Essential Energy

Electricity Network Performance Report 2011/12

Submitted to:
NSW Department of Trade and Investment, Regional Infrastructure and Services 2012

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Profile

1.1 Overview

Essential Energy is a New South Wales Government-owned corporation responsible for building, operating and maintaining Australia's largest electricity network - delivering essential services to more than 800,000 homes and businesses across 95 per cent of NSW and parts of southern Queensland and northern Victoria.

As part of the NSW Government's energy industry reforms, on 1 July 2012 Essential Energy transitioned to a new operating model, with a common Board and Chief Executive Officer appointed to the three NSW electricity distribution businesses – Essential Energy, Endeavour Energy and Ausgrid. Under this model Essential Energy remains a stand-alone corporation, with a focus on the delivery of operational services across its network area.

In October 2011, Essential Energy restructured its regional operations, consolidating our eight existing regions into five, with a focus on safety, productivity and consistency across the network. Essential Energy delivers services under a decentralised regional operating structure with five regional management teams responding quickly and effectively to local needs and priorities.

With medium to very low customer densities and wide variations in topography and climatic conditions, Essential Energy's electricity network is unique in Australia and includes:

- around 200,000 kilometres of powerlines
- around 1.4 million power poles
- approximately 145,000 streetlights
- around 135,000 substations
- almost 400 zone substations
- more than 800,000 network customers.

Providing regional employment opportunities
Essential Energy is a leading employer in regional NSW, providing meaningful and sustainable career opportunities for more than 4,000 employees in 1,500 communities across NSW, with more than 1,140 new apprenticeships created since 2001.

We are one of the largest direct employers of Indigenous apprentices in NSW, with more than 150 Indigenous apprentices and trainees joining the organisation since 2001.

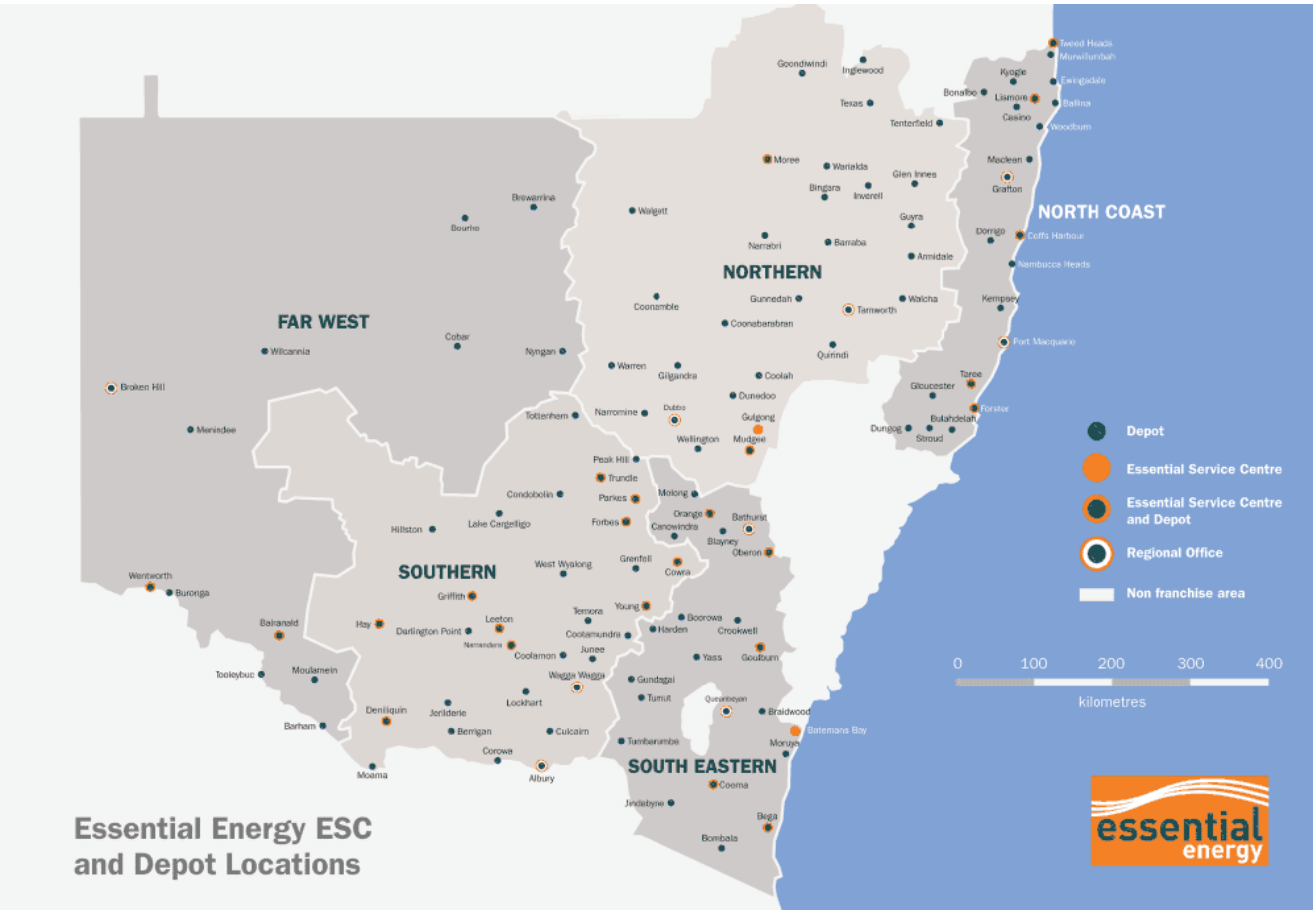
Our aims and objectives
Essential Energy's aim is to be the leading provider of essential services in Australia and a trusted part of our communities.

