, environment, workplace and marketplace were recognised during the year when we received the Corporate Responsibility Index Best Performing Australian and New Zealand company award for the third year in a row. EnergyAustralia also won the Commonwealth's Smart Grid Smart City bid and will demonstrate innovations in new services and products over the next three years, including the deployment of smart communicating meters in 50,000 homes to enable new pricing and demand management options.

2 NETWORK MANAGEMENT

2.1 Overview

In accordance with the Electricity Supply (Safety and Network Management) Regulation 2008 EnergyAustralia is obliged to prepare and implement a Network Management Plan. EnergyAustralia's Network Management Plan is available on our website (www.energy.com.au). This plan contains the high level design, construction, operation and maintenance principles used to manage the network assets, and incorporates the principles being applied to asset utilisation in the areas of safety, reliability, quality of supply and risk management. As required by the Regulation, our Network Management Plan is comprised of the following four chapters:

Chapter 1: Network Safety and Reliability – this chapter provides a framework to ensure that EnergyAustralia's network provides an adequate, reliable and safe supply of electricity of appropriate quality. This plan details how EnergyAustralia:

- Manages its assets and sets out the basis for which we invest in the network;
- Plans our investments;
- Provides reference to our standards and protocols; and
- Outlines our process to identify areas of the network that require development.

EnergyAustralia's network planning balances the need to meet applicable legislative and regulatory requirements with our wider organisational objectives and business responsibilities, including meeting customer expectations of a reliable and safe supply of electricity; managing safety, environmental and security risks associated with our network infrastructure; and managing the financial performance of the business.

To deliver these objectives, EnergyAustralia's Network Management Plan focuses on two key objectives:

1. Maintaining compliant infrastructure
   Achieving this objective involves management of safety, environmental and infrastructure security risk in relation to EnergyAustralia's network. The various environmental, safety and asset security obligations applicable to EnergyAustralia's network, and to the services EnergyAustralia provides as an electricity distributor, have been taken into account in developing EnergyAustralia's network management strategies.
2. Network performance
   Overall network performance is impacted by the performance of individual assets, the number of new customer connections required, and the extent of any imbalance between demand for electricity and supply.

In meeting these two objectives, EnergyAustralia targets its investment expenditure to ensure that network performance and compliance outcomes are achieved in a manner that is efficient and prudent, and are in accordance with the Plan and all regulatory and other obligations applicable to EnergyAustralia as an electricity distributor. EnergyAustralia's network planning processes and asset management strategies reflect and support these objectives.

During 2009/10 managing EnergyAustralia's library of network standards involved issuing 11 new standards and modifying a further 36 existing standards. Major technical disciplines covered in 2009/10 included: Telecommunications, Civil & Building Works, Protection Systems and Safety. All network standards are displayed on an internal intranet platform for general access across EnergyAustralia.

Chapter 2: Customer Installation Safety – addresses the management of safety from within a customer's premises. The objective of this chapter is to ensure the provision of safe electrical installations for connection to our network. It covers management of safety from within a customer's premises to the customer's terminal (the point of connection between the customer's electrical installation and the EnergyAustralia network).

Each year work is undertaken on electrical installations at thousands of customer properties throughout the EnergyAustralia distribution area.

It is our responsibility to maintain the electricity distribution network, including the poles and wires that are identified as our assets 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 (contractor).

The Customer Installation Safety chapter aims to ensure customers and contractors are aware of their rights and responsibilities. It is up to customers and their contractors to ensure that all work is performed safely and meets current industry rules and standards for installation. We aim to protect people in customers' premises by:

- supporting the scheme of licensing electrical contractors; and
- enforcing compliance with the relevant requirements, codes and regulations.

Customers need to employ licensed contractors for any new or modified electrical work. Contractors are required to meet industry rules and standards. Accredited Service Providers (ASP) connecting customer installations to our electricity network need to be authorised by us.

The contractor is responsible for testing and verifying that their work complies with all relevant requirements and standards and is safe. EnergyAustralia conducts a documented risk based inspection program to verify compliance by the contractor by selecting a sample of notified works once a suitable standard of compliance has been achieved.

Using a qualified inspection team, EnergyAustralia undertakes to monitor and audit contractor and ASP performance. If we identify any existing work as hazardous or unsafe we will ensure that the problem is rectified, and if necessary take appropriate action such as disconnection or other disciplinary measures.

EnergyAustralia contributes to the development and maintenance of the various rules, codes and standards, further enabling us to promote safety as a priority. In preparation of our Customer Installation Safety Plan we have taken into account the following NSW Codes of Practice:

(a) Service and Installation Rules:
Specifies the technical requirements necessary for electrical installations to be safely, reliably and efficiently connected to the electricity network and associated obligations and procedures for customers and network operators.

(b) Installation Safety Management:
Outlines the minimum practices required by electricity network operators in managing the safety of customers' electrical installations. The intent of the Code is that safety standards will be maintained or improved.

There are no departures from these Codes, unless to adopt a higher safety standard. As required by the Code, we also advise that customers operating electrical installations, including those above 11kV, are also subject to the requirements of the Service and Installation Rules of NSW and EnergyAustralia's local requirements.

During 2009/10, the number of Certificate of Compliance for Electrical Work (CCEW) notifications of electrical installation work from electrical contractors has increased, up 6%, for the first time in five years. This is mainly due to a significant increase in applications associated with the NSW Solar Bonus Scheme, which mandates that a CCEW must be lodged before a connection can be energised. EnergyAustralia has also communicated the need to use licensed electrical contractors via brochures mailed out to all customers with their electricity accounts.

EnergyAustralia has been assisting the Office of Fair Trading with their electrical contractor compliance campaigns by providing CCEW notification data when requested. EnergyAustralia investigated the notification and defect history of each electrical contractor's work in our network area. EnergyAustralia is also conducting targeted inspections of specific large developments like shopping centres and unit blocks, concentrating on the electrical contractor's compliance with Australian Standards as well as the submission of CCEW's for new electrical work.

EnergyAustralia is represented on related Australian Standards committees such as AS/NZS3000 and AS/NZS3017 as well as the Service and Installation Rules of NSW to ensure the focus on customer installation safety is maintained and improved in the review process.

A trial of the "Wirealert" device, that was developed by Aurora Energy and rolled out in Tasmania, commenced in early 2009/10. The Wirealert device is a supply monitoring device that plugs into a power point and detects potentially dangerous situations arising from a combination of a faulty neutral and earth connections. EnergyAustralia has issued 500 devices to EnergyAustralia staff and will be providing 2,500 devices to customers with older higher risk electrical installations during 2010/11.

EnergyAustralia is working with Sydney Water to fund testing of each installation neutral connection impacted by their water main replacement program. Suspected faults are investigated by EnergyAustralia staff and rectified where necessary.

Chapter 3: Public Electrical Safety Awareness – the intention of this chapter is to warn the public of the hazards associated with electricity in relation to our network. It is based on an assessment of the risks associated with the system and an analysis of any accidents or incidents. EnergyAustralia's approach to public safety focuses on:

- risk assessment and risk reduction;
- education and communication; and
- hazard response and procedures.

The Public Electrical Safety Awareness Plan outlines EnergyAustralia's commitment to safety and our responsibilities under the Electricity Supply (Safety and Network Management) Regulation 2008. This plan details EnergyAustralia's approach to safety and potential hazards associated with the transmission and distribution of electricity, how "at risk" groups are identified and provides precautions to avoid electrical incidents.

Programs are designed to create greater awareness of electrical safety amongst the general public and targeted groups based on an analysis of safety incidents involving EnergyAustralia's network and relevant data sources.

To communicate our safety message we use a number of communication tools and media to reach the at risk groups including TV, radio and print advertisements, sponsorships, education kits, personal presentations, bill inserts, printed material and the web.

A range of safety initiatives and programs undertaken over the past year are outlined in chapter nine of this report.

Chapter 4: Bushfire Risk Management – the objective of the Bushfire Risk Management chapter is to describe a management framework, that when correctly implemented will:

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

EnergyAustralia has an obligation to manage bushfire risks as they relate to our network. We do this by ensuring that our assets and our customers' private powerlines are safe and are properly designed, constructed and maintained. This chapter outlines the procedures, standards, codes and guidelines that EnergyAustralia applies to construction, operation and management of our network to achieve this objective. It also provides an overview of EnergyAustralia's bushfire risk management strategies in relation to key stakeholders including:

- landowners and occupiers;
- local government;

- government agencies; and
- emergency services.

The Bushfire Risk Management Plan also outlines how we inform our customers of their obligation to share bushfire prevention responsibilities with us to ensure that privately owned overhead powerlines are kept free of vegetation and are inspected, tested and maintained at regular intervals.

Details of initiatives undertaken in the last year to improve systems to manage bushfire risk within EnergyAustralia's network area are outlined in chapter eight.

2.2 Network Complaints

2.2.1 EnergyAustralia's Complaint Management Process

EnergyAustralia's complaint processes have been established in line with the principles of Australian Standard 4269:1995. The customer complaints process involves the capture of customer complaints by EnergyAustralia's Contact Centre or depots. The complaint data is entered into a database, and issued to staff who have the appropriate technical and process skills to investigate and resolve each matter. Following resolution of the matter, completion codes are assigned to ensure complaints are categorised according to the complaint cause, and indicating whether the complaint was substantiated.

EnergyAustralia has dedicated resources in each region to coordinate and report on quality of supply, reliability and safety complaint investigations, and has committed qualified technical resources to investigate and manage complaints and ensure the high standard of customer complaint resolution is maintained. From reception to resolution, all complaints and disputes are formally recorded to ensure that EnergyAustralia can continue to deliver a high standard of customer service.

2.2.2 Complaint Performance Data

The number of network complaints received by EnergyAustralia in 2009/10 was 1,121 complaints, which was 26% fewer than the number received in 2008/09. For the same period, the number of network customers increased by 14,263. This resulted in the complaint rate reducing to 0.70 complaints per 1,000 network distribution customers.

Table 2.1 - Complaints Received Regarding Network Issues

	2005/06	2006/07	2007/08	2008/09	2009/10
Complaints Total	1,454	1,554	1,669	1,409	1,121
Complaints per 1,000 Distribution Customers	0.93	0.99	1.06	0.89	0.70
Complaints regarding Vegetation Management *	84	142	165	126	118

* This statistic is to indicate the general level of complaints about this issue.

There were 73 valid voltage, current, quality of supply, reliability and safety complaint investigations completed in 2009/10. The reduction in the number of complaint investigations from the previous year is due to the low voltage distribution system improvements implemented as part of EnergyAustralia's capital works program.

Table 2.2 - Network Complaint Investigations Completed in 2009/10

Category	Number	Number Valid*
Voltage	182	62
Current	0	0
Other Quality of Supply	10	3
Reliability	105	8
Safety	0	0
TOTAL	**297**	**73**

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

2.3 Customer Service Standards Reporting

EnergyAustralia is committed to providing the best possible service to our customers across our network area. That is why we are investing significant capital across our network to keep pace with the growing demand for power and to provide a safe and reliable electricity supply.

EnergyAustralia does everything it can to minimize interruptions to customers' power supply. Across the network we maintain a reliability of approximately 99.98 per cent. However, from time to time in a large and complex network there will unfortunately be instances where customers are inconvenienced by too many power cuts over the course of a year, or interruptions that last too long.

In accordance with the Customer Service Standards, incorporated within the Design, Reliability and Performance licence conditions, metropolitan customers may make a claim if they experience an interruption that is greater than 12 hours in duration, or more than four interruptions, within a financial year, each lasting longer than four hours[1].

EnergyAustralia received 143 Customer Service Standards claims in the 2009/10 financial year and there were 86 eligible claims. Details of claims paid and rejected by area and type of interruption are detailed in Table 2.3.

Table 2.3 – Customer Service Standards Annual Performance

	Payments Given Based on Interruption Duration (Total Number)				Payments Given Based on Interruption Frequency (Total Number)				Claims Not Paid Based on Interruption Duration (Total Number)				Claims Not Paid Based on Interruption Frequency (Total Number)			
Quarter	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Metropolitan	5	16	35	16	1	0	1	0	8	3	15	2	3	5	6	2
Non-Metropolitan	0	6	5	0	0	0	1	0	0	5	2	0	0	1	0	0

Table 2.4 – Ineligible Claims

Reason	
Duration not exceeded	30
Frequency not exceeded	15
Duplicate Claim	1
Claim not within 3 months	4
Invalid Claim	5
No evidence of outage	2
Total	**57**

[1] Non metropolitan customers may make a claim for interruptions greater than 18 hours in duration or more than four interruptions, within a financial year, each lasting longer than five hours.

3 NETWORK PLANNING

3.1 Overview

EnergyAustralia carries out planning at both the strategic and project level. This approach is in part driven by the scale of the capital investment required and the need to effectively deliver individual projects, but largely it is driven by the need to make strategic decisions that are prudent and represent least cost outcomes over the life of the asset. EnergyAustralia's network planning approach is contained in our Network Management Plan and is consistent with the principles of the New South Wales Government's Total Asset Management (TAM) System.

Drivers of network investment can be divided into three main categories:

- Network performance;
- Customer connections; and
- Meeting modern infrastructure standards.

With respect to network performance, EnergyAustralia is required to comply with service standards that are specified in the Design, Reliability and Performance licence conditions (licence conditions), which were imposed on NSW distributors by the Minister for Energy on 1 December 2007. The purpose of the licence conditions is to facilitate the delivery of a safe and reliable supply of electricity. The licence conditions relate to four key areas of performance:

- Design planning criteria;
- Reliability standards (targets for average SAIDI and SAIFI);
- Minimum individual feeder performance; and
- Reliability customer service standards.

For existing network elements, a distributor must be as compliant as practicable with these requirements by 1 July 2014 and fully compliant by 1 July 2019. All new network elements must comply with these requirements. Distribution network service providers are required to report to the Minister compliance with the conditions.

In addition EnergyAustralia's Electricity Network Operation Standards (ENOS), which are available on the EnergyAustralia website www.energy.com.au, detail EnergyAustralia's objectives for maintaining the quality of the electricity supplied to our customers.

EnergyAustralia has forecast its capital investment requirements in the subtransmission network, through consideration of all the investment drivers concurrently. The investment requirements are grouped into 25 separate geographic network areas. The areas are chosen for their homogeneous nature and relative independence from network interconnections. This allows planners to focus on the needs of a particular area and analyse how best to address local issues.

The area plans currently consider network needs and development strategies up to 2024. This period is appropriate due to the long life of network assets and allows the development of a long term strategy that maximises synergies between drivers over the long term.

EnergyAustralia has also developed three transmission plans which have been developed using the same methodology as the area plans, but their scope crosses multiple areas. The transmission plans focus on the transmission network that links TransGrid's bulk supply points to EnergyAustralia's subtransmission substations. The three transmission plans cover the Sydney Inner Metropolitan area, the Central Coast and the Lower Hunter.

EnergyAustralia is committed to ensuring efficient investment, not only in its own network investments, but also in terms of investments that are made jointly with TransGrid and DNSPs like Integral Energy and Country Energy. EnergyAustralia facilitates regular bilateral and 3-way joint planning meetings to ensure decision making is transparent, and appropriately investigated and documented.

The area and transmission plans formed part of EnergyAustralia's regulatory submission to the Australian Energy Regulator (AER) in June 2008 for the 2009-14 regulatory period. The AER reviewed EnergyAustralia's capital program and accepted the works proposed reasonably reflected the efficient costs that a prudent operator in the circumstances of EnergyAustralia would require to meet the capital expenditure objectives of the National Electricity Rules.

3.2 Design Planning Criteria

The design planning criteria contained within the licence conditions set:

- input standards to be used in planning the network; and
- requirements for load forecasting and contingency planning methodologies intended to achieve operational outcomes.

The design planning criteria applicable to EnergyAustralia's network are set out in Table 3.1. The implications of the design planning criteria contained in the licence conditions, and the accompanying notes, are explained in detail in EnergyAustralia's Network Management Plan.

Table 3.1 – Design Planning Criteria

Network Element	Load Type	Forecast Demand or Expected Demand	Security Standard	Customer Interruption Time
Subtransmission Line	CBD	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	≥ 10 MVA	N-1[1]	< 1 minute
	Non-Urban	< 10 MVA	N[2]	Best practice repair time
Subtransmission Substation	CBD[1, 2]	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	Any	N-1	< 1 minute
Zone Substation	CBD[1, 2]	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	≥ 10 MVA	N-1[1]	< 1 minute
	Urban & Non-Urban	< 10 MVA	N[2]	Best practice repair time
Distribution Feeder	CBD	Any	N-1[3]	Nil
	Urban	Any	N-1[4]	< 4 Hours[5]
	Non-Urban	Any	N	Best practice repair time
Distribution Substation	CBD[1]	Any	N-1[3]	Nil
	Urban & Non-Urban	Any	N[7]	Best practice repair time

1. For a subtransmission line – overhead and zone substation:

    a. under N-1 conditions, the forecast demand is not to exceed the thermal capacity for more than 1% of the time ie a total aggregate time of 88 hours per annum, up to a maximum of 20% above the thermal capacity under N-1 conditions.

    b. under N conditions, a further criterion is that the thermal capacity is required to meet at least 115% of forecast demand.

    For a subtransmission line – underground, any overhead section may be designed as if it was a subtransmission line – overhead, providing the forecast demand does not exceed the thermal capacity of the underground section at any time under N-1 conditions.

2. Under N conditions, thermal capacity is to be provided for greater than 115% of forecast demand.

3. The actual security standard is an enhanced N-1. For a second coincident credible contingency on the CBD triplex system, restricted essential load can still be supplied.

4. By 30 June 2014, expected demand is to be no more than 80% of feeder thermal capacity (under system normal operating conditions) with switchable interconnection to adjacent feeders enabling restoration for an unplanned network element failure. By 30 June 2019, expected demand is to be no more than 75% of feeder thermal capacity. In order to achieve compliance, feeder reinforcement projects may need to be undertaken over more than one regulatory period. In those cases where a number of feeders form an interrelated system (such as a meshed network), the limits apply to the average loading of the feeders within one system.

5. The timeframe is expected only, and is based on the need to carry out the isolation and restoration switching referred to in note 4. This standard does not apply to interim / staged supplies, ie prior to completion of the entire development or to excluded interruptions outside the control of the licence holder.

6. In the CBD area, N-2 equivalent is achieved by the network being normally configured on the basis of N-1 with no interruption of supply when any one line or item of electrical apparatus within a substation is out of service. The licence holder must plan the CBD network to cater for two credible contingencies involving the loss of multiple lines or items of electrical apparatus within a substation, by being able to restore supply within 1 hour. Restoration may be via alternative arrangements (eg 11kV interconnections).

7. Urban distributions substations shared, or available to be shared, by multiple customers are generally expected to have some level of redundancy for an unplanned contingency (eg via low voltage manual interconnection to adjacent substations enabling at least partial restoration.

3.2.1 Design Planning Criteria Compliance Reporting

EnergyAustralia has a suite of investment plans, covering each of the transmission, subtransmission, distribution and low voltage areas of the network, to ensure that we design our network to be compliant with the design planning criteria (Table 3.1) within the timeframes specified in conditions 14.1 and 14.2 of the licence conditions.

Transmission / Subtransmission Planning

To ensure that all drivers are considered in a holistic manner, EnergyAustralia has developed a set of area plans that encompass all strategic network investment drivers within the transmission and subtransmission levels of the network. The area plans contain all strategic growth, reliability, customer connection and replacement driver investments within each area. The key inputs to each plan include:

- spatial forecasts for each zone and subtransmission substation within the area which identify future capacity constraints;
- condition-based replacement prioritisation for strategic assets within the area;
- infrastructure compliance issues within the area;
- known large customer connections; and
- compliance with reliability criteria.

EnergyAustralia jointly plans its transmission network with TransGrid. The design planning criteria contained in the licence conditions do not apply to TransGrid. However, EnergyAustralia and TransGrid have jointly agreed reliability criteria based on an enhanced N-1 security standard.

With the exception of the Sydney CBD EnergyAustralia's subtransmission network is based on an N-1 security standard. The licence conditions mandate an N-2 security standard for the network supplying Sydney's CBD.

EnergyAustralia must be as compliant as reasonably practicable with the licence conditions by 1 July 2014. Compliance with the N-2 standard in the CBD is a driver of investment to 2014.

EnergyAustralia produces a five year network plan and Annual Electricity System Development Review (ESDR) on an annual basis. The network plan outlines our planned investments by region, and the ESDR shows emerging constraints for each subtransmission and zone substation. Each emerging constraint is addressed by an indicative solution, and makes up EnergyAustralia's plan to comply with the design planning criteria.

Distribution Network Planning:

EnergyAustralia's 11kV distribution network is highly utilised and significant expenditure is required to keep pace with customer demand and to ensure compliance with the mandatory licence conditions. The location and magnitude of specific 11kV work is driven by spatial demand growth, which is influenced by the behaviour of individual customers.

It is not possible to predict with certainty the individual 11kV augmentation projects that will be required over more than the short term (within two years) as customers and energy consumption patterns change over time. As a result, EnergyAustralia has used a high level model, the Distribution Network Development model, to forecast the long term investment requirements for the 11kV network.

The Distribution Network Development model takes account of demand growth, load density, the relative costs of investing in zone substation infrastructure compared with the costs of investing in the 11kV network, connection costs, the changing magnitude of individual customer loads, and the increasing size of distribution substations. The model has been established on the basis of three types of costs: 11kV network costs; connection costs (subtransmission feeder connections to zone substations); and zone substation costs. Using these three categories of costs the model optimises the size of the zone substations by comparing the fixed and variable costs at the substation with the costs of providing 11kV infrastructure.

Our 11kV capacity plan, based on outputs of the model, identifies two main components of investment:

1. Catch up compliance – this is investment that is required to bring our current network utilisation to levels that comply with the design planning criteria based on current loads; and
2. Growth compliance – investment necessary to maintain utilisation levels on the 11kV network within limits specified by the design planning criteria based on forecast network load growth.

The Distribution Network Development model provides outputs which separate these two expenditure types so that the costs of bringing the network up to the present standard can be separately identified to the costs of keeping the network at those standard into the future.

Strategy towards Distribution Network Compliance:

While Distribution projects are often driven by current or forecast constraints within the distribution network, investment in the distribution network may also be required to address other strategic drivers, such as:

- Subtransmission network and zone substation licence compliance;
- Asset replacement and refurbishment requirements;
- Infrastructure design and construction compliance;
- Specific reliability needs; and
- New, specific customer connection projects.

In order to ensure that EnergyAustralia is compliant with the distribution Design Planning Criteria within the required timeframe, we have adopted the following, multi-faceted strategy:

- Where it can be demonstrated to be cost effective, projects initiated by the strategic drivers described above (such as load transfers between zone substations, switchgear replacement, zone transformer commissioning etc) are optimised so that they also mitigate or address any latent distribution constraints in the affected portions of the network.

- Prioritisation of projects is based on considerations such as scope, delivery time, cost, load at risk, and likelihood of the risk.
- Development of proactive feeder non-compliance forecasting, reporting, and prioritisation regime.
- Significant ramping up of the distribution network capital program to a level necessary for licence compliance by 2014.
- A cross-divisional efficiency review of the end-to-end capital project delivery process (from planning conception to project commissioning).

Distribution Substation Planning

EnergyAustralia's licence conditions for distribution substations require N-1 performance (with no customer interruptions in the CBD) and N performance (with best practice repair time) elsewhere in the network. The standard of service provided at customer substations is subject to customer requirements. EnergyAustralia has set utilisation targets for distribution substations which maintain loading within the cyclic rating. These targets correspond with the requirements of the licence conditions.

Utilisation, at some distribution centres, is presently above the levels required for licence compliance. EnergyAustralia has a plan which has identified the resourcing required in the period to 2014 to bring the current network utilisation into compliance and to account for organic growth in demand over the period.

2009-14 Capital Program

The AER endorsed EnergyAustralia's capital program for 2009-14 which details the requirements for an $8.5 billion capital investment program over the five year period. The capital program outlines EnergyAustralia's strategy for complying with the design planning criteria. One of the key outcomes of this significant investment program is that EnergyAustralia will comply with the design planning criteria as set out in the mandatory licence conditions. All new network elements are designed to the design planning criteria and, by 2014, all existing elements will be as compliant as reasonably practicable.

Progress Against our Plan

During 2009/10 EnergyAustralia invested over $1.32 billion on capital projects. Whilst EnergyAustralia has made progress during 2009/10 against our plan to comply with the licence conditions we have a significant challenge ahead. EnergyAustralia is forecasting a large program of investments for the 2010-14 period which is driven by the need to systematically replace a large number of ageing network assets as well as the requirement to meet the mandatory licence conditions.

EnergyAustralia's plan is to be fully compliant with schedule 1 of the Design Planning Criteria by 30 June 2014. The table below outlines our progress during the year, towards our plan of full compliance.

Estimated Percentage not currently meeting the requirements of Schedule 1

Network Element	June 2010
Subtransmission - Feeders	8.3%
Subtransmission – Substations	8.8%
Subtransmission - Total	**8.4%**
Distribution Feeders – CBD	1.1%
Distribution Feeders – Urban	5.1%
Distribution Feeders – Non urban	8.8%
Distribution Feeders - Total	**5.1%**
Distribution Substations – CBD	0.7%
Distribution Substations – Urban and Non urban	1.5%
Distribution Substations - Total	**1.5%**

Many projects to address subtransmission non compliances have a longer lead time than projects to address non compliances on other parts of the network. All long lead time projects for subtransmission elements which do not currently meet the design planning criteria are already underway.

Highlights during 2009/10:

- 49 major Area Plan Projects were authorised at a value of approximately $850 million and 22 major projects reached practical completion.
- Seven zone substations were completed during the year.
- In excess of 300 Replacement Plan projects were completed.
- $420 million was spent on distribution network projects, $57 million related to increased 11kV capacity.

Network Elements Not Complying with the Design Planning Criteria on 1 July 2010

As at 1 July 2010, EnergyAustralia is required to comply with the Design Planning Criteria for any new network element whereby planning for that network element commenced after 1 December 2007. Existing elements need to be compliant with the design planning criteria by 1 July 2014.

Whilst all existing network elements are forecast to be compliant by 1 July 2014 as required, there are some network elements that would be non-compliant now, if the Design Planning Criteria were to be applied as of 1 July 2010. These non complying network elements, including indicative network solutions, will be detailed in the 2010/11 Electricity System Development Review (ESDR) due to be published on the EnergyAustralia website by end 2010. As an example of the detail which will be available, the 2009/10 ESDR is currently on the EnergyAustralia website.

As at 1 July 2010, all new network elements complied with the Design Planning Criteria, as outlined in Tables 3.2 to 3.4.

Table 3.2 – Subtransmission Lines and Substations and Zone Substations Each Network Element or Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2010

Element including Location, Customer Numbers, Element Length and Capacity	Description of Non-Compliance and Reason	Proposed Remedial Action and Timetable
Nil[1]		

Table 3.3 – Distribution Feeder Summary Report by Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2010

CBD			
Total Number of Feeders	**Number of Feeders Without N-1 Capability (1 minute)**	**Description and Reason for Non-compliance**	**Proposed Remedial Action and Timetable**
279	Nil[2]		
Urban			
Total Number of Feeders	**Number of Feeders Without N-1 Capability**	**Description and Reason for Non-compliance**	**Proposed Remedial Action and Timetable**
1713	Nil[3]		

[1] 53 subtransmission feeders and nine zone and subtransmission substations do not currently meet the design planning criteria. EnergyAustralia is targeting 2014 for their compliance through a program of replacement, upgrading or 11kV load transfers.

[2] Three feeders do not currently have N-1 capability. General load growth and a spot load increase created the non compliance. These feeders are expected to have N-1 capability by end December 2010.

[3] 88 Feeders have been identified as not currently achieving N-1 capability. A full review of all feeders is expected by September 2011. At which time all feeders which do not meet N and N-1 capability will be identified. EnergyAustralia is targeting 2014 for all feeders to be compliant.

Non-Urban			
Total Number of Feeders	**Number of Feeders Without N Capability**	**Description and Reason for Non-compliance**	**Proposed Remedial Action and Timetable**
261	Nil[1]		

Note: Two methods for classifying distribution feeders are described in the licence conditions:

1. The security standards required by the Design Planning Criteria are based upon a classification of 'load type'. With respect to Distribution Feeders, this may be either CBD, Urban or Non-Urban, or some combination of these should a distribution feeder supply two distinct load types.
2. The reliability standards utilise an averaging method for classifying distribution 'feeder types' derived from a calculation of Maximum Demand divided by total feeder route length.

While both methods generally provide the same classification, the 'averaging method' (method 2) can occasionally produce some counter intuitive results. Accordingly, EnergyAustralia generally classifies its distribution feeders according to a classification of 'load type' (method 1). Where a distribution feeder was found to supply more than one load type, that feeder has been included in both categories. One CBD/Urban and 55 Urban/Non-Urban feeders were identified.

Table 3.4 – Distribution Substation Summary Report by Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2010

CBD			
Total Number of Substations	**Number of Substations Without N-1 Capability (1 minute)**	**Description and Reason for Non-compliance**	**Proposed Remedial Action and Timetable**
432	Nil[2]		
Urban and Non-Urban			
Total Number of Substations	**Number of Substations Without N Capability**	**Description and Reason for Non-compliance**	**Proposed Remedial Action and Timetable**
29831	Nil[3]		

[1] 23 Feeders do not have N capability. General load growth has created the non compliance. EnergyAustralia is targeting 2014 for all feeders to be compliant.
[2] In the CBD all distribution substations that are supplied by the 3 feeder triplex system are designed to the N-1 (< 1minute) security standard. There are 3 substations which are currently loaded above 100% of assigned firm rating and are currently considered non compliant for this licence condition. Proposed remedial action and timetable: Remove overload by uprating existing substations or transferring load to adjacent substations. Due for completion 2014.
[3] All Urban and Non-Urban distribution substations are design to have N capability. There are currently 455 substation loaded above 100% of assigned firm rating and are currently considered non compliant for this licence condition. Proposed remedial action and timetable: remove overload by uprating existing substations, transferring load away, new low voltage distributors or installing new substation installations. Due for completion 2014.

3.3 Demand Management

Efficient and effective consideration of Demand Management (DM) is an important part of delivering cost effective network services to customers and satisfying licence and legislative requirements. EnergyAustralia's DM process has been developed and implemented as an integral part of the Investment Governance Process to improve the effectiveness and efficiency of DM investigations.

EnergyAustralia's DM process also enables it to meet its obligations regarding the investigation of DM alternatives under the NSW Electricity Supply Act, 1995 and the conditions of its Distribution Network Service Provider Licence. In developing this process EnergyAustralia has considered the requirements embodied in the revised *"Demand Management for Electricity Distributors: NSW Code of Practice (September 2004)"* as published by Industry and Investment NSW (formerly the Department of Energy, Utilities and Sustainability), which provides guidance on the interpretation of the legislative requirements. The DM process is also designed to meet the requirements relating to DM in the National Electricity Rules.

Emerging constraints on the supply system are identified through the planning process, and published in the Annual Electricity System Development Review (ESDR) on the EnergyAustralia website. EnergyAustralia maintains a DM Register of Interested Parties, who are notified of the publication of the ESDR as well as the release of DM public consultation papers and any other related reports.

Each constraint is assessed to determine whether it is reasonable to expect that DM might prove to be cost effective. Emerging constraints that are expected to have a network augmentation solution with a capital cost of less than $1 million are not normally considered material and DM investigations are not normally pursued for these constraints.

All material constraints identified are subjected to a DM Screening Test, which is the first step in the DM process. It consists of an analysis of the drivers behind the emerging constraint, determination of the extent to which demand is driving investment and the DM requirement. This requirement is described as the approximate size, cost per kVA and nature (time of day, seasonality, etc) of the DM options that would be required to defer the proposed investment for at least one year. The test report provides the basis for a decision regarding whether it would be reasonable to expect that it would be cost effective to avoid or postpone the expansion of the network by implementing DM strategies. Once determined that DM is likely to be cost effective, a formal DM Investigation follows.

Based on the DM requirements identified in the screening test, the DM Investigation identifies possible DM options that might exist in the study area. It determines the approximate amount of DM available and the likely cost (to EnergyAustralia) of each of the identified options. Options are identified based on existing knowledge, field visits, public consultation seeking proposals from interested parties, and through discussions with specific customers. The public consultation is focussed on identifying potential options and uncovering information that is already known (by others) but otherwise unavailable to EnergyAustralia. The information is analysed using a standard approach that compares the net present value of costs for the DM alternative to the net present value of the deferral of the network expansion option. The DM Investigation report identifies and describes any feasible DM options to be considered for development alongside network augmentation options.

If a feasible DM option is determined to be the most economical solution, it is developed into a DM Project Proposal. This consists of a business case and implementation plan that outlines clear deliverables in terms of demand reduction, timing and cost. Once authorised, a DM project is implemented.

The DM Implementation strategy may include a range of implementation options including RFPs (request for proposal), standard offers, marketing programs and direct customer negotiations depending on the DM options being implemented.

The process and methodologies used are described in detail in EnergyAustralia's "Demand Management Guidelines". A summary of this process is provided in various public documents and on EnergyAustralia's website.

Over the past 12 months EnergyAustralia has undertaken the following DM activities (with further details provided in Attachment G to this report):

Addressing Network Capacity Constraints

- 29 DM Screening Tests have been completed, of which six led to opportunities for further investigation.
- Six detailed DM investigations were completed, of which five indicated cost effective DM options for development and implementation.
- Three new DM projects were authorised for implementation.
- We implemented a power factor correction program in the Willoughby area. These targeted programs raise customer awareness about the potential savings on their energy bills, in addition to offering them cost effective solutions to improve their power factor. This achieves the dual benefit of peak demand reductions on our network while also reducing energy costs for our customers.
- We continued to operate an embedded generator project at Wollombi (1MW), and initiated new generator projects at Nelson Bay and Broadmeadow.
- Network capacitors have been approved at two substation locations to provide reactive power support which will reduce demand on upstream network elements.

Metering and Tariffs

- Controlled load tariffs continue to be used to manage hot water load into off peak periods.
- Price signalling of energy costs is reflected through what is known as inclining block tariffs to domestic and business customers with induction disc meters. The block differential for 2010/11 is set at 55% for the network component of customers' tariffs. In concert with this, the retail differential creates an overall differential of 47% between the first and second block of domestics tariffs (GST included). This provides a strong signal to reduce energy consumption.
- More than 377,000 EnergyAustralia customers now have a Time of Use (ToU) capable interval meter in their home or business. These meters measure how much electricity is used over half hour intervals, compared to the standard meters that measure electricity use over a three month period.
- Around 3,300 AMI meters, which are interval meters with additional 'smart' features, are now in use in residences across EnergyAustralia's supply area. The information gathered from this process will be valuable in assisting development of the Smart Metering Infrastructure (SMI) business case.
- EnergyAustralia has been selected as the winning Smart Grid-Smart Cities bid, meaning that a substantial trial of over 50,000 AMI meters, smart technologies and innovate tariffs will be carried out over the coming three years in a number of EnergyAustralia locations. The voluntary tariffs will encourage behaviour that reduces network peak loads and conserves energy. The tariffs, currently in the planning phase, build on previous EnergyAustralia studies, and are intended to meet a broad range of stakeholder requirements. The program will provide ample data to encourage future innovative tariff offerings by Retailers throughout Australia's National Electricity Market.

EnergySave Programs

The 2009/10 EnergySave program focused on providing assistance for small business and low income customers in the face of rising electricity prices.

Helping small businesses

The Hairdressers' Downlight Replacement Program, launched at the end of 2009, offered more than 2,000 hairdressing salons across EnergyAustralia's network area the chance to gain a better understanding of their energy use and replace energy guzzling downlights for free. Salons also received a Business Energy Review which identified alternatives to make further savings on their energy bills.

EnergyAustralia's energy efficiency team received funding from the NSW Government's Energy Efficiency for Small Business Program as part of a campaign to help small business reduce their power bills and carbon pollution.

By the end of the financial year, more than 244 hairdressers had participated in the program with 179 upgrades completed and 5,898 downlights replaced. This equates to $58,516 in customer savings and 343 tonnes of greenhouse gas emissions.

Case studies
Six new business case studies were developed in 2009/10. These case studies included a restaurant, dry-cleaner, antique centre, museum and two hairdressing salons. Energy audits at the sites identified numerous opportunities for energy savings, including the replacement of electric appliances with gas models, producing one third of the greenhouse gas emissions. Lighting and implementing behavioural changes were identified as the most cost-effective ways to reduce energy use.

Educational materials
Our winter heating campaign in July 2009 included the distribution of 50,000 room thermometers with an education booklet to households with the highest penetration of portable electric heaters.

A key focus for 2009/10 was to assist residential customers from disadvantaged and culturally and linguistically diverse groups to reduce their energy use and bills. A new booklet was produced to help these customers better understand where energy is used in their home and identify energy saving actions. This booklet was translated into seven different languages and electronic copies were made available on EnergyAustralia's website.

An Educational Resources kit including a children's' storybook, activity sheet, board game and teacher's notes was developed for students in kindergarten to Year 2 to encourage them and their families to reduce overall household energy consumption. The teacher notes were developed in partnership with the Department of Education and Training to meet the requirements of the NSW Science and Technology syllabus. The material was developed following research that identified gaps in children's knowledge about how to use electricity more efficiently in their homes.

The 530 public primary schools in EnergyAustralia's network area were sent a sample kit with a letter and order form; 122 have so far ordered the materials.

Energy Efficiency Centre events
The Energy Efficiency Centre continues to be used as a venue for a range of topical energy-efficiency seminars and events attracting large numbers of key stakeholders, businesses, advisors and members of the public.

A series of themed open days were held throughout the year including "Reducing small business running costs" with leading financial and business commentator, Peter Switzer and "Eco-lighting" with the Department of Water, Heritage and the Arts, Osram Australia and PlanetArk. In response to customer demand we have also run two public seminars on clean energy solutions with renewable energy expert, Dr Mark Diesendorf.

Other events included "Your 'green' dream home" featuring leading broadcaster and writer Richard Glover and green architect and educator Caroline Pidcock. An event was also held following the NSW Government's announcement of the NSW Government's Solar Bonus Scheme to inform businesses and residents about the financial benefits under the 'gross' feed-in tariff.

The Centre has also been used by a number of internal and external parties, including industry groups, community welfare organisations, government bodies and local councils to host their own energy and sustainability events.

4 ASSET MANAGEMENT

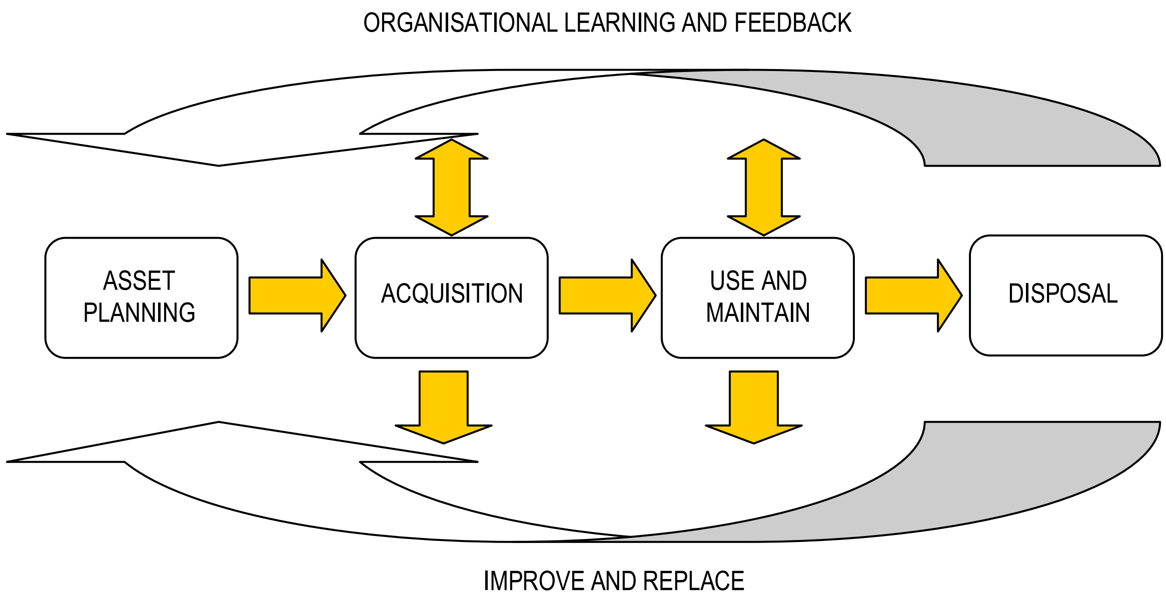
4.1 Overview

EnergyAustralia's philosophy is that an integrated asset management system forms the backbone of an effective service delivery program. We believe that through the integration of all facets of asset management, including design, procurement, maintenance activities, renewals/replacements, capital investment, condition monitoring and continuous improvement, EnergyAustralia will deliver our business and strategic objectives. These objectives are established and documented in our Network Maintenance Plan.

The service delivery program is essential to preserve the engineering integrity of assets and their continued fitness for use within the electrical system. This will enable EnergyAustralia to meet its commercial obligations and statutory responsibilities under the Electricity Safety Act and Occupational Health and Safety Regulation.

The asset management strategies, models and processes adopted by EnergyAustralia are consistent with the elements of a total asset management system as identified in the NSW Government's Total Asset Management (TAM) Manual. EnergyAustralia's Asset Management Model recognises four distinct but overlapping phases in the asset life cycle as depicted in Figure 2.

Figure 2 – EnergyAustralia's Asset Management Model



The key phases and major associated processes with EnergyAustralia's Asset Management Model are:

1. Identification of the need for an asset (Asset Planning)

The key processes leading to a business case are business planning and analysis. These provide the economic justification for the acquisition or improvement of an asset, or in some cases the adoption of another, non-asset solution to meet the business requirement.

The economic impacts of these strategic asset investments are assessed using repair/replace and OPEX/CAPEX trade-off modelling. The output of the Asset Planning process is evidenced in the Areas Plans and Replacement plans which form part of the Regulatory Proposal provided to the Australian Energy Regulator (AER). This document is made publicly available on the EnergyAustralia website.

2. ***Provision of the asset, including its refurbishment (Acquisition)***
   Processes relevant to this phase include full and accurate specification of requirements, systems engineering and quality assurance processes and procedures. These processes verify and validate the final design or delivered product against the specified requirements. Additional processes ensure that project objectives are achieved with minimum risk

3. ***Operation of the asset, including its maintenance (Use and Maintain)***
   Many of the activities performed within this phase rely directly on the planning and analysis carried out during the acquisition phase. These include determining maintenance and support requirements through the application of specialised analysis techniques, and providing documentation, training and facilities to support maintenance and repair actions. This phase covers all routine and programmed maintenance as well as developing and implementing engineering changes and improvements to either enhance asset performance or to reduce costs or both.

   A key element of the asset management task during this phase is engineering management, particularly the documentation of asset configuration and control and approval of engineering changes.

   EnergyAustralia's processes cover a set of systems and procedures for engineering and maintenance management as well as asset information systems, enabling managers to plan and control workload and to evaluate results. Cost and defect rate information relating to individual assets is a key element in the ongoing analysis of performance and forms an integral part of the organisation wide continuous improvement process. This is essential to the continuity of funding from the regulator (AER) to ensure that reliability and safety standards are met.

4. ***Disposal, and thus effective removal of the asset from EnergyAustralia's portfolio (Disposal)***
   Requirements for disposal are incorporated from the earliest stages of asset planning, to ensure that a superseded item and support provisions are removed from service at the earliest possible time, thereby minimising management and storage costs and impact on the value of inventory. The costs of disposal is recognised and provided for in the acquisition budget. Costs associated with the maintenance of these assets are also removed from the asset base when determining future asset operation (OPEX) budget needs.

   Disposal activity can have an important bearing on safety and continuing support costs, as well as significant implications for environmental and/or heritage management.

EnergyAustralia has developed and implemented a series of policies and systems setting out specific management processes and requirements for implementation within each phase of the asset life cycle. The primary purpose is to establish an asset management system to support EnergyAustralia's commercial and statutory responsibilities.

EnergyAustralia is committed to efficient asset investment, which incorporates effective maintenance of our assets and efficient operation of the network. We seek to continuously review and improve our asset management performance through:

- assessing and improving load forecasting techniques;
- identifying critical assets in need of replacement;
- implementing condition-based maintenance practices;
- facilitating effective joint planning with other networks to minimise overall costs of investments;
- improving transparency of decision making to demonstrate prudence of investments;
- taking a pro-active role with the regulators to develop new Demand Management techniques; and
- developing new strategies to deliver improved network reliability.

4.2 Technical Service Standards

EnergyAustralia published its latest version of Electricity Network Operation Standards (ENOS) in June 2009. The document sets out standards of service customers can expect from EnergyAustralia's network.

Electricity delivered by EnergyAustralia's network has particular characteristics including some interruptions to supply caused when powerlines are damaged by storms, bushfires and accidents. It is considered normal for power supply to fluctuate. However, electricity users can take steps to minimise the possible effects of inevitable supply variations. The ENOS document sets out helpful hints for customers to mitigate the impact of supply variations. ENOS suggests customers look at the ENA Customer Guide to Electricity Supply for further information. The Guide is available on EnergyAustralia's website.

EnergyAustralia's objective is to achieve the best possible overall 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, EnergyAustralia makes all reasonable and practicable efforts to ensure that in any financial year, it meets the targets set by Industry and Investment NSW, in respect to reliability standards and individual feeder standards.

Technical information relating to service standards of EnergyAustralia's network and supply commitments can be found on the EnergyAustralia website www.energy.com.au or through the EnergyAustralia Contact centre on 13 15 35.

EnergyAustralia updated and published its document ES1 *Customer Connection Information*, including customer connection application forms, in June 2010. These forms are the basis for EnergyAustralia's assessment of the customer load and equipment connected to its network, in the context of supply quality. Customer equipment connected to the EnergyAustralia network can cause significant impact to its network as well as to other customers at the point of common coupling (PCC). This is simply due to the fact of drawing non-linear currents from the network which then distorts the supply voltage waveform. Hence, the assessment of customer equipment at its connection point has been paramount in order to sustain a quality of supply throughout the EnergyAustralia network.

EnergyAustralia's power quality assessments are based on the Australian standards AS/NZS 61000.3.6 for harmonics and AS/NZS 61000.3.7 for voltage fluctuations.

4.3 Quality of Supply

Quality of supply is a complex issue involving interactions between recognised standards, manufacturers, transmission and distribution networks, regulators, stakeholders and customers. It encompasses customers' equipment, load characteristics, modes of operation and the electrical installation.

EnergyAustralia adopted an industry leadership role as the convenor of the ESAA National Power Quality Group, which has now been reconstituted as the Energy Networks Association (ENA) National Reliability and Power Quality committee (RPQC). EnergyAustralia has appointed a senior manager and an engineer who have strong Power Quality (PQ) background as its representatives on this working group.

In addition, EnergyAustralia is one of the key participators in research work undertaken by the Integral Energy Power Quality and Reliability Centre based at the University of Wollongong. EnergyAustralia also actively participates in the Standards Australia EL034 Power quality Standards committee, and has two EnergyAustralia employees nominated as ENA representatives in the committee.

The ENA National Reliability and Power Quality Committee (RPQC) is a national body, working co-operatively in the areas of power quality and reliability issues that may affect customers. The RPQC seeks to find opportunities to assist the industry in the pursuit of improvements to the reliability and power quality to its customers.

4.3.1 Power Quality Management Plan

In last year's report, it was indicated that EnergyAustralia had reviewed its power quality management strategy and identified key areas of development of managing future supply quality issues in EnergyAustralia. During this year, a detailed project management plan was developed and implementation commenced.

The objectives of this project include:

- To provide a consistent process, across all of EnergyAustralia, to assess new customer connections and network alterations that may impact on network power quality for all sites and equipment wherever possible.
- To provide a data repository capable of storing power quality monitoring data through a combination of information sources from systems such as smart tariff meters and dedicated power quality monitors.
- Expand capabilities for monitoring power quality i.e. additional meters covering a combination of sites.
- To develop a harmonics and voltage fluctuating modelling capability to support assessments of new customer connections and alterations.

The advancement of this project is continuing and the following key activities have been completed during this reporting year.

- Establishment of customer harmonic/flicker allocation process. This process focused on LV and MV customers.
- Guideline for managing power quality emission limits for major customer connections
- Developed a flicker level calculator which assists evaluating possible flicker levels at the PCC due to disturbing loads.
- Established a metering test bed at Mason Park substation which consists of four class A power quality meters from different vendors. These meters are connected to the EnergyAustralia PINC network which transmits to the central server in EnergyAustralia's data centre. Presently, the performance of these meters and its software are being evaluated against a number of criteria, prior to commencement of a large scale roll out.

4.3.2 EnergyAustralia's Power Quality Monitoring Program

EnergyAustralia's power quality monitoring program was established in 2000/01, as a long term project with six sophisticated power quality monitoring instruments installed at significant sites on EnergyAustralia's subtransmission and distribution high and low voltage network. Two monitors have been installed on the low voltage (LV) network and four monitors on the high voltage (HV) network. In addition to the six dedicated power quality monitors, EnergyAustralia uses up to 50 revenue meters that have power quality monitoring to obtain power quality data for the Long Term National Power Quality Survey (LTNPQS).

As indicated in the item 4.3.1.1, installation of trial PQ monitors from a variety of vendors and relevant communication protocols has been completed and EnergyAustralia is presently evaluating its functionality and robustness within the EnergyAustralia network. Having evaluated and selected a suitable vendor, specification and release of contract to complete installation at approximately 40 sites can then begin. These sites were identified as distribution-transmission boundary points and connection points to other registered participants.

4.3.3 Distribution Monitoring and Control program

The Distribution Monitoring and Control (DM&C) project started in mid 2009 which focused on providing remote control and data pooling for EnergyAustralia 11kV/415V distribution centres, by installing new smart devices. More than 1,100 smart devices have now been installed across EnergyAustralia's network. Essentially, these smart sensors would help reduce the length of time to restore supply during outages by narrowing down the fault location that caused the outage.

Installation of enhanced DM&C devices will commence soon. These devices will be able to provide power quality data including steady state voltage, unbalance and harmonics, which would help understand the network performance in terms of power quality. This data can be used to monitor and analyse supply quality parameters in the network and shall assist in the decision where and when more accurate supply quality meters should be installed.

4.3.4 Performance Data

EnergyAustralia's power quality monitoring survey data is summarised and analysed in four key Power Quality (PQ) disturbance types:

- Steady state voltage;
- Voltage unbalance;
- Voltage harmonics; and
- Voltage sags.

A very large quantity of data is gathered during the survey process. It takes several months for the University of Wollongong to analyse and produce a report after each survey period (based on the financial year) has finished. For this reason the 2009 report was based on the data surveyed during the 2007/08 financial year; similarly this year's report is based on the PQ data survey during 2008/09 financial year. Therefore, the actions that have been taken to address the issues on exceeding targets for 2010 report will only be reflected in next year's report.

For the financial year 2008/09, EnergyAustralia was able to analyse the PQ data for most of the 41 sites that were monitored, i.e. 27 LV sites and 13 MV sites. Due to retail contestability, some sites were lost to different retailers, so that replacement sites were chosen within the EnergyAustralia franchise area. The LTNPQS report analyses PQ performance for steady state voltage, voltage unbalance and harmonics (there is no standard defining sag limits at present).

Based on targets stated in LTNPQS report, the majority of sites surveyed met all targets. Four LV sites were found to have exceeded the upper limit for 95th percentile values[1] in relation to the steady state voltage magnitude.

The voltage unbalance assessment is based on 95th percentile and the limit for 10 minute readings of LV voltage unbalance (defined in Table S5.1a.1 of the National Electricity Rules) is 2.5% for LV and 2% for MV. One LV site was found to exceed the voltage unbalance limit whereas all MV sites surveyed met the target.

The assessment of Total Harmonic Distortion (THD) is based on 95th percentile and the limit for LV and MV is specified in Table 1 of AS/NZS61000.3.6:2001 which is 8%. All LV and MV sites surveyed met the target.

EnergyAustralia recognises that the LTNPQS result for steady state voltage ranges and LV voltage unbalance indicates that corrective action to generally reduce voltage levels appears to be required and this will be evaluated in the context of EnergyAustralia Power Quality Management plan with a review of a potential migration from 240V midpoint to 230V mid point voltage range. This review will be undertaken over the next year and the outcome will be outlined in next year's report.

4.3.4.1 Changes Since Last Year (Trending)

EnergyAustralia provides the percentage of sites exceeding PQ limits information as an indicative assessment only of how EnergyAustralia network is performing in relation to steady state voltage, harmonics and unbalance, compared to previous years.

[1] Voltage 95th percentile ($V_{95\%}$) – the 95th percentile voltage provides an indication of the light-load voltage at a site. $V_{95\%}$ is expressed in per unit with nominal voltage (240V) as the base.

Voltage 5th percentile ($V_{5\%}$) – the 5th percentile voltage provides and indication of the heavy-load voltage at a site. $V_{5\%}$ is expressed in per unit with nominal voltage (240V) as the base.

Last year, EnergyAustralia reported that 10 LV sites were found to have exceeded the upper limit for 95th percentile values in relation to the steady state voltage magnitude based on ENOS targets and one LV site was found to exceed the voltage unbalance limit of 2.5%. This year, four sites have exceeded the limit in relation to the steady state voltage and one LV site was found to exceed the limit. Most of exceeded LV sites have marginally exceeded the 240V+6% (254.4V) at 95th percentile steady state voltage. The maximum LV steady state voltage at 95th percentile is 256.1 V which is about 0.67% above the limit.

The following table outlines the trend of percent of sites exceeding limits from 2007/08 to 2008/09.

Table 4.0 – Percentage of Sites exceeding limits

Indices		LV Sites		MV sites	
		2007/08	2008/09	2007/08	2008/09
Voltage	V High ($V_{95\%}$)	29%	15%	0%	0%
	V Low ($V_{5\%}$)	0%	0%	0%	0%
Unbalance	VUF	3%	4%	0%	0%
Harmonics	THD	0%	0%	0%	0%

Note: As only as small number of sites are analysed and the actual sites surveyed may vary from year to year, trend data should be treated as indicative only.

4.3.4.2 Future Initiatives

EnergyAustralia will be continuing its implementation of its Power Quality Management Plan as outlined in the section 4.3.1.1 above.

4.4 Distribution Reliability

Distribution network indices and associated methodologies are defined in Attachment A.

4.4.1 Overview

This report has been prepared in accordance with the 'Design, Reliability and Performance licence conditions' imposed by the Minister for Energy and Utilities on 1 December 2007 and the standards issued by the 'Steering Committee on National Regulatory Reporting Requirements' (SCNRRR).

Two related indices are applied when reporting reliability. The first, SAIDI, is commonly referred to as the "Reliability Index" and represents the average number of customer minutes lost by all network customers. SAIFI represents the average number of interruptions for all customers.

The following notes relate to the reporting system issues outlined in Note 1 Attachment A to this report.

EnergyAustralia had implemented a new Outage Management System (OMS) in July 2007 linked to the Geographic Information System (GIS) to mitigate the accuracy and integrity issues highlighted in the Review of NSW Distribution Network Service Providers Measurement and Reporting of Network Reliability prepared for IPART by PB Associates.

The new OMS utilises the links between customers and assets in the GIS and records outages linked to customer calls and SCADA indications. The new OMS mitigates most of the issues noted in the Summary section of the PB Associates report.

The classification of EnergyAustralia's approximately 2,000 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 throughout the year new feeders are classified at the time of commissioning.

Reliability reporting uses the IEEE methodology for defining Major Event Days as outlined in the Design, Reliability and Performance licence conditions.

There are two instances where EnergyAustralia departs from the Definitions detailed in Attachment A to this report – departures in relation to Notes 2 and 3 of Table A.1 Reliability Measures.

Note 2 – EnergyAustralia measures and records customers affected and the customer base on a daily basis. Reliability performance indices are calculated on a daily basis rather than using the average of the number of customers at the beginning and the end of the reporting period. The daily calculation method provides a more representative customer performance at the time of the event. This had not been possible until the new OMS system was introduced.

Note 3 – EnergyAustralia does not exclude inactive accounts. There are natural time delays in updating customer account details into the real-time OMS, particularly where EnergyAustralia relies on information from other electricity Retailers. EnergyAustralia 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.

The performance for each feeder category and the organisational performance overall are detailed in section 4.4.2. Organisational trends are detailed in section 4.4.3 and feeder category performance trends are detailed in section 4.4.4, including commentary on excluded events in section 4.4.5. Finally, the Individual Feeder performance for the year is detailed in section 4.4.6.

4.4.2 Organisational Detailed Performance Current Year

Reliability data sets for SAIDI and SAIFI are reported for the whole organisation and for each feeder category in Table 4.1.

Table - 4.1 – Organisational Detailed Performance 2009/10

Sustained Interruption Data Sets	Whole Organisation and Feeder Category				
	ORG[1]	CBD	Urban	Short Rural	Long Rural
Customer Numbers[2]	1,603,514	29,702	1,393,173	178,128	2,511
SAIDI					
Overall[3]	103.86	47.11	85.46	254.82	538.87
Planned	15.77	8.97	10.80	56.66	81.46
Unplanned[4]	87.33	38.14	73.99	196.58	457.39
Normalised Unplanned[5]	79.05	38.14	66.70	179.08	443.63
SAIFI					
Overall[3]	1.22	0.13	1.07	2.40	3.90
Planned	0.05	0.02	0.01	0.17	0.31
Unplanned[4]	1.12	0.11	1.01	2.18	3.60
Normalised Unplanned[5]	1.05	0.11	0.95	2.05	3.52

Notes

1 Refers to the average performance of the organisation overall.

2 Customer numbers as at the end of June 2010 for the purposes of reliability indices only. Refer to Table 1.1 for the total of customers served.

3 Overall performance represents the total performance experienced by our customers, irrespective of cause or origin of the fault.

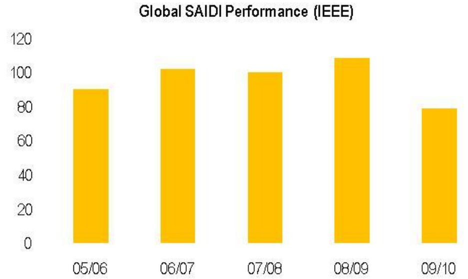
4. Planned and Unplanned performance is the Distribution Network Interruptions (DNI) that have all the excluded interruptions removed, except for Major Event days, as defined in Attachment A, in accordance with the 'Steering Committee on National Regulatory Reporting Requirements' (SCNRRR) standards ie excludes TransGrid and load shedding events, Emergency Services instructed events, momentary interruptions and interruptions caused by a customer installation failure.

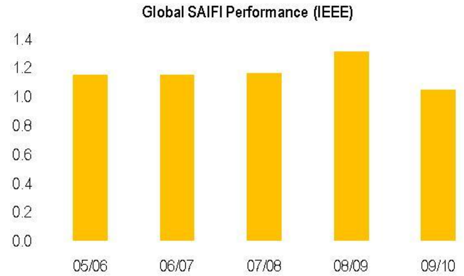
5. Normalised Distribution Network (NDN) performance is the DNI performance with the Major Event Days excluded, and represents the events that EnergyAustralia is expected to manage and are responsible for. The Major Event Days that have been excluded are defined in section 4.4.5.

4.4.3 Organisational Performance (Normalised) Trend

Table - 4.2 – Organisational Performance Trends (Normalised)					
	2005/06	2006/07	2007/08	2008/09	2009/10
SAIDI	90.2	102.0	100.3	108.5	79.0
SAIFI	1.15	1.15	1.16	1.31	1.05

Table 4.2 data representing SAIDI and SAIFI is also shown graphically below.





2009/10 reliability performance has been exceptionally good in comparison with 2008/09. However, over the longer term, the 2009/10 year reflects, along with relatively benign weather for 2009/10, a return to more normal variations around longer term underlying reliability performance trends.

4.4.4 Feeder Category Performance (Normalised) versus Targets Trend

The 2009/10 CBD category has performed well against the Reliability Standards. Note that CBD category outcomes can exhibit wide variability from year to year due to the low customer base. The results for the Urban, Short and Long Rural feeder categories for 2009/10 were all within the reliability standards.

Table - 4.3 – CBD Feeder Performance (Normalised) Trend					
	2005/06	2006/07	2007/08	2008/19	2009/10
SAIDI					
Actual	13.00	13.04	8.07	41.71	38.14
Reliability Standard	60	57	54	51	48
SAIFI					
Actual	0.20	0.17	0.04	0.55	0.11
Reliability Standard	0.35	0.34	0.33	0.32	0.31

Table - 4.4 – Urban Feeder Performance (Normalised) Trend					
	2005/06	2006/07	2007/08	2008/19	2009/10
SAIDI					
Actual	68.50	77.56	84.83	93.55	66.70
Reliability Standard	90	88	86	84	82
SAIFI					
Actual	0.96	0.96	1.04	1.15	0.95
Reliability Standard	1.30	1.28	1.26	1.24	1.22

Table - 4.5 – Short Rural Feeder Performance (Normalised) Trend					
	2005/06	2006/07	2007/08	2008/19	2009/10
SAIDI					
Actual	336.50	290.0	219.26	217.25	179.08
Reliability Standard	400	380	360	340	320
SAIFI					
Actual	3.32	2.76	2.16	2.44	2.05
Reliability Standard	4.40	4.20	3.90	3.70	3.40

Table - 4.6 – Long Rural Feeder Performance (Normalised) Trend					
	2005/06	**2006/07**	**2007/08**	**2008/19**	**2009/10**
SAIDI					
Actual	342.20	1,093.47	543.27	608.69	443.63
Reliability Standard	900	860	820	780	740
SAIFI					
Actual	3.30	5.64	4.08	4.34	3.52
Reliability Standard	8.50	8.00	7.50	7.0	6.50

Note that Long Rural category outcomes can exhibit wide variability from year to year due to the low customer base.

Excluded Events

Excluded interruptions for the reporting period have been listed in Table 4.7 with a description of the basis on which the event met the exclusion criteria. The criteria for excluding events are outlined in Attachment A of this report

Major Event Day T_{MED}

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 2009/10 value of T_{MED} used in preparing Table 4.7 was 3.20 SAIDI per day.

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**
5 October 2009	Major Event Day Due to lightning activity resulting in an outage on the 132kV system	62,514 (54,230 customers interrupted due to the lightning caused event)	117 minutes (The lightning caused event max duration only)	4.44 SAIDI (3.86 SAIDI due to the lightning caused event)	**Exceeds T_{MED}**
20 November 2009	Major Event Day Due to poor weather across the EnergyAustralia network area	74,569 (Across 197 events on 20 Nov 09)	900 minutes (99 customers restored after 11kV Lightning Arrester failure during storm)	4.16 SAIDI	**Exceeds T_{MED}**

Note: Maximum duration means the time until the last high voltage feeder section is restored (not the last customer), which may involve a service failure which has not been reported.

4.4.5 Individual Feeder Reliability Performance

The performance objectives for organisational average performances for each feeder category are not sufficient to identify when customers on a particular feeder experience unsatisfactory reliability performance. For this reason, SAIDI and SAIFI criteria (after 'excluded interruptions' are disregarded), act as a trigger for investigation and exception reporting purposes.

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 ministerially imposed licence conditions for each feeder type.

Table - 4.8 – Individual Feeder Standards for Exception Reporting				
	Feeder Type			
Category	**CBD**	**Urban**	**Rural short**	**Rural long**
SAIDI	100	350	1,000	1,400
SAIFI	1.4	4.0	8.0	10.0

Performance outside this range results in the following actions:

(a) immediate investigation of the causes for each feeder exceeding the individual feeder standards;

(b) by the end of the quarter following the quarter in which the feeder first exceeded the standard, complete an investigation report identifying the causes and action required to improve the performance;

(c) complete any operational actions identified in the investigation report to improve the performance of each feeder to the *individual feeder standards* by the end of the third quarter following the quarter in which each feeder first exceeded the *individual feeder standards*;

(d) where the investigation report identifies actions, other than operational actions, required to improve the performance of each feeder to the *individual feeder standards*, develop a project plan, including implementation timetable, and commence its implementation by the end of the second quarter following the quarter in which the *feeder* first exceeded the *individual feeder standards*;

Summarised performance against the above licence conditions is shown in Table 4.9.

Table 4.9 – Individual Feeder Performance against the Standard				
	Feeder Type			
	CBD	**Urban**	**Short Rural**	**Long Rural**
Feeders (Total Number)	52	1713	257	4
Feeders that Exceeded the Standard during the Year	15	88	8	0
Feeders Not Immediately Investigated	0	0	0	0
Feeders Not Subject to a Completed investigation report by the Due Date	0	0	0	0
Feeder Not having Identified Operational Actions Completed by Due Date	0	1	0	0
Feeders Not having a Project Plan Completed by Due Date	0	0	0	0

The operational action which had not been completed within the specified time frame is now complete.

The details of currently poor performing feeders are shown in the Tables 4.10 through to 4.13, which are included as Attachment H.

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

EnergyAustralia has an ongoing reliability improvement program in place. The program targets those feeders that have exceeded or are approaching the Individual Feeder Standards as outlined in Schedule 3 of the Design, Reliability and Performance licence conditions.

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.

4.5 Transmission Reliability

Transmission network indices and associated methodologies are defined in Attachment B.

4.5.1 Transmission Reliability Performance Data

Table 4.14 – Transmission Circuit Availability (%) Trend					
	2005/06	2006/07	2007/08	2008/09	2009/10
Circuit Availability (Per cent)	98.39	97.00	97.19	97.98	96.67

Notes:
1. A measure of the circuit availability compared to the total if no outages had occurred.
2. Outages will occur for maintenance purposes and thus 100% is inherently unachievable.

This year's transmission availability is lower than last year, with a 1.3 per cent decrease in availability. This is due in part to a large number of long duration outages associated with a major replacement programs, including a number of distance relay replacements and circuit breaker replacements. Such outages are typically of three weeks duration and have a long recall time.
There were also a significant number of long outages for the repair of aging oil / gas filled cables, with the repair of such cables typically taking at least a month.

Table 4.15 – Network Reliability Trend						
Network Reliability (Off Supply Event Numbers)	Objective	2005/06	2006/07	2007/08	2008/09	2009/10
Measure A		-	-	-	-	-
Measure B		-	-	-	-	-
Measure C		3	2	6	1	0

There were no transmission related loss of supply events this year, which is an improvement over last year's result of one event.

Table 4.16 – Outage (Un-Planned) Average Duration (Minutes) Trend					
	2005/06	2006/07	2007/08	2008/09	2009/10
Outage Duration (Minutes)	2,460	2,911	3,924	3,279	2,291

The average unplanned outage duration is significantly lower than last year's reporting period. As with the previous year, the unplanned outage duration is due largely to a number of long duration outages associated with the repair of failed oil/gas insulated cables. The most notable of these have been the repair of a leak in the gas filled cable 908/909, which took four weeks, as well as the repair of 202, which took five weeks.

Table 4.17 – Connection Point Interruptions (Unplanned) 2009/10		
Connection Point	Interruption Number	Interruption Duration Total (Minutes)
326 (ICI Banksmeadow)	17/02/2010 10:11	58
357 (ICI Springvale)	17/02/2010 10:11	59
362 (ICI Springvale)	17/02/2010 10:11	63

Notes:
1. This table provides a listing of customer connection points off supply events.
2. Events included in this list may have been excluded (in accordance with Attachment B) from the data shown in Table 4.15.

There were three connection point interruptions in the 2009/10 period, all associated with the same event (the trip of a 33kV busbar at Bunnerong 132/33kV substation, which tripped three feeders going to ICI). The duration of interruption was approximately one hour per feeder.

Table 4.18 – Connection Point Numbers 2009/10	
Number of Connection Points (Total Number)	17

EnergyAustralia has five transmission customers, supplied from 17 connection points.

5 NETWORK SAFETY

5.1 Overview

EnergyAustralia 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 in an extract from our Network Management Plan.

Safe operation of the network

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

EnergyAustralia 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 Plan. The planned programs of work documented in our Duty of Care Plan are a key organisational safeguard against network safety risk.

In addition to these planned asset-related programs of work, EnergyAustralia 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; and
- formal safety procedures and systems applicable when working on or near the network. This has both network safety and workplace safety implications.

Workplace safety

EnergyAustralia has workplace safety obligations to its staff and contractors under the *Occupational Health and Safety Act 2000* (NSW) (*NSW OH&S Act*) and the *Occupation Health and Safety Regulation 2001* (NSW) (*OH&S Regulation*). Successful implementation of workplace safety processes and procedures also has an impact, more generally, on network safety and contributes to the safe operation of the network.

EnergyAustralia has numerous policies and procedures in place to ensure safe work practices. EnergyAustralia 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.

One of EnergyAustralia's initiatives is the "PeopleSafe" workplace program. This program has two key objectives:

- the health, safety and welfare of all staff while they are at work; and
- ensuring that people other than our staff are not exposed to unacceptable risks to their health and safety in connection with EnergyAustralia's network operations.

Our "PeopleSafe" policy is based on:

- eliminating or controlling any reasonably foreseeable occupational health and safety risks;
- a commitment to consultation with staff to enable them to contribute to decisions affecting their health, safety and welfare at work;
- ensuring the design, supply and use of plant and substances at work is safe and without risks to health when used properly;
- education and training programs to ensure staff and contractors are equipped with sufficient information to ensure their health and safety;
- preventing occupational injury and illness by all reasonable, practicable means;
- providing timely and cost effective injury management to promote early return to duties;

- maintaining a workers' compensation self-insurer licence;
- complying with the OH&S Act and OH&S Regulation, and maintaining an OH&S system that complies with Australian Standard AS/NZS 4801;
- adopting best practice standards where legislation or mandatory standards do not exist; and
- promoting community awareness of safety issues, through public education campaigns.

EnergyAustralia'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 OH&S Act and OH&S Regulation, which require employers such as EnergyAustralia to identify foreseeable hazards, assess the risks of these hazards and eliminate or control these risks and review these controls.

Within our Network Management Plan EnergyAustralia publishes a chapter on Public Electrical Safety Awareness to educate 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). EnergyAustralia 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 EnergyAustralia;
- competency-based training (based on relevant national training packages and in accordance with the principle outlined in Section 7 of the National electricity Network Safety Code "ENA NENS 01 - 2006");
- induction training for all new employees (both employees and contractors) is carried out in accordance with our Quality, Safety, Health and Environmental Management System;
- accreditation of service providers undertaking contestable work meets Code of Practice Contestable Works standards (and other applicable schemes) administered by the Office of Fair Trading;
- reporting of accidents and incidents – as specified by Industry & Investment NSW under the Significant Electrical Network Incidents reporting system (including those required under the Electricity (Consumer Safety) Regulation 2006); and
- reporting of customer installation incidents to the Office of Fair Trading (in accordance with the Electricity (Consumer Safety) Act 2004).

5.2 Serious Electrical Network Accidents (Public)

EnergyAustralia reported four Serious Electricity Network Accidents involving the public in 2009/10, as summarised in Table 5.1. Of these incidents, all were classified as Serious Electrical Accidents as they involved electricity. This figure is comparable with previous years. Fortunately none of the 2009/10 Serious Electrical Accidents involved fatalities.

These Serious Electricity Network Incidents are analysed by EnergyAustralia to form 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.

EnergyAustralia 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 – Serious Electricity Network Accidents (Public)Trend					
Category	**2005/06**	**2006/07**	**2007/08**	**2008/09**	**2009/10**
Non-Fatal	3	4	5	2	4
Fatal	1	-	-	-	-

Incident 1 – Padstow 15 August 2009

It is highly likely that unknown person(s) may have been injured when entry was forced to a live EnergyAustralia substation in Mavis Street, Padstow. The substation supplied an industrial premises which was abandoned after a fire. It is believed that while removing copper assets inside the substation, the person(s) caused an explosion when a hacksaw was used to cut into a live 11kV cable inside a cable chase under the floor of the substation.

The person(s) responsible had fled by the time EnergyAustralia staff had arrived to investigate. The subsequent outage affected Bankstown-Lidcombe Hospital for approximately 2 hours.

The preventative actions arising from the incident investigation are:

- Conduct an investigation into the feasibility of installing high visibility signage/stickers across equipment in substations affected by fire.
- Conduct an investigation into the feasibility of installation of monitored security alarms at similar substations in industrial areas.
- The existing program to upgrade substation locks to be accelerated at similar substations in industrial areas.
- EnergyAustralia has commenced a public awareness campaign warning against dangers of entering substations and stealing copper.

Incident 2 – Revesby 20 August 2009

A roofing contractor was working around the point of attachment at a residence at approximately 3.4m above ground when he came into contact with an exposed line tap. The line tap covers were aged and brittle and in a poor condition. He received an electric shock and fell to the ground, breaking one ankle.