Essential Energy's business strategy focuses on the key priority areas of safety, value and performance, measured through our corporate dashboard and developed across our annual business planning cycle. This strategy aligns Essential Energy's objectives with the *State Owned Corporations Act 1989* and the *Energy Services Corporations Act 1995.*

Planning for 2012 and beyond
Essential Energy is aware of the impact of rising network costs on regional NSW communities and is responding to this by reviewing all operating and capital expenditure areas across the business. Our priority in 2012 is to identify and implement initiatives that will ensure safe and reliable network services are provided at the lowest reasonable cost to our customers.

Essential Energy's focus areas include:

- managing a network business that ensures public and employee safety
- delivering network products and services at the lowest reasonable cost, that are valued by our customers, communities and shareholders
- driving enhanced network and financial performance as part of being an efficient network asset manager.



Essential Energy's network distribution area

Table 1.1 Distributor Statistics

	Number at 30/6/11	Number at 30/6/12
Distribution Customer Numbers (Total)	803,889	803,414
Customer Numbers at Year End (North Western)[1]	60,280	0
Customer Numbers at Year End (Southern)	115,391	157,034
Customer Numbers at Year End (Central Western)[1]	94,307	0
Customer Numbers at Year End (Northern)	94,994	145,801
Customer Numbers at Year End (South Eastern)	120,372	172,933
Customer Numbers at Year End (Far North Coast) – now North Coast	139,804	297,486
Customer Numbers at Year End (Mid North Coast)[1]	157,741	0
Customer Numbers at Year End (Far West)	21,000	30,160
Maximum Demand (MW)	2,238	2,184
Feeder Number CBD	0	0
Feeder Number Urban	293	298
Feeder Number Short Rural	897	901
Feeder Numbers Long Rural	239	240
Energy Received by Dist Network to Year End GWh	12,900	12,626
Energy Distributed to Year End (Residential) GWh	4,879	4,663
Energy Distributed to Year End (Non-Residential including un-metered supplies) GWh	7,174	7,291
Energy Distributed to Year End (North Western) GWh[1]	1,231	0
Energy Distributed to Year End (Southern) GWh	1,882	3,142
Energy Distributed to Year End (Central Western) GWh[1]	2,528	0
Energy Distributed to Year End (Northern) GWh	1,426	2,700
Energy Distributed to Year End (South Eastern) GWh	1,336	2,662
Energy Distributed to Year End (Far North Coast) GWh – now North Coast	1,541	2,988
Energy Distributed to Year End (Mid North Coast) GWh[1]	1,652	0
Energy Distributed to Year End (Far West) GWh	457	461
System Loss Factor (%)	6.6	5.3
Transmission System (km)	0	0
Transmission Substation (Number)[2]	20	20
Sub-transmission System (km)	11,391	10,914[3]
Substation - Zone (Number)	325	326
Substation - Distribution (Number)	134,947	135,757
High Voltage Overhead (km)	145,835	146,372
High Voltage Underground (km)	2,011	2,121
Low Voltage Overhead (km)	26,652	25,807[4]
Low Voltage Underground (km)	4,810	4,679[4]
Pole (Number)	1,385,780	1,387,234
Streetlights (Number)	148,158	149,375
Employees (Full Time Equivalent Number)	4,573	4,648
Contractors (Full Time Equivalent Number)	545	538

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

1 In October 2011, Essential Energy restructured its regional operations, consolidating eight regions into five.
2 Essential Energy assumes any substation that converts to a voltage that is not used for distribution is a Transmission Substation.
3 Sub-transmission System (km) change, the reduction in Sub-transmission overhead is primarily due to identifying some 33kV lines as 33kV distribution instead of 33kV Sub-transmission as part of ongoing data maintenance.
4 The reduction in both LV overhead and underground is due to data cleansing during the reporting period.

1.2 Capital Works Program

Essential Energy is planning to deliver the capital work program necessary to meet objectives outlined in the regulatory determination submission and Network Management Plan. The plan is subject to on-going review to allow for changes due to work delivery scheduling and assessment of network performance and loads growth.

Work delivery has been impacted by extended wet weather conditions in 2011/12 with delays to several major projects, despite this 93 per cent of the distribution works program was completed as planned.

Table 1.2 Capital Works Program Trend

	Previous Years				Current Year
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
Capital works program ($M)	489.6	561.7	652.7	701.9	745.1

2

Network Management

2.1 Overview

Essential Energy manages a complex and geographically diverse power supply network. Our distribution area is one of the largest in the world. To ensure our decisions are localised and reflect the needs and concerns of the local population, the network is managed through a regional management structure.

Essential Energy's Network Management Plan has been put in place to meet its statutory and public responsibilities and to provide a safe, reliable and sustainable electricity supply to our customers. The plan is divided into four chapters, these being:

- **Network Safety and Reliability:** aims to establish a framework which ensures Essential Energy's sub-transmission and distribution system provides an adequate, reliable and safe supply of electricity of appropriate quality. The plan is revised regularly and both management and operations employees are audited to ensure work practices are in accordance with the objectives of the plan (See sections 3 and 4).
- **Customer Installation Safety Plan:** ensures provision of safe electrical installations within Essential Energy's network area and their safe connection to Essential Energy's sub-transmission and distribution system to help provide a safe working environment for our employees, service providers, contractors, customers and the general public (See section 6).
- **Public Electrical Safety Awareness Plan:** provides a framework and strategies to warn the public of the hazards associated with electricity and, in particular, the hazards associated with overhead powerlines, and to provide simple but effective ways to minimise their risk exposure (See section 9).
- **Bush Fire Risk Management Plan:** aims to ensure that Essential Energy's assets are managed in a way that will minimise the risk of bush fires, as well as protect our assets and maintain customer supply reliability at times of bush fire (See section 8).

Essential Energy's commitment to safety management procedures can also be seen in its continuous improvements in safety measures (See section 5).

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	2,327	3,232	3,599	5,301	4,323
Complaints per 1,000 Distribution Customers	3.0	4.2	4.5	6.6	5.4
Complaints regarding Vegetation Management	164	169	234	328	376

Table 2.2 Network Complaint Investigations Completed Current Year

Summary

	2011/12	
	Number	**Number Valid***
Voltage	894	516
Current	3	0
Other Quality	462	276
Reliability	244	109
Safety	0	0

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

Detailed

		2011/12	
Category	**Nature of Complaint**	**Number**	**Number Valid***
Voltage	Sustained over voltage	216	145
	Sustained under voltage	145	94
	Voltage fluctuations	356	172
	Voltage dips	90	51
	Voltage swell	3	2
	Switching transients	1	0
	N-E voltage difference	75	47
	Ground fault voltage	0	0
	Voltage unbalance	7	5
	Mains signalling voltages (outside defined range)	1	0
	HV injection (HV/LV Intermix)	0	0
	Notching	0	0
	Invalid	378	0
Sub-total (Supply Voltage Complaints)		**894**	**516**
Current	Direct current	0	0
	Harmonic Content	3	0
	Inter Harmonics	0	0
	Invalid	3	0
Sub-total (Supply Current Complaints)		**3**	**0**
Other quality	Mains signalling reliability	2	1
	Noise and interference	110	47
	Level of supply capacity	80	56
	Embedded generation (Solar)	240	164
	Embedded generation (Wind)	8	2
	Supply frequency	2	0
	Level of EMF	0	0
	Customer equipment failure	20	6
	Invalid	186	0
Sub-total (Other Quality of Supply Complaints)		**462**	**276**
Sub-total (All Quality of Supply Complaints)		**1,359**	**792**

		2011/12	
Category	**Nature of Complaint**	**Number**	**Number Valid***
Reliability	No. of supply failures	71	26
	Duration of supply failures	2	0
	Outages miscellaneous	15	0
	No. of <1 min. interruptions	156	83
	Invalid	135	0
Sub-total (Reliability of Supply)		**244**	**109**
Safety	Overhead line safety	0	0
	Underground safety	0	0
	Electrical station safety	0	0
	Service line safety	0	0
	Invalid	0	0
Sub-total (Network Safety)		**0**	**0**
Total Completed		**1,603**	**901**
Other	IN Communities	3	0
	Under investigation (not validated)	17	0
Totals		**1,623**	**901**

Total Network Complaints experienced a 4 per cent increase in the 2011/12 reporting period compared to the 2010/11 period. The increase could be attributed to rising customer expectations and awareness with appliances incorporating monitoring capability (inverters, UPS's, etc) and the Solar Bonus Scheme with systems failing to return expected revenue. The percentage of "Valid" complaints per category is very compatible to the previous period.

There has been a marked improvement in the "Under Investigation" category reducing from 20 per cent of total complaints in the 2010/11 period to 1 per cent in the 2011/12 period. This can be attributed to a processing change to validate the complaint when the results of the investigation are known, rather than at the close out of the project. This processing improvement has directly attributed to the increase in the number of "Valid" complaints.

2.3 Customer Service Standards Reporting

Table 2.3 Customer Service Standards Current Year 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	N/A	N/A	N/A	N/A
Non-Metropolitan	6	7	0	10

Table 2.3 shows a total of 7 Claims not paid based on Interruption Duration and 10 based on Interruption Frequency.

Claims based on duration were denied for the following reasons:

- five occurred during severe weather events
- two where the outage was less than 18 hours.

Claims based on frequency were denied for the following reasons:

- ten due to the customers premises having less than four outages recorded.

3

Network Planning

3.1 Overview

Essential Energy is committed to providing a safe, secure and reliable supply of energy in a cost effective manner. Essential Energy achieves this by planning its network and making investment decisions in line with our ***CEK8018*** *Network Asset Management Plan (NAMP).*

The NAMP outlines Essential Energy's obligations in relation to network planning, including the need to compile and publish an annual *Electricity System Development Review (ESDR).* The NAMP has been prepared in accordance with the compliance obligations of network management legislation, regulations and related codes of practice, and reflects recognised industry best practices and standards relating to the management of electricity infrastructure assets. It is designed to conform with the NSW Government policy and planning guidelines on total asset management, which addresses strategic planning relating to capital investments, renewal, and maintenance.

Essential Energy's network development is undertaken in accordance with the *Electricity Supply Act*, the *National Electricity Rules*, the *NSW Code of Practice - Demand Management for Electricity Distributors* and our policy *CEOP8003 Sub-transmission and Distribution Network Planning Criteria and Guidelines.*

In general, Essential Energy plans the development of its network to ensure:

- network capacity is adequate to meet power transfer requirements
- electrical and thermal design ratings (normal and overload) of equipment are not exceeded
- supply reliability is in accordance with published standards, or as negotiated to meet the special requirements of individual major network customers
- quality of supply meets published standards and system voltage levels are maintained within acceptable standard limits
- safety standards are maintained or exceeded
- environmental constraints are satisfied, and
- the above requirements are met in a cost effective manner.

3.2 Design Planning Criteria Compliance Reporting

In August 2005 the Minister for Energy and Utilities introduced new *licence conditions* that included requirements for planning and design of sub-transmission and distribution networks.

Following a review of the *licence conditions* conducted by the Minister, the conditions were replaced with updated and revised conditions with effect from 1 December 2007.

The *design planning criteria* set out:

- input standards to be used by a licence holder in planning its network, and
- requirements for load forecasting and contingency planning methodologies intended to achieve operational outcomes.

The baseline levels of planned redundancy required under the *design planning criteria* underpin Essential Energy's plans for the network to ensure, as far as is reasonably practicable, that:

- the reliability standards are met, and
- an adequate supply, with an appropriate level of redundancy, consistent with its regulatory obligations, is provided.

The *design planning criteria* applicable to Essential Energy are listed in Table 3.1.