The preventative actions arising from the incident investigation are:

- EnergyAustralia will assess the need to implement an awareness program specifically targeted at roofing contractors in relation to compliance with WorkCover's Code of Practice "Work Near Overhead Power Lines".

Incident 3 – Padstow 24 September 2009

It is highly likely that unknown person(s) were injured after forcing entry and starting a fire at an EnergyAustralia substation in Mavis Street, Padstow. While removing copper assets inside the substation, the person(s) caused an explosion after opening the top lid of a live 11kV Ring Main Isolator. The resulting arc ignited the insulating oil that had been drained out of the 11kV isolator and one of the two 11kV/415V transformers and had spread out across the outdoor substation yard.

The person(s) responsible had fled by the time NSW Fire Brigade & EnergyAustralia staff had arrived to investigate. The subsequent outage affected Bankstown-Lidcombe Hospital for approximately 1 hour and 40 minutes.

The preventative actions arising from the incident investigation are:

- Conduct an investigation into the feasibility of installing high visibility signage/stickers across equipment in substations affected by fire.
- Conduct an investigation into the feasibility of installation of monitored security alarms at similar substations in industrial areas.
- The existing program to upgrade substation locks to be accelerated at similar substations in industrial areas.

- EnergyAustralia has commenced a public awareness campaign warning against dangers of entering substations and stealing copper.

Incident 4 – Kooragang Island 3 May 2010

A truck driver was injured when he raised his tipper rear trailer making contact with the 33kV overhead line above in Greenleaf Rd, Kooragang. The driver was standing/moving between the cab and road at the time the overhead line was contacted resulting in earth fault current flowing through his body.

The preventative actions arising from the incident investigation are:

- EnergyAustralia is planning to expand its Public Electricity Safety Campaign to target tip truck operators and haulage companies.
- EnergyAustralia intends to formally correspond with Newcastle City Council, DECCW and the EPA to advise that the practice of dumping residual product along public roads in Kooragang Island is occurring and that steps are taken to stop this practice.

Incident from previous reporting period

EnergyAustralia had one non-fatal accident that was still under investigation at the time the 2008/09 Electricity Network Performance Report was produced. The incident investigation has subsequently been finalised.

Incident – Edgeworth 11 May 2009

An EnergyAustralia steel street lighting pole had fallen causing injury to the right hand of a young boy (Approx. 13 years). A call was received by EnergyAustralia dispatch at 18:25 and emergency staff attended the site at 18:45. The site was made safe to avoid any further potential danger. The boy was on his way to hospital as EnergyAustralia emergency staff arrived.

EnergyAustralia's pole inspection contractor Bilfinger Berger Pty Ltd commenced pole inspections from 1st January 2009. Investigations have found that the pole that fell had been inspected by the contractor on 12 February 2009. At the time of the incident the contractor's written procedure did not require a defective pole to be automatically sleeved at the time it was identified as requiring replacement. The pole was listed for replacement within 12 months.

The preventative actions arising from the incident investigation are:

- All poles that were inspected by Bilfinger Berger Pty Ltd from 1 January 2009 that were found to be defective have been re-visited, re-inspected and have been retrofitted with a securing sleeve.
- The work instructions and procedures for Bilfinger Berger Pty Ltd have been modified to include the process of immediately sleeving a defective pole when it has been identified as requiring replacement.
- All pole inspection contractors have been made aware of the requirement of sleeving and contract performance monitoring has been amended to audit reporting performance.

5.3 Actionable Electricity Network Safety Incidents (Public)

EnergyAustralia utilises the Significant Electricity Network Incident (SENI) reporting scheme to document actionable safety incidents.

An actionable safety incident is an incident, which is not a serious electricity network accident, involving the electricity network, but where there was a significant risk that a person (employee or member of the public) could have been seriously hurt by that incident, and meeting any of the following criteria:

- the circumstances of the incident indicate that there is a duty of care to inform other network operators who may need to act to properly to control a risk of serious injury (e.g. design defect in network equipment which may cause explosion or risk serious injury); or
- the risks indicated by the incident, and the probability of occurrence of the incident, are such that, in order to properly manage the safety risks, the network operator needs to modify its Network Management Plan or any standards, procedures, systems or other documents required to be implemented under that plan.

EnergyAustralia reported one Actionable Electricity Network Safety Incident in 2009/10. The number of Actionable Electricity Network Safety Incidents has remained low over recent years and EnergyAustralia considers this to be a significant trend.

It is EnergyAustralia's policy and commitment to protect customers and the community and raise their awareness of the dangers associated with electricity.

Table 5.2 – Actionable Safety Incidents (Public) on the Electricity Network Classified by Network Element Trend

Category of Incident	2005/06	2006/07	2007/08	2008/09	2009/10
Overhead Mains in Position	-	-	-	-	-
Overhead Mains Fallen	-	-	-	-	-
Overhead Service in Position	-	-	-	-	-
Overhead Service Fallen	-	-	-	-	-
Underground Mains	-	-	-	-	-
Underground Service	-	-	-	-	-
Street Light Fitting or Support	1	-	-	-	-
Cable Boxes, Pillars and Service Cabinets	-	-	-	-	-
Substation (Excluding Pole-type) – Fire and/or Explosion	-	-	-	-	-
Substation (Excluding Pole-type) - Other	-	-	-	-	-
Substation (Pole-type) - Fire and/or Explosion	-	-	-	-	-
Substation (Pole-type) - Other	-	-	-	-	-
Poles Columns or Towers	-	-	-	-	1
Air Break Switches	-	-	-	-	-
Pole Mounted Equipment (Reclosers, Drop Out Fuses, etc)	-	-	-	-	-
Service Connection or Customer Switchboard	-	-	-	-	-
Other	-	-	-	-	-
Total	1	0	0	0	1

Incident 1 – Collaroy Plateau 2 June 2010

An Optus Contractor was transferring the Optus assets from an EnergyAustralia limited life pole to a new pole adjacent. He removed the EnergyAustralia installed rope securing the old pole to the new pole. The old pole fell damaging the front porch of the adjacent house.

The circumstances of this incident are still under investigation. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

5.4 Serious Electricity Network Accidents (Network Worker and ASP)

EnergyAustralia reported five Serious Electrical Network Accidents in 2009/10. All of the accidents were Serious Electrical Accidents.

Table 5.3 –Serious Accidents (Network Worker) on the Electricity Network Trend

	2005/06		2006/07		2007/08		2008/09		2009/10	
Non fatal (NF)/Fatal (F)	NF	F	NF	F	NF	F	NF	F	NF	F
Employees	2	-	4	-	3	-	3	-	5	-
Network Operator Contractors	-	-	-	-	-	-	-	-	-	-
ASPs (see Note)	-	-	1	-	-	-	2	-	-	-

Note: EnergyAustralia will work with Industry and Investment NSW to further clarify SENI reporting requirements associated with ASPs in the near future.

Incident 1 – Silverwater 24 September 2009

An EnergyAustralia employee was installing monitoring equipment in a kiosk. During installation a live fuse carrier base was removed and the non-insulated terminals made contact with the LV board frame, causing an arc flash. The employee was treated at hospital for a superficial flash burn to his nose.

The preventative actions arising from the incident investigation are:

- EnergyAustralia has produced and distributed an awareness brochure detailing the 415V SAIF board.
- Training notes and procedure for installing the particular type of monitoring equipment have been reviewed and modified to clarify installation procedure.

Incident 2 – Mayfield West 13 November 2009

An EnergyAustralia employee was working in an excavation and while trimming the ends of spare conduit with a reciprocating saw cut into a live 11kV cable buried underneath. The employee received flash burns requiring hospitalisation. The preventative actions arising from the incident investigation are:

- EnergyAustralia has ceased the use of power tools around the vicinity of live 11kV cables

Incident 3 – Mosman 28 March 2010

An employee was transferring customer services onto a new LV distributor cable. The cable became energised between testing and cutting. The employee received minor flash burns when he cut through the energised cable.

The preventative actions arising from the incident investigation are:

- Electrical safety rules have to be modified to require the issue of a clearance to work permit (or other form of newly created paperwork) so that staff undertaking LV work will treat the LV mains live.
- Staff planning work have been reminded that all points of isolation need to be nominated on Disconnect and Reconnect Orders.
- Reinstatement of the Planned Outage sheet
- A consistent process of recording and reporting of defective LV mains and apparatus will be employed.

Incident 4 – Hunters Hill 28 April 2010

Two EnergyAustralia employees were changing a live 415V underground / overhead (UGOH) from open wire to Aerial Bundled Conductor (ABC) and connected A phase to C phase. The two employees received flash burns from the resulting electrical arc and explosion.

The circumstances of this incident are still under investigation. The details will be provided in the next Network Performance Report once the incident investigation has been finalised.

Incident 5 – Rutherford 12 May 2010

An EnergyAustralia employee was installing a 1000W floodlight on a substation pole from an elevated work platform (EWPE. While fitting the floodlight to the underside of the cross-arm, the floodlight made contact with the nearest fuse and the neutral bar resulting in a flashover. The employee received flash burns and dropped the floodlight, interrupting the short circuit.

The circumstances of this incident are still under investigation. The details will be provided in the next Network Performance Report once the incident investigation has been finalised.

Incidents from previous reporting period

EnergyAustralia had two non fatal accidents that were still under investigation at the time the 2008/09 Network Performance Report was produced. The incident investigations have subsequently been finalised.

Incident – Tomago 23 June 2009
An EnergyAustralia worker was critically injured after coming into contact with a piece of 33,000 Volt equipment during maintenance at a major substation at Tomago at about 8:45am on 23 June 2009.

The preventative actions arising from the incident investigation are:

- Reinforcement of working at heights and electrical safety rules / access permit requirements to all staff.
- Formation of working groups both within EnergyAustralia and via the Industry Safety Steering Committee (ISSC) to review and where possible improve equipment and processes for access permit areas in outdoor yards.

Incident – Turramurra 5 February 2009
A third year apprentice line worker, while carrying out supervised line work had come into contact with live LV apparatus and as a result had slipped from the pole platform necessitating a pole top rescue.

The preventative actions arising from the incident investigation are:

- Development of a more effective method for installing temporary insulation to low voltage under slung links.

5.5 Actionable Electricity Network Safety Incidents (Network Workers)

EnergyAustralia reported no Actionable Electricity Network Safety Incidents in 2009/10. The number of Actionable Electricity Network Safety Incidents has decreased over recent years and EnergyAustralia considers this to be a significant trend.

Table 5.4 – Actionable Safety Incidents (All Network Workers) on the Electricity Network Classified by Network Element 2009/10

Category of Incident	2005/06	2006/07	2007/08	2008/09	2009/10
Overhead Mains in Position	-	1	-	-	-
Overhead Mains Fallen	-	-	-	-	-
Overhead Service in Position	-	-	-	-	-
Overhead Service Fallen	-	-	-	-	-
Underground Mains	-	1	-	-	-
Underground Service	-	-	-	-	-
Street Light Fitting or Support	-	-	-	-	-
Cable Boxes, Pillars and Service Cabinets	-	-	-	-	-
Substation (Excluding Pole-type) – Fire and/or Explosion	-	-	-	-	-
Substation (Excluding Pole-type) - Other	-	-	-	-	-
Substation (Pole-type) - Fire and/or Explosion	-	-	-	-	-
Substation (Pole-type) - Other	-	-	-	-	-
Poles Columns or Towers	1	-	-	-	-
Air Break Switches	-	-	-	-	-
Pole Mounted Equipment (Reclosers, Drop Out Fuses, etc)	-	-	-	-	-
Service Connection or Customer Switchboard	-	-	-	-	-
Other	-	-	-	-	-
Total	1	2	-	-	-

5.6 Major Incident Reports

EnergyAustralia's Incident Management System (IMS) provides an organisation wide management system. The IMS documents the procedures followed by EnergyAustralia 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 2009/10 there were four major incidents whereby the Minister for Energy was notified in accordance with the Design, Reliability and Performance licence conditions. These incidents are outlined below:

Incident 1 – Telstra Cable Damage –15 September - Major Incident

A major incident was declared after an EnergyAustralia contractor damaged several major telecommunications cables at the intersection of York and Erskine Streets, Sydney. The damaged telecommunications cables belonged to Telstra, Uecomm, PIPE Networks and Macquarie Telecommunications. A number of customers of the affected communications carriers in the CBD had an interrupted or reduced level of service for varying periods during the incident. No customer's electricity supply was affected during the incident.

Incident 2 – Padstow Copper Theft –24 September – Major Incident

A major incident was declared when NSW Police provided information that a minor had been injured and taken to hospital as part of a group who had forced entry to a live substation to steal copper. One transformer and both 11kV ring main isolators had been drained of insulating oil and the top cover of a live RMI had been opened, causing an explosion which ignited the transformer oil. The explosion and fire interrupted ten distribution centres, including Bankstown-Lidcombe Hospital. Supply to nine of the substations was restored within three hours after switching of the 11kV network. The remaining industrial customer was restored after 13 hours.

Incident 3 – Mayfield West Injury –13 November – Major Incident

A major incident was declared when an EnergyAustralia employee was injured when he cut into a live 11kV cable with a reciprocating saw in the vicinity of the Mayfield West zone substation. The employee had been trimming spare conduit in an excavation and the live 11kV cable had not been exposed. As a result of the cable damage approximately 1,300 customers were interrupted for up to one hour. The employee was given first aid on site and was taken to John Hunter Hospital. He was airlifted to Royal North Shore Hospital that night with flash burns and has since returned to work.

Incident 4 – Flooding of CBD Substation –19 December – Major Incident

A major incident was declared when the 11kV feeder bank from part of Dalley Street zone substation tripped when a distribution substation at O'Connell and Hunter Streets flooded due to the failure of a Sydney Water water main. This interrupted nine CBD distribution centres. Supply to all of the substations was restored within nine hours after rearrangement of the 11kV network. Customers supplied from the flooded distribution substation were interrupted for periods of between 8 hours and 38 minutes and 9 hours and 53 minutes.

6 CUSTOMER INSTALLATIONS

From January 2000, EnergyAustralia has maintained a computer database system (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 an 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 contractors' work with AS/NZS3000 - Wiring Rules and the Service and Installation Rules of NSW.

The installation inspection audit process targets electrical contractor's whose previous work has been found to contain major safety breaches (defects) as detailed in the Code of Practice for Installation Safety Management. Electrical contractors with higher defect rates are inspected more often. The reliability of the data collected and reported using SAP – CCS has been verified previously by an independent appraisal of EnergyAustralia's seven previous annual Electricity Network Performance reports.

Consistent with previous years, the major causes of customer electric shocks in the reporting period fell into two specific categories – "Failure of Part of Installation" (more specifically insufficient insulation resistance), and faulty neutral connections. EnergyAustralia is continuing an extensive program to replace all at risk aged service lines, carrying out neutral integrity tests at targeted customer installations in conjunction with the Sydney Water mains replacement program and a trial of the "Wirealert" device, that was developed by Aurora Energy and rolled out in Tasmania commenced in early 2009/10.

6.1 Reports against Customer Installation Safety Plans

The number of notifications of electrical installation work from electrical contractors (CCEW) has increased (up 6%) for the first time in five years. This is mainly due to a significant increase in applications associated with the NSW Solar Bonus Scheme, which mandates that a CCEW must be lodged before a connection can be energised. EnergyAustralia has also communicated the need to use licensed electrical contractors via brochures mailed out to all customers with their electricity accounts.

Table 6.1 - Installation Inspections Trend

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Number of Notifications (CCEW)	49,442	58,621	49,370	47,851	45,138	45,093	47,799
Number of Inspections	15,116	16,971	15,374	14,797	13,705	14,396	20,110
Installation Inspection Rate (%)	30.59%	28.95%	36.60%	30.92%	30.36%	31.93%	42%
Major Safety Defect Rate (%)	4.54%	5.03%	9.00%	6.70%	6.33%	7.39%	5.3%
Safety Breach Notices Issued (%)	19.13%	17.06%	20.17%	16.79%	16.72%	18.67%	13%
Number of Warnings Issued	3	21	77	15	30	29	22
Reports to Office of Fair Trading (No.)	3	7	11	12	11	2	9
Number of Audits by Network Operator	3	4	4	3	3	3	3

See Attachment D for definitions

The trends in 2009/10 continue to indicate that electrical contractors are only submitting notifications when the electrical installation work is associated with contestable service work. The number of notifications for Level 2 Service Provider contestable work (NOSW) has increased from the previous year. This increase is also attributed to the introduction of the NSW Solar Bonus Scheme and the associated contestable metering work which requires submission of a NOSW.

The major defect rate of 5.3% is slightly lower than last year (7.39%) but remains relatively low overall. The low number of major defects correlates to the very low percentage shocks attributed to unsafe electrical contractor installation work (1.16%).

EnergyAustralia has been assisting NSW Fair Trading with their electrical contractor compliance campaigns by providing CCEW notification data when requested. EnergyAustralia investigated the notification and defect history of each electrical contractor's work in our network area.

EnergyAustralia is also conducting "Targeted Inspections" of specific large developments like shopping centres and unit blocks, concentrating on the electrical contractor's compliance with Australian Standards as well as the submission of CCEW's for new electrical work.

EnergyAustralia is represented on related Australian Standards committees such as AS/NZS3000 and AS/NZS3017 as well as the Service and Installation Rules of NSW to ensure the focus on customer installation safety is maintained and improved in the review process.

A trial of the "Wirealert" device, that was developed by Aurora Energy and being rolled out in Tasmania commenced in early 2009/10. The Wirealert device is a supply monitoring device that plugs into a power point and detects potentially dangerous situations arising from a combination of a faulty neutral and earth connections. EnergyAustralia has issued out 500 devices to EnergyAustralia staff and will be providing 2500 devices to customers with older higher risk electrical installations during 2010/11.

EnergyAustralia is working with Sydney Water to fund testing of each installation neutral connection impacted by their water main replacement program. Suspected faults are investigated by EnergyAustralia staff and rectified where necessary.

6.2 Customer Installation Shock Reports

Three fatalities due to electrocution occurred in EnergyAustralia's network area in 2009/10. One was a suspected suicide and two were unintentional interference with installation wiring. There was an 11% increase in the number of electric shocks reported compared to 2008/09. EnergyAustralia continues to run public safety awareness programs and advertising campaigns highlighting the inherent dangers of electricity and precautions that should be taken.

Table 6.2 - Customer Installation Shock Reports Trend

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Shocks on Customer's Premises (Number Reported)	306	328	319	402	311	309	344

Customer installation shock investigations in 2009/10 follow similar trends to previous years with two predominant causes:

- failure of part of installation (27.91%); and
- defective neutral on service line (13.95%).

A breakdown of failure of part of installation shocks into subcategories is shown in Table 6.3a, with insufficient insulation resistance (12.79%) being the major cause. It is considered that these are related to older installations which have not been adequately maintained.

The Electricity (Consumer Safety) Regulation 2006 requires the owner of an electrical installation to maintain that installation in safe condition however there is a substantial lack of awareness of these requirements in the general community. EnergyAustralia is working with the NSW Fair Trading to communicate that message to its customers in conjunction with our Public Electricity Safety Awareness Plan within our Network Management Plan.

Fair Trading NSW is currently reviewing The Electricity (Consumer Safety) Act 2004. EnergyAustralia has submitted comments and suggested changes which include mandating the fitting of Residual Current Devices (RCD's) on power circuits at existing installations and regular safety inspections of the electrical wiring.

Details of Other causes of electric shock are shown in Table 6.3b. The percentage of shocks received due to defective service line neutrals connections (13.95%) is slightly higher than in 2008/09 (11.33%). Suspect installations are reported to EnergyAustralia for investigation via our emergency despatch system. The number of defective neutral connections has reinforced the need to continue and expand the service line replacement program for all aged service lines and neutral integrity testing targeting older installations. The trial of the WireAlert device mentioned previously is another initiative aimed at detecting faulty neutral connections.

Table 6.3 - Customer Installation Safety – Categories of Shocks Analysed for 2009/10			
Category	**Number Fatal**	**Number Non-Fatal**	**% of Total**
Contact with Consumer's Mains – Faulty Mains	-	30	8.72%
Contact with Consumer's Mains – Human error	1	1	0.58%
Contact with Live Parts at Switchboard – Faulty Switchboard	-	10	2.91%
Contact with Live Parts at Switchboard – Human Error	-	5	1.45%
Unsafe Installation Work by Licensed Contractor	-	4	1.16%
Failure of Part of Installation (not water related) – see Table 6.3a	-	96	27.91%
Defective or Unsuitable Appliance	-	18	5.23%
Working on or Interference with Installation	-	7	2.03%
Working on or Interference with Appliance	1	8	2.62%
Water Damage or Ingress	-	18	5.23%
No Cause found (Including Static Electricity)	-	57	16.57%
Other - see Table 6.3b	1	87	25.58%
Total	**3**	**341**	**100%**
Total per 1,000 customers (with 1,605,532 customers)		**0.21**	

Table 6.3a - Details of "Failure of Part of Installation (non water related)" from table 6.3				
Category (as above)	**Subcategory**	**Number Fatal**	**Number Non-Fatal**	**% of Total**
Failure of part of installation (non water related)	Exposed Live Parts	-	10	2.91%
	Defective installation earthing	-	18	5.23%
	Insufficient insulation resistance	-	44	12.79%
	Overloaded equipment	-	-	0%
	Inadequate protection	-	7	2.03%
	Incorrect polarity	-	-	0%
	Unsuitable equipment	-	17	4.94%
	Subtotal	**-**	**96**	**27.91%**

Table 6.3b - Details of 'Other' from table 6.3				
Category (as above)	**Subcategory**	**Number Fatal**	**Number Non-Fatal**	**% of Total**
Network related	Defective neutral on distribution network	-	15	4.36%
	Defective neutral on service line	-	48	13.95%
	Neutral rise/excessive voltage drop	-	2	0.58%
	Incorrect service connection	-	-	0%
	Fallen overhead distribution of service mains on private property	-	4	1.16%
	Failure of distribution Network equipment	-	6	1.74%
	Inadvertent or unauthorised act (contact with service mains on PP eg painter, builder etc)	-	9	2.62%
Non-Network related	Suspected suicide	1	1	0.58%
	no access	-	1	0.29%
	Unable to define or isolate incident	-	1	0.29%
	Subtotal	**1**	**87**	**25.58%**

7 ACCREDITED SERVICE PROVIDER SCHEME

An analysis of the contestable works trends in 2009/10 shows a slight increase (3.6%) in the total number of project notifications associated with Level 1 contestable work compared to 2008/09. Figures obtained for Level 2 contestable work show a 9.2% increase in the total number of notifications of service work (NOSW) compared to 2008/09.

The slight increase in Level 1 activity is possibly associated with major building and construction work. The increase in Level 2 activity is attributed to contestable metering work associated with the introduction of the NSW Solar Bonus Scheme.

Level 1 Contestable Work

Overall there was a 3.8% increase in Level 1 work being carried out by external ASP's, contestable work performed by internal (EnergyAustralia) service providers remained steady. EnergyAustralia found it necessary to implement disciplinary/corrective action on 31 occasions as a result of unsafe practices by external ASP's.

EnergyAustralia has informed Level 1 ASP's via safety alerts and notifications of changes to Network Standards and the potential safety hazards associated with inadequate excavation procedures, asbestos, CCA cross arms, etc.

There were zero safety incidents involving Level 1 ASPs that resulted in loss time injuries.

Level 2 Contestable Work

EnergyAustralia carried out 26,650 inspections of Level 2 completed work for compliance with the standards. This is a 46% increase from 2008/09. The increase is due to the commencement of the NSW Solar Bonus Scheme and the demand for electronic bi-directional metering that is needed for the embedded generators.

EnergyAustralia also carried out 166 safety compliance audits out on Level 2 "work in progress", 66 corrective/disciplinary interviews were conducted and 12 Level 2 ASP authorisations were suspended for non-compliance.

Level 3 Contestable Work

EnergyAustralia certified 451 designs for contestable work, submitted by Level 3 designers. This is a 25% increase from 2008/09. Of these, 13 were submitted by EnergyAustralia's Accredited Service Provider (Level 3) entity, which is an 88% decrease from 2008/09.

The reduced number is due to EnergyAustralia's focus on delivery of its capital program.

Table 7.1 – Contestable Works Trend	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Internal							
Network Work (ASP Level 1)							
Project Notifications	431	339	238	99	56	24	24
Initial Inspections of Completed Projects	-	121	115	77	46	31	23
Of Projects Inspected, Number Initially Non-Conforming	-	7	9	6	3	-	-
Customer Connection Work (ASP Level 2)							
Notifications (NOSW)	13,773	12,709	9,612	8,471	5,963	5,426	4,742
Inspections by Network Operator	2,302	2,551	2,384	2,041	1,500	1,763	2,176
Major Defects	23	16	16	9	11	8	7
Network Design Work (ASP Level 3)							
Designs Certified	386	327	310	268	161	106	13
External							
Network Work (ASP Level 1)							
Project Notifications	129	133	171	221	379	444	461
Initial Inspections of Completed Projects	129	123	119	110	219	294	384
Of Projects Inspected, Number Initially Non-Conforming	21	16	30	60	80	108	74
Customer Connection Work (ASP Level 2)							
Notifications (NOSW)	61,010	72,246	64,138	66,309	51,158	53,015	59,057
Inspections by Network Operator	14,242	18,156	19,500	19,544	15,628	16,542	24,474
Major Defects	204	266	395	302	219	195	243
Network Design Work (ASP Level 3)							
Designs Certified	48	94	120	193	328	327	438

Notes:

1. Int refers to contestable work done by the distributor's Accredited Service Provider entity and Ext refers to work done by independent Accredited Service Providers.

2. Distributors may provide additional information if available that will provide a clarification of procedures and practices they have adopted in administering the Contestable Works scheme.

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

The Better Regulation Office review of the Level 1, 2, and 3 Accreditation Schemes was released in early July 2010 and EnergyAustralia will work closely with Industry and Investment NSW to implement the recommended changes and improvements.

8 BUSHFIRE RISK MANAGEMENT

EnergyAustralia's Bushfire Risk Management strategies 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.

EnergyAustralia's Bushfire Risk Management Plan is contained in chapter four of our Network Management Plan. This section of the Network Performance Report outlines our performance against our Bushfire Risk Management Plan.

The design of our network assets is critical to reducing the risk of bushfires – requiring all new and replacement assets to feature the most appropriate technology with the aim of minimising the potential for our electrical assets to cause bushfires. Our network assets are designed in accordance with the requirements of the design section of our Network Management Plan (chapter one). New and revised design standards include a compliance check and signoff to ensure the design standard meets the objectives of our Bushfire Risk Management Plan.

EnergyAustralia continues to identify bushfire prone areas from bushfire prone land maps certified by the Commissioner for the Rural Fire Service (RFS). EnergyAustralia has a formal agreement in place with the RFS to use these maps to identify our assets in these bushfire prone areas – these are updated annually before the bushfire season so the appropriate asset inspections can be completed.

Refer to Table 8.1 for details of the initiatives that EnergyAustralia has undertaken in the last year to improve systems used to manage bushfire risk within our network area.

Table 8.1 – Initiatives used to manage Bushfire risk within EnergyAustralia's network area

Initiative	Description
1	Continued use and ongoing enhancement of the integrated Asset Management System which provides functionality not available with our superseded asset management system
2	EnergyAustralia has continued its monthly reporting process with additional focus on high priority outstanding corrective works that pose a genuine risk in bushfire areas.
3	EnergyAustralia has established capital and replacement programmes to remove equipment with known failure modes that may initiate bushfires during equipment failure.
4	EnergyAustralia distributes bushfire risk management information which outlines customer's obligations regarding safety management of their electrical installations.
5	Vegetation management plans involving mechanical clearing of 66kV and 132kV overhead lines in areas where poor reliability of electricity supply has occurred due to vegetation.
6	Ongoing review of vegetation management policy and standards following the Victorian bushfires and preliminary recommendations of the Victorian Bushfires Royal Commission.
7	Continued liaison with Rural Fire Service, NSW Fire Brigade, councils and other authorities

There were three network interruptions on 132kV feeders (two in the Newcastle region, one in the Sydney region) caused by bushfires, not initiated by EnergyAustralia electrical infrastructure, between July 2009 and June 2010. There were six incidents where EnergyAustralia equipment initiated fires in bushfire areas:

- Avondale area – high wind caused annealed mains on a LV feeder to break, started grass fire with one substation interrupted.
- Muswellbrook area – an 11kV conductor fell to 1m above ground after a cross-arm failure, vegetation caught fire. The feeder was isolated due to safety concerns and five substations were interrupted.
- Beresfield area – a 33 kV feeder conductor sag on extreme weather day, causing tree to catch fire. Mains were isolated to clear the tree and 998 substations interrupted.
- Baerami area – an 11kV feeder clashing caused a small ground fire with 81 substations interrupted.
- Liddell area – damage to the 11kV Liddell tie (possibly animal induced) with a grass fire initiated and 25 substations interrupted.
- Umina area – an 11kV feeder came into contact with a palm tree, causing tree top fire. The feeder was isolated and 12 substations were interrupted.

8.1 Implementation of an integrated Asset Management System

EnergyAustralia has made further enhancements to the integrated Asset Management System which provides greater functionality in regard to prioritising planned and corrective maintenance work. Staff now have the ability to determine and record if a genuine bushfire risk exists as a result of outstanding corrective work. Work can then be prioritised according to risk.

This new system also supports our automatic re-closing policy for total fire ban days. This policy allows our Network Control Rooms to leave the automatic re-closing function on circuit breakers in place on total fire ban days when there is no outstanding high priority corrective maintenance work that poses a genuine risk of ignition on a high voltage feeder.

8.2 Monthly and Quarterly Reporting Process

Pre-bushfire season patrols of poles, lines and associated apparatus are undertaken annually in accordance with EnergyAustralia's Technical Maintenance Plan. The outcomes of these inspections, including defects, maintenance and rectification works, is captured in EnergyAustralia's integrated Asset Management System. EnergyAustralia has improved the process for notifying a customer where a Line Patrol Report indicates defects exist on a customer's installation in a bushfire prone area.

EnergyAustralia has continued its monthly reporting process to senior management on outstanding corrective work in bushfire prone areas. New reports have been established from information in the integrated Asset Management System which provides a focus on high priority corrective tasks.

Table 8.2 provides a summary of the number of defects identified and rectified under the 2009/10 Preventative Maintenance program in bushfire prone areas. Please note that not all tasks identified during 2009/10 will be of such high priority that they need to be completed prior to the end of the year.

Table 8.2 - Bushfire Prone Areas - Bushfire Risk Corrective Maintenance 2009/10

Number of defects:	Central Coast	Upper Hunter	Lower Hunter	Newcastle	Sydney North	Sydney South
Outstanding pre 2009/10	293	231	765	951	675	34
Identified in 2009/10	2605	658	1138	3861	1323	203
Rectified in 2009/10	2426	656	953	3161	1584	142
Outstanding and due or overdue as at end 2009/10	206	174	623	752	202	40

Notes:

1. The regions reported in the table above are based upon EnergyAustralia's Field Services depot areas.
2. In some regions a number of the defects identified in the previous year were rectified during 2009/10.

3. Due to differing defect priorities, not all defects identified during the 2009/10 year fall due within the 2009/10 year. The table above will not directly summate as a result.
4. High priority defects detected during 2009/10 but not yet rectified by the 30th June 2010 are expected to be rectified prior to the 2010/11 bushfire season.
5. The Sydney East region is not considered to be bushfire prone.

8.3 Capital and Replacement Programs

EnergyAustralia has continued its low voltage spreader capital program to reduce the likelihood that low voltage overhead powerlines will cause bushfires. If overhead powerlines clash together, the resulting arcing has the potential to cause a fire. Low voltage spreaders are used to prevent powerlines clashing and therefore significantly reduce the likelihood of fire. EnergyAustralia installed an additional 986 low voltage spreaders this year, 763 of these were in bushfire-prone areas.

The EnergyAustralia Replacement plan for the 2009-14 regulatory period also includes:

- Replacement of over 40 kilometres of steel overhead mains per year – much of this will be replaced with new covered conductor.
- Replacement of over 500 air break switches per year with new air break switches with enclosed load-break contacts which contain any arcing produced during switching operations.
- Replacement of over 130 oil-filled reclosers and sectionalisers with modern gas-filled equipment.
- Replacement of over 22,000 low voltage services per year.
- Replacement of approximately 5,000 poles per year.
- Continuation of the overhead mains access track refurbishment programme which benefits EnergyAustralia as well as the RFS during times of bushfire by providing improved access to fight fires as well as carry out repairs to restore electricity supply.
- Replacement of defined types of insulators known to be at end-of-life on 132kV transmission lines.

8.4 Communicating with Customers

During 2009/10, EnergyAustralia distributed a brochure to targeted landowners located in bushfire prone areas in the Hunter, Central Coast and North Sydney regions. Titled "Your powerlines: safety and bushfire prevention", the brochure outlines:

- contact details (phone and website) for the NSW Rural Fire Service to enable the customer to assess whether their property is located within a bushfire prone area;
- the demarcation between EnergyAustralia's network and private powerlines;
- 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 poles and mains; and
- a reference to the EnergyAustralia website for contact details of companies which employ qualified pole inspectors, authorised tree trimmers and licensed electrical contractors who can inspect or repair private powerlines.

EnergyAustralia also published press advertisements in local papers across the network area and provided bushfire prevention information and the Bushfire Risk Management Plan, within the Network Management Plan on EnergyAustralia's website.

In addition to the above, EnergyAustralia also issues Customer Installation Advices (CIAs) and Network Standards Advices (NSAs) to ensure current design standards are communicated to all staff, contractors and Accredited Service Providers. These are also available on our website.

All customer inquiries go to our 13 15 35 inquiry line. When a customer calls in regard to bushfire related requests or complaints, the request or complaint is recorded in our new Customer Notification Request (CNR) system by our Contact Centre staff and then sent to the specific business areas responsible for completing the work. When the work is completed, the request or complaint is signed off in the CNR and the customer contacted when they have requested to be notified.

8.5 Vegetation Management Plans Involving Mechanical Clearing

A small number of 66kV and 132kV feeders have had Vegetation Management plans implemented which include mechanical clearing (clearing to ground level). These feeders were identified due to reliability issues or have previously proven to be problematic when attempting to perform vegetation management work due to either the terrain or landowner requirements. EnergyAustralia staff have undertaken extensive negotiation with stakeholders including landowners, Councils, National Parks and Wildlife Service and mine operators, when developing these plans.

Mechanical clearing provides reliability benefits to EnergyAustralia, but also access benefits to us and other authorities during times of bushfire. The area that is cleared will also provide some bushfire buffer area which will possibly reduce the spread of smaller fires.

8.6 Review of Vegetation Management Policy and Standards

Following the widespread damage caused by the Victorian bushfires in early 2009, EnergyAustralia has continued to review the current policy and standards for vegetation management. The current policy and standards were developed in accordance with, and comply with, Australian electricity industry vegetation management standards.

8.7 Monitoring of the Victorian Bushfires Royal Commission

Throughout the course of 2009/10 EnergyAustralia has been monitoring the outcomes of the Victorian Bushfires Royal Commission (VBRC), including the preliminary recommendations made. EnergyAustralia will continue to monitor the final outcomes of the VBRC, due to be handed down in the early part of 2010/11, and will consider the recommendations made as they affect the operation of our business in bushfire prone areas

8.8 Liaison and consultation with Fire Services and others

EnergyAustralia continues to build strong relationships with the RFS and NSW Fire Brigade, as well as maintaining relationships with local councils, National Parks and Wildlife Service and other stakeholders.

EnergyAustralia participates in Regional Bushfire Management Plan preparation 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 EnergyAustralia from the other authorities and local councils of assets that have an impact on the other authorities operating effectively. An example of this is where the RFS has identified locations where marker balls need to be installed on transmission lines.

These forums also allow EnergyAustralia to inform the other authorities of works we have undertaken which may assist their efforts. As an example, EnergyAustralia has undertaken a significant access track refurbishment program, much of this work being in areas defined as bushfire prone. When refurbishing these access tracks, consultation with landowners and other authorities is carried out and access gates installed with joint locking arrangements to prevent unauthorised entry – mapping of the access tracks is also undertaken. These access tracks may be used by fire services to assist their fire fighting efforts and a formal process is being developed to provide the access track maps to these authorities.

Throughout 2009/10 EnergyAustralia has continued to develop our relationship with the RFS, to realise benefits to both our organisations and the community. The following initiatives are being developed:

- Continued support of the RFS though the re-signing of the MoU, which details such things as training and development of RFS staff, support for brigades (electrical work and fridges) and provision of zoo passes to RFS volunteers;
- the future exchange of GIS layer information;
- the undertaking to report and count our works on access tracks and vegetation as part of the state's hazard reduction program;
- support from the RFS in terms of achieving access, and in helping HVC's achieve compliance; and
- RFS to provide endorsement of our bushfire risk management plan as part of our network management plan.

We are also in the process of exchanging information about the criticality of our lines, to enable better decision making within the RFS control centre on event days, especially with regard to the advance warning of the impact of fire on such lines, and also of the switching implications for the network.

9 PUBLIC ELECTRICAL SAFETY AWARENESS CAMPAIGN REPORTS

EnergyAustralia is committed to increasing awareness amongst the general public of electrical safety. This commitment is demonstrated through the development and implementation of a Public Electrical Safety Awareness Plan (PESAP) which is chapter three of our Network Management Plan. This section describes the PESAP program in 2009/10.

9.1 Issues

The PESAP program is designed to highlight the risks associated with the distribution of electricity on the network's assets (i.e. power lines and substations) and to educate the public about how to avoid dangerous situations.

These issues have been identified as hazardous since electricity was first distributed and continue to be the core issues that pose the greatest risk to the public. These issues require ongoing communication, education and awareness to reduce the risk of injury.

9.2 PESAP Objectives

Objective 1: Raise awareness of electrical safety and the hazards related to EnergyAustralia's network assets and the distribution of electricity

Objective 2: Raise awareness of electrical safety amongst targeted groups

Objective 3: Raise awareness of the safe use of electrical equipment

Objective 4: Remind the public of hazardous situations involving electricity such as connecting with overhead wires, underground cables and entering substations

9.2.1 PESAP Programs

Outlined in Table 9.1 are the PESAP programs implemented by EnergyAustralia during 2009/10, including the description of the target market, the key messages of each program and a description of the program and the medium through which it was delivered. Table 9.2 analyses the programs.

Table 9.1 – PESAP Programs implemented during 2009/10

Target Audience	Message	Medium/Description
Primary school aged children and their teachers	• 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	**Electricity Safety Week** EnergyAustralia provided registered primary schools with a pack containing electricity safety activities for Kindergarten to Year 6 students. The pack included prizes, posters, stickers and merit certificates. **Stage 3 Electricity and Safety Program and Electrical Resource Kit** EnergyAustralia developed a Stage 3 Electricity and Safety Unit and Electrical Resource Kit which aligns with best practice teaching principles and the NSW Department of Education and Technology physical phenomena curriculum. **Kids Free Day** EnergyAustralia sponsored a Kids Free Days at both Newcastle Knights and Central Coast Mariners home games by distributing free vouchers to all primary school students in the Hunter and Central Coast co-branded with electricity safety messages. On-ground safety messages were also delivered by key players, tailored to children under 12.

Table 9.1 – PESAP Programs implemented during 2009/10		
Target Audience	**Message**	**Medium/Description**
High School aged teenagers and their teachers	• A tool for use when completing the mandatory science assignment • Understand electricity generation and hazards	In conjunction with the Department of Education and Technology, a microsite based on the science curriculum was developed and branded EnergyAustralia. http://www.highschoolresource.energyaustralia.com.au/ The site provides students with all the information they require to complete their mandatory science assignment and is a tool for teachers when developing lectures.
Residents living within 1km of a high risk substation	• 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 EnergyAustralia if you see anyone climbing over fences • Obey substation warning signs • Be aware of electrical dangers	A safety postcard was developed to communicate with children warning them of the danger of entering a substation and asking them to call EnergyAustralia should a ball or other item go over the fence. The postcard included an offer for free entry to Taronga Zoo to assist with cut through of the collateral and safety messaging.
Do-it-yourself (DIY) home renovators and handymen	• Don't mess with electricity – you're out of your league • Do-it-yourself (DIY) electrical work is not only dangerous, it's illegal. • Always contact a licensed electrician	The NRL continuous call partnership delivers a strong vehicle for an extended DIY Electrical Safety campaign with a broad reach to our target audience in Sydney, Central Coast, Newcastle and the Upper Hunter. The campaign includes live reads and pre-recorded advertisements. Electricity safety tips and online banners were also promoted as part of 2GBs Home Improvements Show from November 2009 to February 2010.
Underground Cables	• If you're digging, make sure you know what's underground so you don't hit any cables • Always Dial Before You Dig • Always follow the safe work guidelines provided by your local utility	A new campaign for Dial Before You Dig (DBYD) was produced and commenced in June 2009. The campaign ran through July-August 2009 and January-March 2010 focusing on the two key hazards surrounding DBYD. Both hazards, directional bore and backhoe, have contributed to major outages in the past.
Overhead Powerline Safety	• Keep a safe distance or clearance from overhead powerlines • Consider appropriate clearances when working around powerlines as the safe distance can vary according to the size and voltage of the powerline • Look up to check the location and distance of powerlines before beginning any outdoor activity • Set-up or build structures well away from powerlines	The overhead powerline safety campaign ran October-November 2009 and April – June 2010. The "Mind the Zap" campaign highlights the importance of staying well clear of powerlines with tall objects and targets industry and recreational groups via radio and electronic (online) mediums. Three scenarios are used in the current campaign – boating, working, playing (kite).
Bushfire Risk Management	• The responsibilities of the landowners with respect to	EnergyAustralia distributes bushfire risk management information which outlines customer's obligations

Table 9.1 – PESAP Programs implemented during 2009/10		
Target Audience	**Message**	**Medium/Description**
	the ownership of private poles and mains, and bushfire risk management	regarding safety management of their electrical installations to customers in our network area via direct mail, newspaper advertisements and the corporate website. In 2009/10 we delivered relevant brochures to targeted landowners located in bushfire prone areas in the Hunter, Central Coast and North Sydney regions.
Storm Safety	• 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 • Always assume fallen powerlines are live	EnergyAustralia ran an awareness campaign throughout the summer storm season to educate the community on what to do before, during and after a storm. A media release was issued in November 2009 providing summer safety tips. A radio campaign was launched in November 2009 and continued until March 2010.
Christmas – people decorating their homes with festive lights	• Use lights and other electrical equipment designed for external use • Check lights for damage before use • Don't overload power points or boards • Switch off lights overnight and when leaving the house	An extensive public relations campaign was supported by radio advertising which ran for two weeks in November and December 2009, the key Christmas decoration period.

9.2.2 Additional sources of Information

A significant amount of information and downloads relating to preventing and managing electrical hazards is on EnergyAustralia's website including:

- Electrical emergencies
- Storms and blackouts
- Home safety tips
- Trees and vegetation
- Bushfire prevention
- Private pole ownership and responsibilities
- Workplace safety
- Advice for contractors
- Dial before you dig
- Lesson plans for primary schools teachers
- Electro-magnetic fields
- Portable generator safety
- Kids safety tips

9.2.3 PESAP Program Analysis

EnergyAustralia monitors the programs and electrical safety incidents and adapts its programs as required to continue to reduce the likelihood of incidents occurring. The broad nature of "electrical safety" and the low number of Serious Electrical Network Incidents (SENIs) makes it difficult to statistically analyse the effectiveness of the above programs.

Outlined below in Table 9.2 is an analysis of the programs.

Table 9.2 – PESAP Programs implemented during 2009/10 Analysis

Program/Campaign	**Analysis**	**Contributes to PESAP objective**
Electricity Safety Week + Stage 3 School Kit	In order to participate in ESW, schools must register to receive prize packs. In 2009 over 800 primary schools (covering 40,000 students) across EnergyAustralia's network distribution area participated in Electricity Safety Week 2009. The resource kits have reached saturation and orders are fulfilled as requested.	**1,2,3,4**
High School Resource	An information pack was distributed to 300 high schools across the EnergyAustralia network distribution are in May 2010 to promote the resource to Stage 5 Science Teachers and students. Total # of schools in franchise: 300 Total # of schools registered: 222 Visits to microsite: over 17,000 % from EnergyAustralia network area 29.45%	**1,2**
Substation safety	An unaddressed mailing was delivered to approximately 380,000 residences living within 1 km of identified zone substations. The postcard was letterbox dropped during summer school holiday period which is a high risk season for this target group.	**1,2,4**
DIY electrical safety	Strong feedback on relevance of campaign from staff and community.	**2,3,4**
Underground Cables **Reach and Frequency provides an analysis for any given advertising schedule, the percentage of persons in a target population that is exposed to an advertising schedule at least once (Reach), and the average number of times it has been heard (Average Frequency).*	Research (Aug 2009) showed DBYD awareness is stable around 80% with a significant increase (10%) in respondents who has seen or heard DBYD ads between the pre and post surveys. **Advertising Schedule** Target – Male 18-54 **Sydney** (potential – 1,211,000) Reach: 1+ 59.8%, 3+ 38.9%, Ave Freq: 7.5 **Newcastle** (potential – 131,000) Reach: 1+ 68.8%, 3+ 48.6%, Ave Freq: 9.5 **Central Coast** (potential – 69,800) Reach: 1+ 56.1%, 3+ 35.1%, Ave Freq: 7.2	**1,2,3**
Bushfire Risk Management	Safety and Bushfire Prevention brochure sent to over 13,000 properties in bushfire designated zones in the Hunter, Central Coast and North Sydney areas. Tombstone style newspaper advertisements were included in all suburban and metro newspapers - coverage up to 1.4 million customers to meet the requirement for broad coverage across EnergyAustralia's network area.	**2,3**

Table 9.2 – PESAP Programs implemented during 2009/10 Analysis		
Program/Campaign	**Analysis**	**Contributes to PESAP objective**
	Radio advertisements and live reads ran on regional stations including: • Newcastle: KOFM, NXFM and 2HD • Central Coast: StarFM, 2GO and SeaFM • Upper Hunter: 2NM and PowerFM	
Emergency services electricity safety	Results of the test at the end of the seminar are used to continue developing the content of the seminar. Feedback from the participants and the management of the emergency services organizations are considered in the development and delivery of future seminars.	**1,2,3,4**
Overhead Powerline Safety	Awareness relating to the statement "Electricity can jump through the air to move between objects or people" from 64% (2006) to 70% (2008) to 71% (2009) (EnergyAustralia Electrical Safety Study 2009). This was the key message in this campaign. **Advertising Schedule** Target – Male 18-54 **Sydney:** Reach 1+ 49.6%, 3+ 28.6%, Ave Freq: 5.6 **Newcastle:** Reach 1+ 69.6%, 3+ 49.6%, Ave Freq: 9.8 **Central Coast:** Reach 1+ 36.3%, 3+ 22.4%, Ave Freq: 8.1	**1,4**
Storm safety	Extended communications program with emphasis on ongoing preparedness messaging via Australian Traffic Network runs from November to March each year.	**1,4**
Christmas safety	Advertising runs late November and early December to coincide with seasonal risks.	**3,4**

Key learnings from Electrical Safety Study 2008 and 2009

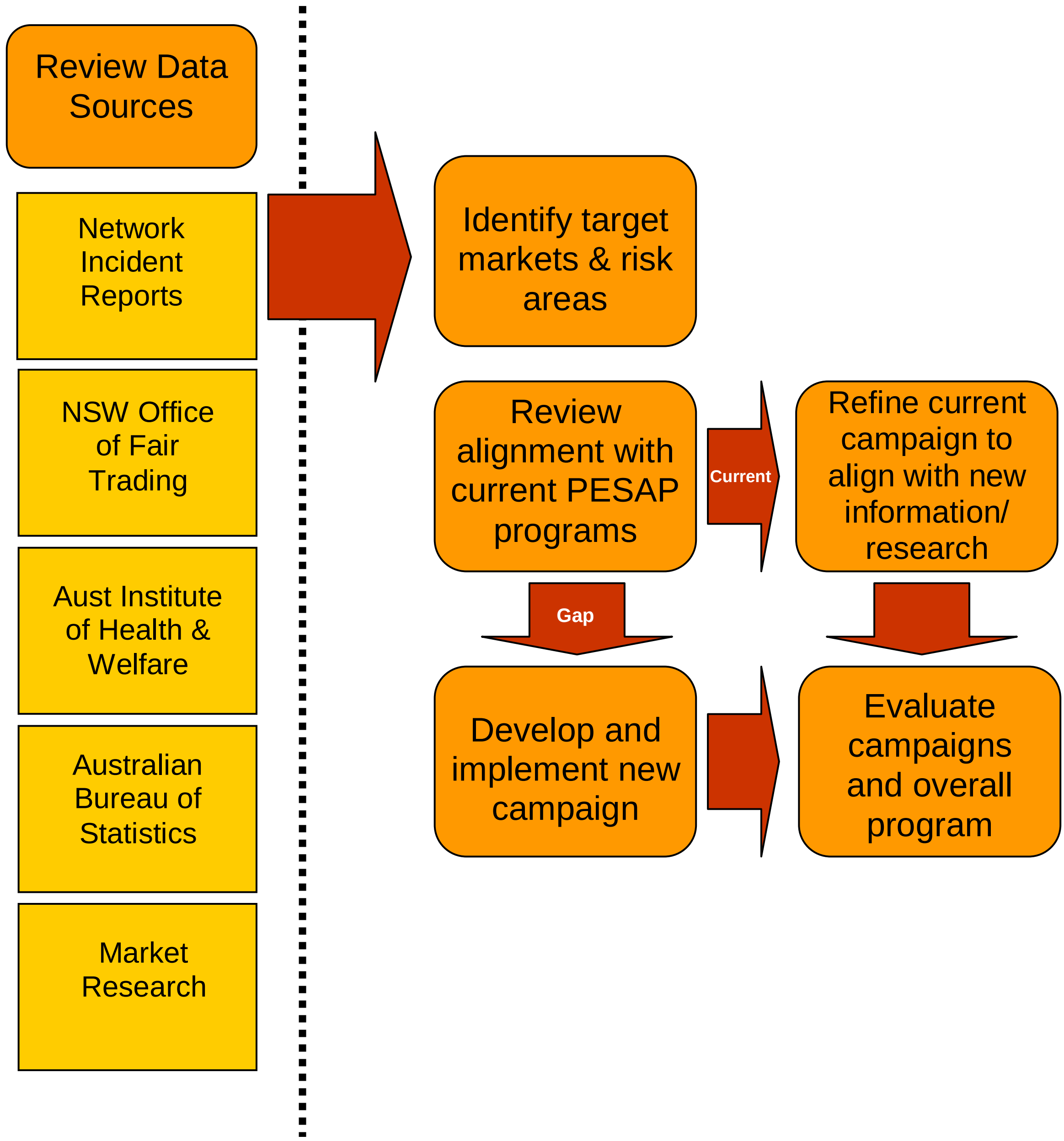
The stability of attitudes towards electrical safety confirm they are deep seated within the community psyche. The hazards that form PESAP communication strategy are critical to the safety of the community. The consistency of these messages is imperative to assist with influencing the behaviour and psyche of the community. Reinforcement through repetition is the recommended approach.

9.2.4 Additional PESAP Initiatives

In addition to the programs and campaigns outlined in the 2009/10 Public Electrical Safety Awareness Plan program, EnergyAustralia undertook the additional programs outlined in Table 9.3 during the year.

Table 9.3 – Additional PESAP Initiatives	
Additional Program	**Description and Rationale**
Graffiti Removal	EnergyAustralia developed a safety postcard to raise community awareness regarding the danger associated with removing graffiti from electrical equipment such as pillar boxes, kiosk subs etc. The postcard explains the risks and requests the community to report graffiti on electrical equipment via our Graffiti hotline, 13 15 35. Over 100,000 postcards were distributed in May and June 2010 to suburbs located in the EnergyAustralia network area.

PESAP Risk Identification and Program Development Flowchart



10 POWER LINE 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 these 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 the crossing, particularly those in relation to navigation safety, are as low as reasonably practicable and that the 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

EnergyAustralia 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.

In the case of crossings which were in existence at the time of implementation of the code (December 2008) EnergyAustralia is required to undertake a risk assessment for all crossings within two years of the code's implementation. Should an incident occur at an existing crossing EnergyAustralia will undertake a risk assessment within three months. The following table provides the timetable to which EnergyAustralia will assess, and if necessary adjust existing overhead crossings and / or their signage.

Table 10.1 – Existing Crossing Assessment Timetable

#	Situation	Treatments Required	Timetable for Completion
1	Reported incident has occurred at an overhead crossing	Analysis to determine an explanation for the incident and risk assessment to be completed. Risk level to be made as low as reasonably practicable through complying with overhead signage requirements and other treatments as necessary	Within three months of incident if incident occurs post implementation
2	All overhead crossings other than those in #1 above	Risk assessment to be completed	April 2011[1]
3	All overhead crossings for which risk assessment at #2 above indicates an 'intolerable' risk to navigation safety	Risk level to be made as low as reasonably practicable through complying with overhead signage requirements and other treatments as necessary	Within 2 years of the completion of the risk assessment.
4	All overhead crossings for which risk	To be redeveloped as submarine crossings	Within first 15 year review period

[1] All risk assessments are forecasted to be complete by April 2011, however, options are being evaluated to accelerate the program in order to achieve the code's required completion date of December 2010.

Table 10.1 – Existing Crossing Assessment Timetable

#	Situation	Treatments Required	Timetable for Completion
	assessment at #3 above indicates an 'intolerable' risk to navigation safety		
5	All overhead crossings with signage which is not in accordance with this code by December 2010	Prepare and implement signage replacement plans based on risk assessment principles	Implement 10 year signage replacement plans

Where the risk assessment of an existing crossing is 'intolerable', or not as low as reasonably practicable, EnergyAustralia undertakes treatment to reduce the risk to an acceptable level. Appropriate treatments in this situation may include:

- Elimination of the need for a crossing (i.e. by re-routing cables);
- Relocating the crossing on the waterway;
- Reconfiguring the network;
- Installing a submarine crossing;
- Raising the height of the crossing;
- The use of signage;
- The use of coloured balls / and or coverings (tiger tails);
- The use of 'breakaway' cables;
- Cable insulation;
- Lighting the signage associated with the crossing; and
- Other treatments as appropriate.

A review has been conducted of the water crossing incidents in EnergyAustralia's network area. There are four incidents recorded, the most recent of which occurred nine years ago, in 2001. Remedial action was taken at the time of these incidents and these four crossings will also be included in the risk assessment under the new code.

10.2 EnergyAustralia's Power Line Crossings

EnergyAustralia currently has a project underway to assess the water crossings as required by the code. This project includes:

- A full survey of all power line crossings of navigable waterways to determine and confirm the parameters of each crossing, including but not limited to clearance above highest astronomical tide level (HAT), conductor properties, structural support types and location, and means of conductor attachments and support; and
- A risk assessment for each power line crossings of navigable waterways. In accordance with section 2 of the code the risk assessment will be conducted to a standard equal to or better than AS/NZS 4360:2004 – Risk Management and will be performed by a competent person(s) familiar with AS/NZS 4360:2004.

The surveys and risk assessments are scheduled for completion by April 2011. Further risk mitigation projects will be raised for any crossings found to pose an 'intolerable' risk. Table 10.2 provides details of EnergyAustralia's power line crossings of navigable waterways.

Table 10.2 – EnergyAustralia's Power Line Crossings of Navigable Waterways as at 30 June 2010					
	Overhead Crossings	**Submarine or Bridge Crossings**	**Incidents during 2009-10**	**Crossings Reconstructed During 2009-10**	**Crossings Identified as Requiring Conversion to Submarine Cable**
Navigable Crossings	275^	88*	0	0	0

^ Includes 11 dual-circuit lines which each represent 2 crossings for the purposes of the risk assessment project.
* Submarine crossings and crossings installed within the structure of bridges are considered to pose low risk and are not required to be risk assessed.

Originally there were 465 water crossing identified that potentially required risk assessments. Further investigations have determined that there are only 275 waterway crossings requiring risk assessments to be undertaken. EnergyAustralia has reached an agreement with NSW Maritime that 152 crossings in the Upper Hunter region could be eliminated from the risk assessment project as they crossed waterways which are not navigable and therefore posed no risk to vessels. The project has also identified a small number of crossings which have either been removed or belong to other supply authorities.

The existing signage at the water crossings remains at the previous standard, however sites are programmed in a prioritised manner for survey and risk assessment, as part of the overall program of works. This includes the implementation of risk reduction actions required as identified from the risk assessments, updating the clearance information on the existing signage and the installation of advisory signs at relevant launching sites.

Significant progress has been made in the survey of the power line crossings with all crossing expected to be surveyed by August 2010. The risk assessments work is progressing and three assessments have already been issued as draft for review. Based on the progress to date, it is anticipated that the majority of the required of risk assessments will be completed in the second half of 2010.

The progress of the project as at 30 June 2010 is summarised in the Table 10.3 below:

Table 10.3 – Progress of the Power Line Water Crossings Survey and Risk Assessment				
Overhead Crossings	**Survey Complete**	**Surveys Submitted for Checking**	**Sag Calculations Complete**	**Risk Assessments (in Progress)**
275	151	146	118	117

EnergyAustralia has issued a new Network Engineering Guideline (NEG OH14 – Guide to the assessment of waterway crossing risks) to reflect the requirements of the new code. This guideline applies to the assessment of risks associated with new or existing waterway crossings, in accordance with the Crossings of NSW Navigable Waters: Electricity Industry Code.

All incidents, including those involving power line crossings, are managed through EnergyAustralia'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 EnergyAustralia and NSW Maritime for incident reporting and analysis.

Inspection and maintenance of EnergyAustralia's power line crossings, including waterway crossing signs and their associated support structures, is performed in accordance with EnergyAustralia's Network Maintenance Plan. The Plan describes the inspection and maintenance activities required on these assets, as determined by the Maintenance Requirements Analysis performed on the groups of assets.

The resulting inspection and maintenance program developed for this group of assets is a combination of Patrols for Line Inspection, Pole and Steel Towers and Structures, base line examination of wood pole structures at all voltages, and vegetation management activities, and has been developed in accordance with industry best practice.

Typically the inspection patrols for line inspection and pole inspection are based on a four yearly inspection cycle. These two inspection programs are offset by two years and as a result the crossings are visited at a minimum of every two years +/- the latitude for the respective tasks. This is further enhanced by the Vegetation Management Program which is a full service program aimed at keeping vegetation at the required clearances at all times.

ATTACHMENT A: Distribution Reliability of Supply: Definitions & Notes

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

Note 2: The following definitions and notes are in accordance with the 'Design, Reliability and Performance licence conditions' imposed on distributors by the Minister for Energy and Utilities on 1 August 2005 and revised in December 2007. The report outline is the implementation of this reporting framework, with some necessary additions, by I & I NSW for this annual Electricity Network Performance Report required under the Electricity Supply (Safety and Network Management) Regulation 2008.

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 an 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 3 below.

Table A.1 Reliability Measures		
Measure/description	**Index**	**Definition**
Total number of minutes a distribution network customer on average is without electricity / year	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.

Table A.1 Reliability Measures		
Measure/description	**Index**	**Definition**
Number of interruptions on average, a distribution network customer's supply is interrupted per year	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).

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 0.5 seconds, 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. The number of distribution customers is calculated as the average of the number of customers at the beginning of the reporting period and the number of customers at the end of the reporting period.

3. Un-metered Street Lighting supplies are excluded. Inactive accounts are excluded.

Table A.2 – Reliability data sets – sustained interruptions

Title	Data Set
Overall interruptions	All sustained interruptions including transmission, directed load shedding, planned and unplanned.
Planned interruptions only Unplanned interruptions	Excludes: transmission outages, and directed load shedding.
Normalised	Further excludes 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 a 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; and

   (e) an interruption caused by a customer's electrical installation or failure of that electrical installation.

6. 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 (Exclude transmission and directed load shedding but include planned outages.) 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 calculated the T_{MED} (i.e. days that did not have any *interruptions* are not included).

c) Take the natural logarithm (In) 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 knows as the log-standard deviation) of the data set.

f) Complete the major event day threshold T_{MED} using the following equation:

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

h) 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 DNSP's SAIDI and SAIFI in respect of all of its feeder types.

Table A.3 – Feeder Classifications

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

Notes

1. Rural short 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.

ATTACHMENT B: Transmission Reliability - Network Indices

A *Transmission Network* is a system of electricity lines and associated equipment 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.

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

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 8760 hours.

System Reliability (Un-Planned 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.

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

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
Note 2: EnergyAustralia 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, EnergyAustralia 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.

Note 2: The connection points for the EnergyAustralia distribution network are not to be included.

ATTACHMENT C: Safety

Annual Reporting of Accidents and Incidents

The report (in accordance with this Outline and the accompanying tables) should summarise the number and type of electrical network accidents and incidents that have occurred during the year. The report should be a summary of reports already forwarded to the Department during the year and should indicate whether the injured persons or people placed at risk were network workers (employees or distributor contractors), accredited service providers or members of the public. The report should indicate the causes and contributory causes of the incidents; and for each cause, indicate the measures taken to prevent similar incidents occurring in the future.

Reporting is to generally follow the Department's Significant Electrical Network Incident (SENI) reporting arrangements which commenced on 1 July 2002. Terms are defined below.

Serious Electricity Network Accidents (SENA)

A *serious electricity network accident* is an accident involving the electricity network (including accidents remote from the network but caused by the network e.g. network neutral failure affecting a customer installation etc.) as a consequence of which a person dies or suffers permanent disability, is hospitalised, receives treatment from a health care professional, or is unable to attend work for any period of time, but excluding situations where network support structures are impacted by motor vehicles and aircraft unless electricity is involved in the injury. The most common SENA are falls from heights.

This statistic also should include Serious Electricity Accidents, i.e. those where electricity was involved in the injuries.

These accidents are to be summarised and listed in Table 5.1 for accidents involving the public and Table 5.3 for network workers.

Actionable Safety Incident (ASI)

An *actionable safety incident* is an incident, which is not a serious electricity network accident, involving the electricity network, but where there was a significant risk that a network worker, accredited service provider or member of the public could have been seriously injured as a result of the incident, and meeting any of the following criteria:

a) the circumstances of the incident indicate that there is a duty of care to inform other distributors who may need to act to properly control a risk of serious injury (e.g. design defect in network equipment which may cause explosion or risk serious injury); or

b) the risks indicated by the incident, and the probability of occurrence of the incident, are such that, in order to properly manage the safety risks, the distributor needs to modify its network management plan (including public safety awareness plan) or any standards, procedures, systems or other documents required to be implemented under that plan; or

c) contact is made, directly or indirectly, with the energised electricity network (e.g. crane hit overhead conductors, underground cable dig-in etc).

Situations where network support structures are impacted by motor vehicles and aircraft would not normally need to be reported unless criteria a) or b) are met.

Incidents involving network assets, which place persons at risk of injury are to be summarised in Table 5.2 for incidents involving the public and Table 5.4 for incidents involving network workers and accredited service providers.

Reporting and analysis of these incidents is the key to the prevention of accidents by timely and appropriately targeted education, training and job or network redesign, where necessary.

ATTACHMENT D: Definitions

Network Safety Context,

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

Contestable Service: means:

any service provided for the connection of customers to the *electricity network*, and

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. Accredited service providers 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 Accredited Service Providers.

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: Independent Appraisal Guidelines

Introduction

The Network Performance Report must include an appraisal of the integrity of the information presented in the report.

The appraisal is to be carried out by independent persons who are qualified to do so.

Integrity for the purposes of the appraisal means that the report is complete and that the data presented can be relied on by the Department for carrying out performance analysis.

Purpose of the Guideline

The purpose of these guidelines is to ensure that appraisals are conducted in an independent, rigorous and consistent manner. To this end the guidelines establish minimum requirements for the independence and expertise of the appraisers, and for the conduct and reporting of the appraisals.

It is intended that the appraisal process will include consideration of all aspects of compliance with the report outline and definitions, as well as identification of any non-compliance and corrective action being taken to eliminate any non-compliance.

Appointment of the Appraiser

The appraisal is to be carried out by a person who has been nominated by the distributor by notice in writing to the Director General for review prior to appointment. Details of the proposed appraiser to be provided should include name, qualifications and experience and any other relevant information.

The nominated appraiser is to be a person who:

- Is independent of the distributor
- is competent to exercise the functions of an appraiser under the Electricity Supply (Safety and Network Management) Regulation and this outline in respect of the Report.

Pre-Appraisal Discussion

Following appointment of the appraiser and prior to the commencement of the appraisal the Department shall be given the opportunity of having a pre-appraisal interview with the appraiser. The interview provides an opportunity for DWE to indicate areas which may be of particular interest and for the appraiser to have clarified any issues which are unclear.

Appraisal Report

The outcome of the appraisal process is to be an appraisal report signed by the Independent Appraiser, and confirming that their appraisal met the requirements of Attachment E of this outline. The appraisal report is to be lodged with the draft Network Performance Report by 30 September annually.

The appraisal report must provide an appraisal of the reliability, accuracy and integrity of information reported in accordance with this Outline and the basis for any views provided. In addition the report must include an analysis of the following:

- the documented procedures for measuring, processing and reporting data, measurement systems, information systems and quality controls
- the extent to which relevant staff demonstrate an understanding of those documented procedures, measurement systems, information systems and quality controls

- evidence that those documented procedures, measurement systems, information systems and quality controls are being observed or properly implemented
- the extent to which any reported data has been estimated or extrapolated rather than measured directly, including an estimated reliability range for data where appropriate
- the extent of involvement by senior management in the Network Performance Reporting process.
- The status of projects planned to address the findings of the PB Associates Report on Distributors' Reliability Reporting, including progress to date, future plans and their timing, and the outcomes that the initiatives are expected to deliver.

The appraiser, as part of this process should review all data by comparing the data with previous years for consistency and also consider whether it meets generally expected results for the particular performance measure. In addition, sufficient data should be thoroughly checked, from its original measurement to its incorporation into the final report, on a sampling basis to generate confidence in the integrity of all data in the report.

ATTACHMENT F: Managing Director Declaration

EnergyAustralia

ELECTRICITY NETWORK
PERFORMANCE REPORT 2009/10

Declaration by Managing Director

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 2008*, and the "Distribution Network Service Provider Annual Report Outline" (the Outline), as provided by Industry & Investment NSW.

2. Has been appraised by an independent appraiser in accordance with the "Appraisal Guidelines" contained in the "Distribution Network Operator Report Outline".

3. Includes a copy of the appraisal, signed by the independent appraiser.

4. Has been checked in accordance with recognised quality procedures; 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 "Distribution Network Operator Report Outline".

NAME: George Maltabarow

SIGNATURE:

Managing Director

DATE: 12th November 2010

ATTACHMENT G: DEMAND MANAGEMENT

Table G1 - Demand Management Projects Implemented During 2009/10

Project Individual large projects	Description of Demand Management Project Implemented	Peak Demand Reduction (kVA)	CO2 Reduction (Tonnes Per Year and Expected Duration)	PV of Costs of Demand Management Project	PV of Total of Capital Expenditure Deferment plus Operating Expenditure Savings
Greenacre Park Area Stage 1 - Power Factor Correction & Network Support Agreements	3.7 MVA of demand reduction consisting of: - A power factor correction program facilitating the installation of equipment at 9 large customers' premises where power factor is low. Customers are offered discounted prices through bulk buying and project facilitation. The target capacity of installations is 3.5MVAr resulting in peak demand reduction of 1.2 MVA. - 4.0 MVA of existing standby generation in the Greenacre Park area via an agreement with a third party aggregator to remove customer loads from the network in response to a dispatch call from EnergyAustralia. Demand reduction capability will persist for duration of deferral (1 year).	3,700 kVA	225 tonnes/yr for 10 years	$1,256,909	$1,750,000
Willoughby Area Stage 1 - Power Factor Correction & Network Support Agreements	6.3 MVA of demand reduction consisting of: - A power factor correction program facilitating the installation of equipment at 13 large customers' premises where power factor is low. Customers are offered discounted prices through bulk buying and project facilitation. The target capacity of installations is 3.1MVAr resulting in peak demand reduction of 1.1MVA. - 2.6 MVA of demand reduction from an existing cogeneration site located in North Sydney. This is a non-dispatchable network support agreement requiring operation between 12pm and 5pm on business days	6,300 kVA	199 tonnes/yr for 10 years	$843,203	$2,250,000

Table G1 - Demand Management Projects Implemented During 2009/10

	between November and April. - 2.6 MVA of existing standby generation in the Willoughby area via an agreement with a third party aggregator to remove customer loads from the network in response to a dispatch call from EnergyAustralia. Demand reduction capability will persist for duration of deferral (1 year).				
Broadmeadow generators	2.4 MVA of diesel generation will been installed at Broadmeadow for summer 2009/10. It is capable of operating in parallel with the network and can be called at any time from the Network control room. Demand reduction capability will persist for duration of deferral (1 year).	2,400 kVA	Not applicable	$650,278	$2,460,000
Network capacitors at Beacon Hill Zone	Installation of reactive support within the network	6,000 kVar	385 tonnes/yr for 10 years	$776,035	Not applicable - To reduce load at risk and ensure power factor complies with National Electricity Rules requirements.
Totals		12,400kVA + 6,000kVar	809 tonnes/yr for 10 years	$3,526,425	$6,460,000

Table G2 – Demand Management Investigations concluded in 2009/10		
	Description of Potential Demand Management Project Investigated	**PV of Costs of Investigations**
Gwawley Bay & Engadine Zone Substation	A constraint was identified for investigation. The screening test and investigation was completed and concluded that DM would be a cost effective option to enable deferral of the supply side project. However in the project development stage, it was concluded that the DM option identified (embedded generation) did not meet the necessary reliability requirements for network support.	$83,863
Brandy Hill Zone Substation	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$14,019
Drummoyne 11kV 14 & 26	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$2,898
Ku-ring-gai STS to Lindfield Zone 33kV cable Replacement	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$724
Empire Bay Zone Substation	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$5,428
Williamtown 33kV feeder	A constraint was identified for investigation. The screening test was completed and concluded that DM would be a cost effective option to enable deferral of the supply side project in this instance. However the subsequent investigation concluded that there were insufficient cost effective DM options available in this area.	$15,392
Enfield Zone Substation	A constraint was identified for investigation. The screening test and investigation was completed and concluded that DM would be a cost effective option to enable deferral of the supply side project.	$100,978
Marrickville North 11kV Zone Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$4,605
Adamstown Zone Substation	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance. However further analysis and investigation concluded that there were cost effective options to reduce load at risk. The Broadmeadow Generator project was subsequently implemented.	$12,170
Rathmines Zone Substation	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance, but it may be cost effective to reduce load at risk. However the subsequent investigation concluded that there were insufficient cost effective DM options available in this area.	$16,432
Concord North Zone Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$1,155

Table G2 – Demand Management Investigations concluded in 2009/10

	Description of Potential Demand Management Project Investigated	PV of Costs of Investigations
Green Square Zone - Additional Transformer	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$1,616
Beacon Hill to Belrose 11kV Transfer	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$10,295
Berkeley Vale Zone Pa 3, 8 & 17	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$1,445
Gwawley Bay 11kV Zone Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$2,314
Castle Cove Zone Development 11kV 15,43, & 44	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$1,815
Miranda Zone 11kV Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$2,667
Raymond Terrace Zone	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance, but it may be cost effective to reduce load at risk. However the subsequent investigation concluded that there were insufficient cost effective DM options available in this area.	$13,037
City Zones 11kV Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$7,423
Cronulla Zone Augmentation	A constraint was identified for investigation. The screening test and investigation was completed and concluded that DM would be a cost effective option to enable deferral of the supply side project in this instance. DM projects are in development that have the potential to defer the supply side investment by up to two years.	$82,692
Jewells Zone Substation & Feeder Upgrade	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$4,903
Woy Woy & West Gosford Feeders Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$1,071
Drummoyne 11kV Pa 23 & 27	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$2,368

Table G2 – Demand Management Investigations concluded in 2009/10		
	Description of Potential Demand Management Project Investigated	**PV of Costs of Investigations**
Wyong East Zone Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$893
Argenton STS - 3rd 132kV Feeder	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$714
Rhodes 132/11kV Zone Substation	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$36,766
Green Sq to Beaconsfield West 132kV Feeder	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$536
Charlestown Zone Substation	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance. However further analysis and investigation concluded that there were cost effective options to reduce load at risk.	$19,589
Engadine 11kV Zone Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$1,048
St Peters North 11kV Zone Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$2,427
Little Bay 11kV Zone Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$1,977

Table G3 – Demand Management Investigations in progress 2009/10		
Location	**Description of Potential Demand Management Project Under Investigation**	**PV of Costs of Investigations**
Pennant Hills NW Zone Development	A constraint was identified for investigation. This investigation is in progress.	$32,756
St Ives Zone Substation Upgrade	A constraint was identified for investigation. This investigation is in progress.	$28,859
SOPA New Zone Substation	A constraint was identified for investigation. This investigation is in progress.	$31,146
Maitland 33/11kV Zone Substation	A constraint was identified for investigation. This investigation is in progress.	$36,624
Epping 11kV Zone Development	A constraint was identified for investigation. This investigation is in progress.	$6,294

ATTACHMENT H: FEEDERS WHICH EXCEEDED INDIVIDUAL FEEDER STANDARDS

Tables 4.10 through to 4.13 provide details, by feeder type, of feeders which exceeded the individual feeder standards at some time during the twelve month period 1 July 2009 through to 30 June 2010.