Table 3.1 Design Planning Criteria

Network Element	Load Type	Forecast Demand or Expected Demand	Security Standard	Customer Interruption Time
Sub-transmission Line	Urban and Non-Urban	≥ 15 MVA	N-1[1]	< 1 minute
	Urban and Non-Urban	< 15 MVA	N[2]	*Best practice repair time*
Sub-transmission Substation	Urban and Non-Urban	Any	N-1	< 1 minute
Zone Substation	Urban and Non-Urban	≥ 15 MVA	N-1[1]	< 1 minute
	Urban and Non-Urban	< 15 MVA	N[2]	*Best practice repair time*
Distribution Feeder	Urban (regional centres)[4]	Any	N-1[3]	< 4 Hours
	Urban (other) and Non-Urban	Any	N	*Best practice repair time*
Distribution Substation	Urban and Non-Urban	Any	N	*Best practice repair time*

Notes:

1. For a *Sub-transmission line - Overhead* and a Zone Substation:
   a) Under N-1 conditions, the *forecast demand* is not to exceed the *thermal capacity* for more than 1 per cent of the time i.e. a total aggregate time of 88 hours per annum, up to a maximum of 20 per cent above the thermal capacity under N-1 conditions. For Essential Energy, in other than regional centres, the *forecast demand* must not exceed 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 per cent 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 per cent of *forecast demand*.

3. By 30 June 2014, expected demand is to be no more than 80 per cent 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 per cent 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 the one system.

4. Regional centre means: Albury, Armidale, Ballina, Bathurst, Broken Hill, Coffs Harbour (including Sawtell), Dubbo, Forster-Tuncurry, Goulburn, Grafton, Griffith, Lismore, Orange, Port Macquarie, Queanbeyan, Tamworth, Taree, Tweed Heads, and Wagga Wagga.

3.2.1 Design Planning Criteria Compliance Reporting

Sub-transmission Planning

The planning criterion considers the adequacy of the sub-transmission network not only to meet the energy demand requirement, but also its capability to do so within component electrical and thermal ratings and voltage limits. Analysis is carried out to generally achieve an economically efficient outcome in which the sub-transmission network is secure and within rating following the forced outage of any single circuit line or substation element during peak periods.

Provision is also made for use of the short-time capability or cyclic rating of transformers during a planned outage of a parallel transformer.

Other sub-transmission planning criteria outline that:

- network equipment is designed to withstand maximum fault duty
- any sub-transmission fault is seen by at least two protection systems that are fully independent.

Each potential augmentation project is treated on its own merits. The main economic impact of sub-transmission investment is on a reduction in the value of the energy not supplied (the 'unserved energy'), an extension of the time taken for capacity limits to be exceeded and the initial capital costs. These are quantified over the expected life of the project and costed at appropriate rates.

Planning of the sub-transmission network is usually carried out over a longer time horizon of between five to ten years. Essential Energy distinguishes between long-term and short-term network planning, with long-term network planning generally confined to 132kV and 66kV networks. Short-term network planning is usually limited to networks ranging from 11 to 33kV, with a horizon period of up to five years.

Primary Distribution Planning

The planning and capital investment framework associated with Essential Energy's distribution network is principally driven by technical considerations and requirements. This is primarily due to the inherent geographical challenges, our commitment to providing customers with published standards of reliability and quality of supply, and low profit structure of the network which is essentially radial.

Distribution network planning is generally of a short-term nature – up to five years. Essential Energy's traditional approach to distribution network planning has been to focus on feeder augmentation works to provide supply to new or growing loads, maintain adequate voltage regulation, enhance reliability of supply, upgrade thermal capacity (and minimise system losses). This form of distribution planning criteria will continue.

Progress against the Plan

Essential Energy has committed to achieving full N-1 compliance by 2014 of both Tier 1 and Tier 2 Regional Centres. Currently there are 783 individual projects scheduled for the 2012/13 and 2013/14 financial years that will complete the program, 519 in 2012/13 and 264 in 2013/14. In total there have been 1,903 individual projects identified to achieve N-1 compliance in all centres.

Financial Year	Feeders Completed
2009/10	316
2010/11	303
2011/12	252
2012/13	58
2013/14	0
Completed	929
In Progress	974
Total	**1,903**

Table 3.2 Sub-Transmission Lines and Substations and Zone Substations Not Complying with the Design Planning Criteria on 1 July of the Current Year

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Projects Deferred		
Boggy Creek - Nambucca Heads 66kV feeder (4km) 6,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand of 15MVA in 2014, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Boggy Creek to Nambucca 66kV feeder, deferred due to revised load forecast
Taree - Kew 66kV feeder (45km) 7,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV feeder has peak demand of 15MVA. Outage of 66kV feeder results in overload of remaining in-service 66kV feeder	Establish a 132/66/11kV transmission substation at Herons Creek, deferred due to revised load forecast. Other drivers may result in this project being delivered ahead of the reliability standards requirement
Trans Grid - Quirindi 66kV feeder (5 6km) 7,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand of 15MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Trans Grid - Quirindi 66kV feeder, deferred due to revised load forecast
Temora - Thanowring 66kV feeder (8km) 7,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand of 15MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Temora - Thanowring 66kV feeder, deferred due to revised load forecast
Projects Completed		
Newee Creek zone substation 4,000 customers North Coast Region	Newee Creek zone substation has a firm transformer capacity of 12MVA with a forecast peak demand of 11MVA in 2013/14	Establish a 132/11kV transmission substation at Macksville in joint planning with Trans Grid's 132kV network constraints, completed 2009/10
Coffs Harbour South zone substation 9,000 customers North Coast Region	N-1 ≥ 15MVA zone substation. Coffs Harbour South zone substation has a firm transformer capacity of 23MVA with a peak demand of 30MVA	Establish a 132/66/11kV transmission substation at Boambee South in joint planning with Trans Grid's constraints, transfer load away from Coffs Harbour South zone substation, completed 2009/10
Raleigh zone substation 6,000 customers North Coast Region	Raleigh zone substation has a firm transformer capacity of 10MVA with a forecast peak demand of 13MVA in 2013/14	Establish a 132/33/11kV transmission substation at Raleigh in joint planning with Trans Grid's 132kV network constraints, completed 2009/10
Stroud - Gloucester 33kV feeders (2 x 40km) 4,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. 33kV feeders have peak demand of 15MVA. Outage of 33kV feeder results in voltage levels below standard and overload of remaining in-service 33kV feeder	Establish a 33kV switching station at Wards River, completed 2010/11
Forster - Tuncurry 66kV feeder (8km) 9,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV feeders have peak demand of 20MVA. Outage of 66kV feeder results in overload of remaining in-service 66kV feeder	Replace existing 66kV feeder river crossing with 66kV cable on bridge, completed 2010/11

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
	Projects Completed (cont'd)	
Trans Grid - Glen Innes 66kV feeder (9km) 7,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV feeder has peak demand of 15MVA. Limited capacity of remaining in-service 66kV feeder	Construct a second Trans Grid - Glen Innes 66kV feeder in joint planning with Trans Grid 132kV constraints, completed 2010/11
Trans Grid - Gunnedah 66kV feeders (2 x 12km) 7,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV feeders have peak demand of 23MVA. Outage of 66kV feeder results in overload of remaining in-service 66kV feeder	Upgrade Trans Grid - Gunnedah 66kV feeders, completed 2010/11
Wagga - Lockhart - Kywong - Narrandera - Yanco 66kV feeder (85km) 5,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV backup to Narrandera limited by low voltage levels	Install a 66kV regulator on Wagga - Narrandera 66kV feeder near Lockhart, completed 2010/11
Bomen zone substation 15,000 customers (Wagga City) Southern Region	N-1 ≥ 15MVA Sub-transmission feeders. The Wagga city 66kV network is arranged in a 'ladder' formation, with some zone substations not having incoming 66kV feeder or 66kV transformer protection. Up to four zone substations can be affected by a single feeder or transformer fault. Restoration of supply within 1 minute is not possible	Augment Bomen substation, completed 2010/11
Merbein - Dareton 66kV feeder (Buronga load) Far West Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV radial feeder with a peak demand of 30+MVA. Outage of 66kV feeder leads to loss of supply to all customers	Establish Buronga 66/22kV zone substation, construct 66kV feeder from Gol Gol to Buronga, reconfigure 22kV feeder to 66kV, completed 2011/12
Lismore 132kV - Lismore South 66kV feeders (2x3km) 17,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV network to Lismore South has peak demand of 35+MVA. Outage of 66kV feeder results in overload of remaining in-service 66kV feeder	Augment Lismore 132kV - Lismore South 66kV feeders, completed 2011/12
Terranora transmission substation 35,000 customers North Coast Region	N-1 ≥ 15MVA transmission substation. Terranora transmission substation has a firm transformer capacity of 100MVA with a peak demand of 110MVA	Install a third 110/66kV transformer at Terranora, completed 2011/12
Coffs Harbour North zone substation 10,000 customers North Coast Region	N-1 ≥ 15MVA zone substation. Coffs Harbour North zone substation has a firm transformer capacity of 23MVA with a peak demand of 30MVA	Augment Coffs Harbour North zone substation to 45MVA capacity, completed 2011/12
Dubbo - Yarrandale 66kV feeder (5.5km) 9,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand above 15MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Dubbo - Yarrandale 66kV feeder, completed 2011/12

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Projects Completed (cont'd)		
Yarrandale zone substation 4,000 customers Northern Region	Yarrandale has a single 10MVA transformer with peak demand approaching 10MVA, and expected additional load, a larger transformer and another transformer is required. A new second 66kV feeder from Dubbo 132kV to Yarrandale requires 66kV feeder bays at Yarrandale	Augment Yarrandale zone substation, completed 2011/12
Mulwala - Finley 132kV and 66kV feeders (60km) 7,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeders. Both Finley zone substation and Mulwala 132/66kV substation have demands above 15MVA. On loss of the 132kV feeder to Mulwala and the 66kV feeder to Finley, the remaining in-service feeder is overloaded	Establish a 132/22kV substation at Mulwala, construct a 132kV feeder from Mulwala tee to new 132/22kV substation, construct 132/66kV dual feeder from Finley 132kV to Finley zone substation, convert 66kv Finley - Mulwala feeder to 132kV, completed 2011/12
Ashmont zone substation 15,000 customers (Wagga City) Southern Region	N-1 ≥ 15MVA Sub-transmission feeders. The Wagga Wagga city 66kV network is arranged in a 'ladder' formation, with some zone substations not having incoming 66kV feeder or 66kV transformer protection. Up to four zone substations can be affected by a single feeder or transformer fault. Restoration of supply within 1 minute is not possible	Augment Ashmont substation to fully switched 66kV substation and construct 66kV feeder connection, completed 2011/12
Projects Commenced - Expected Completion 2012/13		
Koolkhan - Maclean 66kV feeder (36km) 11,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand above 20MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Koolkhan - MacLean 66kV feeder
Ewingsdale - Mullumbimby 66kV feeder (13km) 20,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. Outage of 66kV feeder results in voltage levels below standard and overload of remaining in-service 66kV feeders	Stage 1 conversion of 66kV network to 132kV
Taree - Failford - Tuncurry - Forster - Bohnock 66kV feeders (100km) 18,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV feeders have peak demand of 40+MVA. Outage of 66kV feeder results in voltage levels below standard and overload of remaining in-service 66kV feeders	Establish a 132/66kV transmission substation at Hallidays Point and construct interconnecting 66kV feeders
Borthwick St - Wynne St 66kV feeder, Wynne St zone substation 8,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder and N-1 ≥ 15MVA zone substation. Wynne St substation with a peak demand of 25MVA is controlled by single 66kV circuit breaker at Borthwick St. Transformer or feeder fault leads to loss of supply to all customers with restoration greater than 1 minute	Augment Wynne St and Borthwick St substations and loop in/out Ashford 66kV feeder to Wynne St