Table 4.10 – CBD Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 100 (Minutes per customer) **SAIFI Standard:** 1.4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
ZN263:PA31 32DEF ex 32D Dalley St CBD 895 Triplex	Dec-08	236.56	0.00	0.76	0.00	Duration over index	Performance Corrected
ZN263:PA33 34GHJ ex 33J Dalley St 544 CBD 544 Triplex	Dec-08	109.77	2.15	0.27	0.00	Duration over index	Performance Corrected
ZN263:PA31 32ABC ex 31ª Dalley St CBD 610 Triplex	Mar-09	184.65	0.00	1.18	0.00	Duration over index	Performance Corrected
ZN263:PA31 32KLM ex 32K Dalley St CBD 484 Triplex	Mar-09	159.76	27.19	0.20	0.12	Duration over index	Performance Corrected

Table 4.10 – CBD Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 100 (Minutes per customer) **SAIFI Standard:** 1.4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
ZN263:PA35 37GHJ Dalley St CBD 264 Triplex	Mar-09	611.00	570.27	0.98	1.08	Duration over index	Monitor
ZN263:PA31 32GHJ Dalley St CBD 644 Triplex	Sep-09	110.63	0.00	1.94	0.00	Duration over index	Performance Corrected
ZN263:PA33 34ABC Dalley St CBD 246 Triplex	Sep-09	109.96	0.00	1.91	0.00	Duration over index	Performance Corrected
ZN263:PA33 34DEF Dalley St CBD 1120 Triplex	Sep-09	108.36	0.20	1.96	0.00	Duration over index	Performance Corrected
ZN263:PA33 34KLM Dalley St CBD 1042 Triplex	Sep-09	105.81	143.36	1.89	0.21	Duration over index	Monitor
ZN263:PA35 37DEF Dalley St CBD 235 Triplex	Sep-09	107.36	0.00	1.94	0.00	Duration over index	Performance Corrected
ZN263:PA35 37KLM	Sep-09	105.32	0.52	1.92	0.00	Duration over index	Monitor

Table 4.10 – CBD Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 100 (Minutes per customer) **SAIFI Standard:** 1.4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
Dalley St CBD 605 Triplex							
ZN263:PA35 37ABC Dalley St CBD 436 Triplex	Dec-09	85.66	0.81	1.49	0.00	Frequency over index	Performance Corrected
ZN781:PA12DEF City North CBD 93 Triplex	Dec-09	108.33	0.00	1.95	0.00	Duration over index	Performance Corrected
ZN3288:PA45 46KLM City South CBD 464 Triplex	Mar-10	837.34	820.71	0.97	0.95	Duration over index	Monitor
ZN781:PA14ABC City North CBD 154 Triplex	Jun-10	322.53	322.53	0.49	0.49	Duration over index	Performance under review

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
ZN15002:PA2 Narrabeen 11 1197	Jun-07	706.33	167.45	3.51	1.51	Duration over index	Performance Corrected
ZN15004:PA1 Newport 9 2346	Jun-07	506.32	474.83	8.73	6.97	Duration over index	Monitor
ZN4545:PA31 Meadowbank 11 2723	Sep-07	493.67	69.19	3.1	1.49	Frequency over index	Performance Corrected
ZN4545:PA40 Meadowbank 9 1548	Sep-07	450.81	146.25	3.74	1.97	Duration over index	Performance Corrected
ZN4545:PA41 Meadowbank 13 1889	Sep-07	603.19	19.09	5.15	0.09	Duration over index	Performance Corrected
ZN12610:PA18 Long Jetty 10 1124	Dec-07	487.91	309.26	5.08	3.18	Duration over index	Performance Corrected
ZN9037:PA2 Miranda	Dec-07	325.62	415.40	4.00	3.68	Duration over index	Monitor

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
9 1594							
ZN15005:PA12 Belrose 7 1472	Mar-08	370.32	183.00	3.10	2.29	Duration over index	Performance Corrected
ZN7900:PA3 Campbell St 1 116	Mar-08	625.76	753.18	1.03	1.09	Duration over index	Monitor
232:11459 Nelson Bay 33 18 2258	Mar-08	278.28	43.55	4.11	2.08	Frequency over index	Performance Corrected
ZN14891:PA19 Wyong New 5 204	Mar-08	503.83	50.30	5.09	0.14	Duration over index	Performance Corrected
232:11460 Nelson Bay 33 12 1627	Jun-08	264.33	145.57	4.52	2.01	Frequency over index	Performance Corrected
ZN965:PA42 Pennant Hills 11 1605	Jun-08	246.35	301.33	4.92	4.21	Frequency over index	Reliability Improvement project issued.
232:11457 Nelson Bay 33 17 2238	Sep-08	436.72	133.10	2.22	3.25	Duration over index	Performance Corrected
ZN15005:PA4 Belrose	Dec-08	336.32	10.49	5.25	0.12	Frequency over index	Performance Corrected

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
9 1117							
ZN80:PA32 Chatswood 12 3001	Dec-08	372.76	511.02	4.06	7.27	Duration over index	Reliability Improvement project issued.
ZN116:PA44 Leichhardt 4 1359	Dec-08	136.71	120.15	5.75	1.15	Frequency over index	Performance Corrected
ZN12610:PA11 Long Jetty 13 2292	Dec-08	547.00	232.65	7.36	3.36	Duration over index	Performance Corrected
ZN4545:PA44 Meadowbank 13 1602	Dec-08	346.61	185.73	5.00	3.16	Frequency over index	Performance Corrected
232:33407 Nelson Bay 33 17 1996	Dec-08	292.39	121.17	4.24	2.07	Frequency over index	Performance Corrected
ZN15005:PA2 Belrose 7 1143	Mar-09	600.88	191.18	3.29	2.30	Duration over index	Performance Corrected
ZN15005:PA6 Belrose 10 1238	Mar-09	856.09	327.72	4.09	3.40	Duration over index	Performance Corrected
ZN15005:PA8 Belrose	Mar-09	1021.48	34.83	4.76	0.33	Duration over index	Performance Corrected

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
5 1002							
ZN15001:PA6 Brookvale 5 1054	Mar-09	319.88	152.42	4.16	3.92	Frequency over index	Performance Corrected
203:8082 Carrington 33 2 24	Mar-09	1153.60	116.24	2.05	1.08	Duration over index	Performance Corrected
203:8089 Carrington 33 4 229	Mar-09	528.92	108.57	1.75	1.99	Duration over index	Performance Corrected
218:7478 Charlestown N33 11 1734	Mar-09	169.25	108.58	4.25	3.01	Frequency over index	Reliability project completed.
ZN9252:PA2 Jannali 9 1694	Mar-09	529.97	4.65	4.09	0.05	Duration over index	Performance Corrected
ZN12590:PA4 Lake Munmorah 5 602	Mar-09	430.38	58.90	1.87	1.00	Duration over index	Performance Corrected
ZN15014:PA12 Mona Vale 20 1801	Mar-09	433.62	86.77	0.75	1.60	Duration over index	Performance Corrected
ZN15002:PA6 Narrabeen	Mar-09	432.83	537.48	3.08	5.86	Duration over index	Monitor

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
12 1598							
232:33409 Nelson Bay 33 13 2315	Mar-09	116.17	157.16	4.11	2.25	Frequency over index	Performance Corrected
ZN2568:PA19 St Peters 6 994	Mar-09	1444.46	4.79	2.79	0.07	Duration over index	Performance Corrected
ZN10990:PA6 Arncliffe 2 683	Jun-09	459.73	5.49	2.91	0.09	Duration over index	Performance Corrected
ZN15011:PA10 Beacon Hill 10 1224	Jun-09	446.09	364.90	4.87	5.15	Duration over index	Reliability Improvement project issued. Vegetation report issued.
ZN15011:PA8 Beacon Hill 7 650	Jun-09	356.50	182.99	3.94	3.86	Duration over index	Performance Corrected
ZN9118:PA3 Cronulla 9 853	Jun-09	413.86	108.20	3.37	0.63	Duration over index	Performance Corrected
ZN72:PA10 Five Dock 5 2228	Jun-09	121.76	166.58	4.09	1.95	Frequency over index	Performance Corrected
ZN72:PA15 Five Dock	Jun-09	111.85	141.93	4.07	1.88	Frequency over index	Performance Corrected

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
3 868							
202:34260 Newcastle CBD 33 8 2599	Jun-09	268.33	133.38	4.88	3.06	Frequency over index	Performance Corrected
ZN965:PA37 Pennant Hills 5 567	Jun-09	347.87	41.81	4.20	0.98	Frequency over index	Performance Corrected
ZN10997:PA2 Sans Souci 7 2275	Jun-09	351.01	163.96	2.11	2.03	Duration over index	Performance Corrected
230:34048 Tanilba Bay 33 2 308	Jun-09	295.18	147.64	5.00	2.01	Frequency over index	Performance Corrected
230:34051 Tanilba Bay 33 12 1508	Jun-09	324.16	157.57	5.22	2.07	Frequency over index	Performance Corrected
ZN384:PA8 Camperdown 3 176	Sep-09	175.94	58.47	4.83	1.93	Frequency over index	Performance Corrected
ZN3425:PA28 Castle Cove 8 730	Sep-09	406.04	423.56	4.97	5.43	Duration over index	Reliability project issued, vegetation report issued.
504:48028	Sep-09	462.62	61.25	2.05	1.21	Duration over index	Performance Corrected

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
Cessnock 33 11 1196							
ZN14892:PA16 Charmhaven 18 2167	Sep-09	395.58	206.53	4.71	2.90	Duration over index	Performance Corrected
505:48018 Kurri 33 9 1124	Sep-09	454.93	5.13	2.08	0.10	Duration over index	Performance Corrected
ZN12610:PA10 Long Jetty 15 1760	Sep-09	393.23	208.10	5.71	3.12	Duration over index	Performance Corrected
ZN12610:PA13 Long Jetty 9 1954	Sep-09	342.21	125.74	5.93	1.95	Frequency over index	Performance Corrected
ZN10994:PA20 Mortdale 8 893	Sep-09	379.08	494.58	3.11	4.92	Duration over index	Monitor. Vegetation report issued.
ZN10997:PA6 Sans Souci 0 0	Sep-09	222.25	N/A	4.09	N/A	Frequency over index	Feeder no longer exists
513:48058 Singleton 66 7 489	Sep-09	148.77	131.01	4.45	2.62	Frequency over index	Performance Corrected
ZN15001:PA16	Dec-09	296.63	468.33	6.06	10.15	Frequency over index	Reliability Improvement work Issued, Vegetation

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
Brookvale 4 560							report issued.
ZN15001:PA18 Brookvale 6 1872	Dec-09	352.96	518.37	6.14	9.16	Duration over index	Reliability Improvement work Issued, Vegetation report issued.
214:8669 Cardiff 33 9 1805	Dec-09	207.02	105.81	5.05	3.05	Frequency over index	Performance Corrected
218:7482 Charlestown N33 14 1960	Dec-09	87.83	97.81	4.10	5.09	Frequency over index	Reliability work issued.
ZN1648:PA13 Enfield 5 63	Dec-09	255.70	112.72	4.06	2.02	Frequency over index	Performance Corrected
ZN2635:PA12 Epping 9 826	Dec-09	277.71	270.22	4.83	4.31	Frequency over index	Reliability Improvement work Issued, Vegetation report issued.
ZN72:PA13 Five Dock 2 738	Dec-09	226.99	182.99	5.00	2.00	Frequency over index	Performance Corrected
ZN847:PA1 Hornsby 11 1197	Dec-09	308.58	182.70	4.02	2.20	Frequency over index	Performance Corrected
ZN847:PA2	Dec-09	338.10	362.73	4.51	5.50	Frequency over index	Project Issued.

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
Hornsby 9 1459							Vegetation report issued.
505:48025 Kurri 33 6 1033	Dec-09	433.51	375.49	5.81	4.40	Duration over index	Monitor
ZN195:PA3 Pymble 3 379	Dec-09	223.55	152.95	4.05	3.23	Frequency over index	Performance Corrected
228:7486 Stockton 33 3 2	Dec-09	156.00	99.00	4.50	1.50	Frequency over index	Performance Corrected
224:80346 Argenton 4 20	Dec-09	352.77	161.62	4.35	2.85	Duration over index	Performance Corrected
ZN72:PA35 Five Dock 3 623	Dec-09	150.89	0.50	4.19	0.01	Frequency over index	Performance Corrected
ZN1850:PA3 Bass Hill 10 1051	Mar-10	421.58	399.43	5.98	5.66	Duration over index	Reliability Project being developed
ZN15001:PA13 Brookvale 2 109	Mar-10	99.65	99.65	5.90	5.90	Frequency over index	Monitor. ST feeder patrolled.
ZN15001:PA15	Mar-10	61.35	65.57	5.04	5.88	Frequency over index	Monitor. ST feeder patrolled.

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
Brookvale 5 2834							
ZN15001:PA17 Brookvale 2 9	Mar-10	59.67	123.44	5.11	6.22	Frequency over index	Monitor. ST feeder patrolled.
ZN874:PA8 Concord 6 571	Mar-10	113.17	112.33	4.08	4.05	Frequency over index	Monitor.
ZN3155:PA18 Double Bay 1 434	Mar-10	485.83	486.95	0.64	0.65	Duration over index	Monitor.
ZN847:PA18 Hornsby 16 1561	Mar-10	350.81	474.67	3.13	4.10	Duration over index	Capital Project being developed. Vegetation report issued
ZN965:PA15 Pennant Hills 10 1193	Mar-10	320.52	323.04	4.13	4.11	Frequency over index	Feeder investigated.
ZN12650:PA3 West Gosford 7 1578	Mar-10	365.83	351.48	4.28	4.18	Duration over index	Monitor.
ZN12650:PA8 West Gosford 3 168	Mar-10	381.02	379.75	2.79	1.79	Duration over index	Monitor.
ZN2400:PA22	Mar-10	358.12	243.23	3.80	2.70	Duration over index	Performance Corrected

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
Berowra 13 1327							
240:34835 Mayfield West 132 10 1918	Mar-10	259.52	231.16	4.92	3.91	Frequency over index	Performance Corrected
ZN2196:PA28 Milperra 4 123	Mar-10	714.21	711.76	3.84	3.81	Duration over index	Monitor.
207:1752 Adamstown 33 10 1685	Jun-10	183.88	183.88	4.10	4.10	Frequency over index	Performance under review
ZN12690:PA24 Berkeley Vale 28 1125	Jun-10	268.59	268.59	4.37	4.37	Frequency over index	Performance under review
ZN1648:PA16 Enfield 5 1133	Jun-10	357.30	357.30	3.92	3.92	Duration over index	Performance under review
ZN15008:PA9 Harbord 9 1876	Jun-10	394.61	394.61	4.20	4.20	Duration over index	Performance under review
ZN9700:PA17 Kirrawee 10 2222	Jun-10	281.55	281.55	5.14	5.14	Frequency over index	Performance under review
ZN12600:PA13	Jun-10	244.82	244.82	4.27	4.27	Frequency over index	Performance under review

Table 4.11 – Urban Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 350 (Minutes per customer) **SAIFI Standard:** 4 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
Lisarow 18 841							
ZN12600:PA3 Lisarow 10 1399	Jun-10	146.92	146.92	4.99	4.99	Frequency over index	Performance under review

Table 4.12 – Short Rural Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 1000 (Minutes per customer) **SAIFI Standard:** 8 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
ZN12630:PA2 Peats Ridge 74 133	Jun-07	2236.0	1585.98	11.32	6.88	Duration over index	Reliability project Issued, Planning Project in construction. Vegetation management in progress.
ZN12630:PA4 Peats Ridge 85 640	Sep-07	2061.5	402.02	10.70	4.36	Duration over index	Performance Corrected
ZN14143:PA17 Somersby 68 732	Dec-08	1288.9	289.10	7.44	3.04	Duration over index	Performance Corrected
812:19072 Mitchell Line 66 112 198	Sep-09	345.25	547.03	8.18	3.13	Frequency over index	Performance Corrected

Table 4.12 – Short Rural Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 1000 (Minutes per customer) **SAIFI Standard:** 8 (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
225:33670 Toronto 33 39 1256	Sep-09	863.03	353.22	9.08	6.01	Frequency over index	Performance Corrected
230:34047 Tanilba Bay 33 11 1413	Dec-09	587.5	175.84	8.18	3.00	Frequency over index	Performance Corrected
ZN12690:PA16 Berkeley Vale 29 810	Mar-10	1294.91	1076.36	11.78	10.43	Duration over index	Reliability project Issued, Planning Project in construction. Vegetation management in progress.
512:48049 Branxton 66 171 617	Mar-10	1035.08	1039.21	2.99	3.10	Duration over index	Reliability project being developed. Vegetation management in progress.

Table 4.13 – Long Rural Feeders which exceeded the Individual Feeder Standards during the previous 12 month period

SAIDI Standard: 1400 (Minutes per customer) **SAIFI Standard: 10** (Number per customer)

Feeder Name, Location, Length and Customer Numbers	Date of First Non-Compliance	SAIDI		SAIFI		Description of Non-compliance and Reason	Remedial Actions Proposed or Taken Including Timetable
		At Non-Compliance	Current (as at 30 June 2010)	At Non-Compliance	Current (as at 30 June 2010)		
Nil							

2. 2010/11 Ausgrid Network Performance Report

Network Performance Report

2010/2011

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Introduction

This report represents Ausgrid's Electricity Network Performance Report for the 2010/11 financial year. The report has been prepared in accordance with the Electricity Supply (Safety and Network Management) Regulation 2008 and follows the outline provided by the NSW Department of Trade and Investment, Regional Infrastructure and Services. The report is designed to report actual performance in the 2010/11 financial year, against the criteria and key performance indicators established in the Network Management Plan. This report therefore complements the Plan and details Ausgrid's performance with respect to:

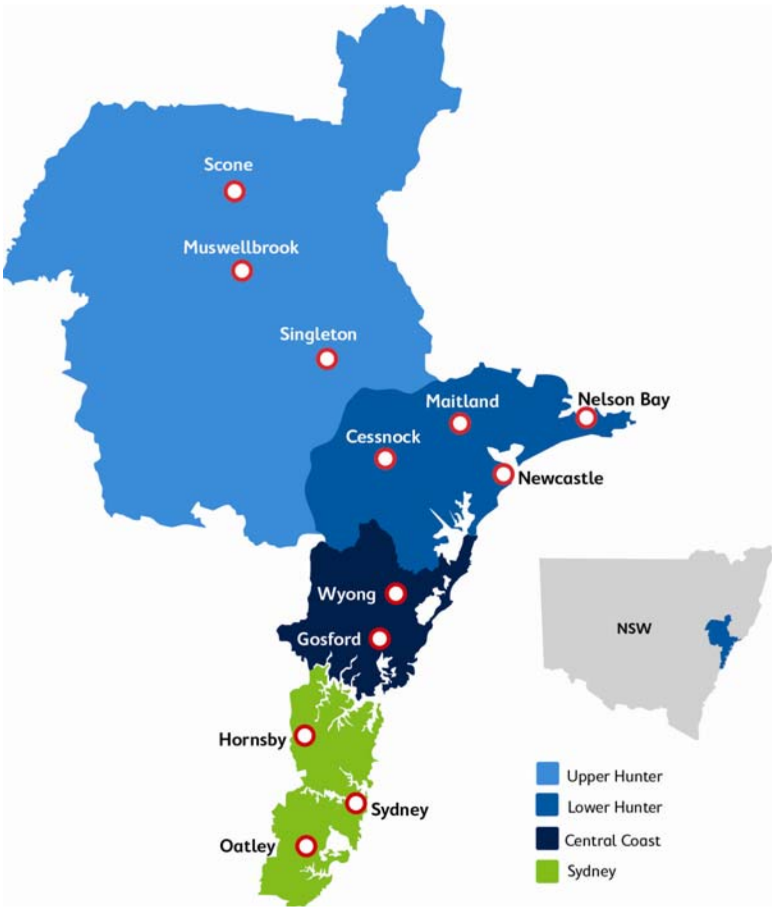
- Network Management;
- Network Planning;
- Asset Management;
- Network Safety;
- Customer Installations;
- Accredited Service Provider Scheme;
- Bushfire Risk Management;
- Public Electrical Safety Awareness; and
- Compliance with the NSW Maritime electricity industry code 'Crossings of NSW Navigable Waters'.

1. Profile

Ausgrid's distribution network covers 22,275 square kilometres from Waterfall in Sydney's south to Auburn in western Sydney and the upper Hunter Valley in the north. Ausgrid supplies electricity to 1.6 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, tourism, manufacturing and agriculture. Until 2 March 2011, the organisation was also a retailer of electricity and gas to more than 1.4 million homes and businesses in New South Wales (NSW), the Australian Capital Territory, Victoria and Queensland.

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;
- Infrastructure – related construction and maintenance services;
- Purchasing and supplying energy; and
- A range of other services including street lighting, customer connections, safety check ups, energy reviews, metering and 24 hour electrical repairs.

Ausgrid's distribution network includes:

- a subtransmission system of 33kV, 66 kV and 132 kV assets
- a high-voltage distribution system of 5 kV, 11 kV and 22kV assets
- a low voltage distribution system of 240V and 415V assets.
- over 49,000 km of overhead lines and underground cables.

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.

1.1 Overview

Table 1.1 Distributor Statistics	Number at 30 June 2010	Number at 30 June 2011
Distribution Customer Numbers (Total)	1,605,635	1,619,988
Distribution Customer Numbers – Sydney East Region	317,715	320,550
Distribution Customer Numbers – Sydney South Region	474,516	476,451
Distribution Customer Numbers – Sydney North Region	382,153	385,774
Distribution Customer Numbers – Newcastle Region	196,174	198,784
Distribution Customer Numbers – Central Coast Region	156,384	157,873
Distribution Customer Numbers – Lower Hunter Region	50,135	51,512
Distribution Customer Numbers – Upper Hunter Region	28,558	29,044
Maximum Demand (Aggregated System MW)	5,609	6,072
Feeder Numbers CBD	156	168
Feeder Numbers Urban	1,713	1,739
Feeder Numbers Short Rural	257	261
Feeder Numbers Long Rural	4	4
Energy Received by Dist Network to Year End (GWh)	31,812	31,816
Energy Distributed to Year End (Residential) (GWh)	9,251	9,538
Energy Distributed to Year End (Non-Residential Including un-metered supplies) (GWh)	21,187	21,153
Energy Distributed to Year End (GWh)	30,438	30,691
System Loss Factor (%)	4.32%	3.54%
Transmission System (km)	962	962
Transmission Substation (Number)	43	43
Sub Transmission System (km)	3,641	3,662
Substation - Zone (Number)	185	187
Substation - Distribution (Number)	30,261	30,551
High Voltage Overhead (km)	10,227	10,195
High Voltage Underground (km)	7,178	7,384
Low Voltage Overhead (km)	20,895	20,834
Low Voltage Underground (km)	6,539	6,673
Pole (Number)	510,217	506,101
Streetlights (Number)	250,143	251,298
Employees (Full Time Equivalent Number)	5,780	5,941
Contractors (Full Time Equivalent Number)	545	792

Notes: Distances for overhead and underground lines are circuit km.

System Loss Factor (%), being the difference between electricity received by the distribution network and electricity received by customers (including un-metered supplies) divided by electricity received by the distribution network (allowing for embedded generation), expressed as a percentage

1.2 Capital Works Program

In 2009, Ausgrid received regulatory approval from the Australian Energy Regulator (AER) for $8.5bn of capital investment during the period 2009-14. The robust planning process Ausgrid undertook to develop the program provides evidence that investment at this level is required to sustain our network and business for the next decade and beyond. The capital program represents the largest investment program to be undertaken by Ausgrid. It is the result of a detailed planning review and is an accurate reflection of the needs of the network.

Since the AER 2009 determination, some of the planned investments have changed to meet the changing nature of investment drivers. These changes are taken into account as the detailed project scopes are developed. For example, where peak demand falls below the forecast, network augmentation can be deferred. Lower peak demand has changed Ausgrid's expenditure in grow related investment. However, the total capital expenditure program has not changed significantly. Ausgrid remains committed to supply peak demand, decommission assets in poor condition, meet duty of care obligations, connect customers, and invest in appropriate technology and capabilities.

During the year, Ausgrid spent $1,578m on the network business including $1,373m directly on the system capital works program.

Table 1.2 Capital works program trend		
Year	**2009/10**	**2010/11**
Capital works program ($M)	$1,319	$1,578m

System capital works during this reporting period include projects to address customer load growth, network reliability, replacement of assets that have reached the end of their service lives, and duty of care projects to address environmental, public safety and asset security issues. Ausgrid's Duty of Care projects have a value of approximately $50m per year during the 2009/2014 regulatory period.

Major subtransmission network augmentation and reliability projects valued over $350m were completed during the year. Some of the larger projects completed include new 132kV zone substations at Adamstown, Kurri and Porty Botany, the City West cable tunnel, and connections to TransGrid's Tomago bulk supply point. Committed major network augmentation projects valued over $536m in construction during the year include new zone substations at Belmore Park (Sydney CBD), Potts Hill, Olympic Park, Royal North Shore Hospital, Rose Bay, Broadmeadow and Empire Bay.

Ausgrid also completed major subtransmission asset replacement projects valued over $246m during the year. Some notable replacement projects include 132kV zone substations at Bankstown, City North (Sydney CBD), and Jesmond, the refurbishment of Kurnell and Ourimbah 132kV subtransmission substations, and the completion of the Rozelle – City Central 132kV underground cable sections replacements. Major asset replacement projects in construction during the year include 132kV zone substations at Hurstville North, Broadmeadow, Lake Munmorah and Charlestwon.

2. Network Management

2.1 Overview

In line with the Electricity Supply (Safety and Network Management) Regulation 2008, Ausgrid is required to prepare, implement and publish a Network Management Plan. The Plan is available at www.ausgrid.com.au.

The Plan contains high level design, construction, operation and maintenance principles to manage network assets. It also incorporates principles applied to asset utilisation in the areas of safety, reliability, quality of supply and risk management. The Plan has four chapters:

Chapter 1: Network Safety and Reliability – provides a framework for Ausgrid's network to provide a reliable and safe supply of electricity. This chapter details how Ausgrid:

- manages its assets and sets out the basis for network investment;
- plans investments;
- provides reference to standards and protocols; and
- identifies areas of the network that require development.

Ausgrid's network planning meets legislative, license compliance and regulatory requirements with wider organisational objectives and business responsibilities. This includes meeting customer expectations for a reliable and safe supply of electricity; managing safety, environmental and security risks associated with network infrastructure and managing the financial performance of the business.

To deliver these objectives, the Network Management Plan focuses on:

1. Maintaining compliant infrastructure

The management of safety, environmental and infrastructure security risk. The environmental, safety and asset security obligations applicable to the network and services Ausgrid provides as a distributor are taken into account to develop Ausgrid's network management strategies.

2. Network performance

Overall network performance is impacted by performance of individual assets, growth in demand, the number of new customer connections required and the extent of any imbalance between overall growth in demand for electricity and available supply.

Ausgrid targets its investment expenditure to ensure network performance and compliance outcomes are achieved efficiently and prudently while meeting all regulatory and other obligations.

The network performance and customer outcomes associated with the planning processes are stipulated in the Design, Reliability and Performance Licence Conditions. However, fault level management is not included. The term fault level relates to how much energy can potentially be released during various fault scenarios - and this parameter varies across the network. Management of fault levels is a critical element of the planning process and can be an investment driver in itself. Ensuring the fault rating of network assets is not exceeded is a significant asset integrity and safety issue, and can drive investment in addition to managing customer outcomes associated with faults.

During 2010/11 Ausgrid issued eight new standards and modified a further 28 existing standards. Major technical disciplines covered in 20010/11 included new electrical and civil standards for the Barangaroo Development, teleprotection signalling, overhead line design and civil standards for major substations.

All network standards are displayed on an intranet platform for general access across Ausgrid and are also available on the Ausgrid website.

Chapter 2: Customer Installation Safety – addresses the management of safety in customer premises to the customer's terminal (the point of connection between the customer's electrical installation and the Ausgrid network).

Each year work is undertaken on electrical installations at thousands of customer properties throughout our distribution area. Ausgrid has responsibility for maintaining the distribution network, including the poles and wires required for 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 (contractor).

Customers need to employ licensed electrical contractors for any new or modified electrical work. Accredited Service Providers (ASP) connecting customer installations to our electricity network need to be authorised by Ausgrid.

In preparation of the Customer Installation Safety Plan we have taken into account the NSW Codes of Practice: Service and Installation Rules and Installation Safety Management. There are no departures from these Codes, unless to adopt a higher safety standard. As required we also advise that customers operating electrical installations are subject to the requirements of the Service and Installation Rules of NSW and Ausgrid's local requirements.

There has been a major increase (89%) in the number of notifications of electrical installation work from electrical contractors (CCEW). This is due to applications and connections associated with the NSW Solar Bonus Scheme and its various amendments, particularly the change from 60 cents/kWh to 20 cents/kWh in October 2010 which created an avalanche of applications for connection over a three week period. Ausgrid's policy is to inspect all solar installations, rather than conduct an audit program, due to an increase in inexperienced installers, more complex metering configurations and new technology that feeds into the network. This has resulted in the percentage of total installations inspected rising from 32% in 2008/09, 42% in 2009/10 and 64% in 2010/11.

The number of notifications for Level 2 Service Provider contestable work (NOSW) has increased by 67% from the previous year. This increase is also attributed to the NSW Solar Bonus Scheme and the associated contestable metering work which requires submission of a NOSW.

The major defect rate of 2.92% is significantly lower than last year (5.3%). This lower than expected number can be attributed to the 89% increase in CCEW's submitted. The low number of major defects also relates to no reported shocks from unsafe electrical contractor installation work.

Ausgrid is represented on related Australian Standards committees as well as the Service and Installation Rules of NSW to ensure the focus on customer installation safety is maintained and improved in the review process.

Ausgrid has also become a member of the Clean Energy Council (CEC), Australia's peak solar industry body. They accredit electrical contractors to install solar panels and systems and also undertake compliance audits of completed solar work.

A trial of the *Wirealert* device developed by Aurora Energy and rolled out in Tasmania was completed in 2011. The *Wirealert* device is a supply monitoring device that plugs into a power point and detects potentially dangerous situations arising from a combination of a faulty neutral and earth connections. Ausgrid issued 500 devices to Ausgrid staff and 2500 devices to customers with older higher risk electrical installations. The trial continues as customers report alarms from devices and investigations are carried out.

Ausgrid and Sydney Water are jointly funding the testing of each installation neutral connection impacted by their water main replacement program. Suspected faults are investigated and rectified by Ausgrid.

Chapter 3: Public Electrical Safety Awareness – this chapter aims to warn the public of hazards associated with electricity in relation to our network. It is based on an assessment of risks associated with the system and an analysis of any accidents or incidents. Ausgrid's approach to public safety focuses on:

- risk assessment and risk reduction;
- education and communication; and
- hazard response and procedures.

The Public Electrical Safety Awareness Plan outlines Ausgrid's commitment to safety and our responsibilities under the Electricity Supply (Safety and Network Management) Regulation 2008. The plan details Ausgrid's approach to safety and potential hazards associated with the transmission and distribution of electricity, how "at risk" groups are identified and provide precautions to avoid electrical incidents.

Programs are designed to create greater awareness of electrical safety amongst the general public and targeted groups based on an analysis of safety incidents involving Ausgrid's network and relevant data sources.

To communicate our safety message we use a number of communication tools and media to reach the at risk groups including TV, radio and print advertisements, education kits, personal presentations, bill inserts, printed material and the web. A range of safety initiatives and programs undertaken over the past year are outlined in **chapter nine** of this report.

Chapter 4: Bushfire Risk Management – the objective of the Bushfire Risk Management chapter is to describe a management framework that when correctly implemented will:

- ensure public safety;
- establish standards for vegetation management near electricity lines (particularly in bushfire prone areas);

- reduce interruptions to supply that are related to vegetation; and
- minimise the possibility of fire ignition by electricity lines and associated equipment.

Ausgrid has an obligation to manage bushfire risks as they relate to our network. We do this by ensuring our assets and our customers' private powerlines are safe and are properly designed, constructed and maintained. This chapter outlines the procedures, standards, codes and guidelines Ausgrid applies to construction, operation and management of our network to achieve this objective. It also provides an overview of Ausgrid's bushfire risk management strategies in relation to key stakeholders including:

- landowners and occupiers;
- local government;
- government agencies; and
- emergency services.

The Bushfire Risk Management Plan also outlines how we inform customers of their obligation to share bushfire prevention responsibilities with us to ensure privately owned overhead powerlines are kept free of vegetation and are inspected, tested and maintained at regular intervals. Details of initiatives undertaken in the last year to improve systems to manage bushfire risk within Ausgrid's network area are outlined in **chapter eight**.

2.2 Network Complaints

2.2.1 Ausgrid's Compliant Management Process

Ausgrid's complaint processes have been established in line with the principles of Australian Standard 4269:1995. The customer complaints process involves the capture of customer complaints by Ausgrid's Contact Centre or depots. The complaint data is entered into a database, and issued to staff who have the appropriate technical and process skills to investigate and resolve each matter. Following resolution of the matter, completion codes are assigned to ensure complaints are categorised according to the complaint cause, and indicating whether the complaint was substantiated.

Ausgrid has dedicated resources in each region to coordinate and report on quality of supply, reliability and safety complaint investigations, and has committed qualified technical resources to investigate and manage complaints and ensure the high standard of customer complaint resolution is maintained. From reception to resolution, all complaints and disputes are formally recorded to ensure that Ausgrid can continue to deliver a high standard of customer service.

2.2 Compliant Performance Data

The number of network complaints received by Ausgrid in 2010/11 totalled 1,420 complaints, which was 27% more than the number received in 2009/10. For the same period, the number of network customers increased by 14,353. This resulted in the complaint rate of 0.88 complaints per 1,000 network distribution customers.

Table 2.1 Complaint Performance Data	Previous Years				2010/11
Year	2006/07	2007/08	2008/09	2009/10	2010/11
Complaints Total	1,554	1,669	1,409	1,121	1,420
Complaints per 1,000 Distribution Customers	0.99	1.06	0.89	0.70	0.88
Complaints regarding Vegetation Management	142	165	126	118	242

There were 177 valid voltage, current, quality of supply, reliability and safety complaint investigations completed in 2010/11.

Table 2.2 Network Complaint Investigations Completed 2010/11	Number	Number Valid*
Voltage	282	61
Current	0	0
Other Quality	58	25
Reliability	262	90
Safety	1	1

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

2.3 Customer Service Standards Reporting

Ausgrid is committed to providing the best possible service to our customers across our network area. That is why we are investing significant capital across our network to keep pace with the growing demand for power and to provide a safe and reliable electricity supply.

Ausgrid does everything it can to minimise interruptions to customers' power supply. Across the network we maintain a reliable supply to customers approximately 99.98 per cent of the time. However, from time to time in a large and complex network there are instances where customers are inconvenienced by too many power cuts over the course of a year, or by interruptions that last too long.

In accordance with the Customer Service Standards incorporated within the Design, Reliability and Performance licence conditions, metropolitan customers may make a claim if they experience an interruption that is greater than 12 hours in duration, or more than four interruptions, within a financial year, each lasting longer than four hours[1].

Ausgrid received 1887 Customer Service Standards claims in the 2010/11 financial year and there were 1428 eligible claims. The increase from 2009/10 was due to an incident that occurred in Enfield zone on 2 February 2011. Customers supplied from the Enfield zone at the time experienced interruptions of more than twelve hours in duration. 452 claims were not valid due to failure to meet the frequency and duration standards. 7 claims received were invalid (as they did not contain sufficient information and were returned to the claimant) and have not been included in the table below.

Table 2.3 Customer Service Standards 2010/11

	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	1418	318	4	129
Non-Metropolitan	6	5	0	0

3. Network Planning

3.1 Overview

Ausgrid carries out planning at the strategic and project level, driven by prudent, strategic decisions which consider the capital investment required and the delivery of individual projects.

Ausgrid's network planning approach is outlined in the Network Management Plan and is consistent with the principles of the NSW Government's Total Asset Management system.

Drivers of network investment include network performance, customer connections and modern infrastructure standards.

Ausgrid is required to comply with service standards in the Design, Reliability and Performance licence conditions imposed by the Minister for Energy. The licence conditions facilitate the delivery of a safe and reliable supply of electricity.

Ausgrid's Electricity Network Operation Standards detail objectives for maintaining quality electricity supply.

Capital investment requirements in the subtransmission network are forecast in line with investment drivers across 25 network areas. Ausgrid also has three transmission plans: Sydney Metropolitan, Central Coast and Lower Hunter, which focus on the transmission network linking TransGrid's bulk supply points to subtransmission substations.

The spatial demand forecast is a critical process which supports planning, development of the capital program and the five yearly regulatory submission. Following two independent audits and a major review, changes to the forecasting process have been made. The most significant change has been the implementation of a new IT forecasting application which will provide greater efficiency and accuracy for future forecasts.

[1] Non metropolitan customers may make a claim for interruptions greater than 18 hours in duration or more than four interruptions, within a financial year, each lasting longer than five hours.

3.2 Design Planning Criteria Compliance Reporting

The design planning criteria contained within the licence conditions set input standards to be used in planning the network, requirements for load forecasting and contingency planning methodologies intended to achieve operational outcomes.

The design planning criteria applicable to Ausgrid's network are set out in below. The implications of the design planning criteria contained in the licence conditions, and the accompanying notes, are explained in detail in Ausgrid's Network Management Plan.

Design Planning Criteria

Network Element	Load Type	Forecast Demand or Expected Demand	Security Standard	Customer Interruption Time
Subtransmission Line	CBD	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	≥ 10 MVA	N-1[1]	< 1 minute
	Non-Urban	< 10 MVA	N[2]	Best practice repair time
Subtransmission Substation	CBD[1, 2]	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	Any	N-1	< 1 minute
Zone Substation	CBD[1, 2]	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	≥ 10 MVA	N-1[1]	< 1 minute
	Urban & Non-Urban	< 10 MVA	N[2]	Best practice repair time
Distribution Feeder	CBD	Any	N-1[3]	Nil
	Urban	Any	N-1[4]	< 4 Hours[5]
	Non-Urban	Any	N	Best practice repair time
Distribution Substation	CBD[1]	Any	N-1[3]	Nil
	Urban & Non-Urban	Any	N[7]	Best practice repair time

1. For a subtransmission line – overhead and zone substation:
   a. under N-1 conditions, the forecast demand is not to exceed the thermal capacity for more than 1% of the time ie a total aggregate time of 88 hours per annum, up to a maximum of 20% above the thermal capacity under N-1 conditions.
   b. under N conditions, a further criterion is that the thermal capacity is required to meet at least 115% of forecast demand.

For a subtransmission line – underground, any overhead section may be designed as if it was a subtransmission line – overhead, providing the forecast demand does not exceed the thermal capacity of the underground section at any time under N-1 conditions.

2. Under N conditions, thermal capacity is to be provided for greater than 115% of forecast demand.

3. The actual security standard is an enhanced N-1. For a second coincident credible contingency on the CBD triplex system, restricted essential load can still be supplied.

4. By 30 June 2014, expected demand is to be no more than 80% of feeder thermal capacity (under system normal operating conditions) with switchable interconnection to adjacent feeders enabling restoration for an unplanned network element failure. By 30 June 2019, expected demand is to be no more than 75% of feeder thermal capacity. In order to achieve compliance, feeder reinforcement projects may need to be undertaken over more than one regulatory period. In those cases where a number of feeders form an interrelated system (such as a meshed network), the limits apply to the average loading of the feeders within one system.

5. The timeframe is expected only, and is based on the need to carry out the isolation and restoration switching referred to in note 4. This standard does not apply to interim / staged supplies, i.e. prior to completion of the entire development or to excluded interruptions outside the control of the licence holder.

6. In the CBD area, N-2 equivalent is achieved by the network being normally configured on the basis of N-1 with no interruption of supply when any one line or item of electrical apparatus within a substation is out of service. The licence holder must plan the CBD network to cater for two credible contingencies involving the loss of multiple lines or items of electrical apparatus within a substation, by being able to restore supply within 1 hour. Restoration may be via alternative arrangements (eg 11kV interconnections).

7. Urban distributions substations shared, or available to be shared, by multiple customers are generally expected to have some level of redundancy for an unplanned contingency (e.g. via low voltage manual interconnection to adjacent substations enabling at least partial restoration.

3.2.1 Design Planning Criteria Reporting

Ausgrid has a suite of investment plans, covering each of the transmission, subtransmission, distribution and low voltage areas of the network to ensure that we design our network to accord with the design planning criteria within the timeframes specified in conditions 14.1 and 14.2 of the licence conditions.

Transmission/Subtransmission Planning

To ensure that all drivers are considered in an holistic manner, Ausgrid has developed a set of area plans that encompass all strategic network investment drivers within the transmission and subtransmission levels of the network. The area plans contain all strategic growth, reliability, customer connection and replacement driver investments within each area.

Ausgrid produces a five year network management plan and Annual Electricity System Development Review (AESDR) on an annual basis.

The network management plan outlines our planned investments by region, and the AESDR shows emerging constraints for each subtransmission and zone substation. Each emerging constraint is addressed by an indicative solution, and makes up Ausgrid's plan to accord with the design planning criteria.

Distribution Network Planning

To meet the distribution Design Planning Criteria within the required timeframe, Ausgrid has adopted the following, multi-faceted strategy:

- Where it can be demonstrated to be cost effective, zone and subtransmission level projects initiated by strategic investment drivers, including demand constraints and asset condition (such as load transfers between zone substations, switchgear replacement, zone transformer commissioning etc) are optimised so that they also mitigate or address any latent distribution constraints in the affected portions of the network.
- Prioritisation of projects is based on considerations such as scope, delivery time, cost, load at risk, and likelihood of the risk.
- Development of proactive feeder non-compliance forecasting, reporting, and prioritisation regime.
- Significant ramping up of the distribution network capital program to a level necessary for licence compliance by 2014.
- A cross-divisional efficiency review of the end-to-end capital project delivery process (from planning conception to project commissioning).

Distribution Substation Planning

Ausgrid's licence conditions for distribution substations require N-1 performance (with no customer interruptions in the CBD) and N performance (with best practice repair time) elsewhere in the network. The standard of service provided at customer substations is subject to customer requirements. Ausgrid has set utilisation targets for distribution substations which maintain loading within the cyclic rating. These targets correspond with the requirements of the licence conditions.

Utilisation at some distribution centres is presently above the levels required for licence compliance. Ausgrid has a plan which has identified the resourcing required in the period to 2014 to bring the current network utilisation to the required levels and to account for organic growth in demand over the period.

Progress Against Our Plan

During 2010/11 Ausgrid invested around $1.58 billion on capital projects. Whilst Ausgrid has made progress during 2010/11 against our plan to comply with the licence conditions we have a significant challenge ahead. Ausgrid is forecasting a large program of investments for the 2009-14 period which is driven by the need to systematically replace a large number of ageing network assets as well as the requirement to meet the mandatory licence conditions.

Ausgrid's plan is to meet the Design Planning Criteria by 30 June 2014. The table below outlines our progress during the year towards our plan.

Estimated Percentage Currently Not Meeting the Requirements of Schedule 1	
Network Element	June 2011
Subtransmission- Feeders	5.1%
Subtransmission – Substations	4.9%
Subtransmission – Total	**5.1%**
Distribution Feeders – CBD	1.2%
Distribution Feeders – Urban	7.6%
Distribution Feeders – Non urban	3.4%
Distribution Feeders – Total	**6.6%**
Distribution Substations – CBD	0.5%
Distribution Substations – Urban and Non Urban	0.9%
Distribution Substations – Total	**0.9%**

Network Elements Not Complying with the Design Planning Criteria on 1 July 2011

On 1 July 2010, Ausgrid was required to comply with the Design Planning Criteria for any new network element where planning for that network element commenced after 1 December 2007. Existing elements need to be compliant with the design planning criteria by 1 July 2014.

Whilst all existing network elements are forecast to meet the Design Planning Criteria by 1 July 2014 as required, there are some network elements that currently do not meet the requirements of schedule 1. These network elements and the proposed indicative network solutions will be detailed in the 2010/11 Annual Electricity System Development Review (AESDR) due to be published on the Ausgrid website by end 2011.

Table 3.1 Sub-Transmission Lines and Substations and Zone Substations Not Complying With the Design Planning Criteria on 1 July 2011		
Element including Location, Customer Numbers, Element Length/Capacity	**Description of Non-Compliance and Reason**	**Proposed Remedial Actions and Timetable**
Refer Appendix F	Refer Appendix F	Refer Appendix F

Table 3.2 Distribution Feeder Summary Report by Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2011			
CBD			
Total Number of Feeders	Number of Feeders Without N-1 Capability (1 Minute)	Description and Reason for Non-Compliance	Proposed Remedial Actions and Timetable
168	2	Growth in peak demand on this feeder network has resulted in peak loads being non firm	5th October 2011 - Due for completion
URBAN			
Total Number of Feeders	**Number of Feeders Without N -1 Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
1739	**133**	General load growth. *A full review of all feeders is expected by June 2013. At which time all feeders which do not meet N and N-1 capability will be identified.	Ausgrid is planning to meet the design planning criteria by June 2014.
NON-URBAN			
Total Number of Feeders	Number of Feeders Without N Capability	Description and Reason for Non-Compliance	Proposed Remedial Actions and Timetable
265	9	General load growth. *A full review of all feeders is expected by June 2013. At which time all feeders which do not meet N and N-1 capability will be identified.	Ausgrid is planning to meet the design planning criteria by June 2014.

Two methods for classifying distribution: Feeders are described in the licence conditions. Ausgrid generally classifies its distribution feeders according to a classification of ‘load type’ (method 1).

Table 3.3 Distribution Substation Summary Report by Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2011			
CBD			
Total Number of Substations	**Number of Substations Without N-1 Capability (1 Minute)**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
435	2	Substations loaded above 100% of firm rating	Remove overload by uprating existing substations or transferring load to adjacent substations. Due for completion July 2014
URBAN and NON-URBAN			
Total Number of Substations	**Number of Substations Without N Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
30136	**276**	Substations loaded above 100% of firm rating	Remove overload by uprating existing substations, transferring load to adjacent substations, installing new low voltage distributors or new substations. Due for completion July 2014

3.3 Demand Management

Emerging constraints on the supply system are identified through the planning process, and published in the Annual Electricity System Development Review (AESDR) on the Ausgrid website.

Each constraint with a network augmentation solution cost of >$1m is assessed to determine whether it is reasonable to expect that demand management (DM) might prove to be cost effective.

The first step in the demand management process is a DM Screening Test. This report determines whether it would be reasonable to expect that it would be cost effective to avoid or postpone the expansion of the network by implementing DM strategies. If the conclusion is positive, a formal DM Investigation follows.

Based on the DM requirements identified in the screening test, the DM Investigation identifies possible DM options that might exist in the study area based on existing knowledge, field visits, public consultation with interested parties, and contact with specific customers. Any feasible DM options are considered for development alongside network augmentation options.

If a feasible DM option is determined to be the most economical solution, it is implemented with clear deliverables in terms of demand reduction, timing and cost. A more detailed summary of this DM process is provided on Ausgrid's website.

Table 3.4 Demand Management Projects Implemented During 2010/11				
	Description of Demand Management Project Implemented	**Peak Demand Reduction (kVA)**	**PV of Costs of Demand Management Project**	**PV of Total of Capital Expenditure Deferment plus Op Ex Savings**
Individual large projects				
Greenacre Park Area Stage 2 - Power Factor Correction	A power factor correction program facilitating the installation of equipment at up to 38 large customers' premises where power factor is low. Customers are offered discounted prices through bulk buying and project facilitation. The target capacity of installations is 3.5MVAr resulting in peak demand reduction of 1.3 MVA. Demand reduction capability will persist for duration of deferral (1 year).	3,500 kVAr	$114,536	$2,565,000
North West Pennant Hills generators	0.4 MVA to 1MVA of diesel generation will been installed in North West Pennant Hills for summer 2010/11 through to summer 2014/15. It is capable of operating in parallel with the network and can be called at any time from the Network control room. Demand reduction capability will persist for duration of deferral (5 years).	1,000 kVA	$1,252,525	$1,600,000
Network capacitors at Peakhurst STS	Installation of reactive support within the network	80,000 kVar	$3,389,924	To reduce load at risk and ensure power factor complies with National Electricity Rules requirements.
Sub-totals		1,000kVA + 83,500kVar	$4,756,985	$4,165,000
Consolidated projects				
N/A	N/A	N/A	N/A	N/A
Totals		1,000kVA + 83,500kVar	$4,756,985	$4,165,000

Table 3.5 Demand Management Investigations in 2010/11 Found Non-Viable		
	Description of Potential Demand Management Project Investigated and Reason for Non-viability	**PV of Costs of Investigations**
Maitland 33/11kV Zone Substation	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to asset replacement requirements.	$48,705
St Ives Zone Substation Upgrade	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, moderate deferral value, and that the target load area was predominantly residential (where it is generally more expensive to achieve demand reductions compared to commercial/industrial areas).	$52,390
Epping 11kV Zone Development	A constraint was identified for investigation. The DM investigation concluded that DM was likely to be a cost effective in this case. Development of a DM project was initiated which included embedded generation and thermal storage options, however this was cancelled when the relevant customer(s) withdrew their interest from the program.	$67,824
Morisset Zone 11kV Development	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, and low to moderate deferral value.	$495
Breakfast Point Development	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, moderate deferral value, and that the target load area was predominantly residential (where it is generally more expensive to achieve demand reductions compared to commercial/industrial areas).	$1,225
Zetland South Zone Development	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, and low to moderate deferral value.	$1,537
Balgowlah North Zone Development	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, low to moderate deferral value, and that the target load area was predominantly residential (where it is generally more expensive to achieve demand reductions compared to commercial/industrial areas).	$2,793
Lidcombe to Flemington 11kV Load Transfer	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, and low deferral value.	$1,611
SOPA New Zone Substation	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, and moderate deferral value.	$35,711
Medowie Zone Substation	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, moderate deferral value, and that the target load area was predominantly residential (where it is generally more expensive to achieve demand reductions compared to commercial/industrial areas).	$14,997

Campsie & Enfield Zones Load Area	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, and low to moderate deferral value.	$2,939
Oxford St Low Voltage Development	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due the combination of a low deferral value compared to the cost savings achieved by synchronising the cabling works with other local council street improvement works.	$2,991
Inner Metropolitan Reactive Support	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, and low deferral value.	$3,423
East Maitland Zone Substation	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, and moderate deferral value.	$66,835
Avoca Zone 11kV Development	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, and low deferral value.	$2,626
Turrumurra North Zone Development	A constraint was identified for investigation. However the subsequent investigation concluded that, on balance, DM was not a viable option to defer the supply side investment due to the combination of a low to moderate demand reduction requirement, low to moderate deferral value, and that the target load area was predominantly residential (where it is generally more expensive to achieve demand reductions compared to commercial/industrial areas).	$861
Peats Ridge Pa 3 & 4	A constraint was identified for investigation. However the subsequent investigation concluded that DM was not a viable option to defer the supply side investment due to the combination of a very high demand reduction requirement, and moderate to high deferral value.	$29,058
Charmhaven Zone development - Stage 1	A constraint was identified for investigation. However the subsequent investigation concluded that, on balance, DM was not a viable option to defer the supply side investment due to the combination of a high demand reduction requirement, low to moderate deferral value, and that the target load area was predominantly residential (where it is generally more expensive to achieve demand reductions compared to commercial/industrial areas).	$9,486

4. Asset Management

4.1 Overview

Ausgrid’s philosophy is that an integrated asset management system forms the backbone of an effective service delivery program. We believe that through the integration of all facets of asset management, including design, procurement, maintenance activities, renewals/replacements, capital investment, condition monitoring and continuous improvement, Ausgrid will deliver our business and strategic objectives. These objectives are established and documented in our Network Maintenance Plan. The service delivery program is essential to preserve the engineering integrity of assets and their continued fitness for use within the electrical system. This will enable Ausgrid to meet its commercial obligations and statutory responsibilities under the Electricity Safety Act and Occupational Health and Safety Regulation.

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.

4.2 Technical Service Standards

Ausgrid published its latest version of Electricity Network Operation Standards (ENOS) in June 2009. The document sets out standards of service customers can expect from Ausgrid's network.

Electricity delivered by Ausgrid's network has particular characteristics including some interruptions to supply caused when powerlines are damaged by storms, bushfires and accidents. Essentially, Ausgrid's objective is to achieve the best possible overall 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 NSW Department of Trade and Investment, Regional Infrastructure and Services, in respect to reliability standards and individual feeder standards.

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

The quality of electricity provided to customers is not always suitable for use by all customer equipment. Ausgrid recommends customers use the ENA Customer Guide to Electricity Supply to minimise any potential problems.

Ausgrid uses the results of the University of Wollongong Long Term National Power Quality Survey (LTNPQS) to monitor quality of supply issues and trends and is introducing a baseline low voltage steady state voltage survey to better monitor its network performance.

Ausgrid is working to improve its assessments of new customer connections to ensure levels of harmonics and flicker levels remain satisfactory. Ausgrid is slightly reducing the average low voltage steady state voltage over time to maintain alignment between the network voltage range and customer equipment utilisation voltages. This is because of the ongoing replacement of legacy 240V range equipment with 230V equipment.

4.3.2 Performance Data

Ausgrid's power quality monitoring survey data is summarised and analysed in four key Power Quality (PQ) disturbance types:

- Steady state voltage;
- Voltage unbalance;
- Voltage harmonics;
- Voltage sags.

A very large quantity of data is gathered during the survey process. It takes several months for the University of Wollongong to analyse and produce a report after each survey period (based on the financial year) has finished. For this reason the 2010 report was based on the data surveyed during the 2008/09 financial year; similarly this year's report is based on the PQ data survey during 2009/10 financial year. Therefore, the actions that have been taken to address the issues on exceeding targets for 2011 report will only be reflected in next year's report.

For the financial year 2009/10, Ausgrid was able to analyse the PQ data for all of the 37 sites that were monitored, i.e. 25 LV sites and 12 MV sites. Due to retail contestability, some sites were lost to different retailers, so that replacement sites were chosen within the Ausgrid franchise area. The LTNPQS report analyses PQ performance for steady state voltage, voltage unbalance and harmonics (there is no standard defining sag limits at present).

Based on targets stated in LTNPQS report, the majority of sites surveyed met all targets. One LV site was found to have exceeded the upper limit for 95th percentile values[2] in relation to the steady state voltage magnitude.

[2] Voltage 95th percentile ($V_{95\%}$) – the 95th percentile voltage provides an indication of the light-load voltage at a site. $V_{95\%}$ is expressed in per unit with nominal voltage (240V) as the base.

The voltage unbalance assessment is based on 95th percentile and the limit for 10 minute readings of LV voltage unbalance (defined in Table S5.1a.1 of the National Electricity Rules) is 2.5% for LV and 2% for MV. One LV site was found to exceed the voltage unbalance limit whereas all MV sites surveyed met the target.

The assessment of Total Harmonic Distortion (THD) is based on 95th percentile and the limit for LV and MV is specified in Table 1 of AS/NZS61000.3.6:2001 which is 8%. All LV and MV sites surveyed met the target.

Ausgrid provides the percentage of sites exceeding PQ limits information as an indicative assessment only of how Ausgrid network is performing in relation to steady state voltage, harmonics and unbalance, compared to previous years.

The following table outlines the trend of percent of sites exceeding limits from 2008/09 to 2009/10. This year, one site has exceeded the limit in relation to the steady state voltage and also one LV site was found to exceed the unbalance limit. The exceeded site has marginally exceeded the 240+6% (254.4V) at 95th percentile steady state voltage. The maximum LV steady state voltage at 95th percentile is 255.6 Volts which is about 0.46% above the limit.

Percentage of Sites exceeding limits					
Indices		LV Sites		MV sites	
		2008/09	2009/10	2008/09	2009/10
Voltage	V High ($V_{95\%}$)	15%	4%	0%	0%
	V Low ($V_{5\%}$)	0%	0%	0%	0%
Unbalance	VUF	4%	4%	0%	0%
Harmonics	THD	0%	0%	0%	0%

Note: As only as small number of sites are analysed and the actual sites surveyed may vary from year to year, trend data should be treated as indicative only.

The LTNPQS result for steady state voltage ranges and LV voltage unbalance indicates that action to generally reduce voltage levels is required. This will be undertaken via Ausgrid's Power Quality Management Plan with migration from a 240V nominal range (average voltage around 250V) to a 230V nominal range (average voltage around 240V). Implementation actions include adjustment of line drop compensation settings, optimisation of 11kV float voltages, distribution substation tap changes and an annual baseline steady state voltage survey.

4.4 Distribution Reliability

Distribution network indices and associated methodologies are defined in Attachment A.

4.4.1 Overview

This report has been prepared in accordance with the 'Design, Reliability and Performance Licence Conditions' imposed by the Minister for Energy and Utilities on 1 December 2007 and the standards issued by the 'Steering Committee on National Regulatory Reporting Requirements' (SCNRRR).

Two related indices are applied when reporting reliability. The first, SAIDI, is commonly referred to as the "Reliability Index" and represents the average number of customer minutes lost by all network customers. SAIFI represents the average number of interruptions for all customers.

The following notes relate to the reporting system issues outlined in Note 1 Attachment A to this report.

Ausgrid had implemented a new Outage Management System (OMS) in July 2007 linked to the Geographic Information System (GIS) to mitigate the accuracy and integrity issues highlighted in the Review of NSW Distribution Network Service Providers Measurement and Reporting of Network Reliability prepared for IPART by PB Associates.

Voltage 5th percentile ($V_{5\%}$) – the 5th percentile voltage provides an indication of the heavy-load voltage at a site. $V_{5\%}$ is expressed in per unit with nominal voltage (240V) as the base.

The new OMS utilises the links between customers and assets in the GIS and records outages linked to customer calls and SCADA indications. The new OMS mitigates most of the issues noted in the Summary section of the PB Associates report.

The classification of Ausgrid's approximately 2000 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 throughout the year new feeders are classified at the time of commissioning.

Reliability reporting uses the IEEE methodology for defining Major Event Days as outlined in the "Design, Reliability and Performance Licence Conditions".

There are three instances where Ausgrid departs from the Definitions detailed in Attachment A to this report – departures in relation to Notes 2 and 3 of Table A.1 Reliability Measures, and in regard to the calculation for the Major Event Day Threshold (Tmed).

Note 2 – Ausgrid measures and records customers affected and the customer base on a daily basis. Reliability performance indices are calculated on a daily basis rather than using the average of the number of customers at the beginning and the end of the reporting period. The daily calculation method provides a more representative customer performance at the time of the event. This had not been possible until the new OMS system was introduced.

Note 3 – Ausgrid does not exclude inactive accounts. There are natural time delays in updating customer account details into the real-time OMS, 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.

In regard to the calculation for the Major Event Day Threshold (Tmed), the Design, Reliability and Performance Licence Conditions review working group had agreed, in March 2010, that the Tmed calculation should be consistent with the Australian Energy Regulator (AER) Tmed calculation method. The Design, Reliability and Performance Licence Conditions require (Schedule 6) that Planned Outages be included in the daily SAIDI dataset for calculation of the Tmed value. The AER requires (STPIS definitions November 2009) that Planned Outages be excluded from the daily SAIDI dataset for calculation of the Tmed value.

This agreed change to the Tmed calculation has not yet been amended in the Design, Reliability and Performance Licence Conditions document. However, Ausgrid has applied this change to the 2010/11 reliability performance reporting to ensure consistency with the AER reliability performance reporting definitions, as agreed with the Minister's Office.

This action impacts the number of Major Event Days that may be identified for exclusion of the Normalised reliability performance in any given year.

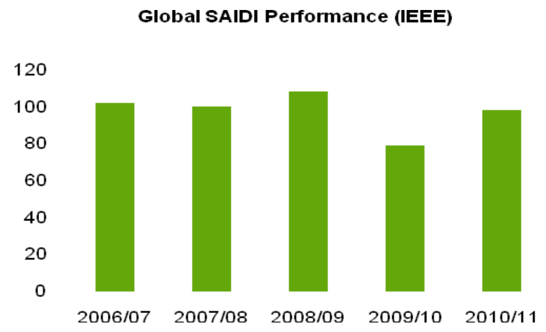
The performance for each feeder category and the organisational performance overall are detailed in section 4.4.2. Organisational trends are detailed in section 4.4.3 and feeder category performance trends are detailed in section 4.4.4, including commentary on excluded events in section 4.4.5. Finally, the Individual Feeder performance for the year is detailed in section 4.4.6.

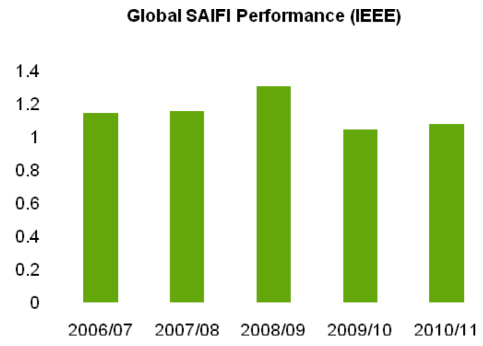
4.4.2 Organisational Performance (Normalised Trend)

Table 4.1 Organisational Performance (Normalised Trend)

	Previous Years				Current Year
Year	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
SAIDI	102	100.3	108.5	79	98.59
SAIFI	1.15	1.16	1.31	1.05	1.08

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





2010/11 reliability performance has returned, as expected, to more normal variations around the longer term underlying reliability performance trends in comparison with the exceptionally good performance in 2009/10. However, the record heat wave in early February 2011 caused a Major Event Day on 2 February 2011. That 7 day period contributed an additional 7.8 Normalised SAIDI more than the equivalent February period in 2009/10 (after Major Event Day excluded). The heat wave mainly impacted Urban SAIDI as 86% of Ausgrid's customers are in the Urban feeder category.

4.4.3 Organisational Detailed Performance 2010/11

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 2010/11						
Sustained Interruption Data Sets		**Whole Organisation and Feeder Category**				
Category		**ORG***	**CBD**	**Urban**	**Short Rural**	**Long Rural**
Customer Numbers[3]		1,619,804	30,472	1,395,434	191,346	2,552
SAIDI	Overall[4]	134.38	11.21	107.19	343.26	891.10
	Planned	19.44	6.10	8.84	93.61	414.69
	Unplanned[5]	106.83	5.11	90.75	235.55	476.41
	Normalised[6]	98.59	5.11	82.62	225.10	467.57
SAIFI	Overall	1.21	0.08	1.05	2.44	5.49
	Planned	0.05	0.02	0.02	0.21	1.13
	Unplanned	1.12	0.06	1.00	2.14	4.36
	Normalised	1.08	0.06	0.97	2.06	4.31

*ORG refers to average performance of the organisation overall.

[3] Customer numbers as at the end of June 2010 for the purposes of reliability indices only. Refer to Table 1.1 for the total of customers served.

[4] Overall performance represents the total performance experienced by our customers, irrespective of cause or origin of the fault.

[5] 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, momentary interruptions and interruptions caused by a customer installation failure.

[6] 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 are responsible for. The Major Event Days that have been excluded are defined in section 4.4.5.

4.4.4 Reliability Report against Standards

All feeder category performances were compliant against the Reliability Standards for 2010/11, except for Urban SAIDI.

The 7-day heatwave period (31st Jan – 6th Feb) directly contributed an additional 6.4 Urban SAIDI for 2010/11 (above the 5yr average Urban SAIDI for a February month.)

If this record 7-day heatwave had not occurred, the June 2011 Urban SAIDI result would have been approximately 76.7 SAIDI (ie 83.1 - 6.4 SAIDI) and within Urban Reliability Standards of 80 SAIDI for 2010/11.

Table 4.3 CBD Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2006/07	2007/08	2008/09	2009/10	2010/11
SAIDI	Actual	13.04	8.07	41.71	38.14	5.11
	Target	57	54	51	48	45
SAIFI	Actual	0.17	0.04	0.55	0.11	0.06
	Target	0.34	0.33	0.32	0.31	0.3

Table 4.4 Urban Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2006/07	2007/08	2008/09	2009/10	2010/11
SAIDI	Actual	77.56	74.83	93.55	66.7	82.62
	Target	90	88	86	84	80
SAIFI	Actual	0.96	1.04	1.15	0.95	0.97
	Target	1.28	1.26	1.24	1.22	1.2

Table 4.5 Rural Short Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2006/07	2007/08	2008/09	2009/10	2010/11
SAIDI	Actual	290	219.26	217.25	179.08	225.10
	Target	380	360	340	320	300
SAIFI	Actual	2.76	2.16	2.44	2.05	2.06
	Target	4.2	3.9	3.7	3.4	3.2

Table 4.6 Rural Long-Feed Performance (Normalised) Trend

		Previous Years				Current Year
Year		2006/07	2007/08	2008/09	2009/10	2010/11
SAIDI	Actual	1,093.47	543.27	608.69	443.63	467.57
	Target	860	820	780	740	700
SAIFI	Actual	5.64	4.08	4.34	3.52	4.31
	Target	8	7.5	7	6.5	6

Excluded Events

Excluded interruptions for the reporting period have been listed in Table 4.7 with a description of the basis on which the event met the exclusion criteria. The criteria for excluding events are outlined in Attachment A of this report.

Major Event Day TMED

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, TMED. The 2009/10 value of TMED used in preparing Table 4.7 was 3.31 SAIDI per day.

Table 4.7 Excluded Interruptions for 2010/11

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
3 August 2010	Major Event Day (The Major Event Day was primarily due to strong wind storm across Ausgrid)	30,543 (29,552 customers interrupted due to the wind storm event)	888 minutes (The wind storm caused event max duration only)	4.31 SAIDI (4.09 SAIDI due to the wind storm oh crapevent)	**Exceeds Tmed 3.31**
2 February 2011	Major Event Day (The Major Event Day was primarily due to record heat wave across Ausgrid)	28,727 (23,335 customers interrupted due to heat wave event on this Major Event Day)	1680 minutes (15 customers restored after distribution substation restored)	3.94 SAIDI (3.14 SAIDI due to the heat wave event on this Major Event day)	**Exceeds Tmed 3.31**

Note: Maximum Duration means the time until the last high voltage feeder section is restored (not the last customer, which may involve a service failure which has not been reported).

4.4.5 Performance Against Individual Feeder Standards

The performance objectives for organisational average performances for each feeder category are not sufficient to identify when customers on a particular feeder experience unsatisfactory reliability performance. For this reason, SAIDI and SAIFI criteria (after ‘excluded interruptions’ are disregarded), act as a trigger for investigation and exception reporting purposes.

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 ministerially imposed Licence Conditions for each feeder type.

Table 4.8 Individual Feeder Standards for Exception Reporting Specified in the Licence Conditions Applicable to Ausgrid

	Feeder Categories			
Category	**CBD**	**Urban**	**Short Rural**	**Long Rural**
SAIDI	100	350	1000	1400
SAIFI	1.4	4.0	8.0	10.0

Performance outside this range results in the following actions:

(a) immediate investigation of the causes for each feeder exceeding the individual feeder standards;
(b) by the end of the quarter following the quarter in which the feeder first exceeded the standard, complete an investigation report identifying the causes and action required to improve the performance;
(c) complete any operational actions identified in the investigation report to improve the performance of each feeder to the *individual feeder standards* by the end of the third quarter following the quarter in which each feeder first exceeded the *individual feeder standards*;

(d) where the investigation report identifies actions, other than operational actions, required to improve the performance of each feeder to the *individual feeder standards*, develop a project plan, including implementation timetable, and commence its implementation by the end of the second quarter following the quarter in which the *feeder* first exceeded the *individual feeder standards*;

Summarised performance against the above licence conditions is shown in Table 4.9.

Table 4.9 Individual Feeder Performance against the Standard Summary

	Feeder Type			
Did	**CBD**	**Urban**	**Short Rural**	**Long Rural**
Feeders (Total Number each Type)	56	1739	261	4
Feeders that Exceeded the Standard During the Year (Total Number)	6	89	11	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 have been completed in the times required.

The details of currently poor performing feeders are shown in Attachment E. Overall, the percentage of poor performing feeders in each feeder category is relatively low.

Ausgrid has an ongoing reliability improvement program in place. The program targets those feeders that have exceeded or are approaching the Individual Feeder Standards as outlined in Schedule 3 of the Design, Reliability and Performance Licence Conditions.

4.5 Transmission Reliability

Transmission network indices and associated methodologies are defined in Attachment B.

4.5.1 Transmission Reliability Performance Data

Table 4.10 Transmission Circuit Availability (%) Trend

	Previous Years				Current Year
Objective	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
	97	97.19	97.98	96.67	97.14

This year's transmission availability is better than that of last year, with a 0.5 per cent increase in availability.

As in previous years, the transmission availability this year was heavily influenced by a large number of long duration outages associated with a major replacement programs, including a number of distance relay replacements and circuit breaker replacements. Such outages are typically of 3 weeks duration and have a long recall time. In addition, there were a number of long duration outages associated with major capital projects (such as the Top Ryde zone commissioning).

Table 4.11 Network Reliability Trend

		Previous Years				Current Year
	Objective	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Network Reliability (Off Supply Event Numbers)		2	6	1	0	2

There were two transmission related loss of supply events this year. One event occurred due to the trip of a 132kV overhead line during strong winds co-incident with a planned outage on the remaining line, resulting in an interruption of supply to Somersby zone substation. The other event occurred due to a protection mal-operation co-incident with a 132kV cable fault that resulted in interruption to Drummoyne zone substation.

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

	Previous Years				Current Year
Objective	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
	2911	3924	3279	2291	3497

The average unplanned outage duration this year is higher than last year's reporting period. As with previous years, the long duration of unplanned outages reflects the long time taken to repair failed 132kV cables, particularly oil and gas insulated cables. In addition, a secondary cabling fire at a TransGrid bulk supply point resulted in two 132kV feeders being unavailable for a number of weeks.

Table 4.13 Connection Point Interruptions (Unplanned) 2010/11

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

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

There were no connection point interruptions in the 2010/2011 period.

Table 4.14 Connection Point Numbers 2010/11

	Current Year
Number of Connection Points (Total Number)	17

Ausgrid has 5 transmission customers, supplied from 17 connection points.

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 in an extract from our Network Management Plan.

Safe operation of the network

Ausgrid has identified safety as a key network risk. To manage this risk, 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 Plan. The planned programs of work documented in our Duty of Care Plan 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; and

- formal safety procedures and systems applicable when working on or near the network. This has both network safety and workplace safety implications.

Workplace Safety

Ausgrid is committed to workplace safety obligations to its staff and contractors under the *Occupational Health and Safety Act 2000* (NSW) (*NSW OH&S Act*) and the *Occupational Health and Safety Regulation 2001* (NSW) (*OH&S Regulation*). Successful implementation of workplace safety processes and procedures also has an impact, more generally, on network safety and contributes to the safe operation of the network. Ausgrid is a workers compensation self-insurer and is required under the self-insurance licence to maintain a health and safety management system in compliance with the National Self-Insurer OHS Audit Tool.

Ausgrid has comprehensive policies and procedures in place to ensure safe people, places and processes. 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’s Workplace Health and Safety Management System is called Be Safe. The Be Safe Management System has two key objectives:

- the health, safety and welfare of all staff while they are at work; and
- ensuring that people other than our staff are not exposed to unacceptable risks to their health and safety in connection with Ausgrid’s network operations.

The principal document in the Be Safe Management System is the Be Safe Policy. The Be Safe Policy articulates the organisation’s commitments to health and safety including:

- eliminating or controlling any reasonably foreseeable occupational health and safety risks;
- a commitment to consultation with staff to enable them to contribute to decisions affecting their health, safety and welfare at work;
- ensuring the design, supply and use of plant and substances at work is safe and without risks to health when used properly;
- education and training programs to ensure staff and contractors are equipped with sufficient information to ensure their health and safety;
- preventing occupational injury and illness by all reasonable, practicable means;
- providing timely and cost effective injury management to promote early return to duties;
- maintaining a workers' compensation self-insurer licence;
- complying with the OH&S Act and OH&S Regulation, and maintaining an OH&S system that complies with Australian Standard AS/NZS 4801;
- adopting best practice standards where legislation or mandatory standards do not exist; and
- promoting community awareness of safety issues, through public education campaigns.

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 OH&S Act and OH&S 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.

Ausgrid also publishes a "Public Electrical Safety Awareness Plan" to educate 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 7 of the National electricity Network Safety Code "ENA NENS 01 - 2006");
- induction training for all new employees (both employees and contractors) is carried out in accordance with our Quality, Safety, Health and Environmental Management System;
- accreditation of service providers undertaking contestable work meets Code of Practice Contestable Works standards (and other applicable schemes) administered by the Office of Fair Trading;
- reporting of accidents and incidents – as specified by Industry & Investment NSW under the Significant Electrical Network Incidents reporting system (including those required under the Electricity (Consumer Safety) Regulation 2006); and
- reporting of customer installation incidents to the Office of Fair Trading (in accordance with the Electricity (Consumer Safety) Act 2004).

5.2 Serious Electricity Network Accidents (Public)

Ausgrid reported five Serious Electricity Network Accidents involving the public in 2010/11, as summarised in Table 5.1. All were classified as Serious Electrical Accidents (Public) as they involved electricity. This figure is comparable with previous years. One of the 2010/11 Serious Electrical Accidents involved a fatality.

These Serious Electricity Network Incidents are analysed by Ausgrid to form 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 Serious Electricity Network Accidents (Public) Trend

	Previous Years				Current Year
Year	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Non-Fatal	4	5	2	4	4
Fatal	-	-	-	-	1

Incident 1 – Mt Hutton 31 October 2010

An 18 year old scaled a network power pole at Mt Hutton without authorisation or cause. He came into hand to hand contact with live, exposed overhead 240/415 volt conductors and fell from a height greater than 6 m. The victim had been attending a party nearby and had scaled the pole previously that evening, again without authorisation or cause. The investigation showed that he used the 11 kV ABS operating mechanism to ascend the pole. He was found unconscious at the base of the pole but pronounced deceased on arrival at the hospital.

The preventative actions arising from the incident investigation are:

- Continue the current policy and practice of installing new and replacement ABS with 'mid-pole' operating handles above 3.6 m in accordance with Network Standard NS126.
- Continue the current Public Electrical Safety Awareness Program.
- Review the current network against the Energy Network Association Document ENA DOC 015-2006 'National Guidelines for Prevention of Unauthorised Access to Electricity Infrastructure'.

Incident 2 – Waverton 14 February 2011

An employee of a private building construction company inadvertently cut through an energised 11kV underground cable with a nine inch angle grinder at Waverton. The resultant flash caused burns to his arms and legs.

This incident was awaiting the finalisation of the investigation report at the time this 2010/11 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

Incident 3 – Marsfield 21 February 2011

A concrete pump operator was using an infra-red remote control to operate a concrete pump inside a new building site at Marsfield. The concrete pour for a foundation floor of the new house was just completed when the operator was positioning the pump boom for a “blow out” of the pump’s pipes. The operator received an electric shock when the top boom of the concrete pump made contact with an 11kV overhead street conductor. It appears that no observer was used to ensure that the concrete pump operator did not move the boom too close to the overhead 11kV or the overhead low voltage street mains.

This incident was awaiting the finalisation of the investigation report at the time this 2010/11 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

Incident 4 – Lorn (Maitland) 2 April 2011

A helicopter flying joy flights from a site on the northern side of the riverbank adjacent the Belmore Bridge, Maitland, came in contact with the 11kV overhead feeder with its rotor. The impact severed the eastern conductor only. The conductor landed on the riverbank on both sides of the river and in the river. On the western (Maitland) side the conductor landed on a metal hand rail running along a path that follows the riverbank. A 3 year old boy was leaning on the rail about 200m from the fallen conductor and received a burn to his lower leg. He was treated at John Hunter Hospital and released on the same day.

This incident was awaiting the finalisation of the investigation report at the time this 2010/11 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

Incident 5 – Ashfield 23 April 2011

An unknown person broke into Ausgrid substation in Ashfield and was attempting to steal copper conductor. As the victim attempted to hacksaw into an 11kV cable, an explosion occurred and the victim received electrical burns to his face and right side. The victim also suffered damage to his vision.

This incident was awaiting the finalisation of the investigation report at the time this 2010/11 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

Incident from previous reporting period

Ausgrid did not have any Serious Electricity Network Accidents (Public) that were still under investigation at the time the 2009/10 Electricity Network Performance Report was produced.

5.3 Actionable Electricity Network Safety Incidents (Public)

Ausgrid utilises the Significant Electricity Network Incident (SENI) reporting scheme to document actionable safety incidents.

An actionable safety incident is an incident, which is not a serious electricity network accident, involving the electricity network, but where there was a significant risk that a person (employee or member of the public) could have been seriously hurt by that incident, and meeting any of the following criteria:

- the circumstances of the incident indicate that there is a duty of care to inform other network operators who may need to act to properly to control a risk of serious injury (e.g. design defect in network equipment which may cause explosion or risk serious injury); or
- the risks indicated by the incident, and the probability of occurrence of the incident, are such that, in order to properly manage the safety risks, the network operator needs to modify its Network Management Plan

(including public safety awareness plan) or any standards, procedures, systems or other documents required to be implemented under that plan.

Ausgrid reported one Actionable Electricity Network Safety Incident (Public) in 2010/11. The number of Actionable Electricity Network Safety Incidents has remained low over recent years and Ausgrid considers this to be a significant trend.

It is Ausgrid's policy and commitment to protect customers and the community and raise their awareness of the dangers associated with electricity.

Table 5.2 Actionable Electrical Network Safety Incidents (Public) Trend

	Previous Years				Current Year
Year	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Non-Fatal	-	-	-	1	1
Fatal	-	-	-	-	-

Incident 1 – Carrington 2 December 2010

Damage occurred to an in-service 33kV underground cable (feeder 763 - Merewether STS to Carrington ZS) during an under bore operation by an Ausgrid contractor. The under bore machine did not strike the cable. However, it passed within minimum clearance distance of the cable and pushed or pulled underground debris into the cable sheath causing physical damage and subsequent operation of the protection system. The Ausgrid Network Standard NS156 ('Working Near or Around Underground Cables') had not been followed. All underground assets had not been positively identified prior to under bore commencing (as required by NS156). Ausgrid GIS information for the existing feeder cable was also found to be incorrect.

The preventative actions arising from the incident investigation are:

- Discussions to be held with the contractor on the need to fully comply with NS156.
- Correct the GIS information for specific site.
- Review NS156 for lessons learnt from this incident.

Incidents from previous reporting period

Ausgrid had one Actionable Electricity Network Safety Incident (Public) that was still under investigation at the time the 2009/10 Electricity Network Performance Report was produced. The incident investigations have subsequently been finalised.

Incident 1 – Collaroy Plateau 2 June 2010

An Optus Contractor was transferring the Optus assets from an Ausgrid limited life pole to a new pole adjacent. He removed the Ausgrid installed rope securing the old pole to the new pole. The old pole fell damaging the front porch of the adjacent house.

There was no preventative action arising from the incident investigation for Ausgrid. Optus and its contractor have implemented a corrective action to prevent a similar incident occurring in the future.

5.4 Serious Electricity Network Accidents (Network Worker and Accredited Service Provider)

Ausgrid reported five Serious Electrical Network Accidents (Network Worker and Accredited Service Provider) in 2010/11. Four of the Accidents were Serious Electrical Accidents while the other one was classified as a Serious Electricity Network Accident (Incident 1).

Table 5.3 Serious Accidents (Network Worker and Accredited Service Provider) Trend					
	Previous Years				Current Year
Year	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Employment Category					
Distributor Employees	4	3	3	5	5
Distributor Contractors	-	-	-	-	-
Accredited Service Providers	1	-	2	-	-

Incident 1 – Willoughby 13 July 2010

An Ausgrid employee was burnt by ignited cable fluid which had ruptured during the installation of a 132kV oil stop joint on the cable sheath at Willoughby sub-transmission substation.

The preventative actions arising from the incident investigation are:

- Jointers are made aware of the findings of the metallurgist's report and reminded of the consequences of high heat inputs into the sheaths of fluid filled cables.
- Use an infrared thermometer to monitor the temperature of sheaths during the application of transition / platform wipes.
- Introduce a site specific work method statement for all jointing of fluid filled cables where fluid flows are required.
- Crushing caps for fluid filled cables only to be used where there is no heating the aluminium sheath, or where fluid flows risks have been addressed in a site specific safe work method statement.
- Review and amend the PPE requirements for heat processes in the existing generic safe work method statement.
- Jointers are made aware that PPE requirement need to be routinely adhered to and documented.

Incident 2 – Padstow 14 August 2010

An Ausgrid employee was working on an overhead mains pole with live low voltage aerial bundled conductor (ABC) at Padstow. The employee made a connection between two different phases, which resulted in a phase-to-phase fault producing an electrical flash that caused burns to the worker's neck and arm. First aid was applied on site before the injured man was taken to hospital for examination and treatment (and discharged the same evening).

Positive identification of cable was not maintained combined with staff having lost sight of identified cable between conducting lamping test and making final connection. Also the staff involved used an outdated procedure for connecting ABC.

The preventative actions arising from the incident investigation are:

- A Distribution Guideline was prepared and distributed to advise staff of correct procedure for connection of low voltage ABC.
- Investigation is being conducted into alternative methods of marking phases during lamping process.
- Investigation is being conducted into alternative insulated piercing connectors with integrated test points.

Incident 3 – Redfern 11 April 2011

An Ausgrid employee received flash burns to the face and arms when using an uninsulated shifting spanner to unbolt tails in an overhead link box at Redfern. The spanner came into contact with 2 phase posts at the same time, causing an electrical flashover. The employee was wearing a long sleeved cotton shirt, low voltage insulating gloves with leather outer gloves, and personal sunglasses. These items were all badly burnt by the flash.

Incorrect tool and procedure had been used. The employee had also been ill during the week and believed that this had affected his judgment.

This incident was awaiting the finalisation of the investigation report at the time this 2010/11 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

Incident 4 – Padstow 14 April 2011

An Ausgrid employee received flash burns to the face whilst bonding through live low voltage aerial bundled conductor overhead mains on a power pole at Padstow. The line worker has made a connection between two different phases causing a phase-to-phase fault.

This incident was awaiting the finalisation of the investigation report at the time this 2010/11 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

Incident 5 – Cherrybrook 9 May 2011

An Ausgrid employee received flash burns to his eyes while reconnecting a service cable to a pillar box at Cherrybrook. During reconnection a 'B' phase to 'C' phase fault occurred across the pillar terminals causing a flash.

This incident was awaiting the finalisation of the investigation report at the time this 2010/11 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

Incidents from previous reporting period

Ausgrid had two Serious Electrical Network Accidents (Network Worker and Accredited Service Provider) that were still under investigation at the time the 2009/10 Electricity Network Performance Report was produced. The incident investigations have subsequently been finalised.

Incident 1 – Hunters Hill 28 April 2010

Two Ausgrid employees were changing a live 415V underground to overhead connection and in the process connected two phases together at Hunters Hill. The two employees received flash burns from the resulting electrical arc and explosion.

The preventative actions arising from the incident investigation are:

- The method of connecting two live ABC bundles to a link box as taught by the apprentice training school is to be documented and included in the training notes supplied by the training school.
- A Distribution Guideline is to be prepared and distributed highlighting the need to adhere to the connection method taught by the training school.
- Investigate the possibilities of an alternate design with the suppliers of IPC's which allows for a test point within the IPC.

Incident 2 – Rutherford 12 May 2010

An Ausgrid employee was installing a 1000W floodlight on a substation pole from an elevated work platform at Rutherford. While fitting the floodlight to the underside of the cross-arm, the floodlight made contact with the nearest fuse and the neutral bar resulting in a flashover. The employee received flash burns and dropped the floodlight, interrupting the short circuit.

The preventative actions arising from the incident investigation are:

- Review the EnergyLight floodlight sales and design process to ensure only suitable sites are offered.
- Review the design documentation provided to field staff for EnergyLight floodlight installations to ensure that there is a clear installation plan.
- Review the pole drilling tools and equipment.
- Review the matting supplied and installation procedure for LV substation fuses.
- Review the hazard identification processes when the planned task execution changes.
- Identify existing EnergyLight installations on substation poles and develop maintenance/decommissioning plan.
- Investigate the confusion between the neutral pins and substation earth bond and look at ways to differentiate the installations.
- Review the Ausgrid training process for tools and equipment used to dress poles.
- Review the Ausgrid training processes related to identifying hazards when working on or near live equipment.
- Review the use of tools and equipment at hight to develop guidelines on the use of lanyards and/or drop zones.

5.5 Actionable Electricity Network Safety Incidents (Network Workers)

Table 5.4 Actionable Safety Incidents (Network Workers) Trend					
	Previous Years				Current Year
Year	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Number	2	-	-	-	3

Incident 1 – Berowra 10 July 2010

Whilst conducting a primary injection test on an out of service 132kV feeder at Ausgrid's Berowra Zone Substation, an Ausgrid employee opened an earthing switch resulting in induced voltages being discharged through the test equipment to earth. The induced voltages occurred due to mutual coupling between the out-of-service 132kV Ausgrid feeder and the in-service 330kV TransGrid feeder combined with the lack of an effective earth at TransGrid Sydney North Bulk Supply Point. No electric shock was received by any Ausgrid employees.

The preventative action arising from the incident investigation is:

- A new work procedure has been written outlining the procedures to be followed by Ausgrid staff when conducting primary injection tests on 132kV feeders. The work procedure required staff to maintain a 5 metre clearance from the primary injection test equipment when removing the final local end earth and for the duration of the primary injection test.

Incident 2 – Kooragang Island 11 September 2010

Two Ausgrid employees were working from an Elevated Work Platform (EWP) to assist operators to open an air break switch (ABS) on the 33kV system on Kooragang Island. As the ABS opened an arc formed leading to an arc flash at the ABS. The line workers were not injured in the incident, but hardware on the pole was damaged by the arc flash.

The preventative actions arising from the incident investigation are:

- Review the current practice of assisted ABS opening.
- Review the switching planning process to break network rings on Kooragang network.
- Review options to provide additional SCADA monitoring on the Kooragang network.
- Investigate the provision of additional network open points on the Kooragang network.
- Review the management of known faulty network equipment.
- Review Ausgrid arc flash management processes.
- Review use of Air Break Switches in high load applications where current breaking is required.

Incident 3 – Tomago 18 February 2011

Four Ausgrid staff were in the process of setting up for indoor switchgear testing. During this setup an employee inadvertently energised the testing transformer by incorrectly connecting supply leads. Another employee came into contact with electricity as his right shoulder was leaning against the test transformer as it became energised. This employee was taken to hospital for observation only.

This incident was awaiting the finalisation of the investigation report at the time this 2010/11 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

Incident from previous reporting period

Ausgrid did not have any Actionable Electricity Network Safety Incidents (Network Workers) that were still under investigation at the time the 2009/10 Electricity Network Performance Report was produced.

5.6 Major Incidents Reports

Ausgrid's Incident Management System (IMS) provides an organisation wide system for managing all types and severity of incidents. The IMS documents the procedures followed by Ausgrid in terms 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 2010/11 there were eight major incidents whereby the Minister for Energy was notified in accordance with the Design, Reliability and Performance licence conditions. These incidents are outlined below:

Incident 1 – Sydney North Outage – Wednesday 7 July – Major Incident

A major incident was declared when TransGrid's 132kV busbar at their Sydney North substation tripped as a result of a fire in the secondary protection wiring. Supply was interrupted to various Ausgrid's 132 kV feeders. As a result supply was lost to Pennant Hills, Berowra, and Hornsby zone substations. Approximately 55,000 customers were interrupted for between 4 hours and 4 hours 33 minutes.

Incident 2 – Sydney East Fatality – Thursday 16 September - Major Incident

A major incident was declared in response to a fatality of a civil contractor who was working for TransGrid within their Sydney East substation. The civil contractor had come into contact with the sheath earthing system associated with Ausgrid's 9E1 feeder, which was energised at the time. There were no customer interruptions as a result of the incident. Notification to the Minister was undertaken by TransGrid as it involved both their contractor and their substation.

Incident 3 – Mt Hutton Fatality – Sunday 31 October – Major Incident

A major incident was declared in response to a fatality involving an 18 year old male who had scaled an Ausgrid power pole at Mt Hutton. The investigation showed that he used the 11kV ABS operating mechanism to ascend the pole. He fell to ground with no damage to the pole or equipment on it. The cause of death was determined by the coroner to be as a result of electrocution.

Incident 4 – Sydney East No. 8 Transformer Sealing End Outage – Monday 31 January – Major Incident

A major incident was declared when the 132/33kV transformer No. 8 at Sydney East sub-transmission substation tripped as a result of a failed transformer sealing end, interrupting the supply to the 33kV busbar at Sydney East. At the time, the other 132/33kV transformer that supplies Sydney East was out of service for a bushing replacement. Supply was interrupted to Narrabeen, Mona Vale, Terrey Hills, Newport, and Careel Bay zone substations. Approximately 29,000 customers were interrupted for between 1 hour 54 minutes and 3 hours 40 minutes.

Incident 5 – Enfield Feeder Outage – Wednesday 2 February – Major Incident

A major incident was declared when a 33kV feeder (feeder 641) which supplies Enfield zone substation tripped due to an underground cable fault. Another 33kV feeder (feeder 640) was already out of service due to an underground cable fault that had occurred during the night. The third 33kV feeder (feeder 639) had been out of service due to a previous fault and was to be returned to service when the 33 kV feeder 641 tripped. Supply was interrupted to Strathfield, Croydon Park, Burwood Park and Enfield. Supply was restored via switching, and deployment of up to 25 mobile generators. Load shedding was required during the first 24 hours of the incident to maintain loads below the ratings of the remaining in-service equipment. In addition, emergency 11 kV network augmentation work and the deployment of a new mobile 33/11kV substation enabled substation loads to be kept below equipment ratings preventing further requirements for load shedding.

Incident 6 – Marsfield concrete Pump Truck – Monday 21 February – Major Incident

A major incident was declared when a concrete pump truck driver received an electric shock when the boom on the truck was raised into the 11kV overhead conductor at Agincourt Rd, Marsfield. The truck driver was hospitalised for several days as a result of the electrical shock, but he received no major injuries and was later released.

Incident 7 – Lorn (Maitland) Helicopter incident – Saturday 2 April – Major Incident

A major incident was declared when the rotor on a helicopter came in contact with the 11kV overhead feeder 48122. The helicopter was carrying out joy flights from a site on the northern side of the riverbank adjacent to Belmore Bridge, Maitland. The impact severed the eastern conductor only (Lorn side), causing the conductor to land on the riverbank (both sides) and in the river. On the western side (Maitland side), the conductor landed on a metal hand rail running along a path that follows the riverbank. A 3 year old boy, who was leaning on the rail at the time, received a burn to his lower leg. The boy was treated at John Hunter Hospital and released on the same day.

Incident 8 – Bland Street Ashfield Sub Break-in – Saturday 23 April – Major Incident

A major incident was declared when police informed Ausgrid of an attempted copper theft in Bland Street Ashfield resulted in a person being hospitalised due to electrical burns. The person had broken into the distribution substation and was attempting to hacksaw an energised 11 kV cable when he received the electrical burns. The cable was repaired and the substation resecured.

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.

The installation inspection audit process targets electrical contractors whose 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 previously by external audit of Ausgrid's eight previous annual Electricity Network Performance reports.

Consistent with previous years, the major causes of customer electric shocks in the reporting period fell into two specific categories – "Failure of Part of Installation" (more specifically insufficient insulation resistance), and faulty neutral connections. Ausgrid is continuing an extensive program to replace all at risk aged service lines, carrying out neutral integrity tests at targeted customer installations in conjunction with the Sydney Water mains replacement program, and implementing a trial of the "Wirealert" device that was developed by Aurora Energy and rolled out in Tasmania in early 2009/10.

6.1 Reports against Customer Installation Safety Plans

There has been a major increase (89%) in the number of notifications of electrical installation work from electrical contractors (CCEW). This is due to applications and connections associated with the NSW Solar Bonus Scheme and its various amendments, particularly the change from 60 cents/kWh to 20 cents/kWh in October 2010. This created an avalanche of applications for connection over a three week period. Ausgrid has adopted a policy to inspect all solar installations rather than an audit program due to the increase in inexperienced installers, more complex metering configurations and new technology that feeds into the network. This has resulted in the percentage of installations inspected rising from 32% in 2008/09 to 42% and this year 64%.

Table 6.1 Installation Inspections Trend

	Previous Years				Current Year
Year	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Number of Notifications (CCEW)	47,851	45,138	45,093	47,799	90,291
Number of Inspections	14,797	13,705	14,396	20,110	57,879
Installation Inspection Rate (%)	30.92%	30.36%	31.93%	42%	64%
Major Safety Defect Rate (%)	6.70%	6.33%	7.39%	5.3%	2.92%
Safety Breach Notices Issued (%)	16.79%	16.72%	18.67%	13%	2.36%
Number of Warnings Issued	15	30	29	22	18
Reports to Fair Trading (No.)	12	11	2	9	9
Number of Audits by Distributor	3	3	3	3	3

The trends in 2010/11 continue to indicate that electrical contractors are only submitting notifications when the electrical installation work is associated with contestable service work. The number of notifications for Level 2 Service Provider contestable work (NOSW) has increased by 67% from the previous year. This increase is also attributed to the NSW Solar Bonus Scheme and the associated contestable metering work which requires submission of a NOSW.

The major defect rate of 2.92% is significantly lower than last year (5.3%). This lower then expected number can be attributed to the 89% increase in CCEW's submitted. The low number of major defects also relates to no reported shocks from unsafe electrical contractor installation work.

Ausgrid has been assisting the NSW Fair Trading with their electrical contractor compliance campaigns by providing CCEW notification data when requested and has entered a Memorandum of Understanding for mutual cooperation on electrical installation safety matters. Ausgrid is also conducting "Targeted Inspections" of specific large developments like shopping centres and unit blocks, concentrating on the electrical contractor's compliance with Australian Standards as well as the submission of CCEW's for new electrical work.

Ausgrid is represented on related Australian Standards committees such as AS/NZS3000 and AS/NZS3017 as well as the Service and Installation Rules of NSW to ensure the focus on customer installation safety is maintained and improved in the review process.

Ausgrid has also become a member of the Clean Energy Council (CEC). The CEC are the peak solar industry body across Australia. They accredit electrical contractors to solar install solar panels and systems and also complete compliance audits of completed solar work. Ausgrid has worked closely with the CEC on all matters relating to solar inspections and has presented at their annual ATRAA 2011 Solar Installers conference.

A trial of the "Wirealert" device (developed by Aurora Energyand which is being rolled out in Tasmania), commenced in early 2009/10 and was completed in 2011. The Wirealert device is a supply monitoring device that plugs into a power point and detects potentially dangerous situations arising from a combination of a faulty neutral and earth connections. Ausgrid issued 500 devices to Ausgrid staff and 2500 devices to customers with older higher risk electrical installations. The trial is continuing as customers report alarms from the devices and subsequent investigations are carried out.

Ausgrid and Sydney Water are jointly funding the testing of each installation neutral connection impacted by their water main replacement program. Suspected faults are investigated by Ausgrid staff and rectified where necessary. Ausgrid are also making arrangements to conduct post water main replacement tests and convert older direct earthed installations to the current MEN earthing.

6.2 Customer Installation Shock Reports

During 2010-11, Ausgrid recorded a 5.5% increase in reported electric shocks. There were three fatalities where the possible cause was electrocution associated with customer's electrical installations and one fatality associated with contact with network distribution mains. Of the three customer installation fatalities, one was confirmed as due to contact with live exposed conductors however, two could not be determined due to the delay in emergency authorities advising Ausgrid in time to carry out an investigation. This delay resulted in the site being tampered with preventing a comprehensive investigation and a conclusive outcome.

Ausgrid continues to run public safety awareness programs and advertising campaigns highlighting the inherent dangers of electricity and precautions that should be taken.

Table 6.2 Customer Installation Shock Reports Trend

	Previous Years				**Current Year**
Year	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Shocks on Customer's Premises (Number Reported)	402	311	309	344	363

Note: Shocks found to be caused by static electricity are to be included in the report.

7. Contestable Works Scheme

An analysis of the contestable works trends in 2010/11 shows an increase (13.6%) in the total number of project notifications associated with Level 1 contestable work compared to 2009/10. Figures obtained for Level 2 contestable work show a 67% increase in the total number of notifications (NOSW) compared to 2009/10. The significant increase in Level 2 activity is attributed to contestable metering work associated with the introduction of the NSW Solar Bonus Scheme.

Level 1 Contestable Work

Overall there was an increase (16.9%) in Level 1 work being carried out by external ASP's. The very low number of contestable projects carried out by internal (Ausgrid) service providers continued. Ausgrid found it necessary to implement disciplinary/corrective action on 38 occasions as a result of unsafe practices by external ASP's.

Ausgrid commenced an ASP Safety Forum to establish a clear safety communication channel between Ausgrid and all Level 1 ASP's. There are currently 15 Level 1 ASP companies attending regular safety forum meetings. Ausgrid has informed Level 1 ASP's via safety alerts and notifications of changes to Network Standards and the potential safety hazards associated with inadequate excavation procedures, working on live low voltage, using machinery, working with 33kV underground cables and using sub contracted staff to carry out contestable work. There were zero safety incidents involving Level 1 ASPs that resulted in loss time injuries.

Level 2 Contestable Work

Ausgrid carried out 60,746 inspections of Level 2 completed work for compliance with the standards. This is a 128% increase from 2009/10 and is due to the roll out of the NSW Solar Bonus Scheme and the higher level of inspections required for electronic bidirectional metering associated with embedded generators. Ausgrid also carried out 182 safety compliance audits on Level 2 "work in progress". 60 corrective/disciplinary interviews were conducted and 14 Level 2 ASP authorisations were suspended for non-compliance. NSW Department of Trade & Investment, Regional Infrastructure & Services (DTIRIS) has commenced a review of the Accreditation Scheme. As a member of the advisory panel, Ausgrid is heavily involved in the development of a more comprehensive scheme that better manages accreditation of ASPs carrying out contestable works.

Table 7.1 Contestable Works Trend

	Previous Years								**Current Year**	
Year	**2006/07**		**2007/08**		**2008/09**		**2009/10**		**2010/11**	
Category	**Int**	**Ext**	**Int**	**Ext**	**Int**	**Ext**	**Int**	**Ext**	**Int**	**Ext**
Network Work (Level 1)										
Project approvals	99	221	56	379	24	444	24	461	12	539
Projects inspected by the DNSP	77	110	46	219	31	294	22	286	10	379
No. of projects with initial major defects	6	60	3	80	0	108	0	72	0	92
Customer Connection Work (Level 2)										
Notifications (NOSW)	8,471	66,309	5,963	51,158	5,426	53,015	4,742	59,057	12,041	94,463
Projects inspected by the DNSP	2,041	19,544	1,500	15,628	1,763	16,542	2,176	24,474	4,401	56,345
No. with initial major defects	9	302	11	219	8	195	7	243	43	281
Network Design Work (Level 3)										
Designs Certified	268	193	161	328	106	327	451	13	42	552

Note:

"Int" refers to contestable work done by the distributor's Accredited Service Provider entity and "Ext" refers to work done by independent Accredited Service Providers..

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

8. Bushfire Risk Management

Ausgrid's Bushfire Risk Management strategies 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 Bushfire Risk Management Plan forms part of Ausgrid's consolidated Network Management Plan, which was updated as required under the Electricity Supply (Safety and Network Management) Regulation 2008. The Bushfire Risk Management Plan was last reviewed February 2011, as part of the Network Management Plan review. The Bushfire Risk Management Plan contains further details of how we manage bushfire risk.

Ausgrid continues to identify bushfire prone areas from bushfire prone land maps certified by the Commissioner for the Rural Fire Service (RFS). Ausgrid has a formal agreement in place with the RFS to use these maps to identify our assets in these bushfire prone areas – these are updated annually before the bushfire season so the appropriate asset inspections can be completed. The latest update to these maps occurred in May 2011, following the receipt from the RFS.

Refer to Table 8.2 for details of the initiatives that Ausgrid has undertaken in the last year to improve systems used to manage bushfire risk within our network area.

Table 8.1 Bushfire Risk Management

	Previous Years				**Current Year**
Year	2006/07	2007/08	2008/09	2009/10	2010/11
Assets in bush fire prone areas checked by pre-summer inspection %	100%	100%	100%	100%	100%
Private lines in bush fire prone areas checked by pre-summer inspection %	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1
Fire ignitions by network assets (Number)	2	0	4	6	4
Complaints from the public regarding preparation for the bush fire season (Number)	Not discernable See Note 2.	Not discernable See Note 2.	Not discernable See Note 2.	Not discernable See Note 2.	Not discernable See Note 2.

Note 1: Bushfire risk management for electrical equipment is a shared responsibility between Ausgrid and all landowners/occupiers who are customers in our distribution area. Ausgrid inspects, tests and maintains the assets we own. However, it is the responsibility of landowners/occupiers to ensure their electrical installations are free from defects that could cause fire or other hazards. Customers are responsible for keeping private overhead powerlines free of vegetation, and must ensure appropriate trees are planted in areas that are close to powerlines. Customers are also responsible for inspecting, testing and maintaining their powerlines and poles at regular intervals – the same way Ausgrid does.

Ausgrid uses the Service & Installation Rules of NSW to determine the delineation of private electrical installations from network assets. Our requirements for the inspection and maintenance of private aerial mains are detailed in our publication ES1 Customer Connection Information, our Standard Form Customer Connection Contract and the Network Standards referenced in ES1. Under the Electricity Supply (Safety and Network Management) Regulation 2008, we have taken into account the Industry & Investment NSW Code of Practice (Electricity) – Service & Installation Rules of NSW, October 2006. The Service and Installation Rules of NSW are prepared in accordance with the Code of Practice.

Information on Private Lines is not currently held by Ausgrid in any of our information systems as they are not Ausgrid assets. Ausgrid will make the required system changes to enable reporting of this statistic throughout the course of 2011/12 should the Department require this measure on an ongoing basis.

Note 2: The majority of the preparations on Ausgrid's network for the bushfire season relate to the clearing of vegetation. Ausgrid has adopted a vegetation strategy designed to maintain vegetation safety clearances at all times, which requires vegetation clearing to be undertaken throughout the entire year, not just at times of preparation for the bushfire season. As our systems are required to record all vegetation related inquiries and complaints, it is not possible to provide an accurate estimate of those that relate specifically to works undertaken in preparation for the bushfire season. Ausgrid will make the required system changes to enable reporting of this statistic, should the Department require this measure on an ongoing basis.

Table 8.2 – Initiatives used to manage Bushfire risk within Ausgrid's network area	
Initiative	**Description**
1	Ausgrid has continued its monthly reporting process with additional focus on high priority outstanding corrective works that pose a genuine risk in bushfire areas.
2	Ausgrid has established capital and replacement programmes to remove equipment with known failure modes that may initiate bushfires during equipment failure.
3	Ausgrid distributes bushfire risk management information which outlines customer's obligations regarding safety management of their electrical installations.
4	Vegetation management plans involving mechanical clearing of 66kV and 132kV overhead lines in areas where poor reliability of electricity supply has occurred due to vegetation.
5	Review of vegetation management policy and standards following the Victorian bushfires and preliminary recommendations of the Victorian Bushfires Royal Commission finalised.
6	Continued liaison with Rural Fire Service, NSW Fire Brigade, councils and other authorities

The following sections provide further information on the initiative described above.

8.1 Monthly and Quarterly Reporting Process

Pre-bushfire season patrols of poles, lines and associated apparatus are undertaken annually in accordance with Ausgrid's Technical Maintenance Plan. The outcomes of these inspections including defects, maintenance and rectification works is captured in Ausgrid's integrated Asset Management System. Ausgrid has improved the process for notifying a customer where a Line Patrol Report indicates defects exist on a customer's installation in a bushfire prone area.

Ausgrid has continued its monthly reporting process to Senior Management on outstanding corrective work in bushfire prone areas.

Table 8.3 provides a summary of the number of defects identified and rectified under the 2010/11 Preventative Maintenance program in bushfire prone areas. Please note that not all tasks identified during 2010/11 will be of such high priority that they need to be completed prior to the end of the year.

Table 8.3 - Bushfire Prone Areas - Bushfire Risk Corrective Maintenance 2010/11						
Number of defects:	**Central Coast**	**Upper Hunter**	**Lower Hunter**	**Newcastle**	**Sydney North**	**Sydney South**
Outstanding pre 2010/11	128	161	534	609	150	30
Identified in 2010/11	1855	631	1329	2740	1224	201
Rectified in 2010/11	1801	533	903	2127	1179	195
Outstanding and due or overdue as at end 2010/11	160	171	710	1043	347	76

Note 1: The regions reported in the table above are based upon Ausgrid's Field Services depot areas. These six depot areas cover all of the bushfire affected regions identified in the Network Map included in Section 1: Profile (figure 1).

Note 2: In some regions a number of the defects identified in the previous year were rectified during 2010/11.

Note 3: Due to differing defect priorities, not all defects identified during the 2010/11 year fall due within the 2010/11 year. The table above will not directly summate as a result.

Note 4: High priority defects detected during 2010/11 but not yet rectified by the 30th June 2011 are expected to be rectified prior to the 2011/12 bushfire season.

Note 5: The Sydney East region is not considered to be bushfire prone and is excluded from the table.

8.2 Capital and Replacement Programmes

Ausgrid has continued its low voltage spreader capital programme to reduce the likelihood that low voltage overhead powerlines will cause bushfires. If overhead powerlines clash together, the resulting arcing has the potential to cause a fire - low voltage spreaders are used to prevent powerlines clashing and therefore significantly reduce the likelihood of fire. Ausgrid installed an additional 520 low voltage spreaders this year, 431 of these in bushfire-prone areas.

The Ausgrid Replacement plan for the 2009/14 regulatory period also includes;

- Replacement of over 40 kilometres of steel overhead mains per year – much of this will be replaced with new covered conductor.
- Replacement of over 500 air break switches per year with new air break switches with enclosed load-break contacts which contain any arcing produced during switching operations.
- Replacement of over 130 oil-filled reclosers and sectionalisers with modern gas-filled equipment.
- Replacement of over 22,000 low voltage services per year.
- Continuation of the overhead mains access track refurbishment programme which benefits Ausgrid as well as the RFS during times of bushfire by providing improved access to fight fires as well as carry out repairs to restore electricity supply.
- Replacement of defined types of insulators known to be at end-of-life on 132kv Transmission lines.

8.3 Communicating with Customers

During 2010/11, Ausgrid distributed a brochure to targeted landowners located in bushfire prone areas in the Hunter, Central Coast and North Sydney regions. Titled “Your powerlines: safety and bushfire prevention”, the brochure outlines:

- contact details (phone and website) for the NSW Rural Fire Service to enable the customer to assess whether their property is located within a bushfire prone area;
- the demarcation between Ausgrid’s network and private powerlines;
- 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 poles and mains; and
- a reference to the Ausgrid website for contact details of companies which employ qualified pole inspectors, authorised tree trimmers and licensed electrical contractors who can inspect or repair private powerlines.

Further information on how we communicate risk with our customers is outlined in our Public Electrical Safety Awareness Program.

8.4 Review of Vegetation Management Policy and Standards

Following the outcomes of the Victorian Bushfires Royal commission, Ausgrid has reviewed the policy and standards for vegetation management. The reviewed policy and standards were developed in accordance with, and comply with, the Australian electricity industry vegetation management standards.

8.5 Monitoring of the Victorian Bushfire Royal Commission

Throughout the course of 20010/11 Ausgrid has been working with industry, government and other stakeholders to consider and evaluate the final recommendations of the Victorian Bushfires Royal Commission (VBRC) participating in industry workshops at a national level. Ausgrid will continue to work with key agencies such as Energy Safe Victoria (ESV), as they review all options to reduce the risk of catastrophic bushfires from the electricity supply. The ESV Taskforce is to recommend to the Victorian Government, by 30 September 2011, a plan to reduce bushfire risk within 10 years. Ausgrid will evaluate the applicability of the plan in the NSW context, and the ongoing operation of our network in bushfire prone areas, once finalised.

8.6 Liaison and consultation with Fire Services and others

Ausgrid continues to build strong relationships with the RFS and NSW Fire Brigade, as well as maintaining relationships with local councils, National Parks and Wildlife Service and other stakeholders.

Ausgrid participates in 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. An example of this is where the RFS has identified locations where marker balls need to be installed on transmission lines.

9. Public Electrical Safety Awareness

Ausgrid is committed to increasing awareness amongst the general public of electrical safety. This commitment is demonstrated through the development and implementation of a Public Electrical Safety Awareness Plan (PESAP). This section describes the PESAP program in 2010/11.

9.1 Issues

The PESAP program is 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 PESAP have been identified as hazardous since electricity was first distributed and continue to be the core issues that pose the greatest risk to the public. These issues require ongoing communication, education and awareness to reduce the risk of injury.

9.2 PESAP Programs

Outlined in Table 9.1 are the PESAP programs implemented by Ausgrid during 2010/11, including the description of the target market, the key messages and a description of each program, the medium through which it was delivered and an analysis of the program. A significant amount of information and downloads relating to preventing and managing electrical hazards is on Ausgrid's website.

Ausgrid monitors the programs and electrical safety incidents and adapts its programs as required to continue to reduce the likelihood of incidents occurring. The broad nature of "electrical safety" and the low number of Serious Electrical Network Incidents (SENIs) makes it difficult to statistically analyse the effectiveness of the programs.

Reach & Frequency provides an analysis of the percentage of persons in a target population that is exposed to an advertising schedule at least once (Reach), and the average number of times it has been heard (Average Frequency).

Table 9.1 PESAP Programs implemented during 2010/11

	Target Group	Messages	Program Overview	Analysis
Overhead Powerline Safety	Tradespeople, outdoor workers, truck drivers, machinery operators, construction workers, scaffolders, painters etc. General community. General community	• Have up-to-date maps/diagrams showing the location of powerlines on the property/worksite, 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	• In October 2010 EnergyAustralia launched a new overhead powerline safety campaign titled "What do we have to do to get you to look up?" • This campaign specifically targets outdoor workers /tradesmen to raise awareness of the dangers associated with overhead powerlines and educate on safe behaviours and	**Radio Reach and Frequency (per burst)** Market: Sydney Target: M25-54 (Pot: 995,000) Reach: 1+ 50.5%, 3+ 32.4%, Ave Freq:8.1x Market: Newcastle Target: M25-54 (Pot: 108,000) Reach: 1+ 72.3%,

Table 9.1 PESAP Programs implemented during 2010/11				
	Target Group	Messages	Program Overview	Analysis
		barriers and make overhead powerlines 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.	work practices. • The campaign comprises of 3 radio advertisements, 2 print advertisements, 6 radio live reads, online banners and NRL rotating signage. • The campaign ran in 2 bursts – Oct/Nov 10 and May/Jun 11. • Radio is a key medium for this target group as it is present on building sites and in vehicles. • The new creative is also being used for construction industry posters, the CFMEU safety handbook and associated promotional material. • An overhead powerline safety message is included in our monthly radio safety campaign.	3+ 53.2%, Ave Freq:11x Market: Central Coast Target: M25-54 (Pot: 57,100) Reach: 1+ 72.6%, 3+ 49.2%, Ave Freq:7.1x **Press Reach and Frequency** Potential: 87,000 Reach: 1+ 26.1%, Ave Freq: 1.14x
Underground Cables	Tradespeople, outdoor workers, machinery operators, construction workers, scaffolders, painters etc. General community. General community	• Always Dial Before You Dig • 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	• Ausgrid's underground cable safety program incorporates an awareness campaign which specifically targets outdoor workers/tradies to raise awareness of the dangers associated with digging and working near underground cables. • The campaign comprises of 3	Results from Ausgrid's Electrical Safety Survey 2010 showed over 75% of respondents were aware of the DBYD service. **Radio Reach and Frequency (per burst)** Market: Sydney Target: M25-54 (Pot: 995,000) Reach: 1+ 59.6%, 3+ 41.1%, Ave

Table 9.1 PESAP Programs implemented during 2010/11				
	Target Group	Messages	Program Overview	Analysis
		and a person trained in resuscitation • Wear protective clothing, including safety footwear and safety helmet • Have emergency contact numbers on site • Set up safety barriers, witches hats and warning lights to reduce the risk of injury to the general public. • Comply with all WorkCover requirements and codes • Comply with all WorkCover requirements and codes	radio advertisements, 2 print advertisements, radio live reads and NRL rotating signage. • The campaign ran in 2 bursts – Aug/Sep 10 and Feb/Mar 11. • Radio is a key medium for this target group as it is present on building sites and in vehicles. • An underground cable safety message is included in our monthly radio safety campaign.	Freq:10x Market: Newcastle Target: M25-54 (Pot: 108,000) Reach: 1+ 72.3%, 3+ 53.2%, Ave Freq:11x Market: Central Coast Target: M25-54 (Pot: 57,100) Reach: 1+ 72.6%, 3+ 49.2%, Ave Freq:7.1x **Press Reach and Frequency** Potential: 87,000 Reach: 1+ 36%, Ave Freq: 1.65x
Electricity safety for school students	Children from Kindergarten to Year 10	• 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	**Electricity Safety Week** Ausgrid provides registered primary schools with a pack containing electricity safety activities for Kindergarten to Year 6 students, prizes, posters, stickers and merit certificates. **Stage 3 Electricity and Safety Unit** Ausgrid developed a Stage 3 Electricity and Safety Unit and Electrical Resource Kit which aligns with best practice teaching principles and the NSW DET physical	95% of primary schools in Ausgrid's network area participated in Electricity Safety Week in 2010. The Electricity Unit and resource kits are provided to schools in Ausgrid's network area on request.

Table 9.1 PESAP Programs implemented during 2010/11				
	Target Group	Messages	Program Overview	Analysis
			phenomena curriculum. **High School Electricity Resource** In conjunction with the Department of Education & Technology, a microsite based on the science curriculum was developed and branded EnergyAustralia. The site provides students with the information they require to complete a mandatory science assignment on electricity	The microsite is currently being migrated to the Ausgrid website and promotion to schools will restart in Aug 2011.
Substation and school holiday safety	Residents living within 1km of a zone substation	• 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	A safety postcard was developed to communicate with children warning them of the danger of entering a substation and asking them to call Ausgrid should a ball or other item go over the fence.	An unaddressed mailing was delivered to approximately 380,000 residences living within 1 km of identified zone substations during the Easter school holidays in 2011.
Do-it-Yourself (DIY)	Home renovators, home handymen, men aged 18-55 years	• Don't mess with electricity – you're out of your league • Do-it-yourself (DIY) electrical work is not only dangerous, it's illegal. • Always contact a licensed electrical contractor	• The NRL continuous call partnership delivers a strong vehicle for an extended DIY Electrical Safety campaign with a broad reach to our target audience in Sydney, Central Coast, Newcastle and the Upper Hunter. The campaign includes live reads and pre-recorded advertisements. • Electricity safety	• Ratings in 2010 continue to dominate weekend listening with the CCT team reaching 256,000 listeners every weekend. • #1 share of overall listening by people 10+ continued to lead in 2010 at 20.9% • Dominating the commercial radio listening by Sydney's men with; 17%

Table 9.1 PESAP Programs implemented during 2010/11				
	Target Group	Messages	Program Overview	Analysis
			tips and online banners were also promoted as part of 2GBs Home Improvements Show from November 2009 to February 2010. • A DIY electrical safety message is included in our monthly radio safety campaign.	share of all males 18+ 14.4% of men 18-54 years 13.9% of men 25-39 years
Storm Safety	General community	• 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 • Always assume fallen powerlines are live.	Extended communications program with emphasis on ongoing preparedness messaging via Australian Traffic Network runs from November to March each year.	• A radio campaign was launched in November 2009 and continued until March 2010.
Fallen Powerlines	General Community	• Assume fallen powerlines are live • Stay well clear and contact Ausgrid on 13 13 88	Covered in Ausgrid's Storm Safety and Electricity Safety for Students Campaigns.	Results from Ausgrid's Electrical Safety Survey 2010 showed a high understanding of dangers associated with fallen powerlines.
Christmas – People decorating their homes with festive lights	General Community	• Use lights and other electrical equipment designed for external use • Check lights for damage before use • Don't overload power points or boards • Switch off lights overnight and when leaving the house.	An extensive public relations campaign was supported by radio advertising which ran for two weeks in November and December 2010, the key Christmas decoration period.	• A media release was issued in December 2010 • Advertising runs late November and early December to coincide with seasonal risks.
Bushfire Risk Management	Private Pole Owners	• 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	Ausgrid distributes bush fire risk management information which outlines customer's obligations regarding safety management of their electrical installations to	• Safety and Bushfire Prevention brochure sent to over 12,000 properties in bushfire designated zones in the

Table 9.1 PESAP Programs implemented during 2010/11	Target Group	Messages	Program Overview	Analysis
		inspecting, testing and maintaining their powerlines regularly and making sure they are free of vegetation.	customers in our network area via direct mail, newspaper advertisements and the corporate website	Hunter, Central Coast and North Sydney areas. • Tombstone style newspaper advertisements were included in all suburban and metro newspapers - coverage up to 1.4 million customers to meet the requirement for broad coverage across Ausgrid's network area. • Radio advertisements and live reads ran on regional stations
Graffiti on electrical infrastructure	General Community	• If you see graffiti on electrical infrastructure do not attempt to remove it, report it to Ausgrid.	Ausgrid developed a safety postcard to raise community awareness regarding the danger associated with removing graffiti from electrical equipment such as pillar boxes, kiosk subs etc. The postcard explains the risks and requests the community to report graffiti on electrical equipment via our Graffiti hotline, 13 15 35. Over 100,00 postcards were distributed in May and June 2010 to suburbs located in the Ausgrid	• 188,000 graffiti postcards were delivered to identified suburbs in Oct/Nov 10 • An unaddressed mailing, which included a graffiti postcard, was delivered to approximately 380,000 residences living within 1 km of identified zone substations during the Easter school holidays in 2011.

In addition to the programs and campaigns outlined in the 2010/11 Public Electrical Safety Awareness Plan program, Ausgrid undertook the additional programs outlined in Table 9.2 during the year.

Table 9.2 – Additional PESAP Initiatives	
Additional Program	**Description and Rationale**
Ausgrid's substation safety postcard campaign was extended to include a number of postcards focusing on electrical hazards including storm safety, DIY, general electrical safety and graffiti removal.	An unaddressed mailing was delivered to approximately 380,000 residences living within 1 km of identified zone substations during the Easter school holidays in 2011.

10. Power Line 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.

Table 10.1 Power Line 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	277	0	2	0	0
Submarine Crossings	87	2	0	0	0

* Description of incident to be given below.
# Description of the modification carried out including sign replacement to be given below.

10.1 Risk Assessment

Due to these 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 the crossing, particularly those to navigation safety, are as low as reasonably practicable and that the appropriate steps are taken to prevent fatalities and injuries to people and / or damage to property and interruption to the supply of electricity.

Ausgrid ensures that all new electricity crossings of navigable waterways include a risk management assessment, conducted to a standard equal or better than AS/NZW 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 power line crossings of navigable waterways as required by the code. The results of the water crossing risk assessments is summarised in the table below:

Summary of the Power Line Water Crossings Survey and Risk Assessment				
Negligible	Medium Risk	High Risk	Extreme Risk	Total
198	0	17	30	245

Where the risk assessment of an existing crossing is 'extreme' or 'high' Ausgrid implements risk treatments to reduce the risk to an acceptable level. Appropriate treatments may include:

- Elimination of the need for a crossing (i.e. by re-routing cables);
- Relocating the crossing on the waterway;
- Reconfiguring the network;
- Installing a submarine crossing;
- Raising the height of the crossing;
- The use of signage;
- The use of coloured balls / and or coverings (tiger tails);
- Cable insulation;
- Lighting the signage associated with the crossing; and
- Other treatments as appropriate.

The following table outlines the timetable for Ausgrid's transition to full compliance with the new industry code for all existing overhead crossings and / or their signage.

Existing Crossing Assessment Timetable			
#	Situation	Treatments Required	Timetable for Completion
1	Reported incident has occurred at an overhead crossing	Analysis to determine an explanation for the incident and risk assessment to be completed. Risk level to be made as low as reasonably practicable through complying with overhead signage requirements and other treatments as necessary	Within three months of incident if incident occurs post implementation
2	All overhead crossings other than those in #1 above	Risk assessment to be completed	Completed
3	All overhead crossings for which risk assessment at #2 above indicates an 'intolerable' risk to navigation safety	Risk level to be made as low as reasonably practicable through complying with overhead signage requirements and other treatments as necessary	Within 2 years of the completion of the risk assessment.
4	All overhead crossings for which risk assessment at #3 above indicates an 'intolerable' risk to navigation safety	To be redeveloped as submarine crossings	Within first 15 year review period
5	All overhead crossings with signage which is not in accordance with this code by December 2010	Prepare and implement signage replacement plans based on risk assessment principles	Implement 10 year signage replacement plans

10.2 Ausgrid's Power Line Crossings

Ausgrid currently has a program of work underway to implement the required risk treatments identified in each risk assessment as required by the code. This program includes the design and implementation of the recommended risk treatments and the updating of existing warning signs to show the maximum vessel clearance heights, the installation of flood warning signage for waterways subject to flooding and advisory warning signs at all public launching sites within 5km of the water crossings.

In 2010/11 there were two incidents associated with waterway crossings, these incidents are listed below:

Summary of Incidents during 2010/11			
Date	Crossing	Location	Vessel Type
16/01/2011	EA136	Maianbar, Port Hacking	Yacht
3/04/2011	EA457	Hunter River, Maitland	Helicopter

The incident at Maianbar, Port Hacking involved a catamaran with a 17.9m mast hitting an 11kV crossing. There were warning signs located beneath the crossing on the northern and southern shores, the safe clearance shown on the signs was 8.6 m and 10.86 m respectively. Large marker balls were also present and located close the lowest point of the crossing. As a result of the incident investigation it has been recommended that this crossing be either raised to a minimum of 22m HAT or converted to a submarine crossing.

The incident at Maitland along the Hunter River involved a helicopter colliding with an overhead water crossing whilst attempting to land in a grassy area nearby. The crossing is located approximately 45 m downstream of the Belmore Bridge and was assessed to have a negligible risk rating. The risk assessment conducted was undertaken to evaluate the risk to water craft, not helicopters or other aircraft.

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 performed on the groups of assets. The resulting inspection and maintenance program developed for this group of assets is a combination of Patrols for Line Inspection, Pole and Steel Towers and Structures, base line examination of wood pole structures at all voltages, and vegetation management activities, and has been developed in accordance with industry best practice.

Typically the inspection patrols for line inspection and pole inspection are based on a four yearly inspection cycle. These two inspection programs are offset by five years and as a result the crossings are visited at a minimum of every 2.5 years +/- the latitude for the respective tasks. This is further enhanced by the Vegetation Management Program which is a full service program aimed at keeping vegetation at the required clearances at all times.

11. Managing Director Certification

Ausgrid

ELECTRICITY NETWORK PERFORMANCE REPORT 2010/11

Declaration by Chief Executive Officer

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

Complies with reporting requirements prescribed under the *Electricity Supply (Safety and Network Management) Regulation 2008*, and the "Distribution Network Service Provider Annual Report Outline" (the Outline), as provided by DTIRIS.

Has been checked in accordance with recognised quality procedures; 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: George Maltabarow

SIGNATURE: George Maltabarow

MANAGING DIRECTOR

DATE: 22/11/11

Attachment A: Distribution Reliability of Supply: Definitions and Notes

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.

Note 2: The following definitions and notes are in accordance with the 'Design, Reliability and Performance Licence Conditions' imposed on distributors by the Minister for Energy and Utilities on 1 August 2005 and revised in December 2007. The report outline is the implementation of this reporting framework, with some necessary additions, by I & I NSW for this annual Electricity Network Performance Report required under the Electricity Supply (Safety and Network Management) Regulation 2008.

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 3 below.

Reliability Measures

Measure/description	Index	Definition
Total number of minutes a distribution network customer on average is without electricity / year	**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.
Number of interruptions on average, a distribution network customer's supply is interrupted per year	**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).

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 0.5 seconds, 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. The number of distribution customers is calculated as the average of the number of customers at the beginning of the reporting period and the number of customers at the end of the reporting period.
3. Un-metered Street Lighting supplies are excluded. Inactive accounts are excluded.

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: • Transmission outages, and • directed load shedding.
Unplanned interruptions	
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 a 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.

6. Major Event Day
The following material is reprinted with permission from IEEE Std. 1366-2003, IEEE *for Electric Power Distribution Reliability Indices*, by IEEE. The IEEE disclaims any responsibility or liability resulting from the placement and use in the described manner.

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, TMED. 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 (Exclude transmission and directed load shedding but include planned outages.) 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 calculated the TMED (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 knows as the log-standard deviation) of the data set.

f) Complete the major event day threshold T_{MED} using the following equation:

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

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

Notes:
Short Rural feeders may include feeders in urban areas with low load densities.
Back up feeders should be given the same classification as the normal supply feeder.

Attachment B: Transmission Reliability: Network Indices

A Transmission Network is a system of electricity lines and associated equipment operating at nominal voltages of 220 kV and above plus:

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

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 8760 hours.

- **System Reliability (Un-Planned 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.

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

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

The report (in accordance with this Outline and the accompanying tables) should summarise the number and type of electrical network accidents and incidents that have occurred during the year. The report should be a summary of reports already forwarded to the Department during the year and should indicate whether the injured persons or people placed at risk were network workers (employees or distributor contractors), accredited service providers or members of the public. The report should indicate the causes and contributory causes of the incidents; and for each cause, indicate the measures taken to prevent similar incidents occurring in the future.

Reporting is to generally follow the Department's Significant Electrical Network Incident (SENI) reporting arrangements which commenced on 1 July 2002. Terms are defined below.

Serious Electricity Network Accidents (SENA)

A *serious electricity network accident* is an accident involving the electricity network (including accidents remote from the network but caused by the network e.g. network neutral failure affecting a customer installation etc.) as a consequence of which a person dies or suffers permanent disability, is hospitalised, receives treatment from a health care professional, or is unable to attend work for any period of time, but excluding situations where network support structures are impacted by motor vehicles and aircraft unless electricity is involved in the injury. The most common SENA are falls from heights.

This statistic also should include Serious Electricity Accidents, i.e. those where electricity was involved in the injuries.

These accidents are to be summarised and listed in Table 5.1 for accidents involving the public and Table 5.3 for network workers.

Actionable Safety Incident (ASI)

An *actionable safety incident* is an incident, which is not a serious electricity network accident, involving the electricity network, but where there was a significant risk that a network worker, accredited service provider or member of the public could have been seriously injured as a result of the incident, and which meets any of the following criteria:

the circumstances of the incident indicate that there is a duty of care to inform other distributors who may need to act to properly control a risk of serious injury (e.g. design defect in network equipment which may cause explosion or risk serious injury); or

the risks indicated by the incident, and the probability of occurrence of the incident are such that, in order to properly manage the safety risks, the distributor needs to modify its network management plan (including public safety awareness plan) or any standards, procedures, systems or other documents required to be implemented under that plan; or

contact is made, directly or indirectly, with the energised electricity network (e.g. crane hit overhead conductors, underground cable dig-in etc).

Situations where network support structures are impacted by motor vehicles and aircraft would not normally need to be reported unless criteria a) or b) are met. Incidents involving network assets, which place persons at risk of injury are to be summarised in Table 5.2 for incidents involving the public and Table 5.4 for incidents involving network workers and accredited service providers.

Reporting and analysis of these incidents is the key to the prevention of accidents by timely and appropriately targeted education, training and job or network redesign, where necessary.

Attachment D: Definitions

D1 Network Safety Context

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

Contestable Service: Means:

any service provided for the connection of customers to the *electricity network*, and
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. Accredited service providers 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 Accredited Service Providers.

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

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
ZN263:PA35 37GHJ	DALLEY ST	264	Triplex	Mar-09	0.00	0.00	611.00	0.98	Duration over index	Performance Corrected
ZN263:PA33 34KLM	DALLEY ST	1039	Triplex	Sep-09	21.12	0.50	105.81	1.89	Duration over index	Performance Corrected
ZN3288:PA45 46KLM	CITY SOUTH	498	Triplex	Mar-10	0.00	0.00	837.34	0.97	Duration over index	Performance Corrected
ZN781:PA14ABC	CITY NORTH	159	Triplex	Jun-10	0.00	0.00	322.53	0.49	Duration over index	Performance Corrected
ZN781:PA13DEF	CITY NORTH	357	Triplex	Dec-10	0.00	0.00	100.52	0.47	Duration over index	Performance Corrected
ZN263:PA35 37ABC	DALLEY ST	456	Triplex	Mar-11	72.31	1.96	73.14	1.97	Frequency over index	Monitor

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	Feeder Performance Investigation Results	Anticipated Completion date
ZN15004:PA 1	NEWPORT	1621	5	Jun-07	459.28	7.81	506.32	8.73	Duration over index	Monitor		
ZN9037:PA2	MIRANDA	1597	9	Dec-07	493.27	4.66	325.62	4.00	Duration over index	Vegetation Report issued	Significant portion of this feeder is being undergrounded.	Dec-11
ZN7900:PA3	CAMPBELL ST	116	1	Mar-08	15.72	0.02	625.76	1.03	Duration over index	Performance Corrected		
ZN80:PA32	CHATSWOOD	2913	11	Dec-08	286.77	4.18	372.76	4.06	Duration over index	Reliability project completed.		
ZN15002:PA 6	NARRABEEN	1605	12	Mar-09	501.26	7.28	432.83	3.08	Duration over index	Monitor	S/T outages	
ZN15011:PA 10	BEACON HILL	1392	11	Jun-09	37.36	1.01	446.09	4.87	Duration over index	Performance Corrected		
ZN15001:PA 16	BROOKVALE	561	4	Dec-09	86.31	1.08	296.63	6.06	Frequency over index	Performance Corrected		
ZN15001:PA 18	BROOKVALE	1879	6	Dec-09	130.91	2.04	352.96	6.14	Duration over index	Performance Corrected		
218:7482	CHARLESTOWN 33	1633	12	Dec-09	23.17	0.09	87.83	4.10	Frequency over index	Performance Corrected		
ZN847:PA2	HORNSBY	1477	10	Dec-09	153.97	2.17	338.10	4.51	Frequency over index	Performance Corrected		
ZN1850:PA3	BASS HILL	1000	10	Mar-10	161.58	1.97	421.58	5.98	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	Feeder Performance Investigation Results	Anticipated Completion date
ZN15001:PA13	BROOKVALE	109	2	Mar-10	79.40	2.44	99.65	5.90	Frequency over index	Performance Corrected		
ZN3155:PA18	DOUBLE BAY	439	1	Mar-10	4.29	0.01	485.83	0.64	Duration over index	Performance Corrected		
ZN847:PA18	HORNSBY	1571	16	Mar-10	516.13	4.13	350.81	3.13	Duration over index	Capital Project issued to correct performance issues. Vegetation work complete.	Long gully crossings and vegetation issues.	Dec-11
ZN12650:PA3	WEST GOSFORD	1193	6	Mar-10	87.34	1.02	365.83	4.28	Duration over index	Performance Corrected		
ZN12650:PA8	WEST GOSFORD	170	3	Mar-10	0.00	0.00	381.02	2.79	Duration over index	Performance Corrected		
207:1752	ADAMSTOWN 33	1685	10	Jun-10	0.00	0.00	183.88	4.10	Frequency over index	Feeder no longer exists	Will not be included in future reports	
ZN12600:PA3	LISAROW	1399	10	Jun-10	152.74	2.06	146.92	4.99	Frequency over index	Performance Corrected		
ZN15010:PA1	CAREEL BAY	1387	9	Sep-10	427.37	6.00	249.68	5.04	Frequency over index	Monitor	Subtransmission outages	
ZN15010:PA11	CAREEL BAY	470	4	Sep-10	441.65	6.12	256.42	5.00	Frequency over index	Monitor	Subtransmission outages	
ZN15010:PA5	CAREEL BAY	868	5	Sep-10	469.16	6.15	284.21	5.11	Frequency over index	Monitor	Subtransmission outages	
ZN15010:PA7	CAREEL BAY	1937	7	Sep-10	588.06	7.08	301.20	5.14	Frequency over index	Monitor	Subtransmission outages	

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	Feeder Performance Investigation Results	Anticipated Completion date
ZN5868:PA3	GORE HILL	9	1	Sep-10	59.68	0.69	568.33	2.22	Duration over index	Performance Corrected		
ZN12600:PA 9	LISAROW	1655	13	Sep-10	217.78	2.78	286.45	5.00	Frequency over index	Performance Corrected		
ZN15004:PA 3	NEWPORT	1557	7	Sep-10	415.63	7.19	197.53	4.99	Frequency over index	Monitor	Subtransmission system has been inspected and minor issues fixed.	
ZN15004:PA 5	NEWPORT	1432	12	Sep-10	426.89	7.17	202.98	5.04	Frequency over index	Monitor	Subtransmission system has been inspected and minor issues fixed.	
ZN15004:PA 9	NEWPORT	2610	10	Sep-10	514.87	8.00	266.33	5.53	Frequency over index	Monitor	Subtransmission system has been inspected and minor issues fixed.	
ZN12620:PA 10	NORAVILLE	1079	11	Sep-10	509.84	5.04	424.42	4.11	Duration over index	Monitor	3 Subtransmission faults while system in radial for maintenance - now complete.	
ZN12620:PA 13	NORAVILLE	411	6	Sep-10	395.04	3.01	396.67	4.00	Duration over index	Monitor	3 Subtransmission faults while system in radial for maintenance - now complete.	

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	Feeder Performance Investigation Results	Anticipated Completion date
ZN12620:PA 3	NORAVILLE	1050	5	Sep-10	532.52	5.34	483.51	4.07	Duration over index	Monitor	3 Subtransmission faults while system in radial for maintenance - now complete.	
ZN12620:PA 7	NORAVILLE	2102	9	Sep-10	523.95	4.05	475.61	4.03	Duration over index	Monitor	3 Subtransmission faults while system in radial for maintenance - now complete.	
ZN2473:PA3 4	NORTH SYDNEY	169	1	Sep-10	508.66	1.65	526.72	1.70	Duration over index	Monitor	2 unrelated Transformer failures, one of which tripped the CB.	
ZN3154:PA1 1	ST IVES	721	7	Sep-10	0.24	0.00	339.30	4.00	Frequency over index	Performance Corrected		
ZN12650:PA 14	WEST GOSFORD	472	7	Sep-10	75.53	0.99	293.37	4.69	Frequency over index	Performance Corrected		
ZN10999:PA 4	KOGARAH	1949	8	Sep-10	259.76	2.92	401.36	4.04	Duration over index	Performance Corrected		
ZN15010:PA 12	CAREEL BAY	88	0.1	Sep-10	421.14	6.00	247.57	4.98	Frequency over index	Monitor	Subtransmission outages	
ZN35800:PA 2	BANKSTOWN	212	3	Dec-10	186.82	4.27	233.51	4.75	Frequency over index	Monitor	Feeder investigated.	
ZN35800:PA 7	BANKSTOWN	11	1	Dec-10	202.32	1.96	393.91	4.09	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	Feeder Performance Investigation Results	Anticipated Completion date
ZN12690:PA7	BERKELEY VALE	697	15	Dec-10	610.59	6.37	736.84	7.66	Duration over index	Reliability Project and vegetation report issued.		Jun-12
ZN874:PA15	CONCORD	561	3	Dec-10	496.14	0.76	400.47	0.44	Duration over index	Monitor	Feeder investigated.	
ZN874:PA9	CONCORD	300	3	Dec-10	314.84	0.34	621.08	0.68	Duration over index	Performance Corrected		
ZN15006:PA13	DEE WHY WEST	1340	7	Dec-10	112.57	2.98	234.89	4.83	Frequency over index	Performance Corrected		
ZN3922:PA11	DRUMMOYNE	1529	12	Dec-10	262.72	3.62	453.39	6.12	Duration over index	Performance Corrected		
ZN3922:PA7	DRUMMOYNE	1871	6	Dec-10	251.85	4.10	221.46	4.04	Frequency over index	Monitor	Feeder investigated.	
503:48078	EAST MAITLAND 33	1578	9	Dec-10	148.73	1.15	347.44	4.14	Frequency over index	Performance Corrected		
ZN129:PA8	HUNTERS HILL	1369	8	Dec-10	520.55	4.84	391.85	3.74	Duration over index	Monitor	Feeder investigated.	
ZN12590:PA3	LAKE MUNMORAH	1491	15	Dec-10	609.02	4.77	360.78	3.78	Duration over index	Monitor	Feeder inspected. Vegetation management completed.	
ZN12600:PA11	LISAROW	847	7	Dec-10	239.13	2.11	248.31	4.15	Frequency over index	Performance Corrected		
ZN15014:PA19	MONA VALE	1974	11	Dec-10	498.57	6.15	724.34	9.24	Duration over index	Monitor	Subtransmission outages	

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	Feeder Performance Investigation Results	Anticipated Completion date
ZN1114:PA10	NORTH RYDE	1647	8	Dec-10	437.37	6.28	281.14	4.83	Frequency over index	Monitor	Feeder investigated.	
ZN269:PA7	WAVERLEY	1333	4	Dec-10	295.19	0.79	377.80	0.91	Duration over index	Performance Corrected		
ZN12650:PA10	WEST GOSFORD	661	4	Dec-10	54.03	1.06	389.70	3.98	Duration over index	Performance Corrected		
ZN12650:PA17	WEST GOSFORD	2336	15	Dec-10	83.23	2.43	174.40	4.52	Frequency over index	Performance Corrected		
ZN12650:PA6	WEST GOSFORD	1795	19	Dec-10	533.83	7.86	250.21	4.49	Frequency over index	Reliability Project issued. Vegetation report issued.	Feeder investigated.	Dec-11
ZN12570:PA19	AVOCA	875	9	Mar-11	441.03	4.75	350.60	3.62	Duration over index	Monitor	Feeder investigated.	
ZN12570:PA9	AVOCA	1756	10	Mar-11	420.37	5.42	421.31	5.43	Duration over index	Monitor	Feeder investigated.	
203:8082	CARRINGTON 33	24	2	Mar-11	380.00	1.16	395.83	1.21	Duration over index	Monitor	Feeder investigated.	
203:8084	CARRINGTON 33	1386	9	Mar-11	456.98	3.11	459.13	3.13	Duration over index	Monitor	Feeder investigated.	
ZN3425:PA30	CASTLE COVE	1973	12	Mar-11	589.36	6.86	537.55	4.98	Duration over index	Feeder inspected, vegetation report issued	Vegetation management required	

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	Feeder Performance Investigation Results	Anticipated Completion date
ZN847:PA1	HORNSBY	1202	11	Mar-11	628.17	8.59	555.04	7.07	Duration over index	Feeder inspected, reliability project issued.		Apr-12
ZN15009:PA 7	MANLY	1603	4	Mar-11	351.55	3.05	372.83	3.16	Duration over index	Feeder inspected, vegetation report issued	Vegetation management required	
ZN15014:PA 11	MONA VALE	1286	7	Mar-11	312.09	3.68	366.03	5.33	Duration over index	Performance Corrected		
ZN15014:PA 14	MONA VALE	827	13	Mar-11	481.82	5.17	434.40	4.83	Duration over index	Monitor	Subtransmission outages	
ZN15014:PA 5	MONA VALE	1216	8	Mar-11	226.54	2.99	240.85	4.05	Frequency over index	Performance Corrected		
ZN15014:PA 16	MONA VALE	1576	6	Mar-11	166.22	1.97	490.49	5.73	Duration over index	Performance Corrected		
ZN15014:PA 22	MONA VALE	858	6	Mar-11	434.98	4.61	419.49	4.57	Duration over index	Monitor	Subtransmission outages	
ZN10994:PA 48	MORTDALE	2025	8	Mar-11	697.55	7.75	622.14	5.74	Duration over index	Monitor	Feeder inspected. Vegetation management completed.	
ZN15002:PA 2	NARRABEEN	1200	11	Mar-11	217.72	4.28	334.45	5.28	Frequency over index	Monitor	Subtransmission outages	
ZN15002:PA 4	NARRABEEN	701	4	Mar-11	250.80	4.94	368.23	5.96	Duration over index	Monitor	Subtransmission outages	
ZN15002:PA 8	NARRABEEN	799	5	Mar-11	200.52	4.10	311.61	4.99	Frequency over index	Monitor	Subtransmission outages	

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	Feeder Performance Investigation Results	Anticipated Completion date
ZN15002:PA9	NARRABEEN	15	0.1	Mar-11	186.00	4.00	303.00	5.00	Frequency over index	Monitor	Subtransmission outages	
ZN1114:PA21	NORTH RYDE	52	5	Mar-11	833.34	3.57	849.37	3.63	Duration over index	Monitor	Feeder investigated.	
ZN965:PA21	PENNANT HILLS	664	5	Mar-11	401.43	2.76	433.04	2.67	Duration over index	Feeder inspected, vegetation report issued	Vegetation management required	Dec-11
523:33509	SINGLETON NORTH 66	455	5	Mar-11	327.43	3.43	368.86	3.62	Duration over index	Performance Corrected		
ZN3154:PA5	ST IVES	1121	8	Mar-11	248.93	3.23	372.12	4.10	Duration over index	Performance Corrected		
235:2121	TARRO 33	22	5	Mar-11	218.09	1.00	542.09	2.00	Duration over index	Performance Corrected		
235:2728	TARRO 33	463	4	Mar-11	221.03	0.65	538.67	1.63	Duration over index	Performance Corrected		
ZN14144:PA2	WAMBERAL	334	3	Mar-11	153.05	2.40	457.35	7.12	Duration over index	Performance Corrected		
ZN15005:PA6	BELROSE	1377	11	Jun-11	384.62	5.47	384.62	5.47	Duration over index	Performance under review		
ZN711:PA16	BLACKWATTLE BAY	298	2	Jun-11	683.24	0.71	683.24	0.71	Duration over index	Performance under review		
ZN384:PA37	CAMPERDOWN	192	1	Jun-11	1065.97	0.88	1065.97	0.88	Duration over index	Performance under review		
ZN3155:PA30	DOUBLE BAY	193	2	Jun-11	366.76	1.08	366.76	1.08	Duration over index	Performance under review		

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	Feeder Performance Investigation Results	Anticipated Completion date
ZN1648:PA1 1	ENFIELD	471	3	Jun-11	230.98	4.12	230.98	4.12	Frequency over index	Performance under review		
ZN129:PA19	HUNTERS HILL	1447	7	Jun-11	381.75	3.06	381.75	3.06	Duration over index	Performance under review		
ZN1193:PA1	LINDFIELD	1546	11	Jun-11	255.65	4.14	255.65	4.14	Frequency over index	Performance under review		
ZN15014:PA 12	MONA VALE	1804	20	Jun-11	385.46	2.79	385.46	2.79	Duration over index	Performance under review		
232:11457	NELSON BAY 33	2250	17	Jun-11	557.02	3.85	557.02	3.85	Duration over index	Performance under review		
ZN12620:PA 2	NORAVILLE	499	6	Jun-11	355.57	2.72	355.57	2.72	Duration over index	Performance under review		
ZN14143:PA 6	SOMERSBY	21	7	Jun-11	382.26	4.43	382.26	4.43	Duration 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	Feeder Performance Investigation Results	Anticipated Completion date
ZN12630:PA2	PEATS RIDGE	570	74	Jun-07	1212.79	6.40	2236.0	11.32	Duration over index	Project in construction	Project has been delayed	Jun-12
ZN12690:PA16	BERKELEY VALE	369	18	Mar-10	250.55	3.00	1294.91	11.78	Duration over index	Performance Corrected		
512:48049	BRANXTON 66	626	169	Mar-10	284.75	2.03	1035.08	2.99	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	Feeder Performance Investigation Results	Anticipated Completion date
ZN12630:PA1	PEATS RIDGE	95	16	Dec-10	1106.70	4.43	1252.39	6.12	Duration over index	Reliability Project Issued		Dec-11
ZN12630:PA5	PEATS RIDGE	288	32	Dec-10	1720.92	7.37	1103.07	7.53	Duration over index	Reliability Project Issued		Dec-11
ZN14143:PA17	SOMERSBY	753	69	Mar-11	1573.43	6.04	1587.3	6.38	Duration over index	Reliability Project being developed	Feeder inspected, vegetation report issued	
ZN15013:PA6	TERREY HILLS	220	9	Mar-11	902.81	8.24	1004.6	8.75	Duration over index	Reliability Project being developed	Feeder inspected, vegetation report issued	
ZN12590:PA6	LAKE MUNMORAH	1340	19.6	Jun-11	1081.88	7.46	1081.9	7.46	Duration over index	Performance under review		
516:48065	LEMINGTON 66	48	32.0	Jun-11	1136.85	6.31	1136.9	6.31	Duration over index	Performance under review		
231:8415	SALT ASH 33	824	42.2	Jun-11	1036.49	6.72	1036.5	6.72	Duration over index	Performance under review		
ZN14891:PA12	WYONG	697	72.4	Jun-11	1646.24	6.85	1646.2	6.85	Duration over index	Performance under review		

Long Rural Feeder Category

None.