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Projects Commenced - Expected Completion 2012/13 (cont'd)		
TransGrid - South Tamworth - Oxley Vale 66kV feeders (25km) 11,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV feeders have peak demand of 40MVA. Outage of 66kV feeder results in overload of remaining in-service 66kV feeders and supply cannot be restored in 1 minute	Augment Trans Grid - South Tamworth - Oxley Vale feeders and configure substation to 66kV 'ring' network
Trans Grid - Goddard Lane 66kV feeder (10km) 5,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand above 15MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Trans Grid - Goddard Lane 66kV feeder
Narromine - Dubbo West Sub-transmission network 6,000 customers Northern Region	N-1 ≥ 15MVA zone substation. Dubbo West approaching 15MVA, currently supplied via a radial from Dubbo 132 to West Dubbo and to Narromine, provides N-1 by a 66kV supply at Narromine, via the establishment of a 132/66kV transformer. A switched 132kV busbar will provide a connection point for a future Wellington - Narromine 132kV feeder	Establish a 132/66kV transmission substation at Narromine 132kV tee
Bega - Pambula - Eden South 66kV feeder (60km) South Eastern Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV radial feeder with a peak demand of 20+MVA. Outage of 66kV feeder leads to loss of supply to all customers	Construct second Bega - Eden South 66kV feeder over redundant 33kV easement
Cooma - Bega 132kV feeder (92km) and Cooma - Bombala - Bega 66kV feeder (96km) 23,000 customers South East Region	N-1 ≥ 15MVA Sub-transmission feeders. 132kV and 66kV network with peak demand of 50MVA. Outage of 132kV feeder leads to overload of 66kV feeder, results in loss load of 30+MVA	Construct a Cooma - Bega dual 132/66kV feeder on existing 66kV easement
Bathurst Russell St zone substation 8,000 customers South Eastern Region	N-1 ≥ 15MVA zone substation. Russell St zone substation has a firm transformer capacity of 20MVA with a peak demand of 26MVA	Augment Russell St zone substation to 30MVA capacity, transfer load to adjacent zone substation
Forbes - West Jemalong 66kV feeder (37km) 7,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand of 15MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Forbes - West Jemalong 66kV feeder
Deniliquin to Moama 66kV feeder (70km) 4,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV radial feeder with a peak demand of 15+MVA. Outage of 66kV feeder leads to loss of supply to all customers	Construct a second Deniliquin to Moama 66kV feeder

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Projects Commenced - Expected Completion 2012/13 (cont'd)		
Bourkelands zone substation 15,000 customers (Wagga City) Southern Region	N-1 ≥ 15MVA Sub-transmission feeders. The Wagga city 66kV network is arranged in a 'ladder' formation, with some zone substations not having incoming 66kV feeder or 66kV transformer protection. Up to four zone substations can be affected by a single feeder or transformer fault. Restoration of supply within 1 minute is not possible	Augment Bourkelands substation with fully switched in/out 66kV busbar
Wagga Wagga City Network 66kV feeders (5km) 15,000 customers (Wagga City) Southern Region	N-1 ≥ 15MVA Sub-transmission feeders. The Wagga Wagga city 66kV network is arranged in a 'ladder' formation, with some zone substations not having incoming 66kV feeder or 66kV transformer protection. Up to four zone substations can be affected by a single feeder or transformer fault. Restoration of supply within 1 minute is not possible	Construct a number of short 66kV feeders between zone substations at Ashmont, Bomen and Cartwrights Hill
Projects Commenced - Expected Completion 2013/14		
Karangi - Coffs Harbour North 66kV feeder (11km) 10,000 customers North Coast Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV feeder has peak demand of 30MVA. Outage of 66kV feeder results in overload of remaining in-service 66kV feeders and extreme low voltage levels	Construct a Coffs Harbour North - Coffs Harbour South 66kV feeder
Beryl - Dunedoo 66kV feeder (41km) 7,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand above 15MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Beryl - Dunedoo 66kV feeder
Yarrandale - Gilgandra 66kV feeder (65km) 5,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand above 15MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct a second Yarrandale - Gilgandra 66kV feeder
Wellington - Dubbo 132kV feeders (2 x 47km) 70,000 customers Northern Region	N-1 ≥ 15MVA transmission feeder. 132kV feeder with peak demand above 150MVA, outage of a 132kV feeder leads to overload of remaining in-service 132kV feeder	Construct a Wellington - Narromine 132kV feeder
Wagga - Temora 132kV feeder (80km) 9,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeder. 132kV feeder with limited 66kV backup, Peak demand of 50MVA. Outage of 132kV feeder leads to overload of 66kV feeder and results in loss load of 20+MVA	Rebuild existing Wagga-Junee-Temora 66kV feeder as 132/66kV dual circuit