Attachment F: Sub-transmission Lines and Substations and Zone substations

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Rose Bay 33/11kV Zone	Forecast to be non compliant in Winter 2011 under N-1 conditions	Addressed by new Rose Bay 132/11kV zone
Port Hacking 132/33kV STS	Forecast to be non compliant in Winter 2011 under N-1 conditions	Relieved by establishment of Engadine and Gwawley Bay 132/11kV zones
Enfield 33/11kV zone	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N-1 conditions	Transfer load at 11kV to Campsie zone initially and in long term by converting Enfield to 132/11kV zone
Homebush 132/33kV STS	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Installation of 3rd transformer at Homebush STS
Lidcombe 33/11kV zone	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	New SOPA 132/11kV zone will add extra capacity in the area enabling 11kV load transfers
Dee Why West 33/11kV zone	Forecast to be non compliant in Winter 2011 under N-1 conditions	Transfer load at 11kV to Beacon Hill
Killarney 33/11kV zone	Forecast to be non compliant in Winter 2011 under N-1 conditions	Replacement of 33kV switchgear at Killarney zone
North Head 33/11kV zone	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N-1 conditions	Replacement of 33kV switchgear at North Head zone
Careel Bay 33/11kV zone	Forecast to be non compliant in Winter 2011 under N-1 conditions	Replacement of 11kV switchgear at Careel Bay zone
Newport 33/11kV zone	Forecast to be non compliant in Winter 2011 under N-1 conditions	Installation of 2nd CLC and splitting 11kV busbar at Newport zone
Lindfield 33/11kV zone	Forecast to be non compliant in Winter 2011 under N-1 conditions	Replacement of 33kV feeders to Lindfield zone
Tomago 132/33kV STS	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	New indoor 33kV switchboard

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Rathmines Temporary 132/11kV zone	Forecast to be non compliant in Summer 2010/11 under N conditions	Conversion to permanent 2-transformer 132/11kV zone and N-1 supply
East Maitland 33/11kV zone	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Replaced by new Metford 33/11kV zone
Telarah 33/11kV zone	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Transfer load at 11kV to Rutherford zone and new Maitland zone
66kV feeder 819 (2) (819 Tee To Hunters Hill)	Forecast to be non compliant in Summer 2010/11 under N conditions	FDR 819(2) constraint addressed by load transfer at 11kV to Top Ryde zone.
33kV feeder 645 (Canterbury To Dulwich Hill T3)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 645 constraint addressed by load transfer at 11kV from Dulwich Hill to Marrickville
33kV feeder 639 (Canterbury To Enfield T1)	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N conditions	Feeder 639 constraint addressed by load transfer at 11kV from Enfield to Campsie
33kV feeder 640 (Canterbury To Enfield T2)	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N-1 conditions	Feeder 640 constraint addressed by load transfer at 11kV from Enfield to Campsie
33kV feeder 641 (Canterbury To Enfield T3)	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N conditions	Feeder 641 constraint addressed by load transfer at 11kV from Enfield to Campsie
33kV feeder 775 (Peakhurst to Rockdale)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 775 constraint addressed by load transfer at 11kV from Rockdale to Kogarah
33kV feeder 462 (Surry Hill to Camperdown Tx3)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 462 constraint addressed by conversion of Camperdown to 33/11kV zone and replacement of 33kV feeders.
33kV feeder 346 (Bunnerong North To Botany T1)	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N-1 conditions	Feeder 346 constraint addressed by load transfer from Botany to Matraville zone
33kV feeder 360 (Bunnerong North to Mascot Tx6)	Forecast to be non compliant in Summer 2010/11 under N conditions	Feeder 360 constraint to be addressed by balancing the load between the transformers and ultimately refurbishment of Mascot zone due to condition

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
		issues
33kV feeder 383 (Surry Hills STS To Surry Hills Tx1)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 383 constraint addressed by balancing the loads between the transformers at Surry Hills zone
33kV feeder 396 (1) (Surry Hills STS to Paddington)	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N-1 conditions	Feeder 396 constraint addressed by load transfer from Rose Bay to Waverley zone and ultimately converting Rose Bay to 132/11kV zone
33kV feeder 396 (2) (Paddington to Waverley)	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N-1 conditions	Feeder 396 constraint addressed by load transfer from Rose Bay to Waverley zone and ultimately converting Rose Bay to 132/11kV zone
33kV feeder 478 (Waverley To Rose Bay T1)	Forecast to be non compliant in Summer 2010/11 and Winter 2011 under N-1 conditions	Feeder 396 constraint addressed by load transfer from Rose Bay to Waverley zone and ultimately converting Rose Bay to 132/11kV zone
33kV feeder 612 (Homebush To Five Dock T1)	Forecast to be non compliant in Winter 2011 under N-1 conditions	Feeder 612 constraint addressed by load transfer at 11kV to New Croydon zone
33kV feeder 602 (Homebush Sts-Lidcombe)	Forecast to be non compliant in Summer 2010/11 under N conditions	Feeder 602 constraint addressed by load transfer at 11kV to New SOPA zone via Flemington zone
33kV feeder 604 (Homebush Sts-Lidcombe)	Forecast to be non compliant in Summer 2010/11 under N conditions	Feeder 602 constraint addressed by load transfer at 11kV to New SOPA zone via Flemington zone
33kV feeder 605 (Homebush Sts-Lidcombe)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 602 constraint addressed by load transfer at 11kV to New SOPA zone via Flemington zone
33kV feeder 606 (Homebush STS-Concord)	Forecast to be non compliant in Summer 2010/11 under N conditions	Feeder 606 constraint addressed by load transfer at 11kV from Concord to Homebush Bay zone
33kV feeder 607 (Homebush STS-Concord)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 607 constraint addressed by load transfer at 11kV from Concord to Homebush Bay zone
33kV feeder 614 (Homebush STS-Auburn)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 614 constraint addressed by load transfer at 11kV from Auburn to Homebush Bay and replacement of UG feeders at Auburn zone
33kV feeder 567 (Willoughby STS to North Sydney zone Tx3)	Forecast to be non compliant in Summer 2010/11 under N conditions	Feeder 567 constraint addressed by conversion of North Sydney to 132/11kV operation

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
33kV feeder 566 (Willoughby STS to North Sydney zone Tx2)	Forecast to be non compliant in Summer 2010/11 under N conditions	Feeder 566 constraint addressed by conversion of North Sydney to 132/11kV operation
33kV feeder 557 (Willoughby STS to North Sydney zone Tx1)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 557 constraint addressed by conversion of North Sydney to 132/11kV operation
33kV feeder 574 (Willoughby To Gore Hill Tx 4)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 571 and 574 overload resolved by balancing load within zone transformers and load transfer to RNSH Zone
33kV feeder 571 (Willoughby To Gore Hill Tx 1)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 571 and 574 overload resolved by balancing load within zone transformers and load transfer to RNSH Zone
33kV feeder 565 (Willoughby STS to Crows Nest Tx2)	Forecast to be non compliant in Winter 2011 under N conditions	Feeder 565 constraint addressed by conversion of Crows Nest to 132/11kV zone
33kV feeder 562 (Willoughby STS to Crows Nest Tx1)	Forecast to be non compliant in Winter 2011 under N-1 conditions	Feeder 562 constraint addressed by conversion of Crows Nest to 132/11kV zone
33kV feeder 730 (Port Hacking-Jannali)	Forecast to be non compliant in Winter 2011 under N-1 conditions	Feeder 730 constraint addressed by uprating the limiting feeder UG section
33kV feeder 534 (Kuringai To Lindfield Tx 1)	Forecast to be non compliant in Winter 2011 under N and N-1 conditions	Feeder 534, 535, 536/1 and 536/2 constraint addressed by 33kV cable replacement
33kV feeder 535 (Kuringai To Lindfield Tx 2)	Forecast to be non compliant in Winter 2011 under N-1 conditions	Feeder 534, 535, 536/1 and 536/2 constraint addressed by 33kV cable replacement
33kV feeder 536/1 (Kuringai To Gordon SRA)	Forecast to be non compliant in Winter 2011 under N and N-1 conditions	Feeder 534, 535, 536/1 and 536/2 constraint addressed by 33kV cable replacement
33kV feeder 536/2 (Gordon SRA To Lindfield Tx3)	Forecast to be non compliant in Winter 2011 under N and N-1 conditions	Feeder 534, 535, 536/1 and 536/2 constraint addressed by 33kV cable replacement
33kV feeder 744/1 (Munmorah BSP - 744tee Noraville/Lake Monmorah/Vales Point)	Forecast to be non compliant in Winter 2011 under N-1 conditions	Feeder 744/1 constraint addressed by conversion of Lake Munmorah to 132/11kV zone
33kV feeder KU1 (Kurri STS - Cessnock zone)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder KU1 constraint addressed by load transfers at 11kV from Cessnock to Nulkaba zone

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
33kV feeder 34099 (Thornton - Wallalong)	Forecast to be non compliant in Summer 2010/11 under N conditions	Feeder 34099 constraint addressed by transfer of load at 11kV from Wallalong to Brandy Hill 132/11kV zone substation
33kV feeder 3061 (Broadmeadow - New Lambton zones)	Forecast to be non compliant in Summer 2010/11 under N-1 conditions	Feeder 3061 constraint addressed by transfer of load at 11kV to proposed Broadmeadow 132/11kV substation
33kV feeder S06 (Warringah STS-Dee Why West)	Forecast to be non compliant in Winter 2011 under N-1 conditions	Feeder S06 constraint addressed by load transfer at 11kV from Dee Why West to Beacon Hill zone

3. 2011/12 Ausgrid Network Performance Report

Electricity Network Performance Report

2011/12

Electricity Network Performance Report

Contents

Introduction

This report represents Ausgrid's Electricity Network Performance Report for the 2011/12 financial year. The report has been prepared in accordance with the Electricity Supply (Safety and Network Management) Regulation 2008 and follows the outline provided by the NSW Department of Trade and Investment, Regional Infrastructure and Services. The report is designed to report actual performance in the 2011/12 financial year, against the criteria and key performance indicators established in the Network Management Plan. This report therefore complements the Plan and details Ausgrid's performance with respect to:

- Network Management
- Network Planning
- Asset Management
- Network Safety
- Customer Installations
- Accredited Service Provider Scheme
- Bushfire Risk Management
- Public Electrical Safety Awareness
- Compliance with the NSW Maritime electricity industry code 'Crossings of NSW Navigable Waters'.

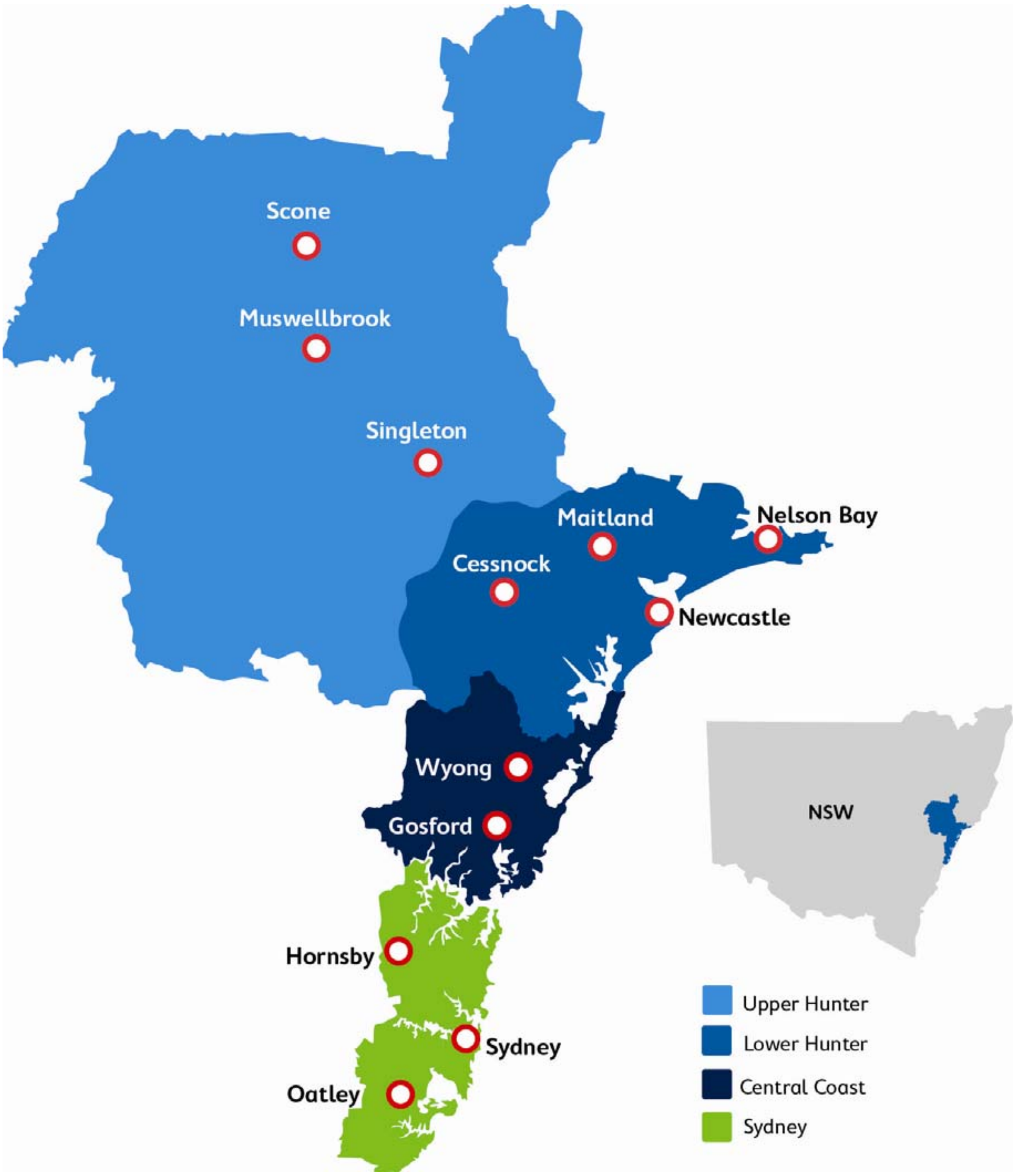
1 Profile

1.1 Overview

Ausgrid's distribution network covers 22,275 square kilometres from Waterfall in Sydney's south to Auburn in western Sydney and the upper Hunter Valley in the north. Ausgrid supplies electricity to 1.6 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, 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 street lighting, customer connections, safety check ups, energy reviews, metering and 24 hour electrical repairs.

Ausgrid's distribution network includes:

- A subtransmission system of 33kV, 66 kV and 132 kV assets
- A high voltage distribution system of 5kV, 11kV and 22kV assets
- A low voltage distribution system of 240V and 415V assets
- Over 49,000km of overhead lines and underground cables.

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 2010/11	Number at end of 2011/12
Distribution Customer Numbers (Total)	1,619,988	1,636,986
Distribution Customer Numbers – Sydney East Region	320,550	323,144
Distribution Customer Numbers – Sydney South Region	476,451	481,842
Distribution Customer Numbers – Sydney North Region	385,774	388,279
Distribution Customer Numbers – Newcastle Region	198,784	201,606
Distribution Customer Numbers – Central Coast Region	157,873	159,549
Distribution Customer Numbers – Lower Hunter Region	51,512	52,988
Distribution Customer Numbers – Upper Hunter Region	29,044	29,578
Maximum Demand (Aggregated System MW)	6,072	5,149
Feeder Numbers CBD	168	56[1]
Feeder Numbers Urban	1,739	1,751
Feeder Numbers Short Rural	261	293
Feeder Numbers Long Rural	4	4
Energy Received by Dist Network to Year End (GWh)	31,816	30,474
Energy Distributed to Year End (Residential) (GWh)	9,538	8,777
Energy Distributed to Year End (Non-Residential Including un-metered supplies) (GWh)	21,153	20,499
Energy Distributed to Year End (GWh)	30,691	29,276
System Loss Factor (%)	3.54%	3.93%
Transmission System (km)	962	1,024

	Number at end of 2010/11	Number at end of 2011/12
Transmission Substation (Number)	43	42
Sub-Transmission System (km)	3,662	3,624
Substation - Zone (Number)	187	188
Substation - Distribution (Number)	30,551	30,860
High Voltage Overhead (km)	10,195	10,159
High Voltage Underground (km)	7,384	7,634
Low Voltage Overhead (km)	20,834	13,642[2]
Low Voltage Underground (km)	6,673	5,494[2]
Pole (Number)	506,101	506,517
Streetlights (Number)	251,298	252,955
Employees (Full Time Equivalent Number)	5941	5869
Contractors (Full Time Equivalent Number)	792	856

Notes: Distances for overhead and underground lines are circuit km.

System Loss Factor (%), being the difference between electricity received by the distribution network and electricity received by customers (including un-metered supplies) divided by electricity received by the distribution network (allowing for embedded generation), expressed as a percentage.

[1] The count of CBD feeders for reliability purposes is the count of triplex system feeders and not x3 (which counts the 3 "legs" of the triplex feeder system.) The count of triplex feeder "legs" has been included in previous years but has been amended this year to align with current reliability reporting formats.

[2] LV Overhead and Underground Mains have removed Streetlighting mains from the totals in the 11/12 figures.

1.2 Capital works program

Ausgrid invested about $1.6 billion in the electricity network during 2011/12. A 12-month snapshot of completed works and maintenance across the electricity network is available on Ausgrid's website, www.ausgrid.com.au.

Network investment included $686 million on major substation projects and the installation of more than 338km of high-voltage cables to connect these substations. There were also more than 529km of below and above ground low-voltage cables commissioned to distribute power from substations to the street-level network.

During 2011/12, six major zone substation projects were commissioned including the Top Ryde, Wamberal, Raymond Terrace, Balgowlah North, Tomago and Royal North Shore Hospital substations.

Table 1.2 Capital works program trend

	Previous Years		Current Year
Year	**2009/10**	**2010/11**	**2011/12**
Capital works program ($M)	1,291.4[1]	1,523.9[1]	1,632.0

[1] In the 2010-11 Electricity Network Performance Report the amounts reported in this table included all capital expenditure by Ausgrid. This year they have been corrected to include only capital expenditure on the network (Network Line of Business).

2 Network Management

2.1 Overview

In line with the Electricity Supply (Safety and Network Management) Regulation 2008, Ausgrid is required to prepare, implement and publish a Network Management Plan. The Plan is available at www.ausgrid.com.au.

The Plan contains high level design, construction, operation and maintenance principles to manage network assets. It also incorporates principles applied to asset utilisation in the areas of safety, reliability, quality of supply and risk management. The Plan has four chapters which are outlined below.

Chapter 1: Network Safety and Reliability – sets out a framework for Ausgrid's network to provide a safe and reliable, supply of electricity. This chapter details how Ausgrid:

- manages its assets and sets out the basis for network investment
- plans investments
- provides reference to standards and protocols
- identifies areas of the network that require development.

Ausgrid's network planning meets legislative, license compliance and regulatory requirements and wider organisational objectives and business responsibilities. These include meeting customer expectations for a safe and reliable supply of electricity; managing safety, environmental and security risks associated with network infrastructure; and managing the financial performance of the business.

To deliver these objectives, the Network Management Plan focuses on:

1. Maintaining compliant infrastructure

The management of safety, environmental and infrastructure security risk. The environmental, safety and asset security obligations applicable to the network and services Ausgrid provides as a distributor are taken into account to develop Ausgrid's network management strategies.

2. Network performance

Overall network performance is impacted by performance of individual assets, growth in demand, the number of new customer connections required and the extent of any imbalance between overall growth in demand for electricity and available supply.

In meeting these two primary objectives Ausgrid targets its investment expenditure to ensure network performance and compliance outcomes are achieved efficiently and prudently along with all regulatory and other obligations.

While the network performance and customer outcomes associated with the planning processes are stipulated in the Design, Reliability and Performance Licence Conditions, fault level management is not included in this document. The term fault level relates to how much energy can potentially be released during various fault scenarios - and this parameter varies across the network. Ensuring the fault rating of network assets is not exceeded is a significant asset integrity and safety issue, in addition to customer outcomes associated with faults. Management of fault levels is a critical element of the planning process and is an investment driver.

During 2011/12 managing Ausgrid's library of network standards involved issuing three new standards and modifying a further 32 existing standards. Major technical disciplines covered in 2011/12 included teleprotection signalling, earthing, NBN construction and civil standards for major substations.

All network standards are displayed on an intranet platform for general access across Ausgrid and publicly available standards are also published on the Ausgrid website.

Chapter 2: Customer Installation Safety – addresses the management of safety in customer premises to the point of connection between the customer's electrical installation and the Ausgrid network.

Each year work is undertaken on electrical installations at thousands of customer properties throughout our distribution area. Ausgrid has responsibility for maintaining the distribution network, including the poles and wires required for 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 (contractor).

Customers need to employ licensed electrical contractors for any new or modified electrical work. Accredited Service Providers (ASP) connecting customer installations to our electricity network need to be authorised by Ausgrid.

In preparation of the Customer Installation Safety Plan we have taken into account the NSW Codes of Practice: Service and Installation Rules and the Installation Safety Management Code of Practice. There are no departures from these Codes, unless to adopt a higher safety standard. As required we also advise that customers operating electrical installations are subject to the requirements of the Service and Installation Rules of NSW and Ausgrid's local requirements. Issues, initiatives and achievements relating to Ausgrid's customer installations during 2011/12 are outlined in **chapter six** of this Electricity Network Performance Report.

Chapter 3: Public Electrical Safety Awareness – aims to warn the public of hazards associated with electricity, particularly in relation to our network. It is based on an assessment of risks associated with the system and an analysis of any accidents or incidents. Ausgrid's approach to public safety focuses on:

- risk assessment and risk reduction
- education and communication
- hazard response and procedures.

The Public Electrical Safety Awareness Plan outlines Ausgrid's commitment to safety and our responsibilities under the Electricity Supply (Safety and Network Management) Regulation 2008. The plan details:

- Ausgrid's approach to safety and potential hazards associated with the transmission and distribution of electricity
- how "at risk" groups are identified
- precautions to avoid electrical incidents.

Programs are designed to create greater awareness of electrical safety amongst the general public and targeted groups, based on an analysis of safety incidents involving Ausgrid's network and relevant data sources.

To communicate our safety message, we use a number of communication tools and media to reach the at risk groups including TV, radio and print advertisements, education kits, personal presentations, bill inserts, printed material and the web. A range of safety initiatives and programs undertaken over the past year are outlined in **chapter nine** of this report.

Chapter 4: Bushfire Risk Management – describes a management framework that when correctly implemented will:

- ensure public safety
- establish standards for vegetation management near electricity lines (particularly in bushfire prone areas)

- reduce interruptions to supply that are related to vegetation
- minimise the possibility of fire ignition by electricity lines and associated equipment.

Ausgrid has an obligation to manage bushfire risks as they relate to our network. We do this by ensuring our assets are safe and are properly designed, constructed and maintained. We also provide information to owners of private powerlines and our customers, describing the obligations associated with private powerlines, so that they can do the same. This chapter outlines the procedures, standards, codes and guidelines Ausgrid applies to construction, operation and management of our network to achieve these objectives. It also provides an overview of Ausgrid's bushfire risk management strategies in relation to key stakeholders including:

- landowners and occupiers
- local government
- government agencies
- emergency services.

The Bushfire Risk Management Plan also outlines how we inform customers of their obligation to share bushfire prevention responsibilities with us to ensure privately owned overhead powerlines are kept free of vegetation and are inspected, tested and maintained at regular intervals. Details of initiatives undertaken in the last year to improve systems to manage bushfire risk within Ausgrid's network area are outlined in **chapter eight of** this Electricity Network Performance Report.

2.2 Network Complaints

Table 2.1 Complaint Performance Data

	Previous Years				Current Year
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
Complaints Total	1,669	1,409	1,121	1,420	1,471
Complaints per 1,000 Distribution Customers	1.06	0.89	0.70	0.88	0.89
Complaints regarding Vegetation Management	165	126	118	242	146

Table 2.2 Network Complaint Investigations Completed 2011/12

	Number	Number Valid*
Voltage	244	69
Current	2	0
Other Quality	39	13
Reliability	95	31
Safety	1	0

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

2.3 Customer Service Standards Reporting

Table 2.3 Customer Service Standards 2011/12 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	370*	23	10	15
Non-Metropolitan	1	1	0	0

* The number of payments given based on interruption duration was significantly higher last year due to a single serious incident that occurred in Enfield zone substation on 2 February 2011. On that occasion customers experienced interruptions of more that twelve hours in duration.

3 Network Planning

3.1 Overview

Ausgrid carries out planning at the strategic and project level, driven by prudent, strategic decisions which consider the capital investment required and the delivery of individual projects.

Ausgrid's network planning approach is outlined in the Network Management Plan and is consistent with the principles of the NSW Government's Total Asset Management system.

Drivers of investment include asset condition, capacity, reliability, customer connections and ensuring the safety and security of the network.

Ausgrid is required to comply with service standards in the Design, Reliability and Performance licence conditions imposed by the NSW Minister for Energy. The licence conditions facilitate the delivery of a safe and reliable supply of electricity. The AEMC has commenced its review of the level of reliability in NSW which, when complete, may have implications for the future licence conditions.

Ausgrid's Electricity Network Operation Standards detail objectives for maintaining quality electricity supply.

Capital investment requirements in the subtransmission network are forecast in line with investment drivers across 25 network areas. Ausgrid also has three transmission plans: Sydney Metropolitan, Central Coast and Lower Hunter, which focus on the transmission network linking TransGrid's bulk supply points to subtransmission substations.

The spatial demand forecast is a critical process which supports planning, development of the capital program and the regulatory submission. Following two independent audits and a major review, changes to the forecasting process have been made; most significantly a new forecasting application has been developed to provide greater efficiency and accuracy.

3.2 Design Planning Criteria Compliance Reporting

The design planning criteria contained within the licence conditions set input standards to be used in planning the network, requirements for load forecasting and contingency planning methodologies intended to achieve operational outcomes.

The design planning criteria applicable to Ausgrid's network are set out below. The implications of the design planning criteria contained in the licence conditions, and the accompanying notes, are explained in detail in Ausgrid's Network Management Plan.

Design Planning Criteria

Network Element	Load Type	Forecast Demand or Expected Demand	Security Standard	Customer Interruption Time
Sub-transmission Line	CBD	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	≥ 10 MVA	N-1[1]	< 1 minute
	Urban & Non-Urban	< 10 MVA	N[2]	Best practice repair time

Network Element	Load Type	Forecast Demand or Expected Demand	Security Standard	Customer Interruption Time
Sub-transmission Substation	CBD	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	Any	N-1	< 1 minute
Zone Substation	CBD	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	≥ 10 MVA	N-1[1]	< 1 minute
	Urban & Non-Urban	< 10 MVA	N[2]	Best practice repair time
Distribution Feeder	CBD	Any	N-1[3]	Nil
	Urban	Any	N-1[4]	< 4 Hours[5]
	Non-Urban	Any	N	Best practice repair time
Distribution Substation	CBD[1]	Any	N-1[3]	Nil
	Urban & Non-Urban	Any	N[7]	Best practice repair time

[1] For a *Sub-transmission line – Overhead* and *Zone substation*:

(a) under N-1 conditions, the forecast demand is not to exceed the thermal capacity for more than 1% of the time i.e. a total aggregate time of 88 hours per annum, up to a maximum of 20% above the thermal capacity under N-1 conditions.

(b) under N conditions, a further criterion is that the thermal capacity is required to meet at least 115% of forecast demand.

For a *Sub-transmission line – Underground*, any overhead section may be designed as if it was a *Sub-transmission line – Overhead*, providing the forecast demand does not exceed the thermal capacity of the underground section at any time under N-1 conditions.

[2] Under N conditions, thermal capacity is to be provided for greater than 115% of forecast demand.

[3] The actual security standard is an enhanced N-1. For a second coincident credible contingency on the CBD triplex system, restricted essential load can still be supplied.

[4] By 30 June 2014, expected demand is to be no more than 80% of feeder thermal capacity (under system normal operating conditions) with switchable interconnection to adjacent feeders enabling restoration for an unplanned network element failure. By 30 June 2019, expected demand is to be no more than 75% of feeder thermal capacity. In order to achieve compliance, feeder reinforcement projects may need to be undertaken over more than one regulatory period. In those cases where a number of feeders form an interrelated system (such as a meshed network), the limits apply to the average loading of the feeders within one system.

[5] The timeframe is expected only, and is based on the need to carry out the isolation and restoration switching referred to in note 4. This standard does not apply to interim / staged supplies, i.e. prior to completion of the entire development or to excluded interruptions outside the control of the licence holder.

[6] In the CBD area, N-2 equivalent is achieved by the network being normally configured on the basis of N-1 with no interruption of supply when any one line or item of electrical apparatus within a substation is out of service. The licence holder must plan the CBD network to cater for two credible contingencies involving the loss of multiple lines or items of electrical apparatus within a substation, by being able to restore supply within 1 hour. Restoration may be via alternative arrangements (e.g. 11kV interconnections).

[7] Urban distribution substations shared, or available to be shared, by multiple customers are generally expected to have some level of redundancy for an unplanned contingency (e.g. via low voltage manual interconnection to adjacent substations enabling at least partial restoration).

3.2.1 Design Planning Criteria Compliance Reporting

Ausgrid has a suite of investment plans, covering each of the transmission, sub-transmission, distribution and low voltage areas of the network to ensure that we design our network to accord with the design planning criteria within the timeframes specified in conditions 14.1 and 14.2 of the licence conditions.

3.2.1.1 Transmission/Sub-transmission Planning

To ensure that all drivers are considered in a holistic manner, Ausgrid has developed a set of area plans that encompass all strategic network investment drivers within the transmission and sub-transmission levels of the network. The area plans contain all strategic growth, reliability, customer connection and replacement driver investments within each area.

Ausgrid produces a five-year Network Management Plan and an Annual Electricity System Development Review (AESDR). The Network Management Plan outlines our planned investments by region, and the AESDR shows emerging constraints for each sub-transmission and zone substation. Each emerging constraint is addressed by an indicative solution, and makes up Ausgrid's plan to accord with the design planning criteria.

3.2.1.2 Distribution Network Planning

To meet the distribution design planning criteria within the required timeframe, Ausgrid has adopted the following, multifaceted strategy:

- Where it can be demonstrated to be cost effective, zone and sub-transmission level projects initiated by strategic investment drivers, including demand constraints and asset condition (such as load transfers between zone substations, switchgear replacement, zone transformer commissioning etc) are optimised so that they also mitigate or address any latent distribution constraints in the affected portions of the network.
- Prioritisation of projects is based on considerations such as scope, delivery time, cost, load at risk, and likelihood of the risk.
- Development of proactive feeder non-compliance forecasting, reporting, and prioritisation regime.
- Significant ramping up of the distribution network capital program to a level necessary for licence compliance by 2014.
- A cross-divisional efficiency review of the end-to-end capital project delivery process (from planning conception to project commissioning).

3.2.1.3 Distribution Substation Planning

Ausgrid's licence conditions for distribution substations require N-1 performance (with no customer interruptions in the CBD) and N performance (with best practice repair time) elsewhere in the network. The standard of service provided at customer substations is subject to customer requirements. Ausgrid has set utilisation targets for distribution substations which maintain loading within the cyclic rating. These targets correspond with the requirements of the licence conditions.

Utilisation at some distribution centres is presently above the levels required for licence compliance. Ausgrid has a plan which has identified the resourcing required in the period to 2014 to bring the current network utilisation to the required levels and to account for organic growth in demand over the period.

3.2.1.4 Progress Against Our Plan

Whilst Ausgrid has made progress during 2011/12 against our plan to comply with the licence conditions, we have a significant challenge ahead. Ausgrid has a large program of investments for the 2009-14 period which is driven by the need to systematically replace a large number of ageing network assets as well as the requirement to meet the mandatory licence conditions.

Ausgrid's plan is to meet the Design Planning Criteria by 30 June 2014. The table below outlines our progress during the year towards our plan.

Estimated Percentage Currently Not Meeting the Requirements of Schedule 1

Network Element	June 2012
Sub-transmission – Feeders	4.0%
Sub-transmission – Substations	4.9%
Sub-transmission – Total	**4.2%**
Distribution Feeders – CBD	0.0%
Distribution Feeders – Urban	10.7%*
Distribution Feeders – Non urban	20.0%*
Distribution Feeders – Total	**10.2%***
Distribution Substations – CBD	1.1%
Distribution Substations – Urban and Non Urban	0.8%
Distribution Substations – Total	**0.9%**

* These percentages have increased since June 2011 because Ausgrid has reviewed more of the network and found more non compliant feeders. Ausgrid is reviewing the entire 11kV network progressively over a 2.5 year period; at July 2011, approximately 50% of the 11kV network had been reviewed, and by July 2012, approximately 86% had been reviewed. The full review of Ausgrid's distribution feeder network is proposed to be completed by January 2013. At this time, all Ausgrid feeders which do not comply or are forecast to be non-compliant with the Licence Conditions will be identified, and projects issued to undertake construction works.

3.2.1.5 Network Elements Not Complying with the Design Planning Criteria on 1 July 2012

On 1 July 2010, Ausgrid was required to comply with the Design Planning Criteria for any new network element where planning for that network element commenced after 1 December 2007. Existing elements need to be compliant with the design planning criteria by 1 July 2014.

Whilst all existing network elements are forecast to meet the Design Planning Criteria by 1 July 2014 as required, there are some network elements that currently do not meet the requirements of schedule 1. These network elements and the proposed indicative network solutions will be detailed in the 2011/12 Annual Electricity System Development Review (AESDR) due to be published on the Ausgrid website by the end of 2012.

Table 3.1 Sub-Transmission Lines and Substations and Zone Substations Not Complying with the Design Planning Criteria on 1 July 2012

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Refer to Attachment F	Refer to Attachment F	Refer to Attachment F

Table 3.2 Distribution Feeder Summary Report by Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2012

CBD			
Total Number of Feeders	**Number of Feeders Without N-1 Capability (1 Minute)**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
165	0	Not applicable	Not applicable
URBAN			
Total Number of Feeders	**Number of Feeders Without N Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
2,007	215	With the introduction of the Licence Conditions a number of feeders were found to require augmentation to meet the new standards, and since that time general load growth has resulted in additional feeders not meeting the new standards. Note: Some feeders supply both urban and non urban areas. In urban areas these feeders are designed to N-1 standard whilst the non urban area is designed to N standard i.e. a feeder may pass through a town before entering rural type areas. For reporting purposes feeders which supply both Urban and Non Urban areas have been reported as Urban.	A full review of all feeders is expected by 1 January 2013, at which time all feeders which do not meet N and N-1 capability will be identified and projects issued to rectify them. It is anticipated that a majority of the identified non compliant feeders will be fixed by 1 July 2014.
NON-URBAN			
Total Number of Feeders	**Number of Feeders Without N Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
75	15	With the introduction of the Licence Conditions a number of feeders were found to require augmentation to meet the new standards, and since that time general load growth has resulted in additional feeders not meeting the new standards. Note: Some feeders supply both urban and non urban areas. In urban areas these feeders are designed to N-1 standard whilst the non urban area is designed to N standard i.e. a feeder may pass through a town before	A full review of all feeders is expected by 1 January 2013, at which time all feeders which do not meet N and N-1 capability will be identified and projects issued to rectify them. It is anticipated that a majority of the identified non compliant feeders will be fixed by 1 July 2014.

		entering rural type areas. For reporting purposes, feeders which supply both Urban and Non Urban areas are recorded as Urban.	

Table 3.3 Distribution Substation Summary Report by Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2012

CBD			
Total Number of Substations	**Number of Substations Without N-1 Capability (1 Minute)**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
433	5	Substations loaded above 100% of firm rating.	Remove overload by uprating existing substations or transferring load to adjacent substations. Due for completion by July 2014.
URBAN and NON-URBAN			
Total Number of Substations	**Number of Substations Without N Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
30,818	268	Substations loaded above 100% of firm rating.	Remove overload by uprating existing substations, transferring load to adjacent substations, installing new low voltage distributors or new substations. Due for completion by July 2014.

3.3 Demand Management

Emerging constraints on the supply system are identified through the planning process, and published in the Annual Electricity System Development Review (AESDR) on the Ausgrid website.

Each constraint with a network augmentation solution cost of greater than $1,000,000 is assessed to determine whether it is reasonable to expect that Demand Management (DM) might prove to be cost effective.

The first step in the demand management process is a DM Screening Test. This report determines whether it would be reasonable to expect that it would be cost effective to avoid or postpone the expansion of the network by implementing DM strategies. If the conclusion is positive, a formal DM Investigation follows.

Based on the DM requirements identified in the screening test, the DM Investigation identifies possible DM options that might exist in the study area based on existing knowledge, field visits, public consultation with interested parties, and contact with specific customers. Any feasible DM options are considered for development alongside network augmentation options.

If a feasible DM option is determined to be the most economical solution, it is implemented with clear deliverables in terms of demand reduction, timing and cost. A more detailed summary of this DM process is provided on Ausgrid's website.

Table 3.4 Demand Management Projects Implemented During 2011/12

	Description of Demand Management Project Implemented	Peak Demand Reduction (kVA)	PV of Costs of Demand Management Project	PV of Total of Capital Expenditure Deferment plus Op Ex Savings
Individual large projects				
Medowie Area Generator & Power Factor Correction Program	5,062kVA of demand reduction consisting of: 1) 5,000kVA of temporary diesel generation to be installed for summer 2011/12 and 2012/13. These are capable of being operated in parallel with the grid. 2) A power factor correction program facilitating installations at a number of customer sites. The anticipated demand reduction is 62kVA.	5,062kVA	$2,738,000	$4,700,000
Network Capacitors at Burwood Zone Substation	Installation of reactive support within the network.	12,000kVAr	$900,000	Not applicable – to reduce load at risk and ensure power factor complies with National Electricity Rules requirements.
Sub-totals		5,062kVA + 12,000kVAr	$3,638,000	$4,700,000
Consolidated projects				
Sub-totals		N/A	N/A	N/A
Totals		5,062kVA + 12,000kVAr	$3,638,000	$4,700,000

Table 3.5 Demand Management Investigations in 2011/12 Found Non-Viable

	Description of Potential Demand Management Project Investigated and Reason for Non-viability	PV of Costs of Investigations
Campsie South Zone Development	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$4,360
Sefton 11kV Fdrs 8, 9, 34 & 35	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$6,022 (est)
Homebush Bay Zn Additional TX and Flemington load transfer	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$6,037
Waverley Zone Development 2011	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$7,669
Metford Zone Substation	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$6,022 (est)
Milperra Zone Substation Uprating	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$27,351
Neringah Warwilla No.2 new substation	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$3,651
Rose Bay LV Cable Replacement	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$3,651 (est)
Heddon St Kurri Kurri	A constraint was identified for investigation. The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project in this instance.	$3,651 (est)

4 Asset Management

4.1 Overview

Ausgrid's philosophy is that an integrated asset management system forms the backbone of an effective service delivery program. Ausgrid believes that through the integration of all facets of asset management, including design, procurement, maintenance activities, renewals/replacements, capital investment, condition monitoring and continuous improvement, it will deliver its business and strategic objectives. These objectives are established and documented in the Network Maintenance Plan. The service delivery program is essential to preserve the engineering integrity of assets and their continued fitness for use within the electrical system. This will enable Ausgrid to meet its commercial obligations and statutory responsibilities under the Electricity Safety Act and Occupational Health and Safety Regulation.

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.

4.2 Technical Service Standards

Ausgrid published its latest version of Electricity Network Operation Standards (ENOS) in October 2011. The document sets out standards of service customers can expect from Ausgrid's network.

Electricity delivered by Ausgrid's network has particular characteristics including some interruptions to supply caused when powerlines are damaged by storms, bushfires and accidents. Essentially, Ausgrid's objective is to achieve the best possible overall 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 NSW Department of Trade and Investment, Regional Infrastructure and Services, in respect to reliability standards and individual feeder standards.

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

The quality of electricity provided to customers is not always suitable for use by all customer equipment. Ausgrid recommends customers use the ENA Customer Guide to Electricity Supply to identify and minimise any potential problems:

http://www.ena.asn.au/udocs/2010/11/ENA-Customer-Guide-to-Electricity-Supply1.pdf

Ausgrid currently monitors the network quality of supply via two programs:

- Distribution Monitoring and Control Program (DM&C) – The DM&C program provides data on the supply voltage at the terminals of the Low Voltage Distribution Transformers across the Ausgrid Network.
- University of Wollongong Long Term National Power Quality Survey (LTNPQS) – Ausgrid uses the results of the LTNPQS to monitor quality of supply issues and trends and is introducing a baseline low voltage steady state voltage survey to better monitor its network performance.

Ausgrid assesses major new customer connections to ensure levels of harmonics and flicker levels remain satisfactory.

In late 2011, Ausgrid commenced migration from a nominal voltage of 240 V to 230 V in line with the new standard AS 61000.3.100:2011 'Limits—Steady state voltage limits in public electricity systems'. Over time the average Ausgrid network voltage will be reduced from around 250 V to around 240 V, and will allow for additional 'headroom' for voltage rise due to Embedded Generation.

The migration will assist in maintaining alignment between the network voltage range and customer equipment utilisation voltages (as customers continue to replace legacy 240V range equipment with 230V equipment).

4.3.2 Performance Data

4.3.2.1 University of Wollongong Long Term National Power Quality Survey (LTNPQS)

Through participation in the Long Term National Power Quality Survey, Ausgrid's power quality monitoring survey data is summarised and analysed in four key Power Quality (PQ) disturbance types:

- Steady state voltage
- Voltage unbalance
- Voltage harmonics
- Voltage sags.

This 2011/12 report is based on the LTNPQS data surveyed during the 2010/11 financial year. Ausgrid was able to analyse the PQ data for all of the 45 sites that were monitored , comprising 25 LV and 20 MV sites. The LTNPQS report analyses PQ performance for steady state voltage, voltage unbalance and harmonics (there is no standard defining sag limits at present).

Based on targets stated in LTNPQS report, the majority of sites surveyed met all targets.

Ausgrid provides the percentage of sites exceeding PQ limits information as an indicative assessment only of how Ausgrid's network is performing in relation to steady state voltage, harmonics and unbalance, compared to previous years.

Table 4.3.2.1 - Percentage of sites exceeding limits

Indices		LV Sites		MV sites	
		2009/10	2010/11	2009/10	2010/11
Voltage	V High (230V $V_{99\%}$)[1]	32%	32%	0%	0%
	V High (240V $V_{95\%}$)	4%	8%	0%	0%
	V Low (240V $V_{5\%}$)	0%	0%	0%	0%
	V Low (230V $V_{1\%}$)	0%	0%	0%	0%
Unbalance	VUF	4%	0%	0%	0%
Harmonics	THD	0%	0%	0%	0%

Note: As only as small number of sites are analysed and the actual sites surveyed may vary from year to year, data should be treated as indicative only.

The LTNPQS result for LV steady state voltage ranges indicates that action to generally reduce voltage levels is required. This is being undertaken via Ausgrid's Power Quality Management Plan with migration from a 240V nominal range (average voltage around 250V) to a 230V nominal range (average voltage around 240V). Implementation actions include adjustment of line drop compensation settings, optimisation of 11kV float voltages, distribution substation tap changes and an annual baseline steady state voltage survey.

[1] $V_{99\%}$ (Voltage 99th percentile) – The voltage percentile is the value of the voltage below which x% of measurements fall over a survey period (99% in this case).

4.3.2.2 Distribution Monitoring and Control Program (DM&C)

A set of 1 week's data (Recorded in April 2012) for a sample set of 225 Distribution Transformers was analysed for (a) Voltage and (b) Voltage Unbalance.

For Voltage, the results confirm that the median of the $V_{50\%}$ voltage across the selected transformers is 250 Volts. The median of the $V_{99\%}$ voltage across the selected transformers is 253 Volts. Over time, as Ausgrid implements its plan to reduce the average network voltage from around 250 V to around 240 V, a corresponding reduction will be observed in these readings.

For Voltage Unbalance, the results show that all except one Distribution Transformer were within the 2% limit. It should be noted that Voltage Unbalance generally increases the further away the customer is from the Distribution Transformer.

In the next 12 months Ausgrid will extend its baseline survey to monitor Voltage Unbalance closer to customer connection points.

4.4 Distribution Reliability

4.4.1 Overview

This report has been prepared in accordance with the 'Design, Reliability and Performance licence conditions' imposed by the Minister for Energy and Utilities on 1 December 2007 and the standards issued by the 'Steering Committee on National Regulatory Reporting Requirements' (SCNRRR).

Two related indices are applied when reporting reliability. The first, SAIDI, is commonly referred to as the "Reliability Index" and represents the average number of customer minutes lost by all network customers. SAIFI represents the average number of interruptions for all customers.

The following notes relate to the reporting system issues outlined in Note 1 of Attachment A to this report.

The classification of Ausgrid's approximately 2,000 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.

Reliability reporting uses the IEEE methodology for defining Major Event Days as outlined in the Design, Reliability and Performance licence conditions.

There are three instances where Ausgrid departs from the Definitions detailed in Attachment A to this report – departures in relation to Notes 2 and 3 of Table A.1 Reliability Measures, and in regard to the calculation for the Major Event Day Threshold (Tmed).

Note 2 – Ausgrid measures and records customers affected and the customer base on a daily basis. Reliability performance indices are calculated on a daily basis rather than using the average of the number of customers at the beginning and the end of the reporting period. The daily calculation method provides a more representative customer performance at the time of the event.

Note 3 – 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.

Given the size of the customer base this action has little effect on reported reliability performance, since the inclusion of vacant premises increases both the number of customers affected (numerator) and the customer base (denominator) in the calculations.

In regard to the calculation for the Major Event Day Threshold (Tmed), the Design, Reliability and Performance Licence Conditions review working group had agreed, in March 2010, that the Tmed calculation should be consistent with the Australian Energy Regulator (AER) Tmed calculation method. The Design, Reliability and Performance Licence Conditions require (Schedule 6) that Planned Outages be included in the daily SAIDI dataset for calculation of the Tmed value. The AER requires (STPIS definitions November 2009) that Planned Outages be excluded from the daily SAIDI dataset for calculation of the Tmed value.

This agreed change to the Tmed calculation has not yet been amended in the Design, Reliability and Performance Licence Conditions document. However, Ausgrid has applied this change to the 2010/11 and 2011/12 reliability performance reporting to ensure consistency with the AER reliability performance reporting definitions, as agreed with the Minister's Office.

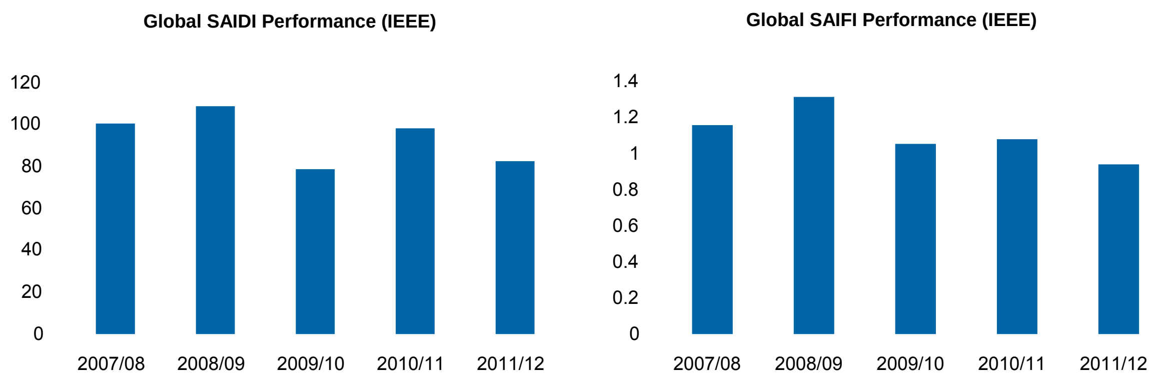
4.4.2 Organisational Performance (Normalised) Trend

Table 4.1 Organisational Performance Trends (Normalised)

	Previous Years				Current Year
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
SAIDI	100.3	108.5	79	98.59	82.35
SAIFI	1.16	1.31	1.05	1.08	0.94

The data in Table 4.1 representing SAIDI and SAIFI is also shown graphically below in Figure 4.

Figure 4 Organisational Performance Trends (Normalised)



The 2011/12 performance for both SAIDI and SAIFI has improved compared to recent years. This year's results can be attributed to the Regulatory Works Program as well as relatively quiet weather conditions.

There was only one Major Event Day - on the 7th December 2011 (4.61 SAIDI for the day). This was predominantly due to a 33kV line bond failure event at Munmorah Power Station on the Central Coast.

4.4.3 Organisational Detailed Performance Current Year

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]		1,636,658	30,887	1,396,124	207,059	2,588
SAIDI	Overall[2]	122.26	19.64	94.73	317.14	756.82
	Planned[3]	33.92	13.80	19.89	130.19	229.43
	Unplanned[3]	86.96	5.83	74.04	181.57	527.33
	Normalised[4]	82.35	5.55	72.42	156.12	527.33
SAIFI	Overall	1.13	0.07	0.95	2.42	6.27
	Planned	0.10	0.03	0.06	0.38	1.63
	Unplanned	0.95	0.04	0.83	1.80	4.64
	Normalised	0.94	0.04	0.83	1.74	4.64

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

[1] Customer numbers as at the end of June 2011 for the purposes of reliability indices only. Refer to Table 1.1 for the total of customers served.

[2] Overall performance represents the total performance experienced by our customers, irrespective of cause or origin of the fault.

[3] 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, momentary interruptions and interruptions caused by a customer installation failure.

[4] 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 are 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	2007/08	2008/09	2009/10	2010/11	2011/12
SAIDI	Actual	8.07	41.71	38.14	5.11	5.55
	Target	54	51	48	45	45
SAIFI	Actual	0.04	0.55	0.11	0.06	0.04
	Target	0.33	0.32	0.31	0.3	0.3

Table 4.4 Urban Feeder Performance (Normalised) Trend

		Previous Years				Current Year
	Year	2007/08	2008/09	2009/10	2010/11	2011/12
SAIDI	Actual	74.83	93.55	66.7	82.62	72.42
	Target	88	86	84	80	80
SAIFI	Actual	1.04	1.15	0.95	0.97	0.83
	Target	1.26	1.24	1.22	1.2	1.2

Table 4.5 Rural Short Feeder Performance (Normalised) Trend

		Previous Years				Current Year
	Year	2007/08	2008/09	2009/10	2010/11	2011/12
SAIDI	Actual	219.26	217.25	179.08	225.10	156.12
	Target	360	340	320	300	300
SAIFI	Actual	2.16	2.44	2.05	2.06	1.74
	Target	3.9	3.7	3.4	3.2	3.2

Table 4.6 Rural Long-Feeder Performance (Normalised) Trend

		Previous Years				Current Year
	Year	2007/08	2008/09	2009/10	2010/11	2011/12
SAIDI	Actual	543.27	608.69	443.63	467.57	527.33
	Target	820	780	740	700	700
SAIFI	Actual	4.08	4.34	3.52	4.31	4.64
	Target	7.5	7	6.5	6	6

All feeder category performances were compliant against the Reliability Standards for 2011/12. CBD performance was approximately the same as the previous year, Urban improved substantially as did Short Rural. Long Rural is the only category to degrade measurably. There are so few feeders in this category that results can fluctuate dramatically year to year.

4.4.4.1 Excluded Events

Table 4.7 Excluded Interruptions for 2011/12

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
7/07/2011	Load Shed - Other Auth. Request	1	313	0.0002	Load Shed - Other Auth. Request
22/07/2011	Load Shed - Other Auth. Request	1,178	244	0.0540	Load Shed - Other Auth. Request
28/07/2011	Load Shed - Other Auth. Request	106	641	0.0236	Load Shed - Other Auth.

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
					Request
29/07/2011	Load Shed - Other Auth. Request	1	50	0.0000	Load Shed - Other Auth. Request
20/09/2011	Load Shed - Other Auth. Request	42	123	0.0032	Load Shed - Other Auth. Request
22/09/2011	Load Shed - Other Auth. Request	3	105	0.0002	Load Shed - Other Auth. Request
24/09/2011	Lightning Strike	17,918	60	0.6578	Transmission / Bulk Supply
5/12/2011	Load Shed - Other Auth. Request	1	342	0.0002	Load Shed - Other Auth. Request
7/12/2011	Major Event Day (The MED was predominantly due to a 33kV bond failure event at Munmorah Power Station on the Central Coast)	19,051 (17,949 customers interrupted due to the bond failure event)	477	4.61 (4.57 SAIDI due to the bond failure event)	Exceeds Tmed 3.14
8/05/2012	Transmission Fault	5,498	1	0.0034	Transmission / Bulk Supply
27/05/2012	TransGrid Equipment Failed in Service	111,463	16	0.5063	Transmission / Bulk Supply

4.4.5 Performance against Individual Feeder Standards

The performance objectives for organisational average performances for each feeder category are not sufficient to identify when customers on a particular feeder experience unsatisfactory reliability performance. For this reason, SAIDI and SAIFI criteria (after ‘excluded interruptions’ are disregarded), act as a trigger for investigation and exception reporting purposes.

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 Ministerially-imposed Licence Conditions for each feeder type.

Table 4.8 Individual Feeder Standards for Exception Reporting Specified in the Licence Conditions Applicable to Ausgrid

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

Performance outside this range results in the following actions:

(a) immediate investigation of the causes for each feeder exceeding the *individual feeder standards*;

(b) by the end of the quarter following the quarter in which the feeder first exceeded the standard, complete an investigation report identifying the causes and action required to improve the performance;

(c) complete any operational actions identified in the investigation report to improve the performance of each feeder to the *individual feeder standards* by the end of the third quarter following the quarter in which each feeder first exceeded the *individual feeder standards*;

(d) where the investigation report identifies actions, other than operational actions, required to improve the performance of each feeder to the *individual feeder standards*, develop a project plan, including implementation timetable, and commence its implementation by the end of the second quarter following the quarter in which the feeder first exceeded the *individual feeder standards*;

Table 4.9 Individual Feeder Performance against the Standard Summary

	Feeder Type			
	CBD	**Urban**	**Short Rural**	**Long Rural**
Feeders (Total Number each Type)	56	1741	293	4
Feeders that Exceeded the Standard During the Year (Total Number)[1]	1	96	16	0
Feeders Not Immediately Investigated (Total Number)	0	1	0	0
Feeders Not Subject to a Completed Investigation Report by Due Date (Total Number)	0	1	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.

Almost all actions required were completed in the times required. One feeder was not investigated in time due to an administrative error, though it was completed shortly after the due date. Overall, the percentage of poor performing feeders in each feeder category is relatively low.

Ausgrid has an ongoing reliability improvement program in place. The program targets those feeders that have exceeded or are approaching the Individual Feeder Standards as outlined in Schedule 3 of the Design, Reliability and Performance Licence Conditions.

[1] Refer Attachment E for details

4.5 Transmission Reliability

4.5.1 Transmission Reliability Performance Data

Table 4.10 Transmission Circuit Availability (%) Trend

	Previous Years				Current Year
Objective	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
	97.19	97.98	96.67	97.14	96.17

There has been a decrease in circuit availability from the previous year's result. A significant factor in this has been the increased number of long duration outages for the replacement of 132kV isolators on a number of key feeders. As in recent years, the transmission availability this year was heavily influenced by the large number of outages associated with major replacement and capital build programs such as the replacement of Ourimbah STS and Beaconsfield West 132kV busbar, as well as a number 132kV I&E switch replacements, and 132kV Circuit Breaker replacements.

Table 4.11 Network Reliability Trend

		Previous Years				Current Year
	Objective	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
Network Reliability (Off Supply Event Numbers)		6	1	0	2	0

There were zero transmission related loss of supply events this year, which is an improvement over last year's result of 2 events.

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

	Previous Years				Current Year
Objective	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
	3,924	3,279	2,291	3,497	5,810

This year's average unplanned outage duration has increased from the levels seen in previous reporting period. A major contributing factor to this was an increased number of 132kV oil insulated cable failures and their long duration repair times (typically 2 months).

Table 4.13 Connection Point Interruptions (Unplanned) 2011/12

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

There were no connection point interruptions in the 2011/2012 period.

Table 4.14 Connection Point Numbers 2011/12

	Year
Number of Connection Points (Total Number)	19

Ausgrid has increased its number of transmission customers to 7 and connection points to 19, due to the commissioning of 2 new 132kV transmission feeders.

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 in an extract from our Network Management Plan.

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 Plan. The planned programs of work documented in our Duty of Care Plan 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 staff and contractors 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 has an impact, 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's Workplace Health and Safety Management System is called Be Safe. The Be Safe Management System has two key objectives:

- the health, safety and welfare of all staff while they are at work
- ensuring that people other than our staff are not exposed to unacceptable risks to their health and safety in connection with Ausgrid's network operations.

The principal document in the Be Safe Management System is the Be Safe Policy. The Be Safe Policy articulates the organisation's commitments to health and safety including:

- eliminating or controlling any reasonably foreseeable occupational health and safety risks
- a commitment to consultation with staff to enable them to contribute to decisions affecting their health, safety and welfare at work
- ensuring the design, supply and use of plant and substances at work is safe and without risks to health when used properly
- education and training programs to ensure staff and contractors are equipped with sufficient information to ensure their health and safety
- preventing occupational injury and illness by all reasonable, practicable means
- providing timely and cost effective injury management to promote early return to duties

- maintaining a workers' compensation self-insurer licence
- complying with the WHS Act and WHS Regulation, and maintaining an OH&S system that complies with Australian Standard AS/NZS 4801
- adopting best practice standards where legislation or mandatory standards do not exist
- promoting community awareness of safety issues, through public education campaigns.

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.

Ausgrid also publishes a "Public Electrical Safety Awareness Plan" to educate 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 7 of the National Electricity Network Safety Code "ENA NENS 01 - 2006")
- induction training for all new employees (both employees and contractors) is carried out in accordance with our Quality, Safety, Health and Environmental Management System
- accreditation of service providers undertaking contestable work meets Code of Practice Contestable Works standards (and other applicable schemes) administered by the Office of Fair Trading
- reporting of accidents and incidents – as specified by NSW DTIRIS under the Significant Electrical Network Incidents reporting system (including those required under the Electricity (Consumer Safety) Regulation 2006)
- reporting of customer installation incidents to the Office of Fair Trading (in accordance with the Electricity (Consumer Safety) Act 2004).

5.2 Public Injuries

Ausgrid reported four Serious Electricity Network Accidents involving the public in 2011/12 (July 2011 - March 2012), as summarised in Table 5.1. This figure is comparable with previous years. Three were classified as Serious Electrical Accidents (Public) as they involved electricity, while one incident was classified as an Actionable Safety Incident (Public). One of the 2011/12 Serious Electrical Accidents involved a fatality.

These Serious Electricity Network Incidents (SENI) are analysed by Ausgrid to form 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.

Note: During 2011/12, the Industry Safety Steering Committee endorsed the implementation of a new SENI reporting scheme which took effect from 1 April 2012. The result is a change in the definitions, and reporting format of incidents to a new spreadsheet format. All reporting data from this period can be found in the column for April 2012 – June 2012 in Table 5.1, and in Attachment C.

Table 5.1 Public Injuries

	Previous Years				Current Year	
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**July 2011 – March 2012**	**April – June 2012**
Non-Fatal	5	2	4	4	3	4
Fatal	-	-	-	1	1	0
Total	5	2	4	5	4	4

5.2.1 Incident 1 – Warrawee 9 August 2011

While excavating to install a storm water pipe, a general public worker struck Ausgrid's 11,000V cable in Warrawee Ave. This caused a shock to be delivered to the worker as well as an explosion and arc flame from the cable. In addition to the shock, the worker received burns from the arc flame and was also thrown clear which resulted in back pain.

The investigation found that the worker and his co-worker did not have Dial Before You Dig plans. They were not aware of the inherent dangers associated with excavation near electrical cables. Also they were not aware of signs indicating the presence of underground assets (e.g. cable cover bricks). There were no written work instructions present on site.

The details of this incident will be included as part of the regular review of Ausgrid's Public Electrical Safety Awareness Program (PESAP).

5.2.2 Incident 2 – Point Claire 22 September 2011

An Ausgrid overhead workgroup was installing several bays of low voltage Aerial Bundled Conductor (ABC). The installation involved pulling the ABC through temporary rollers installed on poles. During the installation, the ABC became separated from the pulling rope and recoiled along the footpath area underneath. The recoiling cables narrowly missed a pedestrian who had alighted from a bus underneath the cable route. A potential serious injury could have occurred due to the physical impact from the recoiling cable. The cables were not energised.

The investigation found that there was a lack of controls by the contractor providing traffic control services. Also the cable stocking failed to maintain grip or remain secured to the cable. There were various issues which contributed to this failure including deterioration of the equipment, and the lack of a defined instruction for stocking application.

The preventative actions arising from the incident investigation were to:

- review the suitability of standard cable hauling equipment and associated training and instructions
- review the safe work method statement (SWMS) and technical standards to reflect the approved method
- review the traffic control contract with the intent of ensuring suitable instructions and assessments are documented.

5.2.3 Incident 3 – Medowie 28 October 2011

An 18 year youth was electrocuted after making contact with his hand on an 11kV feeder while standing on top of a vehicle. A privately owned Mitsubishi Delica van was driven to the remote location under existing 11,000 volt overhead bare conductors. Ausgrid understands from Police and from staff attending the site after the incident that there were three people in and around the van, including the victim.

The investigation found that there had been misadventure by the victim, as the victim was attempting to have his photo taken pretending to touch the conductors. The height of the overhead conductors was below the minimum clearances expected for conductors that cross “land other then carriageways”. There had been delays in rectifying the low mains due to the inaccessibility of the area due to wet ground conditions.

The following preventative actions arose from the incident investigation:

- All current reports of “low mains” were reviewed to determine if any were “on hold” pending other issues. The small number that were found to be “on hold” are being individually risk assessed for appropriate action.
- A new category in the priority and escalation process to be considered. This new category would be an “Urgent Priority” (that is, where the mains are measured to be more than 1 metre below the minimum height in the relevant standard). This new category would require the inspector to notify the despatch officer of the situation and create an OMS job for the local area to rectify the defective low mains. This would bring mains that are more than one metre below the minimum height into the same category and response mechanism as all other urgent notifications detected by line inspectors.
- In addition to the above action item, redefine the current “High Priority” classification to be between 0.5 and 1.0 metre.
- Review the design and construction process to look into ways to streamline the rectification of low mains.
- Review the possible land access issues and Environmental Planning and Assessment Act processes and requirements (including sensitive areas) to ensure approval can be obtained within periods required by the priority and escalation process.
- Establish a working group within Ausgrid to consider and report on the above actions within six months from the date of the report (13 February 2012).
- Any corrective actions implemented above are to be reflected in Ausgrid’s documentation within 3 months of the above workgroup’s findings.

5.2.4 Incident 4 – Pymble 16 November 2011

A general public worker was standing on an aluminium step ladder working approximately 4-5 metres off the ground, trimming the top of a conifer hedge. The worker was using a pair of metal hand secateurs to cut the branches when the secateurs penetrated the insulation of the service line, and contacted a live conductor. At the same time the back of the bottom blade of the secateurs contacted the earthed and neutral-bonded “A” Pole, providing an earth path. An electrical flash occurred and the worker fell to the ground. It is uncertain whether the worker received an electric shock or if the short-circuit and flash have caused the worker to lose balance and fall from the ladder. His apprentice was footing the ladder at the time and reported that he did not receive a shock from the ladder. The worker was taken to hospital by NSW Ambulance Service and admitted for observation. He was later allowed to go home without medical treatment but has had time off work because of the injury. The service was made safe by Ausgrid staff.

The investigation found that the hedge had overgrown the 3 phase service line, consumer's mains and the top of the pole area so the public worker was unable to see the service line as he attempted to cut the hedge. The public worker was also standing on the top of an aluminium step ladder above 2 metres without fall restraint.

The preventative action arising from the incident investigation was the request to the public contractor to review their safe work methods. The details of this incident will also be included as part of the regular review of Ausgrid’s Public Electrical Safety Awareness Program (PESAP).

5.2.5 Incidents from previous reporting period

Ausgrid had four Public Reportable Safety Incidents that were still under investigation at the time that the 2010/11 Electricity Network Performance Report was produced. The incident investigations have subsequently been finalised.

5.2.5.1 Incident 1 – Waverton 14 February 2011

An employee of a private building construction company inadvertently cut through an energised 11kV underground cable with a nine inch angle grinder at Waverton. The resultant flash caused burns to his arms and legs.

The investigation found that the incident occurred because of the employee's direct departure from an agreed safe work procedure and contravention of a direction by the employee's supervisor.

The employee stated that he thought he could perform the task safely and would save time by completing the job.

The preventative action arising from the incident investigation was that the contractor was reminded to take appropriate precautions when working near live cables.

5.2.5.2 Incident 2 – Marsfield 21 February 2011

A concrete pump operator was using an infra-red remote control to operate a concrete pump inside a new building site at Marsfield. The concrete pour for a foundation floor of the new house was just completed when the operator was positioning the pump boom for a "blow out" of the pump's pipes. The operator received an electric shock when the top boom of the concrete pump made contact with an 11kV overhead street conductor. It appears that no observer was used to ensure that the concrete pump operator did not move the boom too close to the overhead 11kV or the overhead low voltage street mains.

The investigation found that the concrete pump operator did not have an observer. The concrete pump operator was preoccupied with the "blow out" (clearing) of his hose at ground level, and did not look up. Also, the temporary fencing was located 1.74 metres outside the property boundary on a public footpath. This would have given the boom operator a false impression of where his boom was located relative to the front property boundary and overhead street conductors. WorkCover also performed their own investigation.

The details of this incident will be included as part of the regular review of Ausgrid's Public Electrical Safety Awareness Program (PESAP).

5.2.5.3 Incident 3 – Lorn (Maitland) 2 April 2011

A helicopter flying joy flights from a site on the northern side of the riverbank adjacent to the Belmore Bridge, Maitland, came in contact with the 11kV overhead feeder with its rotor. The impact severed the eastern conductor only. The conductor landed on the riverbank on both sides of the river and in the river. On the western (Maitland) side the conductor landed on a metal hand rail running along a path that follows the riverbank. A 3 year old boy was leaning on the rail about 200m from the fallen conductor and received a burn to his lower leg. He was treated at John Hunter Hospital and released on the same day.

The details of this incident will be included as part of the regular review of Ausgrid's Public Electrical Safety Awareness Program (PESAP). The Australian Transport Safety Bureau (ATSB) has also conducted their own investigation into the incident including the recommended corrective action to be carried out by the helicopter operator. This report is available on from the ATSB website.

5.2.5.4 Incident 4 – Ashfield 23 April 2011

An unidentified person broke into an Ausgrid substation in Ashfield and was attempting to steal copper conductor. As the victim attempted to hacksaw into an 11kV cable, an explosion occurred and the victim received electrical burns to his face and right side. The victim also suffered damage to his vision.

The investigation found that the person had gained unauthorised access to the substation by cutting the locking device on the substation gate. The victim then attempted to steal the energised conductor within the substation. The victim inadvertently cut through the energised 11kV conductor and was injured during this process.

The details of this incident will be included as part of the regular review of Ausgrid's Public Electrical Safety Awareness Program (PESAP). This substation was already a part of the security fence capital upgrade project.

5.3 Worker Injuries

In 2011/12 (July 2011- March 2012), Ausgrid reported eight Serious Electrical Network Incidents involving either a network worker, network contractor or an Accredited Service Provider. Five of the incidents were Serious Electrical Accidents while the other three were Actionable Safety Incidents.

Note: During 2011/12, the Industry Safety Steering Committee endorsed the implementation of a new SENI reporting scheme which took effect from 1 April 2012. The result is a change in the definitions, and reporting format of incidents to a new spreadsheet format. All reporting data from this period can be found in the column for April 2012 – June 2012 in Table 5.2, and in Attachment C.

Table 5.2 Worker, contractor and ASP Injuries

	Previous Years				Current Year	
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**July 2011 – March 2012**	**April – June 2012**
Workers	3	3	5	5	8	19
Contractors	-	-	-	-	-	2
ASPs	-	2	-	-	-	1
Total	3	5	5	5	8	22

5.3.1 Incident 1 – Bayview 4 July 2011

A cable jointer was working on a Customer Service Box (CSB) on an isolated section of the underground low voltage network in Bayview. While the cable jointer was completing works, a test voltage was applied to locate an underground fault on an isolated section of network mains approximately 100 metres from where the cable jointer was working. The cable jointer received a shock from the test voltage and was thrown from the work area. The cable jointer also received a small burn to the forearm. The cable jointer was transferred to hospital to undergo tests and observation and was discharged the following day.

The investigation found three prime causes of the incident; a lack of communication between different work groups, a failure to follow the process for an access permit for Test and Ancillary Works and a failure of Network Testers to ensure a standby person was present.

The preventative actions arising from the incident investigation were:

- team briefs to be held with field staff reaffirming the relevant responsibilities and procedures when using access permits for test and ancillary works and the need for communication within the group, and with other work groups on site
- relevant staff complete access permit recipient training once finalised and rolled out
- performance recovery and/or disciplinary interviews be conducted with staff involved
- the discrepancies between clauses 6.21.1 and 12.13 of the Electrical Safety Rules (ESR) regarding standby persons and barricading be referred to the ESR committee for harmonisation.

5.3.2 Incident 2 – Canterbury Sub-Transmission Substation Earlwood 30 August 2011

A cable fault location was being performed on a feeder from Canterbury to Dulwich Hill, when a failure was heard in the test vehicle. The voltage supply was switched off and the test equipment earthed. The tester proceeded to investigate the source of the failure in the test equipment, and whilst removing the test cable plug the equipment socket, the remnant charge left in the cable was discharged across to the sheath of the cable. The tester received an electric shock.

The investigation found that the cause of the incident was the failure of test cable plug / socket. The flashover on the high voltage plug inside the test equipment caused the back of the socket to detach from the plug, leaving the plug unearthed, even though the earth was applied in the test equipment. The charge on the cable had built up, and flashed over to earth when the plug was removed.

The preventative actions arising from the incident investigation were to:

- inspect of other high voltage connections in the truck
- inspect of other high voltage connections in other similar test vehicles
- investigate protection systems that may be used for this specific type of fault location
- investigate a methodology of fault location for test equipment failures.

5.3.3 Incident 3 – Castle Hill 21 September 2011

After 11kV wires were reported down at 2am on 21 September 2011, a District Operator opened Air Break Switches (ABSs) to de-energise a pole top substation. The Sydney Control Room dispatched lineworkers to apply access permit earths to the de-energised mains as part of the isolation process. The lineworker tested the mains using the District Operator's Modiewark test equipment from an Elevated Work Platform (EWP). It indicated live on the 2kV setting, but indicated de-energised on the 11kV setting. The lineworker connected an earth to one phase of the 11kV, which flashed and tripped an 11 kV feeder panel at Pennant Hills zone. The lineworker was wearing correct Personal Protective Equipment (PPE) and was not injured.

The investigation found that a flicker blade on one of the ABS had become stuck during its opening, providing a connection between the live feeder and the section that was to be de-energised.

The following preventative actions arose from the incident investigation:

- new work procedure to be developed for the isolation of conductors when there is a possible path to earth
- new work procedure to be developed for the use of Modiewarks to prove dead prior to applying earths.

5.3.4 Incident 4 – Lisarow 30 October 2011

Whilst a technician was carrying out protection trip checks, a flashover occurred when the test probe came in contact with, and shorted the positive and negative 110V DC battery terminals on the protection panel. As a result of the flashover, the technician received burns to the index and middle fingers of his left hand. The technician received medical treatment at Gosford hospital.

The investigation found that there was a lack of sufficient care in the selection and use of the Kelman Unit test probe by the technician. The investigation also revealed that Lisarow Zone substation 11kV panels employed 110V DC battery terminals without barrier segregation (previous Brisbane Water County Council design).