Element including Location, Customer Numbers, Element Length/Capacity	Description of Non-Compliance and Reason	Proposed Remedial Actions and Timetable
Projects Commenced - Expected Completion 2013/14 (cont'd)		
Trans Grid-Orange South-Orange West 66kV feeders (20km) 12,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeder. Orange South and Orange West both have peak demands above 15MVA, 66kV feeders cannot be restored within 1 minute during contingency	Augment Orange South and Orange West zone substation, add 66kV feeder bays
Trans Grid - Parkes 66kV feeder (12km) 7,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeder. 66kV feeder has peak demand of 20MVA. Outage of 66kV feeder results in overload of remaining in-service 66kV feeders	Construct a second 66kV feeder to Parkes Town
Wagga - Uranquinty 66kV feeder (19km) 7,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeder. Radial 66kV feeder with peak demand of 18MVA, outage of 66kV feeder leads to loss of supply to all customers	Construct Bourkelands - Uranquinty 66kV feeder and augment Uranquinty 66kV busbar
Projects yet to commence		
Nyngan - Cobar 66kV feeder (130km) 4,000 customers Far West Region	N Sub-transmission feeder. Radial 66kV feeder with voltage levels below standard during system normal operation	Install a 66kV regulator on Nyngan - Cobar 66kV feeder, anticipated completion 2013/14
Beryl - Mudgee (tee) 132kV feeder (35km) 9,000 customers Northern Region	N-1 ≥ 15MVA Sub-transmission feeder. 132kV feeder has peak demand of 25MVA. Outage of 132kV feeder results in overload of remaining in-service 66kV feeder	Augment Beryl - Mudgee Sub-transmission network, anticipated completion 2013/14
Evans Lane - Batemans Bay 132kV feeder (57km) 25,000 customers South Eastern Region	N-1 ≥ 15MVA Sub-transmission feeder. 132kV network with peak demand of 50+MVA. Outage of 132kV feeder leads to extreme low voltage levels and possible voltage collapse	Rebuild smaller 132kV feeder with larger conductor and staged power factor correction, anticipated completion 2013/14 (Project may change dependant on projects in Endeavour Energy 132kV network)
Griffith 33kV feeders (37km) 12,000 customers Southern Region	N-1 ≥ 15MVA Sub-transmission feeders. 33kV feeders have peak demand above 15MVA. Outage of 33kV feeder results in overload of remaining in-service 33kV feeders	Initially construct 132kV feeder operated at 33kV. Establish a Griffith West 132/33kV transmission substation and 33kV feeder interconnections into the long term, anticipated initial feeder completion 2013/14
Cartwrights Hill zone substation 15,000 customers (Wagga City) Southern Region	N-1 ≥ 15MVA Sub-transmission feeders. The Wagga Wagga city 66kV network is arranged in a 'ladder' formation, with some zone substations not having incoming 66kV feeder or 66kV transformer protection. Up to four zone substations can be affected by a single feeder or transformer fault. Restoration of supply within 1 minute is not possible	Augment Cartwrights Hill substation with fully switched in/out 66kV busbar, anticipated completion 2013/14

2011/12 Progression Summary

Total projects originally listed (as of 2008/09) – 48
Projects Deferred – 4
Projects Added – 0
Projects Completed – 17
Projects Commenced Expected Completion 2012/13 – 14
Projects Commenced Expected Completion 2013/14 – 8
Projects yet to be Commenced (anticipated completion 2013/14) - 5

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

N-1 Regional Centres			
Total Number of Feeders	**Number of Feeders Without N-1 Capability (1 Minute)**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
298	159	Inadequate feeder thermal ratings, lack of interconnectors, underrated interconnecting switchgear	Upgraded and additional feeders. Construction of interconnectors, upgrading additional interconnecting switchgear (gas switches, reclosers) N-1 programs have been and are scheduled to be completed by 2014. (123 completed)
Urban			
Total Number of Feeders	**Number of Feeders Without N Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
As above	As above	As above	As above
Non-urban			
Total Number of Feeders	**Number of Feeders Without N Capability**	**Description and Reason for Non-Compliance**	**Proposed Remedial Actions and Timetable**
1,141	88	Insufficient capacity due to incremental growth	As N capability exceeded remedial plans will be developed accordingly. All feeders without N capability have augmentation works programmed. (65 completed)

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

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**
Not Applicable	Not Applicable	Not Applicable	Not Applicable
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**
135,757	173	Incremental life style growth	Substations programmed to be upgraded when identified. (167 completed)

3.3 Demand Management

Essential Energy has implemented internal procedures to comply with the *NSW Code of Practice - Demand Management for Electricity Distributors* and the *National Electricity Rules*. This ensures the network planning process is transparent, consultative and equitable in the treatment of non-network alternatives relative to traditional network augmentation.

The process includes:

- publication of the Annual Electricity System Development Review
- maintenance of a Register of Interested Parties
- review of emerging constraints with a network augmentation in excess of $1 million
- screening of all distribution projects with an augmentation component in excess of $250,000
- publication of Consultation Papers via AEMO and Essential Energy external web pages
- notification to Interested Parties of Demand Management opportunities
- maintenance of a panel of non-network service providers who are available to investigate and advise on demand management options
- consultation with prospective Demand Management Service Providers
- collaborative agreements with leading academic institutions
- participation in related industry working groups.

Suitable non-network alternatives to major network augmentations have proven difficult to source in Essential Energy's network, due in large part to the nature of the identified constraints and their associated network support requirements. During 2011/12 consultation was undertaken on five Essential Energy new large distribution network asset projects. There were no valid proposals for network support services received during the consultation process.

There were a number of zone substation capacitor bank installations completed in 2011/12 including backlog from 2010/2011 caused by delays in procurement of major equipment. Essential Energy has also continued to invest in upgraded load control functionality.

Innovative Demand Management developments during 2011/12 included:

- application of power electronic equipment field trials for energy storage, reactive power and embedded generation applications, with further installations and development of the technology scheduled for 2012/13.
- economic analysis of the value of network capacity
- evaluation of the effectiveness of demand based customer audits, with completion of this study scheduled for 2012-2013.

Essential Energy has a number of ongoing initiatives in place under the Demand Management Incentive Scheme with full commitment of expenditure for the current regulatory period. The main focus areas are in the development of enabling technologies for real power storage to address constraints in voltage constrained, highly resistive networks and the use of dynamic reactive power to manage supply quality issues associated with added loads and embedded generation.