The preventative actions arising from the incident investigation were:

- all technicians to be advised to use single point test probe in this situation pending design review
- the DC terminals for all protection panels at Lisarow Zone substation to be provided with barrier segregation.

5.3.5 Incident 5 – Clovelly Zone Substation Randwick 22 October 2011

A District Operator attempted to close the 132kV Transformer No.2 isolator manually because the isolator motor drive was not operable. On closing, the pins holding the isolator contact arms on two phases sheered, causing an electrical fault to occur, and both arms fell to the ground in very close proximity to the operator. This resulted in electrical arcing, and the tripping of 90R 132kV feeder.

The investigation found that there was a failure of central mounting pins on 132kV isolator.

The preventative actions arising from the incident investigation were:

- a District Operator advice was issued detailing the use of switchyard isolators, and identifying all isolators that are of the same construction as the failed item
- the replacement program for all Stanger HDB isolators has been accelerated to be completed by June 2014.

5.3.6 Incident 6 – Newcastle East 28 November 2011

During an investigation into a supply failure at a customer's premises, a lineworker was checking the supply at the distribution network pole using test lamps when an explosion occurred, causing injuries to the lineworker's face. The victim was treated on site before being transferred to hospital.

The preventative actions arising from the incident investigation were to:

- publish a 'Distribution Guideline' to provide awareness to lineworkers on the underground service cable types and the possible deterioration which could be expected in hostile environments
- publish a team brief article to remind all lineworkers that the testing of damaged cable must only be undertaken at the point of connection.

5.3.7 Incident 7 – East Maitland 21 January 2012

A lineworker received a flash burn injury when he simultaneously cut through multiple phases of a four core 415V overhead bundled conductor, whilst in the process of connecting new 415V mains to Ausgrid's network. The incident occurred at a pole where taps were to be made between an existing section of low voltage and the new (recently installed) conductor sections. Both the existing mains and the new section were live to enable neutral identification and phasing as part of the connection process.

The investigation found that the lineworker had not recognised severe degradation of the conductor insulation. The lineworker also had not taken all of the precautions when testing damaged cable. Finally, the lineworker lacked an understanding of the specific network configuration.

The following preventative actions arose from the incident investigation:

- clear instruction delivered via toolbox talks to all Ausgrid staff involved in correct preparation and cutting of multi-core bundled conductor of any size
- inclusion of correct preparation and cutting of multi-core bundled conductor of any size in relevant training documentation including provision for competency recording
- review of training records for phasing and identification of mains and services for all Ausgrid apprentices and tradespeople who are required to phase and identify low voltage mains on Ausgrid's network.

5.3.8 Incident 8 – Edgecliff 2 May 2012

Two substation technicians received burns as a result of an electrical explosion from a switchboard inside a distribution substation at Edgecliff. Both were transported by ambulance to hospital. They were both treated for minor burns at the hospital and later released on the same day.

This incident was awaiting the finalisation of the investigation report at the time this 2011/12 Electricity Network Performance Report was produced. The details will be provided in the next Electricity Network Performance Report once the incident investigation has been finalised.

5.3.9 Incidents from previous reporting period

Ausgrid had four Worker Reportable Safety Incidents that were still under investigation at the time that the 2010/11 Electricity Network Performance Report was produced. The incident investigations have subsequently been finalised.

5.3.9.1 Incident 1 – Redfern 11 April 2011

An Ausgrid employee received flash burns to the face and arms when using an uninsulated shifting spanner to unbolt tails in an overhead link box at Redfern. The spanner came into contact with two phase posts at the same time, causing an electrical flashover. The employee was wearing a long sleeved cotton shirt, low voltage insulating gloves with leather outer gloves, and personal sunglasses. These items were all badly burnt by the flash.

The investigation found that the incorrect tool and procedure had been used. The employee had also been ill during the week.

The preventative actions arising from the incident investigation were to:

- consider more widespread use of insulated tools by lineworkers
- consider alternative link box design which has greater separation between phases

5.3.9.2 Incident 2 – Padstow 14 April 2011

An Ausgrid employee received flash burns to the face whilst bonding through live low voltage aerial bundled conductor overhead mains on a power pole at Padstow. The line worker made a connection between two different phases causing a phase-to-phase fault.

The investigation found that the preliminary visual identification of phases using the number of ribs was not used. Also, the use of tape or pegs as part of the identification process was not used. Finally, there had been an incorrect use of piecing G-clamp.

The preventative actions arising from the incident investigation were to:

- investigate the use of an Insulation Piercing Connector (IPC) with integrated test points which would enable the cable to be tested after successfully pieced
- investigate the modification of the existing G-Clamp to ensure test lamp probes positively make contact with the connection point
- establish a workshop to review Low Voltage ABC work practices.

5.3.9.3 Incident 3 – Cherrybrook 9 May 2011

An Ausgrid employee received flash burns to his eyes while reconnecting a service cable to a pillar box at Cherrybrook. During reconnection a ‘B’ phase to ‘C’ phase fault occurred across the pillar terminals causing a flash.

The investigation found that the cable jointer had failed to provide adequate screening between the phase being worked on and the other phases.

The preventative actions arising from the incident investigation were:

- reinforcing with workgroups the need to follow correct live work procedures by issuing a Distribution Guideline or similar notice
- conduct a formal interview with the injured jointer and initiate disciplinary action for safety breaches
- review methods of providing temporary insulation on phase terminals when working on these pillars

- review the risks associated with this style of pillar to determine if a replacement program is warranted
- review Network Universal Standard (NUS)199 to clarify whether it applies to Ausgrid staff as well as external ASPs as the language used favours external ASP processes.

5.3.9.4 Incident 4 – Tomago 18 February 2011

Four Ausgrid staff were in the process of setting up for indoor switchgear testing. During this set up an employee inadvertently energised the testing transformer by incorrectly connecting supply leads. Another employee came into contact with electricity as his right shoulder was leaning against the test transformer as it became energised. This employee was taken to hospital for observation only.

The investigation found that the supply lead to the test equipment could be inadvertently plugged into a 240 Volt GPO.

The preventative actions arising from the incident investigation were:

- supply lead to test equipment to be modified, to prevent inadvertent energisation of test equipment
- communication to other test sections of Ausgrid to ensure a review of existing supply connections (resulted in 2 other test sets having to be modified).

5.4 Major Incident Reports

Ausgrid's Incident Management System (IMS) provides an organisation wide system for managing all types and severity of incidents. 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 2011/12 there were five major incidents, four of which required the Minister for Energy to be notified in accordance with the Design, Reliability and Performance licence conditions. These incidents are outlined below:

5.4.1 Incident 1 – Medowie Public Fatality – Friday 28 October 2011 – Major Incident

A major incident was declared when an 18 year old youth was electrocuted after making contact with his hand on an 11kV feeder while standing on top of a vehicle.

5.4.2 Incident 2 – Loss of DNMS – Saturday 17 December 2011 - Major Incident

A major incident was declared when Ausgrid's control and monitoring capabilities were impacted due to the failure of the Distribution and Network Monitoring System (DNMS). The DNMS lost control and monitoring of all Newcastle substations, and 35% of Sydney substations, after a restart of a communications switch had occurred. Manual patrols were instated to maintain a limited level of monitoring capability. The DNMS was fully restored after a period of approximately 10 hours. This incident did not involve any significant injury to persons, loss of property or widespread supply interruptions and as a result should not fall within the requirements of licence condition 18.6.

5.4.3 Incident 3 – Loss of TransGrid 42 feeder – Thursday 15 March 2012 – Major Incident

A major incident was declared when TransGrid advised Ausgrid that the TransGrid 330kV feeder 42 (Sydney South BSP – Haymarket BSP) was required to be isolated after a nearby excavation caused soil subsidence and exposed the TransGrid cable. The excavation was being done by Ausgrid's Alliance Contractor as part of its capital works program. No customers were interrupted during this incident, and the feeder was successfully returned to service on 17 March 2012.

5.4.4 Incident 4 – Belmore Park Site Non Ausgrid Staff Fatality – Tuesday 27 March 2012 – Major Incident

A major incident was declared after a subcontractor working for the Energy2U Alliance, under the control of the Principal Contractor (Leightons), was fatally injured while working at the Belmore Park zone substation construction site.

5.4.5 Incident 5 – Edgecliff Distribution Substation Multiple Staff Flash Burns – Wednesday 2 May 2012 – Incident

An incident was declared when two substation technicians received burns as a result of an electrical explosion from a switchboard inside a distribution substation at Edgecliff. Both were transported by ambulance to hospital. They were both treated for minor burns at the hospital and later released on the same day.

6 Customer Installations

From January 2001, 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 contractors' 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 contractors whose 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 reported using SAP – CCS has been verified by an external audit of Ausgrid's previous annual Electricity Network Performance reports.

The major causes of customer electric shocks in the reporting period fell into three specific categories – "Failure of Part of Installation" (more specifically, insufficient insulation resistance), "Water Damage or Ingress" and faulty neutral connections. Ausgrid has continued an extensive program to replace all at risk aged service lines, and carry 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

There has been a major decrease (35%) in the number of notifications (CCEW) of electrical installation work from electrical contractors. This is due to the closure of the NSW Solar Bonus Scheme in April 2011 which saw applications and connections significantly drop. Ausgrid continued its policy to inspect all solar installations in 2011/12 due to inexperienced installers, more complex metering configurations and new equipment technology. This policy will be reviewed in 2012-13 and consideration given to a percentage audit based on the reduction in associated major defects.

The trends in 2011/12 continue to indicate that electrical contractors are only submitting notifications when the electrical installation work is associated with contestable service work. Ausgrid has however observed an increase in NSW Fair Trading electrical contractor compliance investigations.

The number of notifications for Level 2 Service Provider contestable work (NOSW) has decreased by 33% from the previous year. This decrease is also attributed to the closure of the NSW Solar Bonus Scheme and a corresponding reduction in the associated contestable metering work which requires submission of a NOSW. The major defect rate of 3.97% is slightly higher than last year (2.97%) but considerably lower than previous periods. The low number of major defects also relates to no reported shocks from unsafe electrical contractor installation work.

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 and requests for information from NSW Fair Trading has increased by 44% (to 13) and it has been evident that there is more activity to actively monitor and punish electrical contractors under the Home Building Act and Electricity (Consumer Safety) Act. Ausgrid has requested that Fair Trading NSW re-establish the quarterly DNSP review meetings to allow Ausgrid, Endeavour Energy and Essential Energy to work with them under the formalised MOU to address electrical contractor compliance issues.

Ausgrid is also conducting "Targeted Inspections" (unannounced) of specific large developments like shopping centres and unit blocks, concentrating on the electrical contractor's compliance with Australian Standards as well as the submission of CCEW's for new electrical work.

Ausgrid is represented on related Australian Standards committees such as AS/NZS3000, AS/NZS3002, AS2067 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 has worked closely with the Clean Energy Council (CEC – the peak solar industry body across Australia) on all matters relating to solar inspections and presented at their annual ATRAA 2011 Solar Installers conference and will present again at the 2012 ATRAA conference.

The trial of the "Wirealert" device, was completed in late 2011. The Wirealert device is a supply monitoring device that plugs into a power point and detects potentially dangerous situations arising from a combination of a faulty neutral and poor earth connections. The trial concluded that the device was not reliable and depended on both the neutral and earth connection to be compromised to initiate an alarm. The number of devices that operated did not warrant a further roll out.

Ausgrid and Sydney Water are jointly funding the testing of each installation neutral connection impacted by their water main replacement program. Suspected faults are investigated by Ausgrid staff and rectified where necessary. Ausgrid are also making arrangements to conduct post water main replacement tests and convert older direct earthed installations to the current MEN earthing.

Ausgrid has commenced enhancements to SAP – CCS database to allow more accurate reporting on installation inspection trends, defect history and work loads. The data will be retrieved from the inspection service order which allows for reports to be accurate to the day of the report and will not be affected by any backlogs in completing work.

6.2 Customer Installation Shock Reports

Table 6.1 Installation Inspections Trend

	Previous Years				Current Year
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
Number of Notifications (CCEW)	45,138	45,093	47,799	90,291	58,364
Number of Inspections	13,705	14,396	20,110	57,859	25,258
Installation Inspection Rate (%)	30.36%	31.93%	42%	64%	43.28%
Major Safety Defect Rate (%)	6.33%	7.39%	5.3%	2.92%	3.97%
Safety Breach Notices Issued (%)	16.72%	18.67%	13%	8.62%[1]	10.22%
Number of Warnings Issued	30	29	22	18	14
Reports to Fair Trading (No.)	11	2	9	9	13
Number of Audits by Distributor	3	3	3	3	5

[1] The number of "safety breach notices issued" for 2010/11 was changed from 2.36% to align with the new reporting procedure used in 2011/12 for defect notices, using SAP customised reporting.

During 2011/12, there were three fatalities where the possible cause was electrocution associated with a customer's electrical installation and one fatality associated with contact with network distribution mains. Two of the fatalities within the customer's installation were as a result of electrical work being carried out by unqualified persons that resulted in contact with live exposed conductors. One fatality was a deliberate act (suicide).

An analysis of customer installation shock investigations in 2011/12 follows similar trends to previous years. 22.42% of reported shocks had no apparent cause at the time of Ausgrid's investigation. For the remaining 77.54% of investigations the dominant causes were: Failure of Part of Installation (22.37%), Water Damage or Ingress 11.83% and Defective Neutral on Service Line (10.54%).

Table 6.2 Customer Installation Shock Reports Trend

	Previous Years				Current Year
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
Shocks on Customer's Premises (Number Reported)	311	309	344	363	389

Note: Shocks found to be caused by static electricity are to be included in the report.

7 Contestable Works Scheme

An analysis of the contestable works trends in 2011/12 shows a 10.5% decrease in the total number of project notifications associated with Level 1 contestable work compared to 2010/11. This decrease is attributed to a downturn in commercial development work, however compared to previous years the activity remains relatively high. Figures obtained for Level 2 contestable work show a 32% decrease in the total number of notifications (NOSW) compared to 2010/11. The significant decrease in Level 2 activity is attributed to the closure of the NSW Solar Bonus Scheme and therefore a reduction in the associated contestable metering work.

7.1 Level 1 Contestable Work

The ratio of Level 1 work being carried out by external ASPs compared to internal ASPs has remained steady in 2011/12. Only 10 contestable projects were carried out by internal (Ausgrid) service providers in the period.

Ausgrid found it necessary to implement disciplinary/corrective action on 32 occasions as a result of unsafe practices by external ASPs. Ausgrid continued to facilitate the ASP Safety Forum with 15 Level 1 ASP companies attending and running these forums.

Ausgrid provided important information to Level 1 ASPs via safety alerts, and notifications of changes to Network Standards. These included potential safety hazards associated with inadequate excavation procedures, working on live low voltage, using machinery near live mains, working with 33kV underground cables and using sub contracted staff to carry out contestable work.

There were no network related safety incidents involving Level 1 ASPs that resulted in lost time injuries.

7.2 Level 2 Contestable Work

Ausgrid carried out 27,828 inspections of Level 2 completed work for compliance with the standards. This is a 54% decrease from 2010/11 due to a trial reduction in the inspection rate for domestic and commercial audit inspections as well as the closure of the NSW Solar Bonus Scheme.

Ausgrid also carried out 421 safety compliance audits of Level 2 “work in progress”. 161 corrective/disciplinary interviews were conducted and 82 Level 2 ASP authorisations were suspended for non-compliance or failure to renew authorisation by the annual date. This is a significant increase on last year attributed to the high number of new, inexperienced Level 2 ASPs obtaining authorisation for solar metering work.

NSW Department of Trade & Investment, Regional Infrastructure & Services (DTIRIS) is continuing its review of the Accreditation Scheme based on the recommendations of the Better Regulation Office (BRO). Ausgrid is a member of the advisory panel carrying out the review.

7.3 Level 3 Contestable Work

The number of contestable designs carried out by Level 3 ASPs during this period has exceeded that in 2010/11 by 15.6%, which may indicate an expected increase in Level 1 construction activity in 2012/13.

Table 7.1 Contestable Works Trend

	Previous Years								Current Year	
Year	2007/08		2008/09		2009/10		2010/11		2011/12	
Category	Int	Ext	Int	Ext	Int	Ext	Int	Ext	Int	Ext
Network Work (Level 1)										
Project approvals	56	379	24	444	24	461	12	539	10	499
Projects inspected by the DNSP	46	219	31	294	22	286	10	379	3	415
No. of projects with initial major defects	3	80	0	108	0	72	0	92	0	110
Customer Connection Work (Level 2)										
Notifications (NOSW)	5,963	51,158	5,426	53,015	4,742	59,057	12,041	94,463	8,340	63,971
Projects inspected by the DNSP	1,500	15,628	1,763	16,542	2,176	24,474	4,401	56,345	1,877	25,951
No. with initial major defects	11	219	8	195	7	243	43	281	28	291
Network Design Work (Level 3)										
Designs Certified	161	328	106	327	451	13	42	552	12	638

Note:

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

Distributors may provide additional information if available that will provide a clarification of procedures and practices they have adopted in administering the Contestable Works scheme.

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

Table 7.2 External Level 2 ASP Compliance Statistics

	2007/08	2008/09	2009/10	2010/11	2011/12
No. of new Authorisations plus Baseline audit	120	232	263	478	262
No. of Re-authorisations	364	412	427	458	462
No. of in-field Level 2 Safety Audits	380	223	166	182	421
No. of Disciplinary Investigations/Interviews	165	86	66	60	161
No. of ASP Suspensions	82	34	12	14	82

8 Bush Fire Risk Management

Ausgrid's Bushfire Risk Management strategies 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
- minimise the possibility of fire ignition by electricity lines and associated equipment.

The Bushfire Risk Management Plan forms part of Ausgrid's consolidated Network Management Plan, which was updated as required under the Electricity Supply (Safety and Network Management) Regulation 2008. The Bushfire Risk Management Plan was last reviewed in March 2012, as part of the Network Management Plan review. The Bushfire Risk Management Plan contains further details of how we manage bushfire risk.

Ausgrid continues to identify bushfire prone areas from bushfire prone land maps certified by the Commissioner for the Rural Fire Service (RFS). Ausgrid has a formal agreement in place with the RFS to use these maps to identify our assets in these bushfire prone areas. These maps are updated annually before the bushfire season so the appropriate asset inspections can be completed. The latest update to these maps occurred in May 2012, after receiving them from the RFS.

Refer to Table 8.2 for details of the initiatives that Ausgrid has undertaken in the last year to improve systems used to manage bushfire risk within our network area.

Table 8.1 Bushfire risk management

	Previous Years				Current Year
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
Assets in bush fire prone areas checked by pre-summer inspection %	100%	100%	100%	100%	100%
Private lines in bush fire prone areas checked by pre-summer inspection %	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1
Fire ignitions by network assets (Number)	0	4	6	4	14
Complaints from the public regarding preparation for the bush fire season (Number)	Not discernable. See Note 2.	Not discernable. See Note 2.	Not discernable. See Note 2.	Not discernable. See Note 2.	Not discernable. See Note 2.

Note 1: Bushfire risk management for electrical equipment is a shared responsibility between Ausgrid and all landowners/occupiers who are customers in our distribution area. Ausgrid inspects, tests and maintains the assets we own. However, it is the responsibility of landowners/occupiers to ensure their electrical installations are free from defects that could cause fire or other hazards. Customers are responsible for keeping private overhead powerlines free of vegetation, and must ensure appropriate trees are planted in areas that are close to powerlines. Customers are also responsible for inspecting, testing and maintaining their powerlines and poles at regular intervals – the same way we do.

Ausgrid uses the Service & Installation Rules of NSW to determine the delineation of private electrical installations from network assets. Our requirements for the inspection and maintenance of private aerial mains are detailed in our publication ES1 Customer Connection Information, our Standard Form Customer Connection Contract and the Network Standards referenced in ES1. Under the Electricity Supply (Safety and Network Management) Regulation 2008, we have taken into account the NSW DTIRIS Code of Practice (Electricity) – Service & Installation Rules of NSW, October 2006, as amended July 2011. The Service and Installation Rules of NSW are prepared in accordance with the Code of Practice. Comprehensive information on Private Lines is not currently held by Ausgrid in our information systems as they are not Ausgrid assets.

Note 2: The majority of the preparations on Ausgrid's network for the bushfire season relate to the clearing of vegetation. Ausgrid has adopted a vegetation strategy designed to maintain vegetation safety clearances at all times, which requires vegetation clearing to be undertaken throughout the entire year, not just at times of preparation for the bushfire season. As our systems record all vegetation related inquiries and complaints, it is not possible to provide an accurate estimate of those that relate specifically to works undertaken in preparation for the bushfire season.

Table 8.2 Initiatives used to manage Bushfire risk within Ausgrid's network area

Initiative	Description
1	Ausgrid has continued its monthly reporting process with additional focus on high priority outstanding corrective works that pose a genuine risk in bushfire areas.
2	Ausgrid has established capital and replacement programmes to remove equipment with known failure modes that may initiate bushfires during equipment failure.
3	Ausgrid distributes bushfire risk management information which outlines the customer's obligations regarding safety management of their electrical installations.
4	Continued liaison with Rural Fire Service, NSW Fire Brigade, councils and other authorities.

The following sections provide further information on the initiatives described above.

8.1 Monthly and Quarterly Reporting Process

Pre-bushfire season patrols of poles, lines and associated apparatus are undertaken annually in accordance with Ausgrid's Technical Maintenance Plan. The outcomes of these inspections including defects, maintenance and rectification works are captured in Ausgrid's integrated Asset Management System. Ausgrid has improved the process for notifying a customer where a Line Patrol Report indicates defects exist on a customer's installation in a bushfire prone area.

Ausgrid has continued its monthly reporting process to Senior Management on outstanding corrective work in bushfire prone areas.

Table 8.3 provides a summary of the number of defects identified and rectified under the 2011/12 Preventative Maintenance program in bushfire prone areas. Please note that not all tasks identified during 2011/12 will be of such high priority that they need to be completed prior to the end of the year.

Table 8.3 Bushfire Prone Areas - Bushfire Risk Corrective Maintenance 2011/12

Number of defects	#	Central Coast	Upper Hunter	Lower Hunter	Newcastle	Sydney North	Sydney South
Outstanding pre 2011/12	1	110	171	734	1016	327	75
Identified in 2011/12	11	1593	695	1921	2808	1371	193
Rectified in 2011/12	6	1516	602	1178	2573	1251	187
Outstanding and due or overdue as at end 2011/12	1	173	207	964	1046	315	82

Note 1: The regions reported in the table above are based upon Ausgrid's Field Services depot areas, and cover all of the bushfire affected regions.

Note 2: In some regions a number of the defects identified in the previous year were rectified during 2011/12.

Note 3: Due to differing defect priorities, not all defects identified during the 2011/12 year fall due within the 2011/12 year. The table above will not directly summate as a result.

Note 4: High priority defects detected during 2011/12 but not yet rectified by the 30th June 2012 are expected to be rectified prior to the 2012/13 bushfire season.

Note 5: The Sydney East region is not considered to be bushfire prone and is excluded from the table.

8.2 Capital and Replacement Programmes

Ausgrid has continued its low voltage spreader capital programme to reduce the likelihood that low voltage overhead powerlines will cause bushfires. If overhead powerlines clash together, the resulting arcing has the potential to cause a fire - low voltage spreaders are used to prevent powerlines clashing and therefore significantly reduce the likelihood of fire. Ausgrid installed an additional 455 low voltage spreaders this year, 320 of these in bushfire-prone areas.

The Ausgrid Replacement plan for the 2009/14 regulatory period also includes:

- replacement of over 40 kilometres of steel overhead mains per year – much of this will be replaced with new covered conductor
- replacement of over 500 air break switches per year with new air break switches with enclosed load-break contacts which contain any arcing produced during switching operations
- replacement of over 130 oil-filled reclosers and sectionalisers with modern gas-filled equipment
- replacement of over 22,000 low voltage services per year
- continuation of the overhead mains access track refurbishment programme which benefits Ausgrid as well as the RFS during times of bushfire by providing improved access to fight fires as well as carry out repairs to restore electricity supply
- replacement of defined types of insulators known to be at end-of-life on 132kV lines.

8.3 Communicating with Customers

During 2011/12, Ausgrid distributed a brochure to targeted landowners located in bushfire prone areas in the Hunter, Central Coast and North Sydney regions. Titled "Your powerlines: safety and bushfire prevention", the brochure outlined:

- contact details (phone and website) for the NSW Rural Fire Service to enable the customer to assess whether their property is located within a bushfire prone area
- the demarcation between Ausgrid's network and private powerlines
- 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 poles and mains
- a reference to the Ausgrid website for contact details of companies which employ qualified pole inspectors, authorised tree trimmers and licensed electrical contractors who can inspect or repair private powerlines.

Further information on how we communicate risk with our customers is outlined in our Public Electrical Safety Awareness Plan.

8.4 Liaison and consultation with Fire Services and others

Ausgrid continues to build strong relationships with the RFS and NSW Fire Brigade, as well as maintaining relationships with local councils, National Parks and Wildlife Service and other stakeholders.

Ausgrid participates in 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.

9 Public Electrical Safety Awareness

Ausgrid is committed to increasing awareness amongst the general public of electrical safety. This commitment is demonstrated through the development and implementation of a Public Electrical Safety Awareness Plan (PESAP). This section describes the PESAP program in 2011/12.

9.1 Key Issues

The PESAP program is designed to highlight the risks associated with the distribution of electricity on the network's assets (i.e. power lines and substations) and to educate the public about how to avoid dangerous situations.

The risks outlined in PESAP have been identified as hazardous since electricity was first distributed and continue to be the core issues that pose the greatest risk to the public. These issues require ongoing communication, education and awareness to reduce the risk of injury.

9.2 PESAP Programs

Outlined in Table 9.1 are the PESAP programs implemented by Ausgrid during 2011/12, including the description of the target market, the key messages and a description of each program, the medium through which it was delivered and an analysis of the program.

Ausgrid monitors the programs and electrical safety incidents and adapts its programs as required to continue to reduce the likelihood of incidents occurring. The broad nature of "electrical safety" and the low number of Serious Electricity Network Incidents (SENIs) makes it difficult to statistically analyse the effectiveness of the programs.

Reach & Frequency provides an analysis of the percentage of persons in a target population that is exposed to an advertising schedule at least once (Reach), and the average number of times it has been heard (Average Frequency).

Table 9.1 PESAP Program 2011/12

Overhead powerline safety	
Target Group	Tradespeople, outdoor workers, truck drivers, machinery operators, construction workers, scaffolders, painters etc. General community
Messages	• Have up-to-date maps/diagrams showing the location of powerlines on the property/worksite, 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 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	• Ausgrid's Overhead Powerline Safety campaign specifically targets outdoor workers/tradies to raise awareness of the dangers associated with overhead powerlines and educate them on safe behaviours and work practices. • The campaign comprised of 3 radio advertisements, 2 print advertisements, 6 radio live reads, online banners and NRL rotating signage. • The campaign ran in 2 bursts – September/October 2011 and May 2012.

	• Radio is a key medium for this target group as it is present on building sites and in vehicles. • The campaign creative is also used for construction industry posters, the CFMEU safety handbook and associated promotional material. • An overhead powerline safety message is included in our monthly radio safety campaign.
Analysis	**Radio Reach and Frequency** Burst 1 Market: Sydney Target: M25-54 (Pot: 1,019,000) Reach: 1+ 48.4%, 3+ 29.6%, Ave Freq: 6.9x Market: Newcastle Target: M25-54 (Pot: 110,000) Reach: 1+ 58.3%, 3+ 38.9%, Ave Freq: 8.7x Market: Central Coast Target: M25-54 (Pot: 59,700) Reach: 1+ 44.4%, 3+ 22.6%, Ave Freq: 4.3x Burst 2 Market: Sydney Target: M25-54 (Pot: 1,019,000) Reach: 1+ 41.5%, 3+ 22.7%, Ave Freq: 5.2x Market: Newcastle Target: M25-54 (Pot: 110,000) Reach: 1+ 51.9%, 3+ 30.4%, Ave Freq: 5.7x Market: Central Coast Target: M25-54 (Pot: 59,700) Reach: 1+ 36.8%, 3+ 15.9%, Ave Freq: 3.4x Source: Survey #1, 2012 **Press Reach and Frequency** Burst 1 Potential: 77,000 Reach 1+ 41.7%, Ave Freq: 1.5x Burst 2 Potential: 77,000 Reach 1+ 31.9%, Ave Freq: 1.0x
Underground cables	
Target Group	Tradespeople, outdoor workers, machinery operators, construction workers, scaffolders, painters etc. General community
Messages	• Always Dial Before You Dig. • 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. • Wear protective clothing, including safety footwear and safety helmet. • Have emergency contact numbers on site. • Set up safety barriers, witches hats and warning lights to reduce the risk of injury to the general public. • Comply with all WorkCover requirements and codes.
Program Overview	• Ausgrid's underground cable safety program incorporates an awareness campaign which specifically targets outdoor workers/tradies to raise awareness of the dangers associated with digging and working near underground cables. • The campaign comprised of 3 radio advertisements, 2 print advertisements, radio live reads and NRL rotating signage. • The campaign ran in 2 bursts – July/August 2011 and January/February 2012. • Radio is a key medium for this target group as it is present on building sites and in vehicles. • An underground cable safety message is included in our monthly radio safety campaign.
Analysis	**Radio Reach and Frequency** Burst 1 Market: Sydney Burst 2 Market: Sydney Target: M25-54 (Pot: 1,019,000)

<table>
<tr><td></td><td>Target: M25-54 (Pot: 1,019,000)
Reach: 1+ 54.7%, 3+ 36.9%, Ave Freq: 9.6x

Market: Newcastle
Target: M25-54 (Pot: 110,000)
Reach: 1+ 66.2%, 3+ 48.1%, Ave Freq: 12x

Market: Central Coast
Target: M25-54 (Pot: 59,700)
Reach: 1+ 63.3%, 3+ 39.5%, Ave Freq: 6.1x</td><td>Reach: 1+ 44.2%, 3+ 25.9%, Ave Freq: 6.2x

Market: Newcastle
Target: M25-54 (Pot: 110,000)
Reach: 1+ 55.2%, 3+ 34.9%, Ave Freq: 7.1x

Market: Central Coast
Target: M25-54 (Pot: 59,700)
Reach: 1+ 50.1%, 3+ 24.9%, Ave Freq: 3.9x
Press Reach and Frequency (per burst)
Potential: 77,000
Reach 1+ 41.7%, Ave Freq: 1.5x</td></tr>
<tr><td colspan="3">Electricity safety for school students</td></tr>
<tr><td>Target Group</td><td colspan="2">Children from Kindergarten to Year 10</td></tr>
<tr><td>Messages</td><td>• 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.</td><td>• 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.</td></tr>
<tr><td>Program Overview</td><td colspan="2">Electricity Safety Week

Ausgrid provides registered primary schools with a pack containing electricity safety activities for Kindergarten to Year 6 students, prizes, posters, stickers and merit certificates.

Stage 3 Electricity and Safety Unit

Ausgrid developed a Stage 3 Electricity and Safety Unit and Electrical Resource Kit which aligns with best practice teaching principles and the NSW Department of Education and Training (DET) physical phenomena curriculum. New Smartboard lessons were developed and launched by the Minister for Education in August 2011.

High School Electricity Resource

In conjunction with the NSW DET, a microsite based on the science curriculum was developed and branded EnergyAustralia. The site provides students with the information they require to complete a mandatory science assignment on electricity.</td></tr>
<tr><td>Analysis</td><td colspan="2">97% of primary schools in Ausgrid’s network area registered to participate in Electricity Safety Week in 2011.

The Electricity Unit and resource kits are provided to schools in Ausgrid’s network area on request. Smartboard lessons were included on USBs in the 2011 Electricity Safety Week Resource Packs and distributed to around 860 primary schools in the Ausgrid network area.

85% of high schools in the Ausgrid network area registered for the High School Electricity Resource support pack.</td></tr>
<tr><td colspan="3">Substation and school holiday safety</td></tr>
<tr><td>Target Group</td><td colspan="2">Residents living within 1km of a zone substation</td></tr>
<tr><td>Messages</td><td>• 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.</td><td>• Call Ausgrid if you see anyone climbing over fences.
• Obey substation warning signs.
• Be aware of electrical dangers.</td></tr>
</table>

<table>
<tr><td>Program Overview</td><td colspan="2">A safety postcard was developed to communicate with children warning them of the danger of entering a substation and asking them to call Ausgrid should a ball or other item go over the fence.</td></tr>
<tr><td>Analysis</td><td colspan="2">An unaddressed mailing was delivered to over 370,000 residences living within 1 km of identified zone substations during May 2012.</td></tr>
<tr><th colspan="3">Do-it-yourself (DIY)</th></tr>
<tr><td>Target Group</td><td colspan="2">Home renovators, home handymen, men aged 18-55 years</td></tr>
<tr><td>Messages</td><td colspan="2">• Don't mess with electricity – you're out of your league.
• Do-it-yourself (DIY) electrical work is not only dangerous, it's illegal.
• Always contact a licensed electrical contractor.</td></tr>
<tr><td>Program Overview</td><td colspan="2">• The NRL continuous call team (CCT) partnership delivers a strong vehicle for an extended DIY Electrical Safety campaign with a broad reach to our target audience in Sydney, Central Coast, Newcastle and the Upper Hunter. The campaign includes live reads and pre-recorded advertisements.
• Electricity safety tips and online banners were also promoted as part of 2GB's Summer Programming from November 2010 to February 2011.
• A DIY electrical safety message is included in our monthly radio safety campaign.</td></tr>
<tr><td>Analysis</td><td>• Ratings in 2011 continue to dominate weekend listening with the CCT team reaching 299,000 listeners every weekend.
• #1 share of overall listening by people 10+ continued to lead in 2010 at 20.9%.</td><td>• Dominating the commercial radio listening by Sydney's men with:
- 24% share of all males 18+
- 16.1% of men 18-54 years
- 14.2% of men 25-39 years.</td></tr>
<tr><th colspan="3">Storm safety</th></tr>
<tr><td>Target Group</td><td colspan="2">General community</td></tr>
<tr><td>Messages</td><td>• Keep a battery-powered torch and radio handy.
• Clear your yard of loose items and prune trees.
• Unplug sensitive electrical devices.</td><td>• Listen to your radio for power restoration updates and safety advice.
• Be careful of electrical hazards hidden in storm debris.
• Always assume fallen powerlines are live.</td></tr>
<tr><td>Program Overview</td><td colspan="2">Extended communications program with emphasis on ongoing preparedness messaging via Australian Traffic Network, runs from November to March each year.</td></tr>
<tr><td>Analysis</td><td colspan="2">A radio campaign was launched in November 2011 and continued until March 2012.</td></tr>
<tr><th colspan="3">Fallen powerlines</th></tr>
<tr><td>Target Group</td><td colspan="2">General community</td></tr>
<tr><td>Messages</td><td colspan="2">• Assume fallen powerlines are live.
• Stay well clear and contact Ausgrid on 13 13 88.</td></tr>
<tr><td>Program Overview</td><td colspan="2">Covered in Ausgrid's Storm Safety and Electricity Safety for Students Campaigns.</td></tr>
<tr><td>Analysis</td><td colspan="2">Results from Ausgrid's Electrical Safety Survey 2012 showed a high understanding of dangers associated with fallen power lines.</td></tr>
</table>

Christmas – people decorating their homes with festive lights	
Target Group	General community
Messages	• Use lights and other electrical equipment designed for external use. • Check lights for damage before use. • Don't overload power points or boards. • Switch off lights overnight and when leaving the house.
Program Overview	Radio advertising ran in December 2011, the key Christmas decoration period.
Analysis	Advertising runs early December to coincide with seasonal risks.
Bushfire risk management	
Target Group	Private Pole Owners
Messages	• 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 inspecting, testing and maintaining their powerlines regularly and making sure they are free of vegetation.
Program Overview	Ausgrid distributes bush fire risk management information to customers in our network area via direct mail, newspaper advertisements and the corporate website. The information outlines the customer's obligations regarding safety management of their electrical installations.
Analysis	• Safety and Bushfire Prevention brochure sent to over 12,500 properties in bushfire designated zones in the Hunter, Central Coast and North Sydney areas. • Tombstone style newspaper advertisements were included in all suburban and metro newspapers – coverage up to 1.4 million customers to meet the requirement for broad coverage across Ausgrid's network area. • Radio advertisements and live reads ran on regional stations.
Graffiti on electrical infrastructure	
Target Group	General community
Messages	If you see graffiti on electrical infrastructure do not attempt to remove it, report it to Ausgrid.
Program Overview	Ausgrid developed a safety postcard to raise community awareness regarding the danger associated with removing graffiti from electrical equipment such as pillar boxes and kiosk subs. The postcard explains the risks and requests the community to report graffiti on electrical equipment via our Graffiti hotline, 13 15 35.
Analysis	An unaddressed mailing, which included a graffiti postcard, was delivered to over 370,000 residences living within 1 km of identified zone substations during May 2012.

9.2.1 Additional sources of Information

A significant amount of information and downloads relating to preventing and managing electrical hazards is on Ausgrid's website.

9.2.2 Additional PESAP Initiatives

In addition to the programs and campaigns outlined in the 2011/12 Public Electrical Safety Awareness Plan program, Ausgrid undertook the additional programs outlined in Table 9.2 during the year.

Table 9.2 Additional PESAP Initiatives

Additional Program	Description and Rationale
Ausgrid's substation safety postcard campaign was extended to include a number of postcards focussing on electrical hazards including storm safety, DIY, general electrical safety and graffiti removal.	An unaddressed mailing was delivered to over 370,000 residences living within 1 km of identified zone substations during May 2012.
Young males aged 16-25 – raise awareness of the high risk to life when acting irresponsibly	An unbranded, viral media based campaign was piloted in Newcastle and the Hunter Region to encourage friends of young men displaying risky behaviour around electrical infrastructure to step in and stop the potential victim. The "Pull Em Down" campaign showed strong results within the target audience with just under 4,000,000 impressions served, 8,300 clicks, a Click Through Rate of 0.21% and a Cost Per Click of $3.75.
Emergency Services personnel electrical hazard awareness	Electrical Hazard Awareness for Emergency Services DVD updated and launched at the 2012 NSW Rural Fire Service Conference. 500 copies were distributed to NSW Rural Fire Service Brigade members from across the state.

10 Power Line 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 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 the crossing, particularly risks 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 to or better than AS/NZW 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 power line crossings of navigable waterways as required by the code. A total of 45 water crossings were assessed to be either a ‘intolerable’ or ‘high’ risk and 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 recorded in Ausgrid Geographical Information Systems as at 30 June 2012 is shown in Table 10.1.

Table 10.1 Power Line 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	227	0	1	1	2
Submarine Crossings	87	1	0	0	0

* Description of incident to be given below.

Description of the modification carried out including sign replacement to be given below.

Ausgrid currently has a program of work underway to implement the required risk treatments identified in each risk assessment as required by the code. The program involves the upgrade of warning signs to comply with the new code and a design review of all 45 ‘intolerable’ and ‘high’ risk water crossings.

Ausgrid has updated the majority of its navigable waterway crossings in the Sydney region to show the maximum vessel clearance heights, as required by the New Australian Standard AS 6947-2000 Crossing of Waterways by Electricity Infrastructure. Additional advisory warning signs have also been installed at all public launching sites within 5km of these water crossings in the Sutherland, Hornsby and Gosford Council Areas.

Ausgrid is currently preparing an Environmental Impact Assessment (EIA) for the works required to upgrade the water crossing signage in the Central Coast, Newcastle and Lower Hunter regions. Ausgrid is also negotiating with private landowners as required, to arrange access to upgrade existing water crossing signs and install new advisory signs as required by the code for Ausgrid crossings.

In 2011/12, the risk mitigation design work for 20 ‘Intolerable’ and 10 ‘High’ risk water crossings was completed and one of the ‘Intolerable’ water crossings was removed to reduce the risk. An additional 6 water crossings are currently being combined with other network projects to address the risks by elimination or modification of the crossing. Out of the 30 water crossing designs completed, two crossings were identified as requiring conversion to a submarine (or underbore) crossing to reduce the risk. A third crossing is also planned to be converted to an underbore, however this is primarily due to other business drivers.

10.3 Water Crossing Incidents

In 2011/12, there was one incident associated with waterway crossings as shown in Table 10.2 below:

Table 10.2 Summary of Incidents during 2011/12

Date	Crossing	Location	Vessel Type
01/09/2011	EA491	Stony Creek, Toronto	Barge

The incident involved the boom of a barge-mounted crane coming into contact with a 240/415V crossing. No injuries or property damage resulted. Ausgrid subsequently replaced the bare wire conductors of the crossing with ABC (insulated) cable and reported the incident to NSW Maritime in accordance with the code.

The crossing was surveyed on 20/5/2010 and the maximum height was determined to be 7.84m above Highest Astronomical Tide (HAT) at maximum operating temperature (75^{o}C). There were warning signs located beneath the crossing on both shores; the safe clearance shown on the signs was 6.4 m (MHWS).

The water crossing was assessed to be of ‘negligible’ risk based on a risk assessment completed by Parsons Brinkerhoff in November 2010, which was carried out in accordance with Australian Standard 6947-2009 Crossing of Waterways by Electricity Infrastructure.

10.4 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. These two inspection programs are offset by five years and as a result the crossings are visited at a minimum of every 2.5 years +/- the latitude for the respective tasks. This is further enhanced by the Vegetation Management Program which is aimed at keeping vegetation at the required clearances at all times.

11 COO Declaration

Ausgrid

ELECTRICITY NETWORK PERFORMANCE REPORT 2011/12

Declaration by Chief Operating Officer

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

- Complies with reporting requirements prescribed under the *Electricity Supply (Safety and Network Management) Regulation 2008*, and the "Distribution Network Service Provider Annual Report Outline" (the Outline), as provided by DTIRIS.
- Has been checked in accordance with recognised quality procedures; 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 Armstrong

SIGNATURE:

CHIEF OPERATING OFFICER

DATE: 20.12.12

ATTACHMENT A: Distribution Reliability of Supply: Definitions and Notes

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.

Note 2: The following definitions and notes are in accordance with the 'Design, Reliability and Performance Licence Conditions' imposed on distributors by the Minister for Energy and Utilities on 1 August 2005 and revised in December 2007. The report outline is the implementation of this reporting framework, with some necessary additions, by NSW DTIRIS for this annual Electricity Network Performance Report required under the Electricity Supply (Safety and Network Management) Regulation 2008.

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 3 below.

Reliability Measures

Measure/description	Index	Definition
Total number of minutes a distribution network customer on average is without electricity / year	**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.
Number of interruptions on average, a distribution network customer's supply is interrupted per year	**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).

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 0.5 seconds, 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. The number of distribution customers is calculated as the average of the number of customers at the beginning of the reporting period and the number of customers at the end of the reporting period.
3. Un-metered Street Lighting supplies are excluded. Inactive accounts are excluded.

Reliability Data Sets – Sustained Interruptions

<table>
<tr><th>Title</th><th>Data Set</th></tr>
<tr><td>Overall interruptions</td><td>All sustained interruptions including transmission, directed load shedding, planned and unplanned.</td></tr>
<tr><td>Planned interruptions only</td><td rowspan="2">Excludes:
• Transmission outages, and
• directed load shedding.</td></tr>
<tr><td>Unplanned interruptions</td></tr>
<tr><td>Normalised</td><td>Further excludes those outages which are defined as ‘excluded interruptions’.</td></tr>
</table>

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 a 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.

6. 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, TMED. 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 (exclude transmission and directed load shedding but include planned outages) 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 calculated the TMED (i.e. days that did not have any interruptions are not included).
(c) Take the natural logarithm (In) 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 TMED using the following equation:
(g) TMED = e(α + 2.5β)
(h) Any day with daily SAIDI value greater than the threshold value TMED 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	A feeder supplying predominantly commercial, high-rise buildings, supplied by a predominantly underground distribution network containing significant interconnection and redundancy when compared to urban areas.
Urban	A feeder, which is not a CBD feeder, with actual maximum demand over the reporting period per total feeder route length greater than 0.3 MVA/km.
Short Rural	A feeder which is not a CBD or Urban feeder with total feeder route length less than 200 km.
Long Rural	A feeder which is not a CBD or Urban feeder 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.

ATTACHMENT B: Transmission Reliability: Network Indices

A **Transmission Network** is a system of electricity lines and associated equipment 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

(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.

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

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 8760 hours.

System Reliability (Un-Planned 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.

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

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 number	Date of incident	Party involved	Details of incident	Corrective action
1	1/04/2012	Worker	While re-tensioning aerial bundled cable, the wire grip (which was too small for the task) damaged the insulation, resulting in a short circuit and blown high voltage substation fuses. The wire grip became live as a result of the incident. There was no risk to the workers as they were in an insulated EWP and wearing appropriate PPE.	Transformer and low voltage mains were isolated. Damaged aerial bundled cable was repaired. All customers meter boards supplied from this pole top transformer were inspected for damage. All customers were advised to contact Claims hotline if private equipment had been damaged. Supply was then restored. The wire grip has been replaced with the correct type.
2	2/04/2012	Worker	An auger was being used to drill a hole about 2 metres below ground level. Earlier the crew had hand dug 900mm down and then used a cable avoidance tool which gave no indication that there were cables below. When a bang was heard, the auger was removed and a damaged cable was found.	All work stopped and site was made safe. Work was carried out correctly but the cable was still hit. Cable avoidance tool had not pick up the cable that was 2 m deep. DBYD plans were checked which showed the cable on the other side of the pole. Cable jointer Leading Hand was reminded to carefully read the DBYD plans.
3	2/04/2012	Contractor	A contractor was completing excavation work for Ausgrid to construct a new HV jointing pit at the corner of Pyrmont St and Quarry St, Pyrmont. A member of the contractor working party was using a jackhammer to break away concrete around service cables. The jack hammer came into contact with the cables resulting in a fault on 11 kV panel at Blackwattle Bay Zone. The flash from the fault exited the conduits away from the worker and no injury was sustained.	Site works halted by contractor supervisor and contact made with Ausgrid Staff.
4	3/04/2012	Worker	While re-bonding a pole, two linesmen were working aloft transferring aerial bundled cable (ABC) to open wire copper mains. During the process of transferring the cable, one of the linesmen connected the ABC tail under load which resulted in a flash / flame coming from the insulation piercing connector (IPC).	Linesman was instructed to cut away ABC tail and checked the copper main for damage (no damage to the main). ABC and copper main were lamped out and found full supply across all phases. Both linesmen instructed to come down, their condition was assessed and another group discussion held about how to properly re-bond the pole, including the reasons why IPC's cannot be connected under load. Both linesmen then got back up the pole to resume work.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
5	10/04/2012	Worker	A Underground to Overhead low voltage service main was being replaced due to a pole change-over but the service neutral conductor was not properly terminated. The incorrect termination occurred at an insulation piercing connector (IPC) where there is a through connection in the service cables. Customer appliance damage resulted due to increased volts at the customer's switchboard.	Following a report from the customer, an EMSO was called to the customer's premises to investigate. After testing, the EMSO found the incorrect termination, and repaired to restore supply to normal.
6	14/04/2012	Worker	In the course of re-connecting after underground cable jointing work, a district operator reported to the Area Operator that he had discovered joint holes, which appeared to be related to the work, that were not adequately backfilled. The access permit related to the mains and apparatus had been signed off by the jointer. This is in conflict with Ausgrid Electrical Safety Rules.	Cable works initiating officer was contacted, who confirmed that these joint holes were related to the works and then arranged for the joint holes to be backfilled prior to being energised.
7	16/04/2012	Public worker	A public contractor who was working for Gosford City Council hit an 11 kV cable while excavating for the relocation of a stormwater main.	Operators switched around fault. Ausgrid jointers temporarily sealed cable to prevent moisture ingress.
8	17/04/2012	Worker	A District Operator received an electric shock from the earth bar whilst in a distribution substation. He was isolating the switchgear for the purpose of issuing an access permit. The Operator had isolated the switchgear and was in the process of taping off the area when his hands came in contact with the Earth bar and the Earthing sheath covering the 11kV conductor.	Repair the faulty earthing of 11kV 63D/45G Ring Main Isolator (RMI) switch in substation. Review done of single point bonded cable system. Safety advice issued to advise all staff to visually inspect earth bars and sweated jointing prior to works.
9	23/04/2012	Worker	A minor LV electrical flash occurred on fuse carrier while staff were working from an EWP during the replacement of damaged low voltage fuse carriers on a pole top substation. When Ausgrid staff were trying to straighten a lug on a live cable using an adjustable spanner, contact was made via spanner with the line side of opened low voltage sub fuse. This caused a minor flash to occur when the spanner made contact. There was no risk to the workers as they were in an insulated EWP and wearing appropriate PPE.	Sub was isolated and low voltage mains were interconnected. No damage to equipment resulted. Supply was checked and no supply was lost to customers.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
10	29/04/2012	Worker	When connecting a new underground service cable at a turret, the service neutral was inadvertently connected to the turret's C phase terminal block. This resulted in an arc/flash at the point of contact. Contrary to correct procedure, the service neutral conductor remained terminated through to the installation's service neutral link. When the service neutral was inadvertently connected to the turret's C phase terminal block, a fault current was generated resulting in an arc/flash at the point of contact in addition to the installations neutral/earth components being energised to 240V.	Supply was isolated at customer's main switchboard by an Ausgrid employee.
11	1/05/2012	Public worker	A contractor carried out repairs to a main switchboard without a Clearance to Work (CTW) permit issued. The distributor was isolated, but the CTW permit was not issued. This isolation was at approximately 12:50pm on Saturday 28 April. A District Operator and Installation Inspection Inspector were sent to the job on Tuesday 1 May to reconnect when they found that the repairs to the customer's switchboard had been carried out without the CTW permit.	Due to the repairs having been carried out, the distributor was returned to service.
12	1/05/2012	Public general	While removing an old service from lead in pole, the road crossing service fell out of the pole, dropped and was run over by a car travelling up the street. This caused the service to flick up and scratch the car's driver's door, quarter panel, windscreen and mirror.	Driver stopped and exchanged details. Swept & cleaned road.
13	2/05/2012	Worker	Two substation technicians were installing protective screening on the live low voltage board of a distribution substation. A third staff member was also present in the substation assisting with preparing the screening material. In the final stages of the work being carried out, an arc-fault occurred in the low voltage board due to unknown reasons. Two technicians received flash burns to their faces from this arc.	Ambulance attended site and employees were taken to hospital for treatment for minor facial burns. Electricity supply was isolated by Ausgrid operators. Substation remains de-energised and will be decommissioned.
14	7/05/2012	Contractor	Joint bay had been previously excavated by the cable laying contractor for upcoming works. On the morning of 7/5/2012, Ausgrid staff entered the joint bay which contained a damaged, but still in service, 11kV cable joint. After examining cables in the joint bay, staff noticed the damaged joint and got out. No direct contact was made by Ausgrid staff with the damaged joint.	Immediately informed all nearby personnel of the damaged joint. The joint bay was covered with boards and temporary fencing restored. Additionally, informed Ausgrid staff including the cable laying contractor project officer. Cable joint repaired under planned works on 10/5/2012.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
15	7/05/2012	Public worker	A public contractor, who was repairing a brick wall, drove 1.8m star picket into 11kV underground cable tripping feeder while installing temporary barricade. The builder employing the worker had insufficient details to contact employee to determine employee's condition. Worker was eventually spoken to after the incident and employee was OK.	Network testers initially had trouble locating fault, but noticed the builders shed. Further investigations located fault under star picket. Cable repaired.
16	15/05/2012	Worker	There was a potential failure of tower member at its attachment point. The two bolts that attach the top and bottom chord of the bottom phase wing on the tower member were highly rusted and were in need of replacement. The worst of the two nuts were assessed and removed along with the bolt. The new bolt that was used to replace it wouldn't go into the old hole; which on inspection was out of alignment. Upon forcing the new bolt into the hole, the leftover rusted nut on the existing bolt disintegrated and the two members sprung apart about 10mm causing massive vibrations through the tower and up and down the lines.	The new bolt was put in and tightened up as much as possible still leaving a gap of around 5mm between the two members.
17	17/05/2012	Worker	High voltage (HV) pole failed while tensioning mains on the adjacent pole. Line crew were transferring 11kV mains from the old pole to the new Air break pole. As they were tensioning the last wire, the HV pole adjacent to them failed under the possum guard and collapsed to the ground. The shock loading that this created caused the pole that they were working on to shake and twist, swinging the cross arm into the shoulder of one of the line crew who sustained a minor soft tissue injury that required no medical treatment.	As it was an earthed high voltage feeder and there was no low voltage on the pole, there was no electrical hazard. Also the incident happened on a fire trail so there was no risk to the public. The Superintendent arranged for the pole to be replaced.
18	31/05/2012	Worker	Whilst carrying out a restoration of supply to isolated customers, an Ausgrid cable jointer noticed that a service fuse had been reinstalled by persons unknown. Service neutral was disconnected as per service reconnection rules. Operator's Danger Tag was found in garden. Operator tag was installed in meter box as there was not a locking tab on service cabinet. Customer was not home at time of restoration.	Service fuse was removed and a full lamp test was carried out. The neutral was reconnected and supply was restored.
19	7/06/2012	Worker	An unplanned crane movement occurred during lift of a Circuit Breaker within Cooranbong Zone Substation. The ground around one of the crane's stabilizing footings collapsed, causing the boom of the crane to come into contact with an Overhead Earth wire.	Work stopped and crane load was put back on the ground, before the crane itself was repositioned to a safe position.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
20	28/06/2012	Worker	Employee was inspecting a timber pole when they brushed up against it, and received a mild electric shock. Work ceased and the area was then barricaded. Supervisor was advised of the incident and employee was then taken for ECG.	Work ceased and area barricaded. Supervisor advised of the incident. Employee taken for ECG.
21	25/06/2012	Worker	On 16/06/2012, terminating pole KO01787 in Margate St was reported with a lean. Pole was recommended for replacement and new pole position was marked approximately half a meter from existing pole, on the side away from LV mains. When pole crew were on site, they hand dug where new pole was marked to depth of 1.7m to ensure they were clear of a storm water pipe marked on DBYD plans. As they began to use the auger to bore the hole to correct size, the pole began to lean further and stopped at an angle about 50 degrees to horizontal. This caused LV mains to lower, coming into contact with a traffic control vehicle that was parked on the roadway, causing damage to truck.	Work was then stopped and the auger was left in the hole to help prevent further movement. Overhead staff cut away mains at next pole to allow safe removal of the old pole and installation of new pole. A second borer/crane was used to remove pole safely.
22	18/06/2012	Worker	Whilst decommissioning the single circuit breaker substation, the no.2 transformer differential current transformers (CTs) were cut away by the substation technician after asking the protection technician if it was safe to do so. The protection technician had incorrectly presumed that the CTs had previously been shorted and it was safe to give go ahead, without checking.	Work was stopped on site near the open circuit CTs until supervisors attended site and proceeded to assist the technician in shorting out in-service CTs, and making CTs safe for work.
23	7/06/2012	Worker	A technician completed an accuracy test on an energy meter and was in the process of restoring the circuit when his mobile phone rang. He took the phone call, then sent an email from his laptop, returning to the meter panel approximately ten minutes later. Upon removing the shorting plug on white phase links an arc was drawn across them.	The short was replaced, the circuit was closed, checked and returned to service. The technician was wearing the correct PPE at the time and had suffered no electric shock or injury.
24	3/07/2012	Worker	An employee was in an EWP while standing a pole. The pole was then turned 180 degrees resulting in the cross arm striking the employee in the back.	No treatment for the injury was required.
25	7/07/2012	Worker	A near miss was reported after an employee was standing a pole when a wire was caught between borer and the pole, resulting in the wire being cut and falling between live LV mains.	Wire recovered to the head of pole.
26	20/06/2012	Accredited Service Provider	The incident occurred when an ASP was connecting twin 4 x 95 aerial bundled cable to a low voltage link box on Ausgrid's Low Voltage Network. ASP did not phase test correctly and inadvertently there was a short circuit, causing a flashover. No injuries occurred to the ASP.	ASP was able to complete work. Ausgrid issued a safety breach and is conducting an investigation.

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

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
ZN263:PA35 37ABC	DALLEY ST	456	1.00	Mar-11	81.33	0.93	73.14	1.97	Frequency over index	Monitor

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
ZN15004:PA1	NEWPORT	367	1	Jun-07	138.99	3.00	506.32	8.73	Duration over index	Performance Corrected
ZN9037:PA2	MIRANDA	1045	6	Dec-07	132.38	2.04	325.62	4.00	Duration over index	Performance Corrected
ZN15002:PA6	NARRABEEN	1615	12	Mar-09	323.62	4.10	432.83	3.08	Duration over index	Monitor
ZN847:PA18	HORNSBY	1576	16	Mar-10	192.97	2.43	350.81	3.13	Duration over index	Performance Corrected
ZN12600:PA3	LISAROW	1436	10	Jun-10	241.41	4.07	146.92	4.99	Frequency over index	Monitor
ZN15010:PA7	CAREEL BAY	1922	8	Sep-10	154.31	2.04	301.20	5.14	Frequency over index	Performance Corrected
ZN15004:PA3	NEWPORT	1562	7	Sep-10	173.41	3.16	197.53	4.99	Frequency over index	Performance Corrected
ZN15004:PA5	NEWPORT	1442	12	Sep-10	157.90	3.21	202.98	5.04	Frequency 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
ZN15004:PA9	NEWPORT	2636	10	Sep-10	181.21	3.09	266.33	5.53	Frequency over index	Performance Corrected
ZN12620:PA3	NORAVILLE	1057	5	Sep-10	162.24	2.15	483.51	4.07	Duration over index	Performance Corrected
ZN12620:PA7	NORAVILLE	2087	9	Sep-10	255.24	3.73	475.61	4.03	Duration over index	Performance Corrected
ZN874:PA15	CONCORD	605	3	Dec-10	0.00	0.00	400.47	0.44	Duration over index	Performance Corrected
ZN129:PA8	HUNTERS HILL	1106	7	Dec-10	87.14	1.18	391.85	3.74	Duration over index	Performance Corrected
ZN15014:PA19	MONA VALE	1924	12	Dec-10	294.14	2.19	724.34	9.24	Duration over index	Performance Corrected
ZN12650:PA6	WEST GOSFORD	1754	19	Dec-10	84.71	2.07	250.21	4.49	Frequency over index	Performance Corrected
ZN12570:PA9	AVOCA	1060	7	Mar-11	232.72	3.33	421.31	5.43	Duration over index	Performance Corrected
203:8082	CARRINGTON 33	25	2	Mar-11	0.00	0.00	395.83	1.21	Duration over index	Performance Corrected
203:8084	CARRINGTON 33	1385	9	Mar-11	129.14	1.00	459.13	3.13	Duration over index	Performance Corrected
ZN3425:PA30	CASTLE COVE	1469	8	Mar-11	177.48	2.17	537.55	4.98	Duration over index	Performance Corrected
ZN847:PA1	HORNSBY	1208	12	Mar-11	205.73	2.14	555.04	7.07	Duration over index	Performance Corrected
ZN15014:PA14	MONA VALE	852	13	Mar-11	104.29	1.24	434.40	4.83	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
ZN15014:PA22	MONA VALE	860	6	Mar-11	223.14	1.05	419.49	4.57	Duration over index	Performance Corrected
ZN15002:PA4	NARRABEEN	706	5	Mar-11	55.09	1.77	368.23	5.96	Duration over index	Performance Corrected
ZN15005:PA6	BELROSE	1371	11	Jun-11	236.54	1.72	384.62	5.47	Duration over index	Performance Corrected
ZN711:PA16	BLACKWATTL E BAY	298	2	Jun-11	0.34	0.00	683.24	0.71	Duration over index	Performance Corrected
ZN384:PA37	CAMPERDO WN	192	1	Jun-11	0.00	0.00	1065.97	0.88	Duration over index	Performance Corrected
ZN1648:PA11	ENFIELD	505	3	Jun-11	171.35	1.01	230.98	4.12	Frequency over index	Performance Corrected
ZN129:PA19	HUNTERS HILL	1722	8	Jun-11	182.66	3.25	381.75	3.06	Duration over index	Performance Corrected
232:11457	NELSON BAY 33	2249	17	Jun-11	26.15	0.14	557.02	3.85	Duration over index	Performance Corrected
ZN12570:PA11	AVOCA	772	7	Sep-11	230.03	2.84	253.51	4.06	Frequency over index	Performance Corrected
ZN12570:PA18	AVOCA	1960	15	Sep-11	366.71	5.25	303.96	6.08	Frequency over index	Reliability Project issued. Vegetation report issued.
ZN15005:PA4	BELROSE	1113	9	Sep-11	657.39	5.36	539.09	6.36	Duration over index	Reliability project issued.
ZN1648:PA16	ENFIELD	1186	5	Sep-11	171.35	1.01	456.30	1.32	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
216:10723	EDGEWORTH 33	740	3	Sep-11	45.13	1.00	373.11	3.11	Duration over index	Performance Corrected
ZN129:PA9	HUNTERS HILL	1100	9	Sep-11	423.71	4.09	471.01	4.26	Duration over index	Vegetation report issued, reliability project under development.
ZN12590:PA4	LAKE MUNMORAH	602	5	Sep-11	96.46	3.03	354.40	4.17	Duration over index	Performance Corrected
211:33602	SHORTLAND 33			Sep-11	0.00	0.00	263.35	4.01	Frequency over index	Performance Corrected
ZN188:PA33	ZETLAND	61	3	Sep-11	1429.21	1.84	1462.72	3.52	Duration over index	Monitor
ZN10994:PA12	MORTDALE	2024	8	Sep-11	396.56	4.56	318.69	5.14	Frequency over index	Monitor
ZN12650:PA19	WEST GOSFORD	33	1	Sep-11	16.00	1.00	346.18	5.82	Frequency over index	Performance Corrected
ZN9035:PA10	CARINGBAH	507	1	Dec-11	287.19	2.15	380.91	3.13	Duration over index	Performance Corrected
ZN9035:PA11	CARINGBAH	1892	6	Dec-11	261.17	2.00	381.92	3.25	Duration over index	Performance Corrected
ZN9035:PA4	CARINGBAH	1799	9	Dec-11	271.31	2.14	393.89	4.09	Duration over index	Performance Corrected
ZN9035:PA7	CARINGBAH	602	3	Dec-11	294.22	2.08	399.68	4.03	Duration over index	Performance Corrected
ZN2635:PA5	EPPING	6	4	Dec-11	436.29	1.00	509.00	1.17	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
ZN35370:PA8	GALSTON	437	11	Dec-11	291.68	2.53	504.56	3.99	Duration over index	Performance Corrected
ZN15008:PA4	HARBORD	1318	8	Dec-11	0.00	0.00	372.84	3.78	Duration over index	Performance Corrected
ZN15008:PA7	HARBORD	2720	8	Dec-11	65.55	2.98	272.93	4.92	Frequency over index	Reliability Project being developed
ZN9700:PA20	KIRRAWEE	1350	13	Dec-11	563.06	5.03	423.70	3.57	Duration over index	Vegetation report issued.
ZN10999:PA11	KOGARAH	2078	4	Dec-11	392.52	2.86	521.26	3.82	Duration over index	Monitor
ZN12600:PA13	LISAROW	852	18	Dec-11	359.19	7.07	305.87	5.95	Frequency over index	Reliability Project issued, vegetation report issued.
240:34843	MAYFIELD WEST 132	270	6	Dec-11	273.39	1.96	519.03	2.49	Duration over index	Performance Corrected
ZN10994:PA19	MORTDALE	902	10	Dec-11	231.04	3.00	303.67	4.08	Frequency over index	Performance Corrected
ZN901:PA19	SURRY HILLS	723	3	Dec-11	950.61	1.15	1000.75	1.27	Duration over index	Monitor
ZN901:PA20	SURRY HILLS	1172	4	Dec-11	337.30	1.63	354.78	1.15	Duration over index	Monitor
ZN14144:PA4	WAMBERAL	829	5	Dec-11	399.00	5.20	438.68	5.07	Duration over index	Monitor
ZN10994:PA7	MORTDALE	1890	10	Dec-11	181.79	1.98	378.93	3.90	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
ZN14144:PA8	WAMBERAL	474	3	Dec-11	288.39	4.23	617.72	7.79	Duration over index	Performance Corrected
ZN35500:PA14	TOP RYDE	73	9	Dec-11	191.74	1.22	623.72	3.15	Duration over index	Performance Corrected
ZN12590:PA2	LAKE MUNMORAH	1502	11	Dec-11	175.27	3.72	376.52	3.03	Duration over index	Performance Corrected
ZN12650:PA13	WEST GOSFORD	1714	17	Dec-11	92.42	2.28	228.55	4.18	Frequency over index	Performance Corrected
ZN15005:PA10	BELROSE	798	15	Mar-12	418.44	3.10	417.03	3.10	Duration over index	Monitor
ZN15005:PA8	BELROSE	2007	5	Mar-12	340.45	4.01	341.67	4.03	Frequency over index	Feeder inspected, vegetation report issued
ZN931:PA26	DARLINGHUR ST	211	2	Mar-12	624.31	1.85	711.15	2.83	Duration over index	Monitor
ZN15012:PA8	KILLARNEY	1503	8	Mar-12	321.83	2.84	439.13	4.77	Duration over index	Performance Corrected
ZN9700:PA23	KIRRAWEE	1684	7	Mar-12	386.13	3.14	358.20	3.11	Duration over index	Reliability Project under development.
ZN1788:PA14	MATRAVILLE	1086	9	Mar-12	248.51	4.07	239.58	4.04	Frequency over index	Performance under review
217:33611	MOUNT HUTTON 33	1355	9	Mar-12	150.73	2.20	367.31	4.22	Duration over index	Performance Corrected
ZN342:PA26	PADDINGTON	2891	6	Mar-12	547.96	2.64	372.43	1.50	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
ZN965:PA38	PENNANT HILLS	977	11	Mar-12	318.55	3.50	344.37	4.38	Frequency over index	Performance Corrected
ZN965:PA42	PENNANT HILLS	1155	7	Mar-12	375.57	5.25	215.58	4.07	Frequency over index	Feeder inspected, vegetation report issued
ZN10995:PA1	RIVERWOOD	2098	6	Mar-12	188.63	4.98	188.82	4.98	Frequency over index	Feeder inspected, vegetation report issued
ZN10995:PA2	RIVERWOOD	2324	8	Mar-12	224.32	3.95	305.85	4.88	Frequency over index	Performance Corrected
ZN901:PA22	SURRY HILLS	310	1	Mar-12	205.21	1.04	386.57	3.15	Duration over index	Performance Corrected
ZN36300:PA17	BALGOWLAH NORTH	1376	6	Mar-12	304.41	2.99	369.43	3.74	Duration over index	Performance Corrected
ZN2400:PA15	BEROWRA	1241	13	Jun-12	531.34	4.30	531.34	4.30	Duration over index	Performance under review
ZN2400:PA22	BEROWRA	1327	14	Jun-12	559.70	5.66	559.70	5.66	Duration over index	Performance under review
ZN3425:PA28	CASTLE COVE	748	8	Jun-12	414.48	2.25	414.48	2.25	Duration over index	Performance under review
ZN15006:PA9	DEE WHY WEST	2536	8	Jun-12	373.90	3.06	373.90	3.06	Duration over index	Performance under review
ZN12580:PA16	ERINA	1236	13	Jun-12	210.46	4.20	210.46	4.20	Frequency over index	Performance under review
221:11897	GATESHEAD 33	650	6	Jun-12	395.78	1.00	395.78	1.00	Duration over index	Performance under review

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
ZN847:PA26	HORNSBY	169	0	Jun-12	368.77	2.54	368.77	2.54	Duration over index	Performance under review
ZN847:PA44	HORNSBY	1036	9	Jun-12	417.13	2.28	417.13	2.28	Duration over index	Performance under review
ZN12600:PA9	LISAROW	1704	13	Jun-12	243.27	4.11	243.27	4.11	Frequency over index	Performance under review
ZN12610:PA11	LONG JETTY	2374	14	Jun-12	369.08	5.12	369.08	5.12	Duration over index	Performance under review
ZN1788:PA11	MATRAVILLE	488	7	Jun-12	329.23	4.70	329.23	4.70	Frequency over index	Performance under review
ZN4545:PA17	MEADOWBANK	955	9	Jun-12	417.55	2.10	417.55	2.10	Duration over index	Performance under review
202:34260	NEWCASTLE CBD 33	2616	8	Jun-12	168.89	4.08	168.89	4.08	Frequency over index	Performance under review
ZN965:PA26	PENNANT HILLS	871	11	Jun-12	361.31	3.13	361.31	3.13	Duration over index	Performance under review
ZN195:PA9	PYMBLE	1255	13	Jun-12	389.51	4.31	389.51	4.31	Duration over index	Performance under review
ZN10996:PA10	ROCKDALE	898	5	Jun-12	280.49	4.82	280.49	4.82	Frequency over index	Performance under review
526:34637	ROTHBURY 132 11KV	153	0	Jun-12	441.32	2.19	441.32	2.19	Duration over index	Performance under review
511:29880	RUTHERFORD 33	1439	11	Jun-12	231.17	4.10	231.17	4.10	Frequency over index	Performance under review
ZN3154:PA12	ST IVES	771	9	Jun-12	508.45	1.10	508.45	1.10	Duration over index	Performance under review

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
ZN3154:PA5	ST IVES	1123	8	Jun-12	680.89	1.07	680.89	1.07	Duration over index	Performance under review
ZN12660:PA10	WOY WOY	1740	14	Jun-12	270.53	4.06	270.53	4.06	Frequency over index	Performance under review
ZN36300:PA11	BALGOWLAH NORTH	3528	18	Jun-12	376.48	3.76	376.48	3.76	Duration 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:PA2	PEATS RIDGE	568	74	Jun-07	1088.28	8.89	2236.00	11.32	Duration over index	Reliability Project Issued
ZN12630:PA1	PEATS RIDGE	463	83	Dec-10	836.12	8.74	1252.39	6.12	Duration over index	Reliability Project Issued
ZN12630:PA5	PEATS RIDGE	297	40	Dec-10	784.54	7.10	1103.07	7.53	Duration over index	Performance Corrected
ZN14143:PA17	SOMERSBY	757	69	Mar-11	799.94	5.05	1587.29	6.38	Duration over index	Performance Corrected
516:48065	LEMINGTON 66	45	32	Jun-11	221.49	2.07	1136.85	6.31	Duration over index	Performance Corrected
ZN14891:PA12	WYONG	700	72	Jun-11	691.53	4.61	1646.24	6.85	Duration over index	Performance Corrected
802:82225	BAERAMI 33	106	96	Sep-11	1124.87	6.04	870.42	8.38	Frequency over index	Reliability Project Issued

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:PA4	PEATS RIDGE	275	28	Sep-11	538.33	5.33	1008.31	6.91	Duration over index	Performance Corrected
802:82220	BAERAMI 33	60	35	Dec-11	1540.04	8.75	1144.25	9.03	Frequency over index	Reliability Project Issued
ZN2400:PA11	BEROWRA	684	23	Dec-11	1084.51	4.00	1186.25	5.54	Frequency over index	Feeder inspected, vegetation report issued
810:74050	MERRIWA 33	91	102	Dec-11	733.51	5.21	938.34	8.55	Duration over index	Performance Corrected
810:74058	MERRIWA 33	197	124	Dec-11	825.27	6.31	976.04	9.20	Duration over index	Performance Corrected
810:74062	MERRIWA 33	610	13	Dec-11	709.66	5.04	883.53	8.12	Duration over index	Performance Corrected
ZN14144:PA10	WAMBERAL	674	20	Dec-11	1063.32	10.41	810.14	9.70	Duration over index	Feeder inspected, reliability project and vegetation reports issued.
515:35192	MT THORLEY 66	333	88	Mar-12	558.66	5.74	677.7	8.99	Frequency over index	Performance Corrected
802:82215	BAERAMI 33	41	26.9	Jun-12	1128.36	6.10	1128.36	6.10	Duration over index	Performance under review

Long Rural Feeder Category

None.

Attachment F: Sub-transmission lines and substations and Zone substations

Element including location, customer numbers, element length/capacity	Description of non-compliance and reason	Proposed actions and timetable
Homebush 132/33kV STS	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Installation of 3rd transformer at Homebush STS
Port Hacking 132/33kV STS	Forecast to be non compliant in Winter 2012 under N-1 conditions	Relieved by establishment of Engadine and Gwawley Bay 132/11kV zones
Flemington 132/11kV ZS	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Transfer load at 11kV to Homebush Bay zone and future Olympic Park zone
Gwawley Bay 33/11kV ZS	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Retired as a result of the establishment of Gwawley Bay 132/11kV zone
Milperra 132/11kV ZS	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Installation of an additional transformer at Milperra ZS
Rockdale 33/11kV ZS	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Transfer load at 11kV to Kogarah zone
Dee Why West 33/11kV zone	Forecast to be non compliant in Winter 2012 under N-1 conditions	Transfer load at 11kV to Beacon Hill
Killarney 33/11kV zone	Forecast to be non compliant in Winter 2012 under N-1 conditions	Replacement of 33kV switchgear at Killarney zone
Newport 33/11kV zone	Forecast to be non compliant in Winter 2012 under N-1 conditions	Installation of 2nd CLC and splitting 11kV busbar at Newport zone
Hunters Hill 66/11kV ZS	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Transfer load at 11kV to Top Ryde zone
Tomago 132/33kV STS	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	New indoor 33kV switchboard
Rathmines Temporary 132/11kV zone	Forecast to be non compliant in Summer 2011/12 under N conditions	Conversion to permanent 2-transformer 132/11kV zone and N-1 supply
East Maitland 33/11kV ZS	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Retired as a result of the establishment of Metford 33/11kV zone

Element including location, customer numbers, element length/capacity	Description of non-compliance and reason	Proposed actions and timetable
33kV feeder 328 (Bunnerong North to Mascot ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 12 under N conditions	Feeder 328 constraint to be addressed by load transfer to Green Square zone and ultimately refurbishment of Mascot zone due to condition issues
33kV feeder 339 (Bunnerong North to Port Botany ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 12 under N conditions	Feeder 339 constraint to be addressed by load transfer to Maroubra zone via Matraville zone
33kV feeder 341 (Bunnerong North to Mascot ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 12 under N-1 conditions	Feeder 341 constraint to be addressed by load transfer to Green Square zone and ultimately refurbishment of Mascot zone due to condition issues
33kV feeder 345 (Bunnerong North to Sydney Airport ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 12 under N-1 conditions	Ausgrid notify customer and request redistribution of load during outage of feeder 359
33kV feeder 346(1) (Bunnerong North to Botany ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 12 under N-1 conditions	Feeder 346(1) constraint to be addressed by load transfer to Matraville zone
33kV feeder 347 (Bunnerong North to Port Botany ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 12 under N conditions	Feeder 347 constraint to be addressed by load transfer to Maroubra zone via Matraville zone
33kV feeder 360 (Bunnerong North to Mascot ZS)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 360 constraint to be addressed by load transfer to Green Square zone and ultimately refurbishment of Mascot zone due to condition issues
33kV feeder 383 (Surry Hills STS To Surry Hills ZS)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 383 constraint addressed by balancing the loads between the transformers at Surry Hills zone
33kV feeder 396 (1) (Surry Hills STS to Paddington ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 2012 under N-1 conditions	Feeder 396 constraint addressed by load transfer from Rose Bay to Waverley zone and ultimately converting Rose Bay to 132/11kV zone
33kV feeder 396 (2) (Surry Hills STS to Paddington ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 2012 under N-1 conditions	Feeder 396 constraint addressed by load transfer from Rose Bay to Waverley zone and ultimately converting Rose Bay to 132/11kV zone
33kV feeder 478 (Waverley To Rose Bay ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 2012 under N-1 conditions	Feeder 348 constraint addressed by load transfer from Rose Bay to Waverley zone and ultimately converting Rose Bay to 132/11kV zone

Element including location, customer numbers, element length/capacity	Description of non-compliance and reason	Proposed actions and timetable
33kV feeder 644 (Canterbury To Dulwich Hill ZS)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 644 constraint addressed by load transfer at 11kV from Dulwich Hill to Marrickville
33kV feeder 645 (Canterbury To Dulwich Hill T3)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 645 constraint addressed by load transfer at 11kV from Dulwich Hill to Marrickville
132kV feeder 200 (Mason Park STSS to Flemington ZS)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 200 constraint addressed by load transfer to Homebush Bay zone and future Olympic Park zone
132kV feeder 201 (Mason Park STSS to Flemington ZS)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 201 constraint addressed by load transfer to Homebush Bay zone and future Olympic Park zone
33kV feeder 602 (Homebush STS to Lidcombe ZS)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 602 constraint addressed by load transfer to Sefton
33kV feeder 605 (Homebush STS to Lidcombe ZS)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 605 constraint addressed by load transfer to Sefton
33kV feeder 606 (Homebush STS to Concord ZS)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 606 constraint addressed by load transfer to Homebush Bay zone
33kV feeder 607 (Homebush STS to Concord ZS)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 607 constraint addressed by load transfer to Homebush Bay zone
33kV feeder 750/2 (750 tee to Engadine ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 2012 under N-1 conditions	Feeder 750/2 constraint addressed by converting Engadine to 132/11kV operation
66kV feeder 813 (Carlingford STS to Epping ZS)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 813 constraint addressed by load transfer to Meadowbank zone
66kV feeder 820 (Carlingford STS to Epping ZS)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 820 constraint addressed by load transfer to Meadowbank zone
33kV feeder 567 (Willoughby STS to North Sydney zone ZS)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 567 constraint addressed by conversion of North Sydney to 132/11kV operation
33kV feeder 566 (Willoughby STS to North Sydney zone ZS)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 566 constraint addressed by conversion of North Sydney to 132/11kV operation

Element including location, customer numbers, element length/capacity	Description of non-compliance and reason	Proposed actions and timetable
33kV feeder 557 (Willoughby STS to North Sydney zone ZS)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 557 constraint addressed by conversion of North Sydney to 132/11kV operation
33kV feeder 565 (Willoughby STS to Crows Nest Tx2)	Forecast to be non compliant in Summer 2011/12 and Winter 2011 under N conditions	Feeder 565 constraint addressed by conversion of Crows Nest to 132/11kV zone
33kV feeder 562 (Willoughby STS to Crows Nest Tx1)	Forecast to be non compliant in Summer 2011/12 and Winter 2012 under N-1 conditions	Feeder 562 constraint addressed by conversion of Crows Nest to 132/11kV zone
33kV feeder 574 (Willoughby To Gore Hill Tx 4)	Forecast to be non compliant in Summer 2011/12 under N conditions	Feeder 571 and 574 overload resolved by balancing load within zone transformers and load transfer to RNSH Zone
33kV feeder 571 (Willoughby To Gore Hill Tx 1)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 571 and 574 overload resolved by balancing load within zone transformers and load transfer to RNSH Zone
33kV feeder S10/3 (Warringah STS tee Kangaroo Point terminal tee Balgowlah ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 2012 under N-1 conditions	Feeder S10/3 constraint addressed by load transfer at 11kV from Harbord zone to Balgowlah Noth zone
33kV feeder S06 (Warringah STS-Dee Why West)	Forecast to be non compliant in Winter 2012 under N-1 conditions	Feeder S06 constraint addressed by load transfer at 11kV from Dee Why West to Beacon Hill zone
66kV feeder 841 (Avoca ZS to Erina ZS)	Forecast to be non compliant in Winter 2012 under N-1 conditions	Feeder 841 constraint addressed by load transfer at 11kV from Avoca ZS to Wamberal ZS
33kV feeder KU1 (Kurri STS - Cessnock zone)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder KU1 constraint addressed by load transfers at 11kV from Cessnock to Nulkaba zone
33kV feeder KU6 (Kurri STS - Cessnock zone)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder KU6 constraint addressed by load transfers at 11kV from Cessnock to Nulkaba zone
33kV feeder H760 (Merewether STS to Dudley ZS)	Forecast to be non compliant in Summer 2011/12 and Winter 2012 under N-1 conditions	Feeder H760 constraint addressed by load transfers at 11kV from Dudley ZS to Charlestown ZS)
33kV feeder H767 (Merewether STS to Charlestown ZS)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder H767 constraint addressed by retirement of Charlestown 33/11kV ZS and transfer of load to Charlestown 132/11kV ZS)
33kV feeder 3061 (Broadmeadow - New Lambton zones)	Forecast to be non compliant in Summer 2011/12 under N-1 conditions	Feeder 3061constraint addressed by transfer of load at 11kV to proposed Broadmeadow 132/11kV substation

Attachment G: 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.

4. 2012/13 Ausgrid Network Performance Report

Electricity Network Performance Report
2012/13

Electricity Network Performance Report

Contents

Introduction

This report represents Ausgrid's Electricity Network Performance Report for the 2012/13 financial year. The report has been prepared in accordance with the Electricity Supply (Safety and Network Management) Regulation 2008 and follows the outline provided by the NSW Department of Trade and Investment, Regional Infrastructure and Services. The report is designed to report actual performance in the 2012/13 financial year, against the criteria and key performance indicators established in the Network Management Plan. This report therefore complements the Plan and details Ausgrid's performance with respect to:

- Network Management
- Network Planning
- Asset Management
- Network Safety
- Customer Installations
- Accredited Service Provider Scheme
- Bushfire Risk Management
- Public Electrical Safety Awareness
- Compliance with the NSW Maritime electricity industry code 'Crossings of NSW Navigable Waters'.

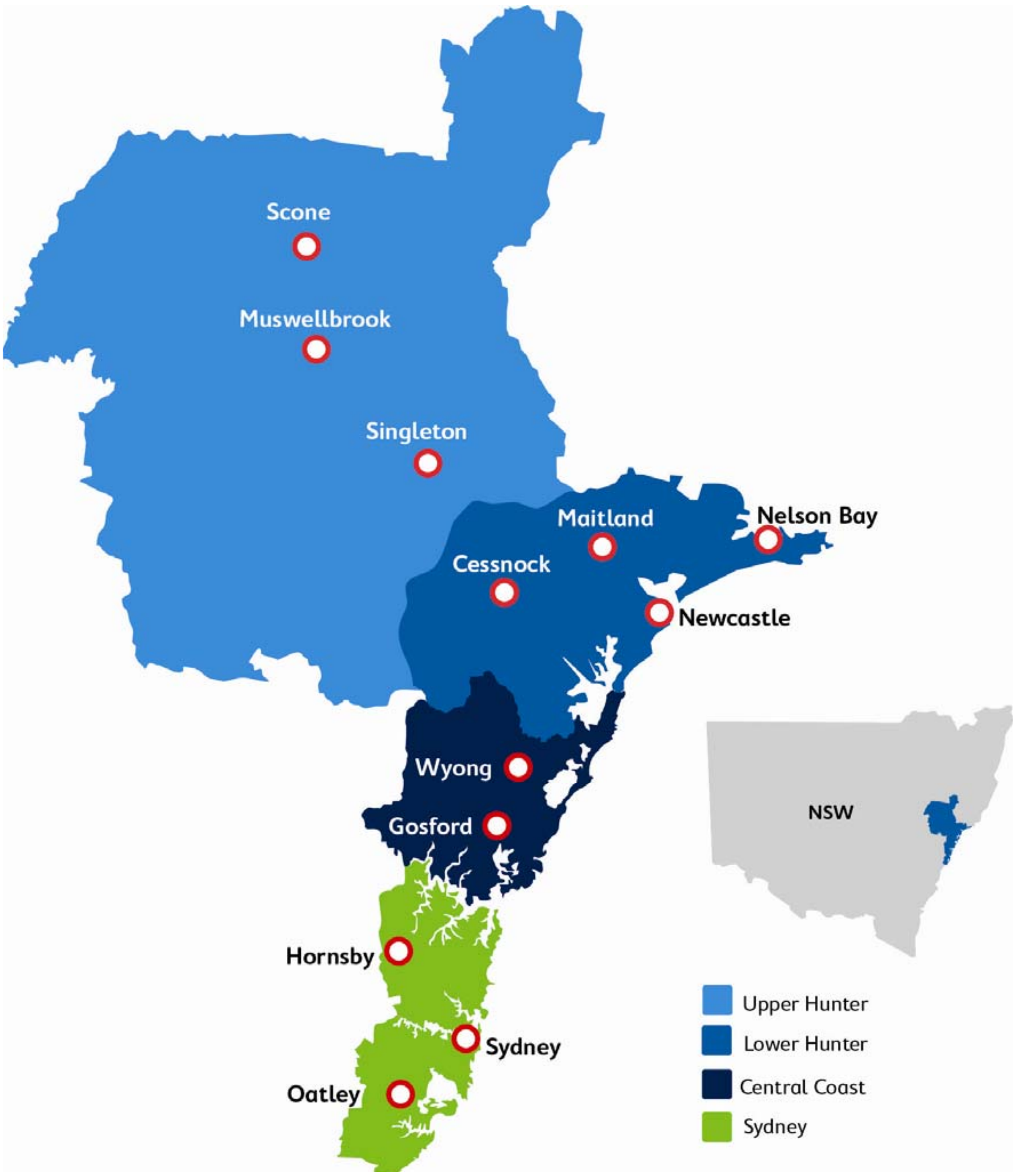
1 Profile

1.1 Overview

Ausgrid's distribution network covers 22,275 square kilometres from Waterfall in Sydney's south to Auburn in western Sydney and the upper Hunter Valley in the north. Ausgrid supplies electricity to 1.6 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, 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 street lighting, customer connections, safety check ups, energy reviews, metering and 24 hour electrical repairs.

Ausgrid's distribution network includes:

- a sub-transmission system of 33kV, 66kV and 132kV assets
- a high voltage distribution system of 5kV, 11kV and 22kV assets
- a low voltage distribution system of 240V and 415V assets
- over 40,000km of overhead lines and underground cables.

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 2011/12	Number at end of 2012/13
Distribution Customer Numbers (Total)	1,627,948*	1,642,353
Distribution Customer Numbers – Sydney East Region	321,360*	326,028
Distribution Customer Numbers – Sydney South Region	479,182*	485,836
Distribution Customer Numbers – Sydney North Region	386,135*	388,924
Distribution Customer Numbers – Newcastle Region	200,493*	199,759
Distribution Customer Numbers – Central Coast Region	158,668*	158,045
Distribution Customer Numbers – Lower Hunter Region	52,695*	53,679
Distribution Customer Numbers – Upper Hunter Region	29,415*	30,082
Maximum Demand (Aggregated System MW)	5,149	5,659
Feeder Numbers CBD	56**	55**
Feeder Numbers Urban	1,751	1,733
Feeder Numbers Short Rural	293	287
Feeder Numbers Long Rural	4	4
Energy Received by Dist Network to Year End (GWh)	30,463*	27,401
Energy Distributed to Year End (Residential) (GWh)	8,892*	8,527
Energy Distributed to Year End (Non-Residential Including un-metered supplies) (GWh)	20,453*	17,789
Energy Distributed to Year End (GWh)	29,345*	26,316
System Loss Factor (%)	3.67%*	3.96%

	Number at end of 2011/12	Number at end of 2012/13
Transmission System (km)	1,024	789[1]
Transmission Substation (Number)	42	42
Sub Transmission System (km)	3,624	3,534[1]
Substation - Zone (Number)	188	192
Substation - Distribution (Number)	30,860	31,070
High Voltage Overhead (km)	10,159	10,117
High Voltage Underground (km)	7,634	7,822
Low Voltage Overhead (km)	13,642	13,060
Low Voltage Underground (km)	5,494	5,638
Pole (Number)	506,517	507,513
Streetlights (Number)	252,955	253,881
Employees (Full Time Equivalent Number)	5,869	5,713
Contractors (Full Time Equivalent Number)	856	622

Notes: Distances for overhead and underground lines are circuit km.

[1] The implied reduction in network length is due to a number of; network reclassifications, reconfiguration of the network, and the correction of errors found in the FY11/12 data.

System Loss Factor (%) is the difference between electricity received by the distribution network and electricity received by customers (including un-metered supplies) divided by electricity received by the distribution network (allowing for embedded generation), expressed as a percentage.

* Data for 2011/12 has been revised in line with the audited Weighted Average Price Cap (WAPC) values and updated customer numbers.

** The count of CBD feeders for reliability purposes is the count of triplex system feeders and not x3 (which counts the 3 "legs" of the triplex feeder system.) The count of triplex feeder "legs" has been included in previous years but was amended in 2011/12 to align with current reliability reporting formats.

1.2 Capital works program

Ausgrid invested about $1.3 billion in the electricity network during 2012/13. A 12 month snapshot of completed works and maintenance activities across the electricity network is available on Ausgrid's website, www.ausgrid.com.au.

Network investment included approximately $443 million on major substation and related feeder projects. During the year, seven major zone substation projects were commissioned in Empire Bay, Rathmines, Tomaree, Charlestown, Aberdeen, Potts Hill and Lake Munmorah. Feeder connections were completed from Lindfield to Kuringai, and Lake Munmorah.

More than 300 kilometres of high-voltage cable and 280 kilometres of low-voltage overhead and underground cables were installed in 2012/13, and more than 430 distribution substations were replaced. In addition, 277,780 planned maintenance inspections were completed across Ausgrid's network.

Table 1.2 Capital works program trend

	Previous Years			Current Year
Year	**2009/10**	**2010/11**	**2011/12**	**2012/13**
Capital works program ($M)	1,291.4	1,523.9	1,632.0	1,267.4

2 Network Management

2.1 Overview

In line with the Electricity Supply (Safety and Network Management) Regulation 2008, Ausgrid is required to prepare, implement and publish a Network Management Plan. The Plan is available at www.ausgrid.com.au.

The Plan contains high level design, construction, operation and maintenance principles to manage network assets. It also incorporates principles applied to asset utilisation in the areas of safety, reliability, quality of supply and risk management. The Plan has four chapters which are outlined below.

Chapter 1: Network Safety and Reliability – sets out a framework for Ausgrid's network to provide a safe and reliable, supply of electricity. This chapter details how Ausgrid:

- manages its assets and sets out the basis for network investment
- plans investments
- provides reference to standards and protocols
- identifies areas of the network that require development.

Ausgrid's network planning meets legislative, licence compliance and regulatory requirements and wider organisational objectives and business responsibilities. These include meeting customer expectations for a safe and reliable supply of electricity; managing safety, environmental and security risks associated with network infrastructure; and managing the financial performance of the business.

To deliver these objectives, the Network Management Plan focuses on:

1. Maintaining compliant infrastructure

   Maintaining compliant infrastructure includes managing safety, environmental and infrastructure security risk. The environmental, safety and asset security obligations applicable to the network and services Ausgrid provides as a distributor are taken into account to develop Ausgrid's network management strategies.

2. Network performance

   Overall network performance is impacted by performance of individual assets, growth in demand, the number of new customer connections required and the extent of any imbalance between overall growth in demand for electricity and available supply.

In meeting these two primary objectives Ausgrid targets its investment expenditure to ensure network performance and compliance outcomes are achieved efficiently and prudently along with all regulatory and other obligations.

While the network performance and customer outcomes associated with the planning processes are stipulated in the Design, Reliability and Performance Licence Conditions, fault level management is not included in this document. The term fault level relates to how much energy can potentially be released during various fault scenarios - and this parameter varies across the network. Ensuring the fault rating of network assets is not exceeded is a significant asset integrity and safety issue, in addition to customer outcomes associated with faults. Management of fault levels is a critical element of the planning process and is an investment driver.

During 2012/13, managing Ausgrid's library of network standards involved issuing four new standards and modifying a further 51 existing standards with an additional 60 changes of a minor nature. All network standards are displayed on an intranet platform for general access across Ausgrid and publicly available standards are also published on the Ausgrid website.

Chapter 2: Customer Installation Safety – addresses the management of safety in customer premises to the point of connection between the customer's electrical installation and the Ausgrid network.

Each year work is undertaken on electrical installations at thousands of customer properties throughout our distribution area. Ausgrid has responsibility for maintaining the distribution network, including the poles and wires required for 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 (contractor).

Customers need to employ licensed electrical contractors for any new or modified electrical work. Accredited Service Providers (ASPs) connecting customer installations to our electricity network need to be authorised by Ausgrid.

In preparation of the Customer Installation Safety Plan we have taken into account the NSW Codes of Practice: Service and Installation Rules, and the Installation Safety Management Code of Practice. There are no departures from these Codes, unless to adopt a higher safety standard. As required we also advise that customers operating electrical installations are subject to the requirements of the Service and Installation Rules of NSW and Ausgrid's local requirements. Issues, initiatives and achievements relating to Ausgrid's customer installations during 2012/13 are outlined in **Chapter** 6 of this report.

Chapter 3: Public Electrical Safety Awareness – aims to warn the public of hazards associated with electricity, particularly in relation to our network. It is based on an assessment of risks associated with the system and an analysis of any accidents or incidents. Ausgrid's approach to public safety focuses on:

- risk assessment and risk reduction
- education and communication
- hazard response and procedures.

The Public Electrical Safety Awareness Plan outlines Ausgrid's commitment to safety and our responsibilities under the Electricity Supply (Safety and Network Management) Regulation 2008. The plan details:

- Ausgrid's approach to safety and potential hazards associated with the transmission and distribution of electricity
- how "at risk" groups are identified
- precautions to avoid electrical incidents.

Programs are designed to create greater awareness of electrical safety amongst the general public and targeted groups, based on an analysis of safety incidents involving Ausgrid's network and relevant data sources.

To communicate our safety message we use a number of communication tools and media to reach the at risk groups including TV, radio and print advertisements, education kits, personal presentations, bill inserts, printed material and the web. A range of safety initiatives and programs undertaken over the past year are outlined in **Chapter** 9 of this report.

Chapter 4: Bushfire Risk Management – describes a management framework that when correctly implemented will:

- ensure public safety

- establish standards for vegetation management near electricity lines (particularly in bushfire prone areas)
- reduce interruptions to supply that are related to vegetation
- minimise the possibility of fire ignition by electricity lines and associated equipment.

Ausgrid has an obligation to manage bushfire risks as they relate to our network. We do this by ensuring our assets are safe and are properly designed, constructed and maintained. We also provide information to owners of private power lines and our customers, describing the obligations associated with private power lines, so that they can do the same. This chapter outlines the procedures, standards, codes and guidelines Ausgrid applies to construction, operation and management of our network to achieve these objectives. It also provides an overview of Ausgrid's bushfire risk management strategies in relation to key stakeholders including:

- landowners and occupiers
- local government
- government agencies
- emergency services.

The Bushfire Risk Management Plan also outlines how we inform customers of their obligation to share bushfire prevention responsibilities with us to ensure privately owned overhead power lines are kept free of vegetation and are inspected, tested and maintained at regular intervals. Details of 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 Complaint Performance Data

	Previous Years				Current Year
Year	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**
Complaints Total	1,409	1,121	1,420	1,471	1,973
Complaints per 1,000 Distribution Customers	0.89	0.70	0.88	0.89	1.2
Complaints regarding Vegetation Management	126	118	242	146	266

Table 2.2 Network Complaint Investigations Completed 2012/13

	Number	Number Valid*
Voltage	211	95
Current	0	0
Other Quality	14	1
Reliability	75	12
Safety	0	0

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

2.3 Customer Service Standards Reporting

Table 2.3 Customer Service Standards 2012/13 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	348	36	0	33
Non-Metropolitan	40	10	0	5

3 Network Planning

3.1 Overview

Ausgrid carries out planning at the strategic and project level, driven by prudent, strategic decisions which consider the capital investment required and the delivery of individual projects. Ausgrid's network planning approach is outlined in the Network Management Plan and is consistent with the principles of the NSW Government's Total Asset Management system. Drivers of investment include asset condition, capacity, reliability, customer connections and ensuring the safety and security of the network.

Ausgrid is required to comply with service standards in the Design, Reliability and Performance licence conditions imposed by the NSW Minister for Energy. The licence conditions facilitate the delivery of a safe and reliable supply of electricity. The AEMC's report following their review of the NSW licence conditions is currently with the Government for consideration, and we are providing ongoing support to both this, and the associated national review. Ausgrid's Electricity Network Operation Standards detail objectives for maintaining quality electricity supply.

Capital investment requirements in the subtransmission network are forecast in line with investment drivers across 25 network areas. Ausgrid also has three transmission plans: Sydney Metropolitan, Central Coast and Lower Hunter, which focus on the transmission network linking TransGrid's bulk supply points to subtransmission substations.

The spatial demand forecast is a critical process which supports planning, development of the capital program and the regulatory submission. The current forecast is the first full implementation of a new forecasting application and enhanced process, developed to provide greater efficiency and accuracy, and specifically including weather correction and load normalisation, broad-based demand management, and econometric growth projections.

3.2 Design Planning Criteria Compliance Reporting

The design planning criteria contained within the licence conditions set input standards to be used in planning the network, requirements for load forecasting and contingency planning methodologies intended to achieve operational outcomes.

The design planning criteria applicable to Ausgrid's network are set out below. The implications of the design planning criteria contained in the licence conditions, and the accompanying notes, are explained in detail in Ausgrid's Network Management Plan.

Design Planning Criteria

Network Element	Load Type	Forecast Demand or Expected Demand	Security Standard	Customer Interruption Time
Sub-transmission Line	CBD	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	≥ 10 MVA	N-1[1]	< 1 minute
	Urban & Non-Urban	< 10 MVA	N[2]	Best practice repair time

Network Element	Load Type	Forecast Demand or Expected Demand	Security Standard	Customer Interruption Time
Sub-transmission Substation	CBD	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	Any	N-1	< 1 minute
Zone Substation	CBD	Any	N-2[6]	Nil for 1st credible contingency < 1hr for 2nd credible contingency
	Urban & Non-Urban	≥ 10 MVA	N-1[1]	< 1 minute
	Urban & Non-Urban	< 10 MVA	N[2]	Best practice repair time
Distribution Feeder	CBD	Any	N-1[3]	Nil
	Urban	Any	N-1[4]	< 4 Hours[5]
	Non-Urban	Any	N	Best practice repair time
Distribution Substation	CBD[1]	Any	N-1[3]	Nil
	Urban & Non-Urban	Any	N[7]	Best practice repair time

[1] For a *Sub-transmission line – Overhead* and *Zone substation*:

(a) under N-1 conditions, the forecast demand is not to exceed the thermal capacity for more than 1% of the time i.e. a total aggregate time of 88 hours per annum, up to a maximum of 20% above the thermal capacity under N-1 conditions.

(b) under N conditions, a further criterion is that the thermal capacity is required to meet at least 115% of forecast demand.

For a *Sub-transmission line – Underground*, any overhead section may be designed as if it was a *Sub-transmission line – Overhead*, providing the forecast demand does not exceed the thermal capacity of the underground section at any time under N-1 conditions.

[2] Under N conditions, thermal capacity is to be provided for greater than 115% of forecast demand.

[3] The actual security standard is an enhanced N-1. For a second coincident credible contingency on the CBD triplex system, restricted essential load can still be supplied.

[4] By 30 June 2014, expected demand is to be no more than 80% of feeder thermal capacity (under system normal operating conditions) with switchable interconnection to adjacent feeders enabling restoration for an unplanned network element failure. By 30 June 2019, expected demand is to be no more than 75% of feeder thermal capacity. In order to achieve compliance, feeder reinforcement projects may need to be undertaken over more than one regulatory period. In those cases where a number of feeders form an interrelated system (such as a meshed network), the limits apply to the average loading of the feeders within one system.

[5] The timeframe is expected only, and is based on the need to carry out the isolation and restoration switching referred to in note 4. This standard does not apply to interim / staged supplies, i.e. prior to completion of the entire development or to excluded interruptions outside the control of the licence holder.

[6] In the CBD area, N-2 equivalent is achieved by the network being normally configured on the basis of N-1 with no interruption of supply when any one line or item of electrical apparatus within a substation is out of service. The licence holder must plan the CBD network to cater for two credible contingencies involving the loss of multiple lines or items of electrical apparatus within a substation, by being able to restore supply within 1 hour. Restoration may be via alternative arrangements (e.g. 11kV interconnections).

[7] Urban distribution substations shared, or available to be shared, by multiple customers are generally expected to have some level of redundancy for an unplanned contingency (e.g. via low voltage manual interconnection to adjacent substations enabling at least partial restoration).

3.2.1 Design Planning Criteria Compliance Reporting

3.2.1.1 Our Compliance Plan

Ausgrid has established planning processes that reflect the licence design criteria which are applied to each of the transmission, sub-transmission, distribution and low voltage areas of the network.

Major projects are planned through a geographically based Area Planning approach that integrates replacement and growth planning and establishes forward plans to meet licence conditions.

Ausgrid completed a comprehensive review of all distribution feeders in January 2013, and has identified projects that will bring all distribution feeders into compliance. Projects are prioritised for delivery based on considerations such as scope, delivery time, cost, load at risk, and likelihood of the risk.

Ausgrid has set utilisation targets for distribution substations which maintain loading within the cyclic rating in accordance with the requirements of the licence conditions.

3.2.1.2 Progress Against Our Plan

Whilst Ausgrid has made progress during 2012/13 against our plan to comply with the licence conditions, we have a significant challenge ahead. Ausgrid has a large program of investments for the 2009-14 period which is driven by the need to systematically replace a large number of ageing network assets as well as the requirement to meet the mandatory licence conditions.

Whilst Ausgrid has completed all planning required to meet the Design Planning Criteria by 30 June 2014, the practicalities of delivery timing will mean that some elements will remain outside the design criteria beyond that date. This includes a number of distribution feeders, two City CBD zones which will not meet the criteria in summer 2015/16 and one 33kV feeder which will be retired by winter 2015.

3.2.1.3 Network Elements Not Complying with the Design Planning Criteria on 1 July 2013

On 1 July 2013, Ausgrid was required to comply with the Design Planning Criteria for any new network element where planning for that network element commenced after 1 December 2007. Existing elements need to be compliant with the design planning criteria by 1 July 2014.

Whilst most existing network elements are forecast to meet the Design Planning Criteria by 1 July 2014 as required, there are some network elements that currently do not meet the requirements of Schedule 1.

Table 3.1 Sub-Transmission Lines and Substations and Zone Substations Not Complying with the Design Planning Criteria on 1 July 2013

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
City Central 132/11kV CBD zone, 22,763 customers, 128MVA secure capacity	Forecast to be non compliant in Summer 2012/13, 2013/14 and 2014/15 under N-2 conditions	Transfer load at 11kV to new Belmore Park and City North zones by summer 2015/16
City South 132/11kV CBD zone, 24,864 customers, 130MVA secure capacity	Forecast to be non compliant in Summer 2012/13, 2013/14 and 2014/15 under N-2 conditions	Transfer load at 11kV to new Belmore Park zone by summer 2015/16
Dalley St 132/11kV CBD zone, 12,710 customers, 123MVA secure capacity	Forecast to be non compliant in Summer 2012/13 under N-2 conditions	Transfer load at 11kV to new City North zone by summer 2013/14

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Leichhardt 33/11kV ZS, 12,435 customers, 36.5MVA secure capacity	Forecast to be non compliant in Summer 2012/13, 2013/14 and Winter 13 under N-1 conditions	Transfer load at 11kV to Camperdown zone in early 2014 to meet compliance by July 2014 and then conversion to 132/11kV operation in 2016
Tarro 33/11kV, 6,507 customers, 22.9 secure capacity	Forecast to be non compliant in Summer 2012/13 under N-1 conditions due to time over firm requirements	Transfer load at 11kV to Thornton zone in 2013 to meet compliance by summer 2013/14
33kV feeder 542 (Kuringai STS to St Ives ZS), 1.9km, 28.9MVA cyclic rating	Forecast to be non compliant in Summer 2012/13 and 2013/14 under N-1 conditions	Feeder 542 constraint addressed by load transfers within the zone to other transformer groups in 2013
33kV feeder 345 (Bunnerong North to Sydney Airport ZS), 8.3km, 16.2MVA cyclic rating	Forecast to be non compliant in Summer 2012/13, 2013/14, 2014/15 under N-1 conditions	Cable scheduled for replacement in 2016. Compliance managed by working with customer to transfer load between Sydney Airport and International Terminal substations in the event of an outage of 33kV feeder 359 at peak loads, resulting in no interruptions.
33kV feeder 396 (1) and 396 (2) (Surry Hills STS to Paddington ZS), 3.9km and 5.2km, 15.5MVA cyclic rating	Forecast to be non compliant Winter 2012, 2013 and 2014 under N-1 conditions	Feeder 396 constraint addressed by load transfer from Rose Bay to Waverley zone and ultimately converting Rose Bay to 132/11kV zone in 2014 by winter 2015
33kV feeder S10/3 (Warringah STS tee Kangaroo Point terminal tee Balgowlah ZS), 2.5km, 37.1MVA cyclic rating	Forecast to be non compliant in Winter 2013 under N-1 conditions	Feeder S10/3 constraint addressed by load transfer at 11kV from Harbord zone to Balgowlah North zone in 2013

Table 3.2 Distribution Feeder Summary Report by Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2013

CBD			
Total Number of Feeders	**Number of Feeders Without N-1 Capability (1 Minute)**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
167	0	Not applicable	Not applicable
URBAN			
Total Number of Feeders	**Number of Feeders Without N or N-1 Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
2,026	261	With the introduction of the Licence Conditions a number of feeders were found to require augmentation to meet the new standards. Also since that time general load growth has resulted in additional feeders not meeting the new standards.	A full review of all feeders was completed in January 2013. All feeders which did not meet N or N-1 capability were identified and projects were issued to rectify.

		Note: Some feeders supply both urban and non urban areas. In urban areas these feeders are designed to N-1 standard whilst the non urban area is designed to N standard. i.e. feeder may pass through a town before entering rural type areas. For reporting purposes feeders which supply both Urban and Non Urban areas have been reported as Urban.	It is anticipated that a majority of the identified non compliant feeders will be fixed by 1 July 2014.
NON-URBAN			
Total Number of Feeders	**Number of Feeders Without N Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
59	13	With the introduction of the Licence Conditions a number of feeders were found to require augmentation to meet the new standards. Also since that time general load growth has resulted in additional feeders not meeting the new standards. Note: Some feeders supply both urban and non urban areas. In urban areas these feeders are designed to N-1 standard whilst the non urban area is designed to N standard. i.e. feeder may pass through a town before entering rural type areas. For reporting purposes feeders which supply both Urban and Non Urban areas have been reported as Urban.	A full review of all feeders was completed in January 2013. All feeders which did not meet N or N-1 capability were identified and projects were issued to rectify. It is anticipated that a majority of the identified non compliant feeders will be fixed by 1 July 2014.

Table 3.3 Distribution Substation Summary Report by Class of Network Elements Not Complying with the Design Planning Criteria on 1 July 2013

CBD			
Total Number of Substations	**Number of Substations Without N-1 Capability (1 Minute)**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
433	2	Substations loaded above 100% of firm rating.	Remove overload by uprating existing substations or transferring load to adjacent substations. Overloads measured before February 2013 are due for rectification by 30 June 2014.

URBAN and NON-URBAN			
Total Number of Substations	**Number of Substations Without N Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
31,088	236	Substations loaded above 100% of firm rating.	Remove overload by uprating existing substations, transferring load to adjacent substations via augmentation, installing new low voltage distributors or new distribution substations. Overloads measured before February 2013 are due for rectification by 30 June 2014.

Note: the Licence Condition for existing network elements does not take effect until 1 July 2014. Reporting should only be in relation to Clause 14.1 of the Licence Conditions i.e. for new network elements.

3.3 Demand Management

Demand and capacity forecasts for the electricity supply system are identified through the planning process, and published in the Distribution Annual Planning Report (DAPR) on the Ausgrid website.

When forecasts indicate that a network need for demand related investment is required, Ausgrid will investigate and where viable, develop and implement demand management (DM) projects to maintain network reliability. The DM investigation is comprised of five separate stages:

Stage 1: Identify network need for demand related investment

Demand management options are considered during the network planning process either as part of the development of potential credible options for individually identified network needs, or as part of the integrated consideration of potential credible options in Area Plan reviews.

Stage 2: Conduct demand management screening test for credible non-network solutions

Each potential network investment is screened to determine if it is reasonable to expect that a demand management or non-network solution could allow for a deferral or avoidance of the network investment. The screening test is a desktop study used to establish Ausgrid's expectation of whether non-network options are technically and economically feasible. If the screening test concludes that it is reasonable to defer the proposed network infrastructure project, a Non-network options report will be issued and the options investigation process will be initiated.

Stage 3: Conduct demand management investigation including community consultation

The investigation process seeks to identify potential cost effective demand management options that could defer the network investment, and to identify the size, timing and budget costs of these feasible options. Based on the demand reduction requirements in the demand management screening test, the investigation stage identifies potential non-network solutions to achieve the demand reductions. Options are identified using Ausgrid's existing knowledge, via public consultation, field visits to customer sites and discussions with major customers. The investigation identifies the amount of demand reductions available and the likely cost of each non-network option identified.

Stage 4: Select preferred non-network option, where viable and cost effective

Any feasible DM options are considered for development alongside network augmentation options.

Stage 5: Implement demand management solution

If a feasible DM option is determined to be the most economical solution, it is implemented with clear deliverables in terms of demand reduction, timing and cost.

A more detailed summary of this DM process is provided on Ausgrid's website.

Table 3.4 Demand Management Projects Implemented During 2012/13*

	Description of Demand Management Project Implemented	Peak Demand Reduction (kVA)	PV of Costs of Demand Management Project	PV of Total of Capital Expenditure Deferment plus Op Ex Savings
Individual large projects				
Sub-totals	-	-	-	-
Consolidated projects				
Sub-totals	-	-	-	-
Totals	**-**	**-**	**-**	**-**

* Ausgrid continued implementation of two demand management projects in 2012/13 at Medowie and North West Pennant Hills which have been reported in previous years. There were no new projects approved in this reporting year.

Explanatory notes for Table 3.5:

Reports are required for large projects reported individually and for small projects reported collectively. Optionally, small projects may be individually listed, but must not be counted again in the consolidated report. Small projects could conveniently be grouped into headings such as: Customer Negotiations (Demand Reduction) or Installation of Local Generator etc. A large project is defined as proposed network expansions or augmentations, which would cost in excess of $500,000. Such large projects may be at zone substation level. Demand reductions should relate to permanent reductions only, and are the figures for the reporting year.

Table 3.5 Demand Management Investigations in 2012/13 Found Non-Viable**

	Description of Potential Demand Management Project	Investigated and Reason for Non-viability	PV of Costs of Investigations
1	Beresfield Zone Substation	The DM investigation was initiated. This investigation is still in progress.	$3,454
2	Jannali Zone Feeders 2 & 9	The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project.	$2,807 (est)
3	Homebush Bay Zone Additional Transformer	The screening test was completed and concluded that DM would be a cost effective option to enable deferral of the supply side project. However due to a subsequent change in the demand forecast, the demand reductions were no longer required.	$16,265
4	South Greenacre Park Zone Development	The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project.	$2,974
5	Darling Harbour Zone Development	The screening test was completed and concluded that DM would not be a cost effective option to enable deferral of the supply side project.	$2,641

** In 2012/13 Ausgrid changed the process by which demand management options are considered in the network planning process, with DM Screening Tests now primarily integrated into the Area Plan reviews. In future years Ausgrid will limit reporting in this table to DM Investigations conducted in Stage 3 of the process described above.

4 Asset Management

4.1 Overview

Ausgrid's philosophy is that an integrated asset management system forms the backbone of an effective service delivery program. Ausgrid believes that through the integration of all facets of asset management, including design, procurement, maintenance activities, renewals/replacements, capital investment, condition monitoring and continuous improvement, it will deliver its business and strategic objectives. These objectives are established and documented in the Network Maintenance Plan. The service delivery program is essential to preserve the engineering integrity of assets and their continued fitness for use within the electrical system. This will enable Ausgrid to meet its commercial obligations and statutory responsibilities under the Electricity Safety Act and Occupational Health and Safety Regulation.

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.

4.2 Technical Service Standards

Electricity delivered by Ausgrid's network has particular characteristics including some interruptions to supply caused when power lines are damaged by storms, bushfires and accidents. 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 NSW Trade & Investment, in respect to reliability standards, quality standards and individual feeder standards.

The NSW Code of Practice - Electricity Service Standards[1] provides a framework for supplying electricity customers on the Distribution Network. Ausgrid's technical document Electricity Network Operation Standards[2] (ENOS) 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

It is not possible to supply a customer with the idealised voltage and current due to the physical nature of the network and the characteristics of the customers' loads. Ausgrid's objective is to achieve the best possible overall supply quality of our electricity network, given the condition and utilisation of existing network assets, within the funding available to maintain and augment the electricity network. The National Electricity Rules require the Distribution Network Service Providers to establish Planning levels for a range of Supply Quality parameters.

At Ausgrid, monitoring for supply quality is undertaken by a number of means including fixed meters at Distribution Substations, random Power Quality (PQ) surveys at customer premises and participation in the Long Term National Power Quality Survey conducted by the University of Wollongong.

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 new Standards based Supply Quality monitoring project, the Ausgrid Low Voltage Network Power Quality Survey. Ausgrid monitored 206 randomly selected Low Voltage customer sites for one week using temporarily installed power quality meters. These meters meet the highest accuracy

[1] http://www.energy.nsw.gov.au/electricity/network-connections/electricity_connect_code_of_practice_electricity_service_standards.pdf
[2] http://www.ausgrid.com.au/~/media/Files/Network/Documents/ES/ENOS_Oct2011.pdf

requirements (Class A) as specified in AS/NZS 61000.4.30. As this is the first year of the survey, year on year comparison will not be possible until the next reporting period.

The sites were evaluated for compliance against the relevant standards:

- Range of Supply Voltage – AS 61000.3.100
- Voltage Unbalance – AS/NZS 61000.2.2
- Harmonic Content of the Voltage Waveform – AS/NZS 61000.2.2
- Voltage Fluctuations (Flicker) – AS/NZS 61000.2.2

Of the 206 sites, five sites were excluded due to insufficient data. The following sections describe the performance of the 201 sites to the relevant standards:

a) Range of Supply Voltage

AS 61000.3.100 which is written to a nominal low voltage supply of 230V, states that the 99th percentile (V99%) of the 10 minute average voltage readings for a 1 week survey should be less than 253 Volts and that the 1st percentile (V1%) of the 10 minute average voltage readings for a one week survey should be greater than 216 Volts.

In the survey all sites complied with the V1% limit and approximately 70% of sites complied with the V99% limit. The high V99% figure is a consequence of the network being historically designed for a nominal 240V range.

Based on the survey results, a relatively small drop in peak voltages of around 1.5% (based on 230V) would enable Ausgrid to meet a probabilistic planning level of at least 95% of the network delivering voltage within the AS 61000.3.100 compliance range.

Ausgrid’s 230V migration program is progressively delivering a voltage range reduction using adjustments of zone substation voltage regulation settings and distribution substation tap changes. The benefits of this program should begin to be seen in the 2013-14 reporting period with the expectation that a higher percentage of the LV sites will meet the limits.

b) Voltage Unbalance

Voltage unbalance is a condition in which the three phase voltages differ in amplitude and/or are displaced from their normal 120 degrees phase relationship.

The results of the survey show that voltage unbalance for all measured sites with three phase connection were under the Compatibility Level of 3% as specified in AS/NZS 61000.2.2. The compatibility level is a reference value for trouble-free operation of items of equipment connected to the network.

All measured sites were compliant for Voltage Unbalance.

c) Harmonic Content of the Voltage Waveform

Harmonics are sinusoidal voltages having frequencies that are whole multiples of the frequency at which the network is designed to operate (50 Hz). Total Harmonic Distortion is a measure of the harmonics in the supply voltage and is the sum of the powers of all harmonic voltages present compared to the fundamental (50Hz) voltage.

The results of the survey show that the Total Harmonic Distortion (THD) was at or below 3.6% against the Compatibility Level of 8% THD for Low Voltage as specified in AS/NZS 61000.2.2.

All measured sites were compliant for THD.

d) All individual harmonics apart from the 15th harmonic (i.e. 750 Hz) were compliant. For the 15th harmonic, about 30% of measured sites were above the 0.3% compatibility level in AS/NZS 61000.2.2 (maximum recorded level was 0.5%). This is not seen as a significant issue in terms of causing trouble for equipment operation and it may be appropriate for the compatibility level to be increased - noting that New Zealand has chosen a higher limit of 1.8% as the Compatibility Level for the 15th Harmonic.
Voltage Fluctuations (Flicker)

Short Term Flicker (PST)

The results of the survey show that the majority (approximately 95%) of sites met the Short Term (PST) compatibility level for flicker of 1.0.

Long Term Flicker (PLT)

The results of the survey show that just over 90% of sites met the Long Term compatibility level (PLT) for flicker of 0.8.

Long term flicker (PLT) is higher than short term flicker (PST) due to the lower limit against which it is assessed (0.8 versus 1.0).

Inspection of the results show that a number of the sites with high levels of Flicker were in proximity of an Electric Arc Furnace (EAF) that is injecting high levels of Flicker onto the network. Ausgrid is planning to investigate potential mitigation methods for reducing the flicker from the EAF, however no issues have been reported by customers in relation to the EAF.

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

A set of 1 week's data (recorded in April 2013) for a sample set of 1090 Distribution Transformers was analysed for Voltage performance, and was compared with data gathered from 225 Distribution Transformers in April 2012.

For Voltage, the results indicate on average, there has been a 1 Volt drop in the Median and 99th percentile values between 2012 and 2013 measured data.

Over time, as Ausgrid progresses its plan to reduce the average network voltage from around 250V to around 240V, a corresponding reduction will be observed in these readings.

4.4 Distribution Reliability

4.4.1 Overview

This report has been prepared in accordance with the 'Design, Reliability and Performance licence conditions' imposed by the Minister for Energy and Utilities on 1 December 2007 and the standards issued by the 'Steering Committee on National Regulatory Reporting Requirements' (SCNRRR).

Two related indices are applied when reporting reliability. The first, SAIDI, is commonly referred to as the "Reliability Index" and represents the average number of customer minutes lost by all network customers. SAIFI represents the average number of interruptions for all customers.

The following notes relate to the reporting system issues outlined in Note 1 Attachment A to this report.

The classification of Ausgrid's approximately 2,100 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.

Reliability reporting uses the IEEE methodology for defining Major Event Days as outlined in the Design, Reliability and Performance licence conditions (Major Event Day is defined in Attachment A, see page 49)

There are three instances where Ausgrid departs from the Definitions detailed in Attachment A to this report – departures in relation to Notes 2 and 3 of Table A.1 Reliability Measures, and in regard to the calculation for the Major Event Day Threshold (Tmed):

1. Note 2 – Ausgrid measures and records customers affected and the customer base on a daily basis. Reliability performance indices are calculated on a daily basis rather than using the average of the number of customers at the beginning and the end of the reporting period. The daily calculation method provides a more representative customer performance at the time of the event.

2. Note 3 – 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.

3. In regard to the calculation for the Major Event Day Threshold (Tmed), the Design, Reliability and Performance Licence Conditions review working group had agreed, in March 2010, that the Tmed calculation should be consistent with the Australian Energy Regulator (AER) Tmed calculation method. The Design, Reliability and Performance Licence Conditions require (Schedule 6) that Planned Outages be included in the daily SAIDI dataset for calculation of the Tmed value. The AER requires (STPIS definitions November 2009) that Planned Outages be excluded from the daily SAIDI dataset for calculation of the Tmed value.

   This agreed change to the Tmed calculation has not yet been amended in the Design, Reliability and Performance Licence Conditions document. However, Ausgrid has applied this change to the 2010/11, 2011/12 and 2012/13 reliability performance reporting to ensure consistency with the AER reliability performance reporting definitions, as agreed with the Minister's Office.

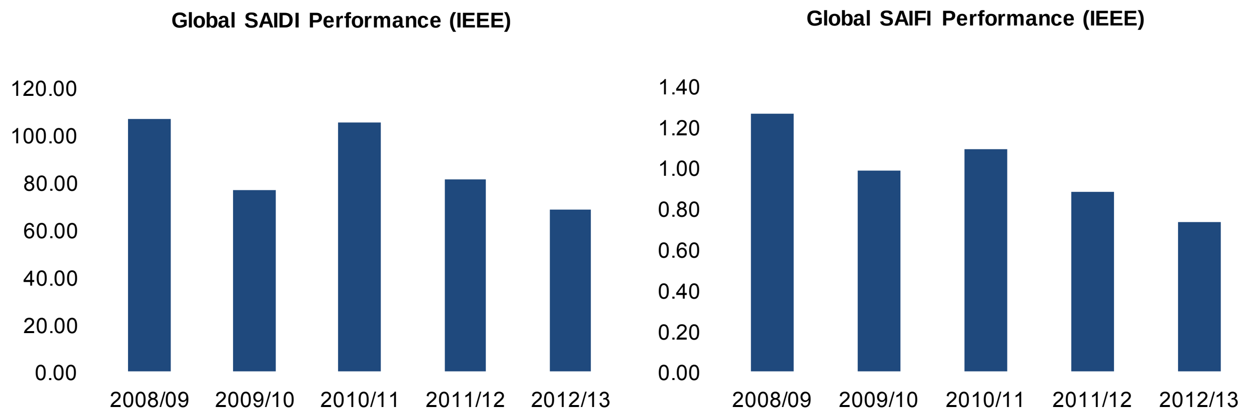
4.4.2 Organisational Performance (Normalised) Trend

Table 4.1 Organisational Performance Trends (Normalised)

	Previous Years				Current Year
Year	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**
SAIDI	106.41	76.77	104.81	80.88	68.24
SAIFI	1.26	0.98	1.09	0.88	0.73

The data in Table 4.1 representing SAIDI and SAIFI is also shown graphically below in Figure 2.

Figure 2 Organisational Performance Trends (Normalised)



4.4.2.1 Comment on Performance

The 2012/13 performance for both SAIDI and SAIFI was the best result in the last five years and has been trending downwards over this period. This year's results can be attributed to the Regulatory Works Program as well as favourable weather conditions.

There were two Major Event Days for 2012/13, firstly on 10 August, 2012 (6.03 SAIDI for the day) and secondly on 23 February, 2013 (5.80 SAIDI for the day). Both events were predominantly due to strong wind storms impacting the entire Ausgrid Network.

The historical reliability performance has been re-calculated using the more accurate OMS connectivity data and a consistent application of the current exclusion rules across all years. As a consequence reliability figures are 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 2012/13

Sustained Interruption Data Sets		Whole Organisation and Feeder Category				
Category		ORG*	CBD	Urban	Short Rural	Long Rural
Customer Numbers[1]		1,642,951	30,363	1,417,378	192,590	2,620
SAIDI	Overall[2]	115.75	66.85	85.44	329.16	943.40
	Planned[3]	35.57	28.35	19.64	146.35	303.03
	Unplanned[3]	80.07	38.49	65.73	182.37	640.37
	Normalised[4]	68.24	38.49	56.91	147.87	533.15
SAIFI	Overall	0.90	0.16	0.76	1.98	3.62
	Planned	0.10	0.04	0.06	0.43	0.99
	Unplanned	0.79	0.12	0.70	1.55	2.63
	Normalised	0.73	0.12	0.65	1.42	2.56

Notes:

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

[1] Customer numbers as at the end of June 2013 for the purposes of reliability indices only. Refer to Table 1.1 for the total of customers served.
[2] Overall performance represents the total performance experienced by our customers, irrespective of cause or origin of the fault.
[3] 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, momentary interruptions and interruptions caused by a customer installation failure.
[4] 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		2008/09	2009/10	2010/11	2011/12	2012/13
SAIDI	Actual	41.24	34.94	4.57	5.36	38.49
	Target	51	48	45	45	45
SAIFI	Actual	0.55	0.10	0.05	0.04	0.12
	Target	0.32	0.31	0.3	0.3	0.3

Table 4.4 Urban Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2008/09	2009/10	2010/11	2011/12	2012/13
SAIDI	Actual	91.48	64.16	88.3	71.45	56.91
	Target	86	84	80	80	80
SAIFI	Actual	1.13	0.87	0.97	0.78	0.65
	Target	1.24	1.22	1.2	1.2	1.2

Table 4.5 Rural Short Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2008/09	2009/10	2010/11	2011/12	2012/13
SAIDI	Actual	214.43	179.25	236.88	150.92	147.87
	Target	340	320	300	300	300
SAIFI	Actual	2.31	1.95	2.08	1.62	1.42
	Target	3.7	3.4	3.2	3.2	3.2

Table 4.6 Rural Long-Feeder Performance (Normalised) Trend

		Previous Years				Current Year
Year		2008/09	2009/10	2010/11	2011/12	2012/13
SAIDI	Actual	620.66	423.29	440.56	516.22	533.15
	Target	780	740	700	700	700
SAIFI	Actual	3.78	2.93	4.23	4.19	2.56
	Target	7	6.5	6	6	6

4.4.4.1 Comment on Performance

All feeder category performances were compliant against the Reliability Standards for 2012/13. CBD performance increased from previous years due to cable fault in pit in the CBD. Both Urban and Short Rural feeders continued to improve. Long Rural was similar to the previous year. There are so few feeders in this category that results can fluctuate dramatically year to year.

4.4.4.2 Excluded Events

Table 4.7 Excluded Interruptions for 2012/13

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
23/07/2012	Transmission / Bulk Supply	516	162	0.0511	Transmission / Bulk Supply
10/08/2012	Major Event Day (The Major Event Day was predominantly due to a strong wind storm impacting the entire Ausgrid network)	53,776	262	6.03	Exceeds Tmed 2.69
24/08/2012	Load Shed - Other Auth. Request	2	124	0.0002	Load Shed - Other Auth. Request
07/12/2012	Load Shed - Other Auth. Request	1	3498	0.0021	Load Shed - Other Auth. Request
02/01/2013	Load Shed - Other Auth. Request	3	27	0.0000	Load Shed - Other Auth. Request
14/01/2013	Load Shed - Other Auth. Request	19	119	0.0014	Load Shed - Other Auth. Request
23/02/2013	Major Event Day (The Major Event Day was predominantly due to a strong wind storm impacting the entire Ausgrid network)	36,295	4,185	5.80	Exceeds Tmed 2.69

4.4.5 Performance against Individual Feeder Standards

The performance objectives for organisational average performances for each feeder category are not sufficient to identify when customers on a particular feeder experience unsatisfactory reliability performance. For this reason, SAIDI and SAIFI criteria (after 'excluded interruptions' are disregarded) act as a trigger for investigation and exception reporting purposes.

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 Ministerially-imposed Licence Conditions 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

Performance outside this range results in the following actions:

(a) immediate investigation of the causes for each feeder exceeding the *individual feeder standards*;

(b) by the end of the quarter following the quarter in which the feeder first exceeded the standard, complete an investigation report identifying the causes and action required to improve the performance;

(c) complete any operational actions identified in the investigation report to improve the performance of each feeder to the *individual feeder standards* by the end of the third quarter following the quarter in which each feeder first exceeded the *individual feeder standards*; and

(d) where the investigation report identifies actions, other than operational actions, required to improve the performance of each feeder to the *individual feeder standards*, develop a project plan, including implementation timetable, and commence its implementation by the end of the second quarter following the quarter in which the feeder first exceeded the *individual feeder standards*.

Table 4.9 Individual Feeder Performance against the Standard Summary

	Feeder Type			
	CBD	**Urban**	**Short Rural**	**Long Rural**
Feeders (Total Number each Type)	55	1,733	287	4
Feeders that Exceeded the Standard During the Year (Total Number)	2	59	6	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.

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

Ausgrid has an ongoing reliability improvement program in place. The program targets those feeders that have exceeded or are approaching the Individual Feeder Standards as outlined in Schedule 3 of the Design, Reliability and Performance Licence Conditions.

4.5 Transmission Reliability

4.5.1 Transmission Reliability Performance Data

Table 4.10 Transmission Circuit Availability (%) Trend

	Previous Years				Current Year
Objective	2008/09	2009/10	2010/11	2011/12	2012/13
	97.98	96.67	97.14	96.17	96.20

There has been a slight increase in circuit availability from the previous year's result. As in recent years, the transmission availability this year was heavily influenced by the large number of outages associated with major capital build programs such as the 132kV isolator and circuit breaker replacement programs, as well as relay replacements at various sites and the transfer of 132kV feeders to the new TransGrid Beaconsfield busbar.

Table 4.11 Network Reliability Trend

		Previous Years				Current Year
	Objective	2008/09	2009/10	2010/11	2011/12	2012/13
Network Reliability (Off Supply Event Numbers)		1	0	2	0	0

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

	Previous Years				Current Year
Objective	2008/09	2009/10	2010/11	2011/12	2012/13
	3,279	2,291	3,497	5,810	4,734

This year's average unplanned outage duration was shorter than last year, though still significant. Major contributors to this year's unplanned duration index were a number of 132kV oil insulated cable failures and their long duration repair times. The most notable of these has been the repair of a leak in oil filled cable 90W, which took more than four months.

Table 4.13 Connection Point Interruptions (Unplanned) 2012/13

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

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

Table 4.14 Connection Point Numbers 2012/13

	Year
Number of Connection Points (Total Number)	20

Ausgrid has seven transmission customers supplied from 20 connection points.

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 in an extract from our Network Management Plan.

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 staff and contractors under the Work Health and Safety Act 2011 (NSW) (WHS Act) and the Work Health and Safety Regulation 2011 (NSW) (WHS Regulation). Successful implementation of workplace safety processes and procedures also has an impact, 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’s Workplace Health and Safety Management System is called Be Safe. The Be Safe Management System has two key objectives:

- the health, safety and welfare of all staff while they are at work
- ensuring that people other than our staff are not exposed to unacceptable risks to their health and safety in connection with Ausgrid’s network operations.

The principal document in the Be Safe Management System is the Be Safe Policy. The Be Safe Policy articulates the organisation’s commitments to health and safety through in the areas of:

- Leadership
- Making health and safety part of all business decisions
- Awareness and Measurement
- Training, Protection and Investigations.

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.

Ausgrid also publishes a Public Electrical Safety Awareness Plan to educate 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 7 of the National Electricity Network Safety Code "ENA NENS 01 - 2006")
- induction training for all new employees (both employees and contractors) is carried out in accordance with our Quality, Safety, Health and Environmental Management System
- accreditation of service providers undertaking contestable work meets Code of Practice Contestable Works standards (and other applicable schemes) administered by the Office of Fair Trading
- reporting of accidents and incidents – as specified by NSW DTIRIS under the Significant Electrical Network Incidents reporting system (including those required under the Electricity (Consumer Safety) Regulation 2006)
- reporting of customer installation incidents to the Office of Fair Trading (in accordance with the Electricity (Consumer Safety) Act 2004).

5.2 Public Reportable Safety Incidents

During 2011/12, the Industry Safety Steering Committee endorsed the implementation of a new SENI reporting scheme which took effect from 1 April 2012. The result is a change in the definitions, and reporting format of incidents to a new spreadsheet format. The change in definitions, which involves the inclusion of near miss incidents, results in a significant increase in the quantity of data analysed and reported.

Ausgrid reported 143 Reportable Safety Incidents involving the public in 2012/13, as summarised in Table 5.1. Although this figure is larger in quantity, a comparison of incidents of the same significance as those reported in previous years, shows that the results are comparable. Of the 143 Public Reportable Safety Incidents, only one incident involving contact with the electrical network resulted in an injury. This incident is described in further detail in 5.2.1.

These Serious Electricity Network Incidents (SENI) are analysed by Ausgrid to form 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

	Previous Years					Current Year
Year	**2008/09**	**2009/10**	**2010/11**	**July 2011 – March 2012**	**April 2012 – June 2012**	**2012/13**
Non-Fatal	2	4	4	3	4	143
Fatal	-	-	1	1	0	0

5.2.1 Incident 1 – Rose Bay 20 July 2012

A public electrician received flash burns due to a short circuit that occurred while carrying out work on a private residence at Bayview Hill Road. He was not an ASP but was attempting to connect a new house main at the Point of Attachment (POA). The electrician was transported to hospital in an ambulance but was not admitted having only received minor flash burns. The service cable was then repaired by Ausgrid staff.

5.3 Worker Reportable Safety Incidents

During 2011/12, the Industry Safety Steering Committee endorsed the implementation of a new SENI reporting scheme which took effect from 1 April 2012. The result is a change in the definitions, and reporting format of incidents to a new spreadsheet format. The change in definitions, which involves the inclusion of near miss incidents, results in a significant increase in the quantity of data analysed and reported.

Ausgrid reported 63 Reportable Safety Incidents involving workers in 2012/13, as summarised in Table 5.2. Although this figure is larger in quantity, a comparison of incidents of the same significance as those reported in previous years, shows that the results are comparable. Of the 63 Worker Reportable Safety Incidents, three incidents involving contact with the electrical network resulted in an injury. These incidents are described in further detail in 5.3.1 to 5.3.3.

Table 5.2 Worker, contractor and ASP Reportable Safety Incidents

	Previous Years					Current Year
Year	**2008/09**	**2009/10**	**2010/11**	**July 2011 – March 2012**	**April 2012 – June 2012**	**2012/13**
Workers	3	5	5	8	19	39
Contractors	-	-	-	-	2	16
ASPs	2	-	-	-	1	8

5.3.1 Incident 1 – Lidcombe 10 October 2012

An ASP worker, while identifying a Low Voltage cable, removed a Low Voltage cap from an energised cable, and shorted it with a knife. The ASP worker received minor burns and was taken to hospital. The ASP Company notified WorkCover of the incident.

5.3.2 Incident 2 – Epping 8 December 2012

An arc flash occurred, resulting in a fire when an Ausgrid employee (district operator) was in the process of racking in an 11kV circuit breaker at Epping. The site was made electrically safe by staff, and the fire brigade managed the fire. The employee received minor burns to his hand that was treated by first aid.

5.3.3 Incident 3 – Epping 7 May 2013

A Contractor working for Ausgrid at Epping Zone substation jack hammered into a live 11kV underground cable, causing an arc flash. The contractor received treatment in hospital and was released on the same day. Ausgrid made the cable and site safe, prior to repairs being carried out.

5.4 Major Incident Reports

Ausgrid's Incident Management System (IMS) provides an organisation wide system for managing all types and severity of incidents. 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 2012/13 there were two major incidents which required the Minister for Energy to be notified in accordance with the Design, Reliability and Performance licence conditions. These incidents are outlined below:

5.4.1 Incident 1 – Regents Park Depot Staff Eye Injury – Monday 4 February 2013 – Major Incident

A major incident was declared when an Ausgrid staff member received a serious eye injury as a result of a fragment of an electrical conduit becoming embedded in his eye while he was working near Regents Park depot.

5.4.2 Incident 2 – Apprentice Motor Mechanic Hand Injury – Monday 24 June 2013 – Major Incident

A major incident was declared when an Ausgrid motor apprentice sustained a serious hand injury while he was working in the engine compartment on an elevated Work Platform (EWP).

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 contractors' 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 contractors whose 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 reported using SAP – CCS has been verified by external audit of Ausgrid's previous annual Electricity Network Performance Reports.

Consistent with previous years, the major causes of customer electric shocks in the reporting period fell into three specific categories – Failure of Part of Installation (more specifically insufficient insulation resistance), Water Damage or Ingress, and faulty neutral connections. 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

	Previous Years				Current Year
Year	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**
Number of Notifications (CCEW)	45,093	47, 799	90,291	58,364	55,156
Number of Inspections	14,396	20,110	57,859	25,258	15,814
Installation Inspection Rate (%)	31.93%	42%	64%	43.28%	28.67%
Major Safety Defect Rate (%)	7.39%	5.3%	2.92%[2]	3.97%	4.07%
Safety Breach Notices Issued (%)	18.67%	13%	8.62%[1]	10.22%	17.53%
Number of Warnings Issued	29	22	18	14	14
Reports to Fair Trading (No.)	2	9	9	13	18
Number of Audits by Distributor	3	3	3	5	3

[1] The number of "safety breach notices issued" for 2010-11 was changed from 2.36% to align with the new reporting procedure used in 2011-12 for defect notices, using SAP customised reporting.

[2] The number of "major safety breach notices issued" in 2010-11 using the new SAP customised reporting (2.89%) was comparable to previous reporting method, so no change was needed.

There has been a further decrease (5.5%) in the number of CCEW notifications of electrical installation work from electrical contractors (in addition to a 35% decrease in 2011-12). This is due to a reduction of solar installations attributed to the solar credits changing to a one times multiplier, as well as a general down turn in the construction and building industry. In late 2012 Ausgrid reviewed the defect rate associated with solar installations and it had decreased to a level comparable with other installation work. As a result, solar installation inspections were then carried out on an audit basis similar to other domestic and commercial installation work.

The trends in 2012/13 continue to indicate that electrical contractors are only submitting notifications when the electrical installation work is associated with contestable service work. Ausgrid has however observed an increase in Fair Trading NSW electrical contractor compliance investigations.

The number of notifications for Level 2 Service Provider contestable work (NOSW) has decreased slightly by 3.33% from the previous year. This decrease is also attributed to the changes to the solar multiplier and general downturn in building activity. The major defect rate of 4.1% is slightly higher than last year (4.0%) but considerably lower than previous periods.

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 for mutual cooperation on electrical installation safety matters. The number of referrals to Fair Trading NSW has increased from 14 to 18 and it has been evident that NSW Fair Trading has increased its electrical contractor compliance activities under the Home Building Act and Electricity (Consumer Safety) Act. Ausgrid has requested that NSW Fair Trading re-establish the quarterly DNSP review meetings to allow Ausgrid, Endeavour and Essential to work with them under the formalised MOU to address electrical contractor compliance issues and the failure of electrical contractors to submit CCEWs to DNSPs as required under the Electricity (Consumer Safety) Regulation.

Ausgrid is also conducting “targeted inspections” (unannounced) of specific large developments like shopping centres and unit blocks, concentrating on the electrical contractor’s compliance with Australian Standards as well as the submission of CCEWs for new electrical work.

Ausgrid is represented on related Australian Standards committees such as AS/NZS3000, AS/NZS 3002, AS2067 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 has worked closely with the Clean Energy Council (CEC – the peak solar industry body across Australia) on all matters relating to solar inspections and presented at their annual ATRAA 2012 Solar Installers conference and Professional Development Day.

Ausgrid and Sydney Water continue to jointly fund the testing of each installation neutral connection impacted by their water main replacement program. Suspected faults are investigated by Ausgrid staff and rectified where necessary. Ausgrid is also making arrangements to conduct post water main replacement tests and convert older direct earthed installations to the current MEN (Multiple Earthed Neutral) earthing.

In 2012 Ausgrid enhanced the SAP – CCS database to allow more accurate reporting on installation inspection trends, defect history and work loads. The enhancements have built in validations that ensure users enter the correct data, which will significantly reduce human error in data entry. The data is now retrievable from the inspection service order which allows for reports to be accurate to the day of the report and will not be affected by any backlogs in completing work.

6.2 Customer Installation Shock Reports

Table 6.2 Customer Installation Shock Reports Trend

	Previous Years				Current Year
Year	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**
Shocks on Customer's Premises (Number Reported)	309	344	363	389	313

Note: Shocks found to be caused by static electricity are to be included in the report.

During 2012/13, there were two fatalities where the probable cause was electrocution whilst working on a customer’s electrical installation. One was as a result of electrical work being carried out by an unqualified person, which resulted in contact with live exposed conductors at a distribution board. The other was as a result an arc flash when an earthed wire came into contact with a live busbar at a 1000 Amp distribution board which an electrician was working on. A third electrical fatality was attributed to suicide.

There was a 19.5% decrease in the number of electric shocks reported this year compared to 2011/12. 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.

An analysis of customer installation shock investigations in 2012/13 follows similar trends to previous years. 19.2% of reported shocks had no apparent cause at the time of Ausgrid's investigation. For the remaining 80.8% of investigations the dominant causes were: Failure of Part of Installation (23%), Defective Neutral on Service Line (11.5%) and faulty consumer's mains (8.6%).

NSW Fair Trading reviewed The Electricity (Consumer Safety) Act 2004 in 2011 but there has been no amendments resulting from the review as yet. Ausgrid submitted comments and suggested changes which included mandating the fitting of Residual Current Devices (RCD's) on power circuits at existing installations and regular safety inspections of the electrical wiring.

7 Contestable Works Scheme

Table 7.1 Contestable Works Trend

	Previous Years								Current Year	
Year	**2008/09**		**2009/10**		**2010/11**		**2011/12**		**2012/13**	
Category	**Int**	**Ext**	**Int**	**Ext**	**Int**	**Ext**	**Int**	**Ext**	**Int**	**Ext**
Network Work (Level 1)										
Project approvals	24	444	24	461	12	557	10	499	4	486
Projects inspected by the DNSP	31	294	22	286	10	393	3	415	4	392
No. of projects with initial major defects	0	108	0	72	0	95	0	110	0	64
Customer Connection Work (Level 2)										
Notifications (NOSW)	5,426	53,015	4,742	59,057	12,041	94,463	8,340	63,971	3,023	66,878
Projects inspected by the DNSP	1,763	16,542	2,176	24474	4,401	56,345	1,877	25,951	718	19437
No. with initial major defects	8	195	7	243	43	281	28	291	0	232
Network Design Work (Level 3)										
Designs Certified	106	327	451	13	42	552	12	638	2	594

Note:

“Int” refers to contestable work done by the distributor’s ASP entity and “Ext” refers to work done by independent ASPs.

Distributors may provide additional information if available that will provide a clarification of procedures and practices they have adopted in administering the Contestable Works scheme.

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

An analysis of the contestable works trends in 2012/13 shows a slight decrease (2.6%) in the total number of project notifications associated with Level 1 contestable work compared to 2011-12 and an 8.3% decrease in certified designs submitted by Level 3 ASPs. This decrease can be attributed to a downturn in commercial development work and general building activity. Figures obtained for Level 2 contestable work show a slight (3.3%) decrease in the total number of notifications (NOSW) compared to 2011-12. The small decrease in Level 2 activity can be attributed to the reduction in the connection of new solar installations due to the reduction of the multiplier and subsequent reduction in the associated contestable metering work.

Level 1 Contestable Work

The ratio of Level 1 work being carried out by external ASPs compared to internal ASPs has remained steady in 2012/13. Only four contestable projects were carried out by internal (Ausgrid) service providers in the period.

Ausgrid found it necessary to implement disciplinary/corrective action on 17 occasions as a result of unsafe practices by external ASPs. Ausgrid facilitated the ASP Safety Forum with increased attendance throughout 2012/13. Eighteen Level 1 ASP companies attended and ran these forums.

Ausgrid provides important information to Level 1 ASP's via safety alerts, and notifications of changes to Network Standards. These included potential safety hazards associated with inadequate excavation procedures, working on live low voltage, using machinery near live mains, working with 33kV underground cables and using sub contracted staff to carry out contestable work. There was one network related safety incident involving a Level 1 ASP that resulted in one loss time injury.

Level 2 Contestable Work

Ausgrid carried out 20,115 inspections of Level 2 completed work for compliance with the standards. This is a 27.7% decrease from 2011/12 due to a trial reduction in the inspection rate for domestic and commercial audit inspections as well as the closure of the NSW Solar Bonus Scheme.

Ausgrid also carried out 449 safety compliance audits of Level 2 "work in progress". Ausgrid conducted 59 corrective/disciplinary interviews, and 11 Level 2 ASP authorisations were suspended for non-compliance or failure to renew authorisation by the annual date. This is a significant decrease on last year which was then attributed to the high number of new, inexperienced Level 2 ASPs entering the industry to do solar metering work. With the downturn in solar metering work, a high number of these inexperienced ASPs have since left the industry.
NSW Trade & Investment is continuing its review of the Accreditation Scheme and adopting the recommendations of the Better Regulation Office (BRO). Ausgrid is a member of the advisory panel carrying out the review.

Table 7.2 External Level 2 ASP Compliance Statistics

	Previous Years				Current Year
Year	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**
Number of new authorisations plus baseline audit	232	263	478	262	268
Number of re-authorisations	412	427	458	462	472
Number of in-field Level 2 safety audits	223	166	182	421	449
Number of disciplinary investigations/interviews	86	66	60	161	59
Number of ASP suspensions	34	12	14	82	11

8 Bush Fire Risk Management

Ausgrid's Bushfire Risk Management strategies 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
- minimise the possibility of fire ignition by electricity lines and associated equipment.

The Bushfire Risk Management Plan forms part of Ausgrid's consolidated Network Management Plan, which was updated as required under the Electricity Supply (Safety and Network Management) Regulation 2008. The Bushfire Risk Management Plan was last reviewed June 2012, as part of the Network Management Plan review. The Bushfire Risk Management Plan contains further details of how we manage bushfire risk.

Ausgrid continues to identify bushfire prone areas from bushfire prone land maps certified by the Commissioner for the Rural Fire Service. Ausgrid has a formal agreement in place with the Rural Fire Service (RFS) to use these maps to identify our assets in these bushfire prone areas – these are updated annually before the bushfire season so the appropriate asset inspections can be completed. The latest update to these maps occurred in 2013, following the receipt from the RFS.

Refer to Table 8.2 for details of the initiatives that Ausgrid has undertaken in the last year to improve systems used to manage bushfire risk within our network area.

Table 8.1 Bushfire risk management

	Previous Years				Current Year
Year	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**
Assets in bush fire prone areas checked by pre-summer inspection %	100%	100%	100%	100%	100%
Private lines in bush fire prone areas checked by pre-summer inspection %	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1
Fire ignitions by network assets (Number)	4	6	4	14	7
Complaints from the public regarding preparation for the bush fire season (Number)	Not discernable, see Note 2.	Not discernable, see Note 2.	Not discernable, see Note 2.	Not discernable, see Note 2.	Not discernable, see Note 2.

Note 1: Bushfire risk management for electrical equipment is a shared responsibility between Ausgrid and all landowners/occupiers who are customers in our distribution area. Ausgrid inspects, tests and maintains the assets we own. However, it is the responsibility of landowners/occupiers to ensure their electrical installations are free from defects that could cause fire or other hazards. Customers are responsible for keeping private overhead powerlines free of vegetation, and must ensure appropriate trees are planted in areas that are close to powerlines. Customers are also responsible for inspecting, testing and maintaining their powerlines and poles at regular intervals – the same way we do.

Ausgrid uses the Service and Installation Rules of NSW to determine the delineation of private electrical installations from network assets. Our requirements for the inspection and maintenance of private aerial mains are detailed in our publication ES1 Customer Connection Information, our Standard Form Customer Connection Contract and the Network Standards referenced in ES1. Under the Electricity Supply (Safety and Network Management) Regulation 2008, we have taken into account the Industry & Investment NSW Code of Practice (Electricity) – Service and Installation Rules of NSW, October 2006, as amended July 2011. The Service and Installation Rules of NSW are prepared in accordance with the Code of Practice. Comprehensive information on Private Lines is not currently held by Ausgrid in our information systems as they are not Ausgrid assets.

Note 2: The majority of the preparations on Ausgrid's network for the bushfire season relate to the clearing of vegetation. Ausgrid has adopted a vegetation strategy designed to maintain vegetation safety clearances at all times, which requires vegetation clearing to be undertaken throughout the entire year, not just at times of preparation for the bushfire season. As our systems record all vegetation related inquiries and complaints, it is not possible to provide an accurate estimate of those that relate specifically to works undertaken in preparation for the bushfire season.

Table 8.2 Initiatives used to manage bushfire risk within Ausgrid's network area

Initiative	Description
1	Ausgrid has continued its monthly reporting process throughout 2012/13 with additional focus on high priority outstanding corrective works that pose a genuine risk in bushfire areas.
2	Ausgrid has established capital and replacement programs to remove equipment with known failure modes that may initiate bushfires during equipment failure.
3	Ausgrid distributes bushfire risk management information which outlines customers' obligations regarding safety management of their electrical installations.
4	Ausgrid has actively participated in NNSW reviews of activities relating to bushfire risk and the inspection and treatment of private lines.
5	Continued liaison with Rural Fire Service, NSW Fire Brigade, councils and other authorities

The following sections provide further information on the initiatives described above.

8.1 Monthly and Quarterly Reporting Process

Pre-bushfire season patrols of poles, lines and associated apparatus are undertaken annually in accordance with Ausgrid's Technical Maintenance Plan. The outcomes of these inspections including defects, maintenance and rectification works are captured in Ausgrid's integrated Asset Management System.

Ausgrid has continued its monthly reporting process to Senior Management on outstanding corrective work in bushfire prone areas.

Table 8.3 provides a summary of the number of defects identified and rectified under the 2012/13 Preventative Maintenance program in bushfire prone areas. Please note that not all tasks identified during 2012/13 will be of such high priority that they need to be completed prior to the end of the year.

Table 8.3 Bushfire prone areas – Bushfire risk corrective maintenance 2012/13

Number of defects	Central Coast	Upper Hunter	Lower Hunter	Newcastle	Sydney North	Sydney South
Outstanding pre 2012/13	157	137	854	801	221	63
Identified in 2012/13	2,142	1,647	3,004	2,449	1,081	236
Rectified in 2012/13	2,033	1,439	2,724	2,521	1,092	264
Outstanding and due or overdue end 2012/13	271	231	1,151	1,241	228	30

Note 1: The regions reported in the table above are based upon Ausgrid's Field Services depot areas, and cover all of the bushfire affected regions.

Note 2: In some regions a number of the defects identified in the previous year were rectified during 2012/13.

Note 3: Due to differing defect priorities, not all defects identified during the 2012/13 year fall due within the 2012/13 year. The table above will not directly summate as a result.

Note 4: High priority defects detected during 2012/13 but not yet rectified by 30 June 2013 are expected to be rectified prior to the 2013/14 bushfire season.

Note 5: The Sydney East region is not considered to be bushfire prone and is excluded from the table.

8.2 Capital and Replacement Programs

Ausgrid has continued its low voltage spreader capital programme to reduce the likelihood that low voltage overhead power lines will cause bushfires. If overhead power lines clash together, the resulting arcing has the potential to cause a fire - low voltage spreaders are used to prevent power lines clashing and therefore significantly reduce the likelihood of fire. Ausgrid installed an additional 161 low voltage spreaders this year, 67 of these in bushfire-prone areas.

The Ausgrid Replacement plan for the 2009/14 regulatory period also includes:

- replacement of over 40 kilometres of steel overhead mains per year – much of this will be replaced with new covered conductor
- replacement of over 500 air break switches per year with new air break switches with enclosed load-break contacts which contain any arcing produced during switching operations
- replacement of over 130 oil-filled reclosers and sectionalisers with modern gas-filled equipment
- replacement of over 22,000 low voltage services per year
- continuation of the overhead mains access track refurbishment programme which benefits Ausgrid as well as the RFS during times of bushfire by providing improved access to fight fires as well as carry out repairs to restore electricity supply
- replacement of defined types of insulators known to be at end-of-life on 132kV lines.

8.3 Communicating with Customers

During 2012/13, Ausgrid distributed a brochure to targeted landowners located in bushfire prone areas in the Hunter, Central Coast and North Sydney regions. Titled "Your power lines: safety and bushfire prevention", the brochure outlines:

- contact details (phone and website) for the NSW Rural Fire Service to enable the customer to assess whether their property is located within a bushfire prone area
- the demarcation between Ausgrid's network and private power lines
- 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 poles and mains
- a reference to the Ausgrid website for contact details of companies which employ qualified pole inspectors, authorised tree trimmers and licensed electrical contractors who can inspect or repair private power lines.

Further information on how we communicate risk with our customers is outlined in our Public Electrical Safety Awareness Program.

8.4 Liaison and consultation with Fire Services and others

Ausgrid continues to build strong relationships with the RFS and NSW Fire Brigade, as well as maintaining relationships with local councils, National Parks and Wildlife Service and other stakeholders.

Ausgrid participates in 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.

9 Public Electrical Safety Awareness

Ausgrid is committed to increasing awareness amongst the general public of electrical safety. This commitment is demonstrated through the development and implementation of a Public Electrical Safety Awareness Plan (PESAP). This section describes the PESAP program in 2012/13.

9.1 Key Issues

The PESAP program is designed to highlight the risks associated with the distribution of electricity on the network's assets (i.e. power lines and substations) and to educate the public about how to avoid dangerous situations.

The risks outlined in PESAP have been identified as hazardous since electricity was first distributed and continue to be the core issues that pose the greatest risk to the public. These issues require ongoing communication, education and awareness to reduce the risk of injury.

9.2 PESAP Programs

Outlined in Table 9.1 are the PESAP programs implemented by Ausgrid during 2012/13, including the description of the target market, the key messages and a description of each program, the medium through which it was delivered and an analysis of the program.

Ausgrid monitors the programs and electrical safety incidents and adapts its programs as required to continue to reduce the likelihood of incidents occurring. The broad nature of "electrical safety" and the low number of Serious Electrical Network Incidents (SENIs) makes it difficult to statistically analyse the effectiveness of the programs.

Table 9.1 PESAP Program 2012/13

Overhead powerlines safety	
Target Group	Tradespeople, outdoor workers, truck drivers, machinery operators, construction workers, scaffolders, painters etc. General community.
Messages	• Have up-to-date maps/diagrams showing the location of power lines on the property/worksite, 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 power lines. • Where possible, provide ground barriers and make overhead power lines at ground level. • Lower all machinery to the transport position when relocating every time. • Work away from power lines not towards. • Ensure maintenance of machinery and activities are carried out well away from power lines. • Power line heights vary so do a visual inspection before passing under or near them. • Set-up or build structures well away from power lines.
Program Overview	• Ausgrid's Overhead Power line Safety campaign specifically targets outdoor workers/tradies to raise awareness of the dangers associated with overhead power lines and educate them on safe behaviours and work practices. • The campaign comprised of 3 radio advertisements, 6 radio live reads, and online banners.
Analysis	• The campaign ran in April and May 2013. • Radio is a key medium for this target group as it is present on building sites and in vehicles. • An overhead power line safety message is included in our monthly radio safety campaign.

Underground cables	
Target Group	Trades people, outdoor workers, machinery operators, construction workers, scaffolders, painters etc. General community.
Messages	• Always Dial Before You Dig. • 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. • Wear protective clothing, including safety footwear and safety helmet. • Have emergency contact numbers on site. • Set up safety barriers, witches hats and warning lights to reduce the risk of injury to the general public. • Comply with all WorkCover requirements and codes.
Program Overview	• Ausgrid's underground cable safety program incorporates an awareness campaign which specifically targets outdoor workers/tradies to raise awareness of the dangers associated with digging and working near underground cables. • The campaign comprises of 3 radio advertisements, radio live reads and online banners.
Analysis	• The campaign ran in July and August 2012. • Radio is a key medium for this target group as it is present on building sites and in vehicles. • An underground cable safety message is included in our monthly radio safety campaign.
Electricity safety for school students	
Target Group	Children from Kindergarten to Year 10.
Messages	• Play in open spaces away from electricity poles, towers and power lines. • 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	**Electricity Safety Week** Ausgrid provides registered primary schools with a pack containing electricity safety activities for Kindergarten to Year 6 students, prizes, posters, stickers and merit certificates. **Stage 3 Electricity and Safety Unit** Ausgrid developed a Stage 3 Electricity and Safety Unit and Electrical Resource Kit which aligns with best practice teaching principles and the NSW Department of Education and Training (DET) physical phenomena curriculum. New Smartboard lessons were developed and launched by the Minister for Education in August 2011. **High School Electricity Resource** In conjunction with the NSW DET, a microsite based on the science curriculum was developed and branded EnergyAustralia. The site provides students with the information they require to complete a mandatory science assignment on electricity.
Analysis	98% of primary schools in Ausgrid's network area registered to participate in Electricity Safety Week in 2012. The Electricity Unit and resource kits are provided to schools in Ausgrid's network area on request. 87% of high schools in the Ausgrid network area registered for the High School Electricity Resource support pack.

Substation and electrical safety	
Target Group	Children living and playing near substations.
Messages	• 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	This safety message is a key component of all Ausgrid education programs.
Analysis	A key message in Electricity Safety Week, Electricity and Safety Unit and High School Electricity Resource promotional materials and posters.
Do-it-yourself (DIY)	
Target Group	Home renovators, home handymen, men aged 18-55 years.
Messages	• Don't mess with electricity – you're out of your league. • Do-it-yourself (DIY) electrical work is not only dangerous, it's illegal. • Always contact a licensed electrical contractor.
Program Overview	• The NRL continuous call partnership delivers a strong vehicle for an extended DIY Electrical Safety campaign with a broad reach to our target audience in Sydney, Central Coast, Newcastle and the Upper Hunter. The campaign includes live reads and pre-recorded advertisements. • The campaign comprises of 3 radio advertisements and radio live reads.
Analysis	• NRL continuous call ratings in 2012 continue to dominate weekend listening. • The campaign ran in March 2013. • Radio is a key medium for this target group. • A DIY electrical safety message is included in our monthly radio safety campaign.
Storm safety	
Target Group	General community.
Messages	• 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. • Always assume fallen power lines are live.
Program Overview	Extended communications program with emphasis on ongoing preparedness messaging via Australian Traffic Network runs from November to March each year.
Analysis	A radio campaign was launched in November 2012 and continued until February 2013.
Fallen powerlines	
Target Group	General community.
Messages	• Assume fallen power lines 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	Results from Ausgrid's Electrical Safety Survey 2012 showed a high understanding of dangers associated with fallen power lines.
Christmas – people decorating their homes with festive lights	
Target Group	General community.
Messages	• Use lights and other electrical equipment designed for external use. • Check lights for damage before use. • Don't overload power points or boards. • Switch off lights overnight and when leaving the house.
Program Overview	Radio advertising ran in December 2012, the key Christmas decoration period.
Analysis	Advertising runs early December to coincide with seasonal risks.
Bushfire risk management	
Target Group	Private Pole Owners.
Messages	• If your property has private power lines you have a legal obligation to ensure these power lines and poles do not cause a fire or other hazard. • Private pole owners are responsible for inspecting, testing and maintaining their power lines regularly and making sure they are free of vegetation.
Program Overview	Ausgrid distributes bush fire risk management information to customers in our network area via direct mail, newspaper advertisements and the corporate website. The information outlines the customer's obligations regarding safety management of their electrical installations.
Analysis	• Safety and Bushfire Prevention brochure sent to over 36,400 properties in bushfire designated zones in the Hunter, Central Coast and North Sydney areas. • Tombstone style newspaper advertisements were included in all suburban and metro newspapers – coverage up to 1.4 million customers to meet the requirement for broad coverage across Ausgrid's network area. • Radio advertisements and live reads ran on regional stations.

9.2.1 Additional sources of Information

A significant amount of information and downloads relating to preventing and managing electrical hazards is on Ausgrid's website.

9.2.2 Additional PESAP Initiatives

In addition to the programs and campaigns outlined in the 2012/13 Public Electrical Safety Awareness Plan program, Ausgrid undertook the additional programs outlined in Table 9.2 during the year.

Table 9.2 Additional PESAP Initiatives

Additional Program	Description and Rationale
Young males aged 16-25 – raise awareness of the high risk to life when acting irresponsibly	The unbranded, viral media based campaign which was run in May & June 2012 in the Newcastle area was extended through to August 2012. Further campaign activity is planned for the forthcoming year in the Sydney area.
Emergency Services personnel electrical hazard awareness	Electrical Hazard Awareness for Emergency Services DVD distributed to NSW Emergency Services Organisations.

10 Power Line 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/NZW 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 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 recorded in Ausgrid Geographical Information Systems as at 30 June 2013 is shown in the following table.

Table 10.1 Power Line Crossings of Navigable Waterways Summary

	Existing at 30/6/2013 (Number)	New since 30/6/2012 (Number)	Incidents (Number)*	Remedial Action Completed (Number)#	Crossings Identified as Requiring Conversion to Submarine Crossings (Number)
Overhead Crossings	270 (including 26 dual circuit OH crossings)	0	0	11	2
Submarine Crossings	77	5	0	0	0
Bridge Crossings	15	0	0	0	0

* Description of incident to be given below.

Description of the modification carried out including sign replacement to be given below.

Ausgrid currently has a program of work underway to implement the required risk treatments identified in each risk assessment as required by the code. The program involves the upgrade of warning signs to comply with the code and a design review of all 47 ‘intolerable’ and ‘high’ risk water crossings.

Ausgrid has updated the signage associated with the majority of its navigable waterway crossings to show the maximum vessel clearance heights, as required by the New Australian Standard AS 6947-2000 Crossing of

Waterways by Electricity Infrastructure. Additional advisory warning signs have also been installed at public launching sites within 5km of these water crossings.

In 2012/13 the risk mitigation design work for most of the ‘Extreme’ and ‘High’ risk water crossings was completed and work commenced on implementing these designs. The crossings for which risk mitigation work has been completed are shown in Table 10.2 below.

Table 10.2 Risk Mitigation work completed in 2012/13

Crossing	Description of Work
EA126	Crossing reconstructed to increase height
EA200A	Maximum sag of conductors reassessed at lower maximum operating temperature which now gives code-compliant safe clearance
EA201B	Maximum sag of conductors reassessed at lower maximum operating temperature which now gives code-compliant safe clearance
EA218	Crossing removed
EA283	Reconstructed in conjunction with adjacent new bridge works which now prevent access by vessels
EA447	New signage only was required
EA470	Conductors retensioned to increase height
EA472	Originally 33/11kV crossing - underbuilt 11kV mains have now been removed
EA484	Crossing reconstructed to increase height
EA494	New signage only was required
EA495	New signage only was required

Two crossings were identified as requiring conversion to a submarine (or underbore) crossing to reduce the risk. A third crossing is also planned to be converted to an underbore, however, this is primarily due to other business drivers.

10.3 New Crossings

In 2012/13 five new crossings were installed. Although these are categorised as “submarine” they were actually installed under-bores of the waterways. This method of installation is inherently “Low” risk. The crossings are:

- new 132kV submarine (under-bored) crossing of Cooks River: feeder 91H-2, Thornley Ave – Pine Ave, Undercliffe
- new 132kV submarine (under-bored) crossing of Cooks River: feeder 906, Thornley Ave – Pine Ave, Undercliffe
- new 132kV submarine (under-bored) crossing of Wolli Creek: feeder 91H-2, Unwin St – Lusty St, Undercliffe
- new 132kV submarine (under-bored) crossing of Wolli Creek: feeder 907, Unwin St – Lusty St, Undercliffe
- new 33kV submarine (under-bored) crossing of Salt Pan Creek, Gow Street, Padstow.

10.4 Water Crossing Incidents

In 2012/13, there were no incidents associated with waterway crossings.

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. These two inspection programs are offset by five years and as a result the crossings are visited at a minimum of every 2.5 years +/- the latitude for the respective tasks. This is further enhanced by the Vegetation Management Program which is aimed at keeping vegetation at the required clearances at all times.

11 COO Declaration

Ausgrid

ELECTRICITY NETWORK PERFORMANCE REPORT 2012/13

Declaration by Chief Operating Officer

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

- Complies with reporting requirements prescribed under the *Electricity Supply (Safety and Network Management) Regulation 2008*, and the "Distribution Network Service Provider Annual Report Outline" (the Outline), as provided by DTIRIS.
- Has been checked in accordance with recognised quality procedures; 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: ....

CHIEF OPERATING OFFICER

DATE: 17.12.13

ATTACHMENT A: Distribution Reliability of Supply: Definitions and Notes

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.

Note 2: The following definitions and notes are in accordance with the 'Design, Reliability and Performance Licence Conditions' imposed on distributors by the Minister for Energy and Utilities on 1 August 2005 and revised in December 2007. The report outline is the implementation of this reporting framework, with some necessary additions, by I & I NSW for this annual Electricity Network Performance Report required under the Electricity Supply (Safety and Network Management) Regulation 2008.

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 3 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.
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 1 minute or less) divided by the number of customers (averaged over the financial year) of that licence holder. In calculating MAIFIe, 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 (MAIFIe). 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 0.5 seconds, 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. The number of distribution customers is calculated as the average of the number of customers at the beginning of the reporting period and the number of customers at the end of the reporting period.
3. Un-metered Street Lighting supplies are excluded. Inactive accounts are excluded.

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: • Transmission outages, and • directed load shedding.
Unplanned interruptions	
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 a 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.

6. 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, TMED. 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 (Exclude transmission and directed load shedding but include planned outages.) 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 calculated the TMED (i.e. days that did not have any interruptions are not included).
(c) Take the natural logarithm (In) 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 knows as the log-standard deviation) of the data set.
(f) Complete the major event day threshold TMED using the following equation:
(g) TMED = e(α + 2.5β)
(h) Any day with daily SAIDI value greater than the threshold value TMED 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	A feeder supplying predominantly commercial, high-rise buildings, supplied by a predominantly underground distribution network containing significant interconnection and redundancy when compared to urban areas.
Urban	A feeder, which is not a CBD feeder, with actual maximum demand over the reporting period per total feeder route length greater than 0.3 MVA/km.
Short Rural	A feeder which is not a CBD or Urban feeder with total feeder route length less than 200 km.
Long Rural	A feeder which is not a CBD or Urban feeder 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.

ATTACHMENT B: Transmission Reliability: Network Indices

A **Transmission Network** is a system of electricity lines and associated equipment 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
(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.

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

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 8760 hours.

System Reliability (Un-Planned 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.

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

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 number	Date of incident	Party involved	Details of incident	Corrective action
7	2/07/2012	Public general	A member of the public, while cutting down a tree for fire wood, contacted the overhead service mains, pulling it to the ground. No injuries were reported.	The mains were made safe and then repaired.
8	3/07/2012	Worker	An employee was in an EWP while standing a pole. The pole was then turned 180 degrees resulting in the cross arm striking the employee in the back.	No treatment for the injury was required.
9	7/07/2012	Worker	A near miss was reported after an employee was standing a pole when a wire was caught between borer, and the pole resulting in the wire being cut and falling between live LV mains.	Wire recovered to the head of pole
10	9/07/2012	Public worker	A public worker, while cutting down a tree, contacted the street lighting mains, pulling it to the ground. No injuries were reported.	The street light mains were made safe and repaired.
11	11/07/2012	Public general	A member of the public, while driving a truck, contacted the service wire and disconnected it from the customer point of attachment pulling it to the ground. No injuries were reported.	The service was made safe and then repaired.
12	13/07/2012	Public worker	A public worker, while painting at a factory, contacted and damaged the service to the factory with their scissor lift. Tarapolis had been applied to the service strands but the scissor lift still contacted the copper. No injuries were reported.	The service was made safe and then repaired.
13	13/07/2012	Public general	A member of the public, while driving an unknown vehicle, contacted the Optus cable which then proceeded to wrap itself around the customer service wire, breaking the cross arm on the service main and disconnecting it from the customer point of attachment. No injuries were reported.	The service was made safe and then repaired.
14	13/07/2012	Public worker	A public worker, while excavating on a footpath, damaged a street light cable.	The cable was disconnected for repairs.
15	16/07/2012	Public general	A member of the public, while driving an unknown vehicle, contacted the service wire and damaged the service wire so it was hanging low. No injuries were reported.	The service was made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
16	18/07/2012	Worker	An employee cut two low voltage aerial bundled cable phases together, resulting in a low voltage phase to phase short. The employee had an understanding that the low voltage had been de-energised since the customers had been notified of the network interruption. Note: the employee was still treating the cable as live.	Site was made safe and supervisor was notified.
17	20/07/2012	Worker	An employee was discovered working on Distribution Substation S49631 (Onslow Erina) which was under an equipping permit. The work should have been done under an access permit since S49631 had already been connected to the high voltage network.	Work ceased and correct permit issued.
18	20/07/2012	Public worker	A public electrician received flash burns while carrying out work on a private residence at Bayview Hill Road. He was not an Accredited Service Provider (ASP). He was attempting to connect a new house main at the Point Of attachment (POA) while the service was alive. It appears that, after he had connected the neutral and while preparing the active wire, the neutral termination block came free of the housing which resulted in a short circuit across phases.	He was transported to hospital in an ambulance but not admitted to hospital as he had only received minor flash burns. The service cable was repaired by Ausgrid staff.
19	24/07/2012	Public worker	A public worker, while boring a hole for a fence, damaged an 11kV cable. No injuries were sustained by the worker.	The cable was repaired and returned to service.
20	24/07/2012	Public general	A member of the public, while driving an unknown vehicle, contacted the service wire, pulling it to the ground. No injuries were reported.	The service was made safe and then repaired.
21	25/07/2012	Public general	A member of the public, while driving an unknown vehicle, contacted the service wire and damaged the service wire so it was hanging low. No injuries were reported.	The service was made safe and then repaired.
22	26/07/2012	Contractor	Ausgrid's Alliance partner, during excavation for the installation of cable ducting, struck a 33kV feeder, damaging the gas filled cable. No injuries were sustained by the contractor.	The feeder did not trip but was taken out of service for inspection (no major damage reported).
23	26/07/2012	Public general	A member of the public, while driving a truck, contacted the overhead service mains, pulling it to the ground. No injuries were reported.	The mains were made safe and then repaired.
24	26/07/2012	Public general	A member of the public, while driving a truck, contacted the service wire, damaging service mains including the post. No injuries were reported.	The service was made safe and then repaired.
25	26/07/2012	Public worker	A public worker, while moving an excavator in the yard of an equipment hire firm contacted the service wire, pulling it to the ground. No injuries were reported.	The service was made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
26	27/07/2012	Contractor	A contractor, during excavation for the installation of cable ducting, struck a HV cable. No injuries were sustained by the contractor.	The cable was repaired and returned to service.
27	30/07/2012	Accredited Service Provider	During ASP works to complete pot holing for existing underground cables, a LV cable was struck by the ASP (Connect Engineering) using a crow bar. The ASP involved was not injured, and reported seeing a flash, and hearing an explosion.	Incident investigation has been conducted by the ASP company, with a review of investigation report to be completed by Ausgrid.
28	30/07/2012	Public worker	A public worker, while excavating, damaged a LV cable. No injuries were sustained by the worker.	The cable was repaired and returned to service.
29	31/07/2012	Contractor	During the removal of a HV transformer bushing at Willoughby STS, a crane contractor acting as the dogman on site was struck on the lower abdomen by the bushing, when the knot on the sling shifted. At the time, the bushing was in the process of being lowered, and lay down.	The contractor did not receive an injury and the incident has been investigated.
30	3/08/2012	Public worker	A public worker, while drilling through a masonry wall, damaged a service cable. The drill bit melted as a result of coming in contact with the service cable. No injuries were sustained by the worker.	The cable was repaired and returned to service.
31	6/08/2012	Public general	A member of the public, while backing a truck in a driveway, contacted the overhead service mains, and caused a service fuse to blow. No injuries were reported.	The mains were made safe and then repaired.
32	7/08/2012	Public general	A member of the public, while driving a truck loaded with a container onto a building site, contacted the service wire and disconnected the service wire at the point of attachment, pulling the service wire to the ground. No injuries were reported.	The service was made safe and then repaired.
33	8/08/2012	Worker	During the replacement of a HV fuse, an employee was struck on the wrist by a falling fuse, after failing to successfully place the fuse into the carrier with a link stick.	The employee completed works on site and then applied ice to the bruising back at the depot.
34	9/08/2012	Public worker	A public worker, while boring under a private driveway, struck an 11kV feeder. No injuries were sustained by the worker.	The cable was repaired and returned to service.
35	10/08/2012	Worker	An employee, while excavating for a new power pole, struck an 11kV cable as well as damaging a neighbouring LV cable. The staff member had changed from hand digging to the use of an Auger, following a change in supervision.	All work ceased and the site was made safe. An investigation is being undertaken for this incident with regard to the identification of underground services.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
36	10/08/2012	Public worker	A public worker, while removing a redundant concrete sewer junction pit with an excavator, damaged an 11kV underground cable.	The cable was repaired and returned to service.
37	13/08/2012	Worker	An employee used the incorrect tool (rattle gun) to tension an IPC. This resulted in an improper service connection that was reported later by the customer.	The IPC was then replaced using the correct tool and technique.
38	14/08/2012	Worker	An employee, while hand digging to install a new street light pole, struck a LV cable, resulting in a flash and blown distributor fuse. A Dial Before You Dig plan had been done and was on site.	The work was immediately stopped, and District Operators contacted to isolate the circuit, and make safe. The cable was repaired and returned to service.
39	15/08/2012	Public worker	A public worker, while tree trimming for a resident, dropped a tree branch on LV mains resulting in the mains clashing, and blown LV fuses. The tree trimmer fell as a result of being startled by the clashing mains, sustaining one confirmed broken ankle.	The LV mains did not require repair and were returned to service.
40	16/08/2012	Public general	A member of the public, while driving a truck, contacted the overhead service and street lighting mains, pulling both to the ground. No injuries were sustained by the driver.	Both mains were made safe then repaired.
41	17/08/2012	Public general	Fallen LV mains caused a grass fire at a property, damaging 4000 square metres of grass. There was no significant property damage, and no injuries to the public.	The mains were made safe and repaired.
42	19/08/2012	Public general	A member of the public, while driving a truck with a raised tipper tray, contacted the overhead service mains. No injuries were sustained by the driver.	There was no damage to the mains.
43	21/08/2012	Public general	Vandals set fire to a distribution substation, burning the kiosk to the ground.	Kiosk was replaced.
44	21/08/2012	Public worker	A public worker, while excavating, damaged the insulation on an 11kV cable. No injuries were sustained by the worker.	The cable was repaired and returned to service.
45	22/08/2012	Worker	An overhead work crew, while in the process of proving 11kV overhead mains as de-energised, for an access permit issue, identified that the “Top Tronic” HV detector used was defective, even after the self test function of the detector indicated that it was working normally. The work crew immediately took the detector out of service, and used an alternate correctly functioning unit to continue. No injury or damage occurred, but this scenario had a high potential for injury or damage.	Subsequent to the completion of the work, all “Top Tronic” High Voltage detectors were immediately withdrawn from service, and a safety alert has been released.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
46	22/08/2012	Public worker	A public worker, while excavating, struck the earth cable and earthing rods to two distribution kiosks. No injuries were sustained by the worker.	Damage to earth cable and earthing rods were repaired.
47	22/08/2012	Public general	A member of the public, while driving a truck, contacted the overhead service mains, pulling it to the ground, and causing a service fuse to blow. No injuries were sustained by the driver.	The mains were made safe and then repaired.
48	23/08/2012	Public worker	A public worker, while operating a crane, contacted the neutral wire of a service main to a house. No injuries were sustained by the worker, or members of the public.	The power was isolated to the house and the service cable was repaired.
49	24/08/2012	Public general	A member of the public, while driving an unknown vehicle, contacted the service wire, pulling it to the ground and causing a distributor substation fuse to blow. No injuries were reported.	The service was made safe and then repaired.
50	25/08/2012	Public worker	A public worker, while excavating for Sydney Water, damaged a LV cable. No injuries were sustained by the worker.	The cable was repaired, and returned to service.
51	27/08/2012	Worker	An employee access permit recipient, following completion of works to terminate a 33kV UGOH, removed access permit earths, and then placed the permit on transfer. This issue was then identified by the operator.	The incident is currently under investigation.
52	28/08/2012	Public general	Copper theft occurred at Leightonfield Zone Substation, with parts of the earthing system stolen. No injuries were reported.	Earth cable damage was rectified or replaced.
53	29/08/2012	Worker	An employee, lowered a span of LV ABC to within 100mm of a communications cable during its replacement work, and left it in that position for a number of days, resulting in communications company staff being able to come within 500mm of live LV. No injuries were reported.	The LV ABC was rectified.
54	29/08/2012	Worker	An employee, during installation of ABC, made live a section of ABC that was still on the ground.	The cable was then pulled up and terminated following a worksite discussion.
55	30/08/2012	Accredited Service Provider	An employee, following a test on a cable for a new LV pillar, discovered that there had been an incorrect isolation of customer services by the ASP (Salem Power Engineering services Pty Ltd). Ausgrid employees found that the service fuses had not been withdrawn by the ASP, despite assurances from the ASP that the services were isolated.	Services were then properly isolated with the cable passing its test afterwards. Incident investigation is being conducted by the ASP company, with a review of investigation report to be completed by Ausgrid.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
56	30/08/2012	Worker	An employee, during the excavation of a trench for a new 33kV cable, contacted an 11kV underground cable. No persons were injured, and there was no loss of supply.	The cable damage was assessed and no repairs were required. The cable was covered to ensure there were no further risks.
57	31/08/2012	Worker	An employee reported that transformer works at Hurstville North Zone Substation, were being carried out without adequate isolation. It was identified that an 11kV bus coupler had not been isolated.	Work ceased on site until the isolations was corrected.
58	2/09/2012	Contractor	An Alliance partner, during the excavation for the installation of 11kV cable ducting, struck a 33kV feeder, damaging the gas filled cable and tripping the feeder. No injuries were sustained by the contractor.	The feeder is out of service for repairs.
59	6/09/2012	Public general	A member of the public, while driving a truck with a high load, contacted the overhead service mains, pulling it to the ground. No injuries were reported.	The mains were made safe and then repaired.
60	7/09/2012	Public general	A member of the public, while driving a truck, contacted the service wire and disconnected it from the customer point of attachment pulling it to the ground. No injuries were reported.	The service was made safe and then repaired.
61	5/09/2012	Worker	An Ausgrid employee, cancelled an access permit as the permit recipient prior to adequate backfilling of an excavation for a cable joint.	When the district operator discovered the inadequate back filling, restoration of the cable was stopped until the excavation had been properly backfilled.
62	19/09/2012	Public worker	A public worker, while excavating for Leightons Construction on the M2 motorway extension project, damaged an 11kV cable. No injuries were reported.	The cable was made safe and then repaired.
63	18/09/2012	Public general	A member of the public, while driving a truck, contacted the Optus cable, which caused the neutral and A phase to clash and burn down. The truck drove away without stopping. The Optus cable was below the minimum height of 5.5 metres. No injuries were reported.	The mains were made safe and then repaired.
64	18/09/2012	Public general	A member of the public, while driving heavy machinery, contacted the 33kV mains. The damage to the feeder was discovered after a patrol of the feeder following a suspected lightning strike. No injuries were reported.	The 33kV feeder was repaired and warning signs erected at the location.
65	25/09/2012	Public general	A member of the public, while driving a truck, contacted the Optus cable, which caused the neutral and C phase to clash and burn down. It is not known if the Optus cable was above the minimum height. No injuries were reported.	The mains were made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
66	24/09/2012	Public general	A member of the public, while driving a truck, contacted the service wire at two premises. The service mains were disconnected from the customer points of attachment pulling them to the ground. No injuries were reported.	The service mains were made safe and then repaired.
67	15/09/2012	Worker	An employee, while in the process of commissioning a new service cable via a pillar, crossed the phase and neutral connections.	The service cable was tested and repaired after the cross between phase and neutral was found.
68	20/08/2012	Accredited Service Provider	An ASP (Australian Power Services), whilst constructing a new HV UGOH and OH mains, failed to re-instate the OH Access permit Earths at the completion of their works as per the Electrical Safety Rules.	The ASP immediately stopped all work onsite. Ausgrid operator then re-tested and instructed Ausgrid line workers to reinstate the Access Permit Earths so that work could continue. Ausgrid is conducting an investigation into this incident.
69	8/09/2012	Public worker	A public worker, while excavating, damaged a LV cable. No injuries were reported.	The cable was repaired, and returned to service.
70	22/09/2012	Public worker	A public worker, while drilling/boring to install a conduit on a construction site, damaged an 11kV feeder and pilot cable. No injuries were reported.	The feeder and pilot cables were repaired, and returned to service.
71	24/09/2012	Public worker	A public worker, while excavating for a new wall, exposed the earth rods on a kiosk distribution substation, damaging the earthing cable. No injuries were reported.	Damage to earth cable and earthing rods were repaired.
72	26/09/2012	Public general	A member of the public, while driving a truck, contacted the service cable, damaging B and C phase cables. No injuries were reported.	The service was made safe and then repaired.
73	26/09/2012	Public worker	A public worker, while excavating, damaged a service cable. No injuries were reported.	The service was made safe and then repaired.
74	26/09/2012	Public worker	A public worker, while excavating the foundations for a retaining wall, damaged an 11kV cable. No injuries were reported.	The mains were made safe and then repaired.
75	3/10/2012	Public general	A member of the public, while driving a truck transporting an excavator, contacted the service wires, pulling it to the ground. No injuries were reported.	The service was made safe and then repaired.
76	12/09/2012	Public general	A member of the public, while driving a truck, contacted the service wires, causing the substation fuses to blow. No injuries were reported.	The service was made safe and then repaired.
77	12/09/2012	Public general	A member of the public, while driving a truck, contacted the Optus cable, which caused the B and C phase to clash and sustain damage. No injuries were reported.	The service was made safe and then repaired.

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78	13/09/2012	Public worker	A public worker, while trimming a tree, cut through a service wire with a chainsaw. No injuries were reported.	The service was made safe and then repaired.
79	27/09/2012	Worker	An operating error occurred during the isolation of the auxiliary transformers at Aberdeen Zone substation for oil sampling. The error involved the operation of the incorrect earth switch on a Ring Main Unit, resulting in the earthing of a live 11kV feeder. No injuries were reported.	A senior operator was sent to the site to correct the isolation and earthing. The limited operating authority for this employee has been suspended while the investigation is in progress.
80	29/09/2012	Public general	An 11kV mains failed, falling onto a house and into a swimming pool. The house had been extended and a swimming pool installed without consideration of the location of the existing 11kV feeder. As a result of the residential works, a steel mains replacement project to rectify the issue was planned to occur in February 2013. No injuries were reported.	The repairs were made to the conductor, and the conductor re-erected. The incident is under investigation, and the replacement works are now being accelerated.
81	8/10/2012	Accredited Service Provider	An ASP (MPDI), while conducting pot holing with an excavator, hit and damaged an 11kV feeder. No injuries were reported.	An incident investigation is being conducted by the ASP company, with a review of investigation report to be completed by Ausgrid.
82	10/10/2012	Accredited Service Provider	An ASP (Westside UG power), while identifying a LV cable, removed a LV cap from an energised cable, and shorted it with a knife. The ASP received minor burns and was taken to hospital.	The ASP company has notified WorkCover and is completing a report for Ausgrid. Ausgrid is also conducting its own investigation.
83	10/10/2012	Accredited Service Provider	An ASP worker (Connect Engineering) was witnessed by an Ausgrid Compliance Officer working on a live pole substation when they are not permitted to.	The safety breach was issued to the ASP and the worker was suspended. Incident investigation is being conducted by the ASP company. Ausgrid is also conducting its own investigation.
84	4/10/2012	Public general	A member of the public, while driving a truck with a high load, contacted the Optus cable, which became tangled in LV mains and causing the mains to burn down. It is not known if the Optus cable was above the minimum height. No injuries were reported.	The mains were made safe and then repaired.
85	4/10/2012	Public worker	A public worker, while excavating with a jack hammer, damaged a service cable. No injuries were reported.	The service was made safe and then repaired.
86	26/09/2012	Public general	A member of the public contacted Ausgrid's Contact Centre to report a broken neutral on their POA. The Contact Centre then assigned the job incorrectly to EnergyFix, instead of an Ausgrid Emergency Services Officer (EmSO). This job was then not attended for a number of days.	The EnergyFix contractor immediately contacted Ausgrid and an EmSO was urgently dispatched to the property. The EmSO made the installation safe. An investigation into this incident is in progress.

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87	5/10/2012	Worker	An employee, while working in a distribution substation, shorted the 'C' phase of a distribution cable against the neutral busbar when pulling the disconnected neutral away from the switchboard. This caused a short circuit, blowing the associated distributor fuse. There were no injuries to the employee.	The distribution substation was isolated by an Ausgrid operator. Repairs and modifications were then completed at the substation.
88	5/10/2012	Worker	Employees cut into a live LV street light cable with a pair of battery cutters. This caused an explosion and damage to the cutters but no injuries to the employees. The employees believed the cable to be de-energised.	Work ceased immediately and the incident is being investigated.
89	10/10/2012	Worker	An employee cut into an incorrectly identified live 11kV underground cable. There were no injuries to the employee.	Work ceased immediately and the incident is being investigated.
90	15/10/2012	Public worker	A public worker, while hammering a star picket into the ground, damaged a service cable. No injuries were reported.	The service was made safe and then repaired.
91	11/10/2012	Accredited Service Provider	An ASP (Wilken Services) whilst installing new conduits into an existing Ausgrid cable pit, damaged the structure of the pit wall, causing the pit wall to collapse onto cables inside the pit. Minor damage was found on lead sheath of one cable. The new conduits form part of a greater streetscape upgrade project being carried out by Ford Civil Contracting. No injuries were reported.	Cable jointers were called to inspect the pit, and remove the concrete rubble from the cables. All contractors at the worksite were advised that the pit should not be entered into or work to occur near it until rectification works are completed by Ausgrid. Ausgrid are meeting with the ASP contractor and the builder to discuss the safety issues with the construction of these works.
92	16/10/2012	Contractor	An Ausgrid contractor (Active Tree Services), while cutting down a tree, brought down a 22kV feeder, resulting in a bushfire. No injuries were reported.	The feeder was made safe and repaired following mitigation of the bushfire danger.
93	17/10/2012	Public general	A member of the public, while driving a truck, contacted the Telstra and service cables. No injuries were reported.	The service was made safe and then repaired.
94	17/10/2012	Public worker	A member of the public, while slewing tree debris with a crane, dropped a tree branch on a service main, causing damage to the cross arm on pole. No injuries were reported.	The service was made safe and then repaired.
95	16/10/2012	Public general	A member of the public, while driving a truck, brought down the service wires. No injuries were reported.	The service was made safe and then repaired.
96	19/10/2012	Contractor	An Ausgrid contractor (Subakette), while cable laying, damaged an underground customer service with a shovel. No injuries were reported.	The service was made safe and then repaired.
97	29/10/2012	Public	A member of the public, while driving a truck, damaged service wires after the	The service was made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
		general	truck hit an overhead Optus cable.	
98	26/10/2012	Public worker	A public worker, while operating a crane on a building site, came in contact with an 11kV overhead feeder, causing the feeder to trip and damaging the feeder. No injuries were reported.	The feeder was made safe and then repaired.
99	20/10/2012	Worker	An employee, while boring a hole for a condemned pole replacement, damaged a 33kV feeder. A DBYD was completed for this job. The damage occurred when the staff switched from hand digging to the use of a borer, after reaching a depth of 1m with no sign of the cable. No injuries were reported.	The feeder was made safe and then repaired.
100	25/10/2012	Contractor	The Energised alliance, while working as part of a work party to replace an asbestos joint on an 11kV underground feeder at Lindfield, was discovered by a District Operator to be still working on the cable after the access permit had been cancelled.	All work on site was stopped for a safety discussion. The works areas were made prior to the District Operator continuing his work.
101	28/10/2012	Worker	An Ausgrid District Operator, while performing a planned isolation at Darling Harbour ZS, opened a 132kV isolator that was under load due to an error in communication of the transformer switch status.	An investigation into this incident has been completed.
102	24/10/2012	Public general	A distribution pillar caught fire outside the Lakes Hotel, causing property damage to the hotel. NSW Fire & Rescue attended the fire and allowed site access following the remediation of the asbestos issues from the damaged hotel awning.	Supply to the pillar was isolated, and the pillar was later replaced.
103	19/10/2012	Contractor	An Ausgrid contractor, while excavating, hit a service cable that had not been laid to Ausgrid standards.	The service was made safe and then repaired.
104	27/10/2012	Public general	A member of the public, while cutting down a tree, contacted the overhead service main with the tree, pulling it to the ground. No injuries were reported.	The service was made safe and then repaired.
105	2/11/2012	Public worker	A public worker, while lifting the tray on the truck, contacted the overhead service main, bringing it to the ground. No injuries were reported.	The service was made safe and then repaired.
106	5/11/2012	Public worker	A public worker, while excavating on footpath, damaged a LV cable. No injuries were reported.	The cable was made safe and then repaired.
107	2/11/2012	Public worker	A public worker, while post hole digging for a newly erected fence, cut two street light cables. No injuries were reported.	The cables were made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
108	4/09/2012	Public worker	A public worker, while operating a crane, backed into a 33/11kV pole, breaking the pole. No injuries were reported.	The pole was made safe and then repaired.
109	16/08/2012	Public worker	A public worker, while operating an excavator, hit a pillar box. No injuries were reported.	The pillar box was made safe and then repaired.
110	14/11/2012	Public worker	A public worker, while cutting a tree, caused a branch to fall onto a service wire. This caused the service cables to clash, resulting in 'A' phase to fall to the ground. No injuries were reported.	The service was made safe and then repaired.
111	17/11/2012	Public worker	A public worker, while excavating to install gas pipes, dug up a service cable. The service cable had been previously installed by an ASP but found not been done to industry standards (e.g. incorrect depth, no markers). No injuries were reported.	The service was made safe and then repaired.
112	20/11/2012	Public worker	A public worker, while excavating to lay new NBN cables, hit 11kV feeder cables and caused the feeder panel protection to operate. No injuries were reported.	The cable was made safe and then repaired.
113	22/11/2012	Public worker	A public worker, while driving in a metal spike into the ground, hit an 11kV feeder cables. No injuries were reported.	The cable was made safe and then repaired.
114	27/11/2012	Public worker	A public worker, while operating an excavator, damaged a LV service cable. No injuries were reported.	The service cable was made safe and then repaired.
115	24/11/2012	Worker	An employee, while erecting a streetlight bracket, slewed the bucket on the EWP against 415V street mains, pushing two phases together which then resulted in a flash/arc. No injuries were reported.	All work was stopped and the mains were checked for damage. Work was able to continue.
116	29/11/2012	Public worker	A public worker, while operating an excavator, contacted distribution wires, causing mid span burns and fuse operation. No injuries were reported.	Site made safe and then repaired.
117	7/12/2012	Public general	A vandal set fire to a distribution substation, resulting in the substation being destroyed. No injuries were reported.	Site made safe and substation was replaced.
118	7/12/2012	Public worker	A public worker (contractor for NBN roll-out), while operating a direction borer, damaged an underground 11kV cable. No injuries were reported.	Site made safe and then repaired.
119	10/12/2012	Worker	An employee reported that a LV distributor was energised into a new substation at Freshwater that had works in progress under an equipping permit.	Site was made safe, danger tags were applied, and access permits were issued for further works.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
120	8/12/2012	Worker	An arc flash occurred, resulting in a fire when an employee (district operator) was in the process of racking in an 11kV circuit breaker at Epping.	Site was made electrically safe by staff, and the fire brigade managed the fire. The employee received minor burns to his hand that was treated by first aid.
121	30/11/2012	Public general	A member of the public caused a rubbish fire next to a distribution substation, resulting in damaged kiosk housing. No injuries were reported.	Site made safe and then the substation was repaired.
122	13/12/2012	Public worker	A public worker, while preparing for concreting, drove a reinforcement bar into the ground with a sledge hammer and damaged an 11kV cable. No injuries were reported, however the worker was taken to RPA Hospital as a precaution.	The cable was made safe and then repaired.
123	13/12/2012	Contractor	A contractor, while Ausgrid staff were performing high voltage testing within Marrickville zone substation, passed under a roped off section of the substation which defined the high voltage test area and where there was exposed live HV test equipment.	The contractor was stopped by standby staff positioned around the perimeter of the test area and the incident was reported to the Contractor's site manager. The incident is under investigation.
124	17/12/2012	Worker	A worker cut live LV cables while removing cables in duct lines for an ASP job at Martin Place. The short sealed ends of the cable made it difficult to identifying the cable by lamping techniques. No injuries were reported.	The site was made safe and the cable was cut away in the next cable pit.
125	29/12/2012	Public general	A member of the public, while removing grass from the base of an Ausgrid underground pillar, placed one hand on the top of the pillar and received a shock. A high resistance connection within the pillar had melted the pillar cover, exposing live terminals. The member of the public was advised by Ausgrid staff to seek medical assessment as a precaution. The person attended their local hospital where they received an ECG but were not admitted to the hospital.	The defective pillar was made safe and then was later replaced.
126	30/12/2012	Public general	A member of the public, while cutting down gum trees on their property, brought down some 11kV mains. No injuries were reported.	The mains were made safe and then repaired.
127	4/01/2013	Public worker	A public worker, while trimming trees, caused the mains to clash because of the fallen branches, resulting in blown LV fuses. No injuries were reported.	The mains were inspected but no damage was sustained.
128	8/01/2013	Public general	A member of the public received an electric shock while touching a pole UGOH cover. The cover was tested and measured to have 230V potential. The member of the public did not go to hospital or seek medical treatment.	Ausgrid staff remained on site until the mains were isolated and the UGOH repaired.
129	10/01/2013	Public worker	A public worker, while cutting down a tree, brought down service mains. No injuries were reported.	The service mains were made safe and mains were repaired

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
130	16/01/2013	Public worker	A public worker, while cutting down a tree, brought down 11kV mains, tripping the feeder. No injuries were reported.	The mains were made safe and then repaired.
131	16/01/2013	Public general	A member of the public, while digging footings to replace a retaining wall, jack hammered into an 11kV feeder cable that was in the easement of his property. No injuries were sustained.	The cable was made safe and then repaired.
132	14/01/2013	Contractor	A contractor, while cutting concrete within Wallsend depot, damaged the sheath of 415V cable which supplies the Admin building. There was no electrical flash or operation of the protection due to the cable contact. No injuries were sustained.	The cable was made safe and then repaired. The incident is under investigation.
133	17/01/2013	Public worker	A public worker, while operating the boom on a concrete truck, contacted the 11kV mains, causing the feeder to trip. Burn marks on the ground suggested a flash over on the tyres. No injuries were sustained.	The mains were inspected and then repaired.
134	16/01/2013	Public worker	A public worker, while excavating for Jemena, struck a LV cable causing an interruption to the distribution substation. No injuries were reported.	The cable was made safe and then repaired.
135	23/01/2013	Public worker	A public worker, while demolishing a garage with an excavator, pulled down a service cable. No injuries were reported.	The service mains were made safe and mains were repaired.
136	17/01/2013	Worker	A worker, while carrying out LV changeover work in an EWP at Croydon, had his harness caught on the connector of the service tail, resulting in clashing mains and a LV flash. No injuries were reported.	The mains were made safe and then repaired. The incident is under investigation.
137	28/01/2013	Public worker	A public worker (security guard) reported that he received an electric shock from a perimeter fence on a construction site in Killara. Investigations showed that the fence was energised due to damage caused by the installation of a fence post, to an underground cable.	The cable was made safe and then repaired.
138	4/02/2013	Public Worker	A public worker, while tree trimming in Camperdown, damaged service mains. No injuries were reported.	The service mains were made safe and then repaired.
139	5/02/2013	Public Worker	A public worker, while excavating in Mt Hutton as part of road works, damaged a low voltage underground cable. No injuries were reported.	The cable was made safe and then repaired.
140	12/02/2013	Public Worker	A public worker, while installing a sign post in Cherrybrook, damaged a low voltage underground cable. No injuries were reported.	The cable was made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
141	12/02/2013	Public Worker	A public worker, while excavating to replace kerb and guttering at Greenacre, damaged link box cross bonding leads for the underground 132kV Feeder 296 (Potts Hill - Bankstown). No injuries were reported.	The damaged area was made safe and then repaired.
142	15/02/2013	Public Worker	A public worker, while core hole drilling at Meadowbank, damaged a high voltage cable. No injuries were reported.	The cable was made safe and then repaired.
143	6/02/2013	Worker	An employee, while replacing overhead low voltage distributors at Wyoming, lowered a live conductor, causing a flash between the conductor and a Telstra Pillar. No injuries were reported.	Staff immediately stopped work and made safe. An investigation into this incident is in progress.
144	7/02/2013	Worker	An employee, while performing an induced high voltage transformer winding test at Kincumber, received a low voltage shock from the portable generator used for testing.	The employee was taken to hospital for an ECG test. Test result was clear and the employee returned to normal duties on the following day.
145	19/02/2013	Worker	An employee, while excavating a blocked spare conduit at Rutherford, contacted an underground low voltage cable. No injuries were reported.	The cable was made safe and then repaired.
146	18/02/2013	Public Worker	A public worker, while excavating for a building site at Auburn, damaged an underground low voltage cable. No injuries were reported.	The cable was made safe and then repaired.
147	25/02/2013	Worker	A staff member, whilst excavating for a low voltage cable fault at Padstow, struck an adjacent low voltage distributor that had been previously installed without cover tiles on top. No injuries were reported.	The cable was made safe and then repaired.
148	6/03/2013	Public general	A member of the public reported that he was struck by a piece of wood, which had broken off a pole at Barnsley. The member of the public advised that he had pain in his shoulder and neck.	Pole condition checked by staff and made safe. The member of the public was advised to seek medical advice if required.
149	11/03/2013	Public worker	A public worker hit an underground low voltage cable with a directional drill at Mona Vale. The public worker was taken to hospital as a precaution.	The cable was made safe and then repaired.
150	12/03/2013	Public worker	A public worker, while constructing a concrete pit at Wallsend, exposed and moved energised 11kV and low voltage cables.	The cable was made safe and then repaired.
151	7/03/2013	Public worker	A public worker, while excavating at Millfield, made contact with overhead service wires, damaging the customer's point of attachment. No injuries were reported.	The damaged mains were made safe and then repaired.
152	7/03/2013	Public worker	A public worker, while tree trimming in Stanmore, damaged service mains. No injuries were reported.	The damaged mains were made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
153	1/03/2013	Public worker	A public worker, whilst installing a fence at Alexandria, contacted a low voltage cable. No injuries were reported.	The damaged cable was made safe and then repaired.
154	28/03/2013	Worker	A staff member, whilst preparing to undo a cover panel to the back of an isolated and earthed circuit breaker, noticed that the taped off area had a different I.D number to the access permit. On further inspection, the Area Operator had taped off the right circuit breaker cable panel but the I.D number required was on a live circuit breaker cable beside the taped off one.	
155	28/03/2013	Public worker	A public worker, whilst excavating at Monterey, moved LV cable from easement. Nil injuries were reported.	The cable was made safe and then repaired.
156	25/03/2013	Public worker	A public worker, whilst excavating at a construction site at Bondi, ran over an exposed cable, causing sparking and a small explosion. No injuries were reported.	The cable was made safe and then repaired.
157	25/03/2013	Public general	A member of the public whilst stealing street light cables and covers at Pelaw Main, knocked over pillar box. No injuries were reported.	The area was made safe and items replaced / repaired.
158	23/03/2013	Public general	A member of the public, rolled car back onto a pillar box at Anna Bay. Nil injuries were reported.	Removed car from pillar, replaced pillar base, turret & service fuse.
159	27/03/2013	Public worker	A public worker, whilst excavating at Shortland, came into contact with 11kV mains. No injuries were reported.	The cable was made safe and then repaired.
160	2/04/2013	Public worker	A public worker, whilst excavating at Malabar, came into contact with in service HV feeder cable, causing a flash. No injuries were reported.	The cable was made safe and then repaired.
161	4/04/2013	Contractor	A contractor, whilst being supervised by Ausgrid staff, cut through the power circuit whilst core drilling in the Control Room at Mosman. No injuries were reported.	The cable was made safe and then repaired.
162	26/03/2013	Contractor	A contractor working under the supervision of Ausgrid, while dismantling scaffolding in a distribution substation at Neutral Bay, caused a flash over on the low voltage board as a result of dropped materials. Nil injuries were reported.	Staff stopped work and exited the substation. The site has been made safe for repairs.
163	7/04/2013	Worker	Staff working at Rozelle STS, were in the vicinity of arcing between a 132kV Circuit Breaker and the switchyard fence, caused by a phase to earth fault from a joint failure on the feeder 90V (City Central - Rozelle). Nil injuries were reported.	Staff stopped work and reported the incident. Incident is currently under investigation.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
164	6/04/2013	Public worker	A public worker, whilst excavating at Rozelle, severed LV cables. No injuries were reported.	The cable was made safe and the incident is under investigation.
165	15/04/2013	Contractor	A contractor working for Ausgrid, while carrying out under boring at Metford, damaged a LV cable. No injuries were reported.	The cable was made safe and then repaired.
166	13/04/2013	Worker	A worker (overhead line crew), while working at Northbridge, connected a premise in reverse polarity. No injuries were reported.	The service connection was made safe and then repaired.
167	3/04/2013	Public worker	A public worker, whilst undertaking a building demolition at Top Ryde, damaged live service cables. No injuries were reported.	The cable was made safe and then repaired.
168	9/04/2013	Public Worker	A public worker, while tree trimming in Wahroonga, damaged service wires. No injuries were reported.	The damaged mains were made safe and then repaired.
169	12/04/2013	Accredited Service Provider	An ASP (Poles & Underground), while excavating in Redfern, damaged an underground LV cable. No injuries were reported.	The cable was made safe and then repaired.
170	15/04/2013	Public worker	A public worker, while excavating at Auburn, damaged street light cables. No injuries were reported.	The cable was made safe and then repaired.
171	16/04/2013	Public worker	A public worker, while boring at Balcolyn, damaged an underground LV cable. No injuries were reported.	The cable was made safe and then repaired.
172	16/04/2013	Public worker	A public worker, while tree trimming in Lindfield, damaged overhead service wires. No injuries were reported.	The damaged mains were made safe and then repaired.
173	18/04/2013	Public general	A member of the public, while tree trimming in Kurri Kurri, damaged overhead service wires. No injuries were reported.	The damaged mains were made safe and then repaired.
174	17/04/2013	Public worker	A public worker, while excavating at North Ryde, damaged an underground LV cable. No injuries were reported.	The cable was made safe and then repaired.
175	23/04/2013	Public general	A member of the public, while tree trimming in Mosman, damaged service wires. No injuries were reported.	The damaged mains were made safe and then repaired.
176	23/04/2013	Public worker	A public worker, while excavating at Ramsgate Beach, damaged service wires. No injuries were reported.	The damaged mains were made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
177	24/04/2013	Public worker	A public worker, while boring at Scone, damaged service wires. No injuries were reported.	The damaged mains were made safe and then repaired.
178	5/04/2013	Public worker	A public worker, while boring at Soldier's Point, damaged an underground LV cable. No injuries were reported.	The cable was made safe and then repaired.
179	26/04/2013	Public worker	A public worker, while tree trimming in Arncliffe, damaged overhead service wires. No injuries were reported.	The damaged mains were made safe and then repaired.
180	7/05/2013	Contractor	A Contractor working for Ausgrid at Epping Zone substation jack hammered into a live 11kV underground cable, causing an arc flash. Received treatment in hospital and has returned to work.	The cable was made safe and then repaired.
181	6/05/2013	Worker	A Worker contacted live equipment whilst working within a CBD distribution substation, causing an arc flash. Employee did not receive any injuries and has returned to work with no lost time.	The area was made safe, and repairs required carried out.
182	2/05/2013	Public General	A member of the public, while driving a truck at Mosman, collided with a pole. The pole snapped and fell, damaging the truck and created a wires down hazard in the immediate vicinity.	The area was made safe, and repairs to the overhead network were carried out.
183	10/04/2013	Public general	A member of the public, while tree trimming in Woodberry, damaged overhead service wires. No injuries were reported.	The damaged mains were made safe and then repaired.
184	27/04/2013	Public Worker	A public worker, while boring at Wyoming, damaged an underground service cable. No injuries were reported.	The cable was made safe and then repaired.
185	23/04/2013	Public Worker	A public worker, while removing a tree in Nelson Bay, damaged a streetlight and connections. No injuries were reported.	The area was made safe, and repairs required carried out.
186	7/05/2013	Public Worker	A public worker, while excavating at Avoca Beach, damaged an underground 11kV feeder. No injuries were reported.	The cable was made safe and then repaired.
187	10/05/2013	Public worker	A public worker, while undertaking works at St Ives, cut live service cables to a premise. No injuries were reported.	The cable was made safe and then repaired.
188	11/05/2013	Public general	A member of the public, conducting works at their premises at St Ives, cut into a service wire in a steel termination enclosure, with an angle grinder.	The area was made safe, and repairs required carried out.
189	11/05/2013	Public worker	A public worker excavating at Willoughby, damaged an underground service cable. No injuries were reported.	The cable was made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
190	15/04/2013	Public worker	A public worker removing trees in Cardiff brought down service mains. No injuries were reported.	The area was made safe, and repairs required carried out.
191	14/05/2013	Public Worker	A public worker excavating at Revesby, came into contact with a LV cable. No injuries were reported.	The cable was made safe and then repaired.
192	21/05/2013	Contractor	A contractor working for Ausgrid at Cammeray struck an underground HV cable whilst excavating. No injuries were reported.	The cable was made safe and then repaired.
193	16/05/2013	Public worker	A public worker excavating at Stanmore, struck LV cables with a shovel, causing a flashover. The public worker was taken to hospital as a precaution. No injuries were reported.	The area was made safe, and repairs required carried out.
194	22/05/2013	Public worker	A public worker tree trimming at Riverview, damaged services wires. No injuries were reported.	The damaged mains were made safe and then repaired.
195	28/05/2013	Contractor	A contractor working for Ausgrid using a drill rig for earthing installation at North Ryde struck an underground HV cable. Worker was taken to hospital for a precautionary ECG. No injuries were reported.	The cable was made safe and then repaired.
196	23/05/2013	Worker	A worker installing a neutral cable at a meter terminal caused a short circuit between c phase and neutral terminals. The service fuse blew as a result but no injuries were reported.	The area was made safe, and repairs required carried out.
197	21/05/2013	Worker	A phase to neutral short occurred due to damaged heat shrinking that had been damaged while distribution cables were being cut by a Worker, at Bondi.	The area was made safe, and repairs required carried out.
198	5/06/2013	Public worker	A public worker excavating at Burwood, damaged LV cables. The date the damage was caused is unknown, but the resulting water ingress caused the cable to fail on the date reported. No injuries were reported.	The area was made safe, and repairs required carried out.
199	29/05/2013	Public worker	A public worker installing a post for a guard rail at Westleigh struck HV cables. No injuries were reported.	The cable was made safe and then repaired.
200	29/05/2013	Public Worker	A public worker excavating at Chatswood, exposed and pulled out earth cables. No injuries were reported.	The cable was made safe and then repaired.
201	3/06/2013	Public Worker	A public worker excavating at Alexandria, damaged a street light cable. No injuries were reported.	The cable was made safe and then repaired.

Dept Record number	Date of incident	Party involved	Details of incident	Corrective action
202	4/06/2013	Public Worker	A public worker excavating at Strathfield, struck a HV cable. No injuries were reported.	The cable was made safe and then repaired.
203	5/06/2013	Public general	A member of the public mowing their lawn at Menai struck and damaged a steel pillar. After investigation it was found that the insulation / screening was not fitted in correct position allowing steel casing to come into contact with live connection when hit by lawnmower. No injuries were reported.	The area was made safe, and repairs required carried out.
204	11/06/2013	Worker	A worker excavating at Empire Bay, struck a live LV distributor. No injuries were reported.	The area was made safe, and repairs required carried out.
205	4/06/2013	Public General	A member of the public tree trimming at Cremorne, damaged service wires. No injuries were reported.	The damaged mains were made safe and then repaired.
206	6/06/2013	Worker	A worker excavating for a new pole as part of a network upgrade at Camberwell, struck LV mains. No injuries were reported.	The area was made safe, and repairs required carried out.
207	7/06/2013	Public worker	A public worker excavating at Sedgefield, damaged 11kV mains. No injuries were reported.	The area was made safe, and repairs required carried out.
208	4/06/2013	Public worker	An unknown Public worker trenching at Burwood, caused pole to lean towards the road, lowering the mains below statutory level. No injuries were reported.	The area was made safe, and repairs required carried out.
209	24/06/2013	Public worker	A public worker tree trimming at Wahroonga, damaged services wires. No injuries were reported.	The damaged mains were made safe and then repaired.
210	25/06/2013	Public general	An unauthorised, unknown member of the public entered distribution substation S9001 at Kurnell and removed the LV board and damaged HV cables. A battery operated ankle grinder was found on site. This action caused an outage reported to Ausgrid.	Ausgrid staff responded and made area safe.
211	28/06/2013	Public worker	Ausgrid staff observed external telecommunications staff from Service Stream Essential Network Services, working above live mains in an EWP without approval.	Work was stopped and an Ausgrid representative contacted the business to discuss the incident.
212	18/06/2013	Public worker	A public worker excavating at Pyrmont, damaged LV cables. No injuries were reported.	The area was made safe, and repairs required carried out.

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

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
ZN4990:PA5556GHJ	CITY CENTRAL	1412	0	Dec-12	641.37	2.08	579.63	1.05	Duration over index	Monitor
ZN263:PA3334KLM	DALLEY ST	1012	0	Mar-13	127.22	0.08	126.97	0.08	Duration over index	Monitor

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
ZN15002:PA6	NARRABEEN	1608	11	Mar-09	239.30	2.14	432.83	3.08	Duration over index	Performance Corrected
ZN129:PA19	HUNTERS HILL	1703	8	Jun-11	68.39	1.00	381.75	3.06	Duration over index	Performance Corrected
ZN15005:PA4	BELROSE	1105	9	Sep-11	125.22	1.11	539.09	6.36	Duration over index	Performance Corrected
ZN2635:PA5	EPPING	9	4	Dec-11	0.00	0.00	509.00	1.17	Duration over index	Performance Corrected
ZN9700:PA20	KIRRAWEE	1789	14	Dec-11	176.68	2.02	423.70	3.57	Duration over index	Performance Corrected
ZN10999:PA11	KOGARAH	2235	5	Dec-11	8.95	0.04	521.26	3.82	Duration over index	Performance Corrected
ZN901:PA19	SURRY HILLS	746	3	Dec-11	65.47	2.00	1000.75	1.27	Duration over index	Performance Corrected
ZN14144:PA4	WAMBERAL	821	5	Dec-11	295.95	5.16	438.68	5.07	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
ZN15005:PA10	BELROSE	769	13	Mar-12	178.24	2.11	417.03	3.10	Duration over index	Performance Corrected
ZN15005:PA8	BELROSE	1539	10	Mar-12	343.47	4.92	341.67	4.03	Frequency over index	Feeder inspected, vegetation report issued
ZN931:PA26	DARLINGHUR ST	214	2	Mar-12	2.71	0.09	711.15	2.83	Duration over index	Performance Corrected
ZN15012:PA8	KILLARNEY	1143	6	Mar-12	273.99	5.02	439.13	4.77	Duration over index	Feeder inspected, vegetation report issued
ZN1788:PA14	MATRAVILLE	1090	9	Mar-12	40.29	1.00	239.58	4.04	Frequency over index	Performance Corrected
ZN342:PA26	PADDINGTON	2817	6	Mar-12	212.45	4.56	372.43	1.50	Duration over index	Monitor
ZN965:PA42	PENNANT HILLS	1104	7	Mar-12	30.71	0.25	215.58	4.07	Frequency over index	Performance Corrected
ZN2400:PA22	BEROWRA	1342	14	Jun-12	84.83	1.10	559.70	5.66	Duration over index	Performance Corrected
ZN3425:PA28	CASTLE COVE	741	8	Jun-12	431.44	2.49	414.48	2.25	Duration over index	Monitor
ZN15006:PA9	DEE WHY WEST	2649	8	Jun-12	40.04	0.12	373.90	3.06	Duration over index	Performance Corrected
ZN12580:PA16	ERINA	1247	13	Jun-12	114.30	2.04	210.46	4.20	Frequency over index	Performance Corrected
221:11897	GATESHEAD 33	837	6	Jun-12	7.52	0.79	395.78	1.00	Duration over index	Performance Corrected
ZN847:PA44	HORNSBY	1029	9	Jun-12	14.94	0.14	417.13	2.28	Duration over index	Performance Corrected
ZN1788:PA11	MATRAVILLE	576	7	Jun-12	145.79	0.86	329.23	4.70	Frequency 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
ZN4545:PA17	MEADOWBANK	991	9	Jun-12	354.49	3.46	417.55	2.10	Duration over index	Monitor
202:34260	NEWCASTLE CBD 33	2413	8	Jun-12	226.65	3.46	168.89	4.08	Frequency over index	Performance Corrected
ZN965:PA26	PENNANT HILLS	905	11	Jun-12	75.32	2.09	361.31	3.13	Duration over index	Performance Corrected
ZN195:PA9	PYMBLE	1231	16	Jun-12	202.26	2.05	389.51	4.31	Duration over index	Performance Corrected
511:29880	RUTHERFORD 33	1435	11	Jun-12	2.09	0.02	231.17	4.10	Frequency over index	Performance Corrected
ZN3154:PA12	ST IVES	719	9	Jun-12	106.69	1.10	508.45	1.10	Duration over index	Performance Corrected
ZN3154:PA5	ST IVES	1132	8	Jun-12	62.21	1.09	680.89	1.07	Duration over index	Performance Corrected
ZN36300:PA11	BALGOWLAH NORTH	3572	18	Jun-12	271.24	2.08	376.48	3.76	Duration over index	Performance Corrected
ZN15005:PA12	BELROSE	1438	7	Sep-12	141.74	1.27	366.09	3.34	Duration over index	Performance Corrected
ZN2635:PA21	EPPING	1343	6	Sep-12	155.27	1.34	355.68	2.15	Duration over index	Performance Corrected
ZN12580:PA1	ERINA	1241	9	Sep-12	73.94	1.00	238.23	4.11	Frequency over index	Performance Corrected
ZN847:PA15	HORNSBY	1277	9	Sep-12	485.61	3.92	385.42	2.28	Duration over index	Feeder inspected, vegetation report issued
ZN9252:PA12	JANNALI	1215	5	Sep-12	196.23	1.38	312.15	4.20	Frequency over index	Performance Corrected
220:8692	JEWELLS 33	899	6	Sep-12	28.05	2.00	201.83	4.08	Frequency over index	Performance Corrected
ZN965:PA43	PENNANT HILLS	1021	11	Sep-12	166.57	2.10	403.32	3.10	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
ZN195:PA30	PYMBLE	1187	12	Sep-12	352.78	1.36	363.17	1.34	Duration over index	Monitor
ZN901:PA8	SURRY HILLS	715	4	Sep-12	338.98	0.28	382.62	1.32	Duration over index	Performance Corrected
ZN80:PA32	CHATSWOOD	2844	10	Sep-12	107.52	1.30	363.98	4.55	Duration over index	Performance Corrected
ZN12610:PA13	LONG JETTY	1950	9	Sep-12	139.72	2.42	311.44	4.11	Frequency over index	Performance Corrected
ZN15005:PA2	BELROSE	1907	13	Dec-12	257.13	3.28	383.87	3.35	Duration over index	Performance Corrected
ZN2400:PA26	BEROWRA	954	7	Dec-12	432.13	4.35	431.26	4.08	Duration over index	Feeder inspected, vegetation report issued
ZN3155:PA44	DOUBLE BAY	2201	7	Dec-12	95.93	0.51	352.07	1.41	Duration over index	Performance Corrected
242:81541	TOMAREE 33	1537	9	Dec-12	624.77	3.34	456.88	2.09	Duration over index	Reliability project completed.
ZN13000:PA11	LAKE MUNMORAH	1563	18	Dec-12	119.52	1.36	374.52	3.42	Duration over index	Performance Corrected
ZN2400:PA21	BEROWRA	1449	14	Mar-13	417.46	0.53	526.65	1.58	Duration over index	Monitor
ZN12580:PA10	ERINA	1502	9	Mar-13	441.25	4.99	373.51	4.00	Duration over index	Feeder inspected, vegetation report issued
507:80926	KURRI KURRI 132 11kV	43	4	Mar-13	378.92	2.91	364.52	1.91	Duration over index	Monitor
ZN1290:PA12	LEIGHTONFIE LD	1040	8	Mar-13	381.39	3.32	366.13	3.16	Duration over index	Feeder inspected, vegetation report issued
ZN12610:PA18	LONG JETTY	1106	10	Mar-13	361.08	2.75	535.81	3.68	Duration over index	Feeder inspected, vegetation report issued

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
ZN15013:PA2	TERREY HILLS	69	2	Mar-13	367.57	3.28	370.12	3.30	Duration over index	Feeder inspected, vegetation report issued
238:34144	THORNTON 33	834	18	Mar-13	295.79	6.57	295.70	4.28	Frequency over index	Feeder inspected, reliability project issued
ZN188:PA18	ZETLAND	96	1	Mar-13	826.64	0.89	826.64	0.89	Duration over index	Monitor
ZN12570:PA22	AVOCA	1598	16	Mar-13	357.66	4.13	461.70	4.63	Duration over index	Monitor
203:8089	CARRINGTO N 33	233	4	Jun-13	500.78	3.00	500.78	3.00	Duration over index	Performance under review
ZN10994:PA4	MORTDALE	1682	7	Jun-13	490.16	3.74	490.16	3.74	Duration over index	Performance under review
ZN342:PA15	PADDINGTON	121	3	Jun-13	547.82	2.07	547.82	2.07	Duration over index	Performance under review
ZN35500:PA28	TOP RYDE	3089	17	Jun-13	293.83	4.10	293.83	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
510:48164	WALLALONG 33	825	102	Sep-12	776.64	2.71	1631.5	5.32	Duration over index	Performance Corrected
514:18146	NEWDELL 66	5	14	Mar-13	1399.00	1.80	1409.0	2.00	Duration over index	Feeder investigated, Monitor
ZN14143:PA17	SOMERSBY	748	69	Mar-13	875.06	7.24	979.2	8.97	Frequency over index	Performance Corrected
508:82578	BRANDY HILL 132	422	63	Mar-13	395.45	6.17	816.8	9.06	Frequency 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
513:48056	SINGLETON 66	251	55	Jun-13	776.45	8.33	776.5	8.33	Frequency over index	Performance under review
806:82662	MOONAN 33	230	186	Jun-13	1935.49	7.85	1935.5	7.85	Duration over index	Performance under review

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
806:82656	MOONAN 33	271	223	Mar-13	0	0	1663.97	6.11	Feeder was a temporary configuration, now 2 SR feeders. This feeder no longer exists	Feeder investigated.

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.