Table 3.5 Demand Management Projects Implemented During Current Year

	Description of Demand Management Project Implemented	Peak Demand Reduction (kVA)	PV of Costs of Demand Management Project (000's)	PV of Total of Capital Expenditure Deferment plus Op Ex Savings (000's)
Individual large projects				
1	Union Road, Albury – installation of 12 MVAr capacitor bank	2,020	$1,047	$1,486
2	Cootamundra – installation of 3 MVAr capacitor bank	810	$694	$1,219
3	Gunnedah – installation of 6 MVAr capacitor bank	1,660	$734	$1,222
4	Mudgee – installation of 4.5 MVAr capacitor bank	1,060	$720	$776
5	Narromine – installation of 3 MVAr capacitor bank	680	$585	$1,026
6	Queanbeyan South – installation of 6 MVAr capacitor bank	1,030	$580	$757
7	Raglan Street, Bathurst – installation of 6 MVAr capacitor bank	930	$545	$683
8	Kooringal, Wagga Wagga – installation of 6 MVAr capacitor bank	1240	$537	$1,018
9	Yass – installation of 3 MVAr capacitor bank	720	$577	$526
Sub-totals	49.5 MVAr	10,150	$6,019	$8,713
Consolidated projects				
1	Minor capacitor bank installations (Yenda, Young) totalling 6 MVAr	1,690	$890	$2,228
Sub-totals		1,690	$890	$2,228
Totals		**11,840**	**$6,909**	**$10,941**

Table 3.6 Demand Management Investigations in Current Year Found Non-Viable

	Description of Potential Demand Management Project Investigated and Reason for Non-viability	PV of Costs of Investigations
1	Forster Tuncurry 66kV N-1 reliability improvement. Consultation under NER process. No submissions for network support services received.	Internal investigation, reasonableness test and preparation of consultation documentation. Estimated cost $10,000 but not separately recorded
2	Temora 66kV N-1 reliability improvement. Consultation in accordance with NER requirements. No valid submissions for network support services received	Internal investigation, reasonableness test and preparation of consultation documentation. Cost estimated at $12,000 but not separately recorded
3	Dunedoo and Coonabarabran 66kV N-1 reliability improvement. Consultation under NER process. No submissions for network support services received.	Internal investigation, reasonableness test and preparation of consultation documentation. Cost estimated at $7,000 but not separately recorded
4	Dubbo and Western area (Narromine, Nyngan, Cobar, Bourke) N-1 reliability improvement Consultation under NER process. No submissions for network support services received.	Internal investigation, reasonableness test and preparation of consultation documentation. Cost estimated at $15,000 but not separately recorded
5	Quirindi 66kV N-1 reliability improvement. Consultation under NER process. No submissions for network support services received.	Internal investigation, reasonableness test and preparation of consultation documentation. Cost estimated at $10,000 but not separately recorded

4

Asset Management

4.1 Overview

Asset management is a critical component of Essential Energy's overall network management strategy and has an important role in determining the outcomes for both the business and our customers.

The *NAMP* provides a framework for strategic management of our physical system assets to best support network service delivery. It includes our asset management strategies, policies, processes, resources, and our planned capital investments, asset maintenance and demand management. The *NAMP* is closely related to annual budgets and forecasts for capital, operating and maintenance expenditure planning.

The *NAMP's* primary objectives include:

- establishing priorities in line with organisational objectives and statutory obligations, namely safety, reliability and sustainability
- planning and controlling financing and expenditure in accordance with these priorities, and
- ensuring resources are used as effectively and efficiently as possible so that the government and the community receive the most value for money.

These objectives cover the three major elements of asset management outlined in the *NAMP:*

- capital investment strategic planning
- asset renewal and replacement strategic planning, and
- asset maintenance strategic planning.

The *NAMP* is designed to comply with the State Government's policy on Total Asset Management (TAM). It includes a five year forecast and reviews capital investment, refurbishment and asset maintenance strategies to ensure a focus on long - term, system wide and whole of life management. These strategies ensure delivery of a secure, high quality, reliable and safe electricity network service that meets the needs and expectations of customers, community, shareholders, and other stakeholders at the lowest possible price, and complies with related statutory and regulatory requirements.

Essential Energy reviews this plan annually.

4.2 Technical Service Standards

The Electricity Supply Standards adopted by Essential Energy are set out in the document *CEOP8026 Electricity Supply Standard,* in accordance with the *Code of Practice – Electricity Service Standards.*

The main areas addressed include:

- voltage fluctuations managed in accordance with Australian Standards *AS/NZS 61000.3.3:2012, 61000.3.5:1998* and *61000.3.7:2012*
- switching transients (voltage waveform distortion) limited where possible to less than two times normal supply voltage
- frequency variation and Essential Energy's role in notifying AEMO of any sustained fluctuations
- voltage dips managed through best practice network improvement and augmentation
- steady state voltage differences between neutral and earth limited to less than 10 volts at the customer's point of supply
- lightning strikes limited in their impact on supply where possible by adherence to industry best practice system

design and maintenance principles
- limitation of 'step and touch' voltage differentials managed in accordance with industry standards, namely *ENA Earthing Guide AS/NZS 7000*
- limiting of voltage imbalance to a 6 per cent difference on the LV network using 10 min average values between the highest and lowest phase to neutral or phase to phase steady state voltages (this may be exceeded on occasions in rural areas)
- harmonic content of voltage and current waveforms managed in accordance with *Australian Standards AS 61000.3.6:2012*
- mains signalling reliability set at a target of 99.5 per cent failsafe to ensure correct switching and metering functions.

A copy of *CEOP8026 Electricity Supply Standard* can be downloaded from essentialenergy.com.au.

CEOP8026 also outlines Essential Energy's adoption of the *Australian Standard AS 60038 – 2000 Standard Voltages.*

4.3 Quality of Supply

4.3.1 Overview

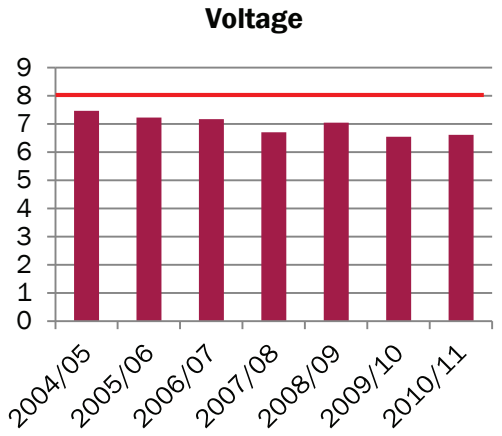
Essential Energy actively participates in the Long Term National Power Quality Survey (LTNPQS), a national power quality survey conducted by the University of Wollongong and a number of other distributors throughout Australia.

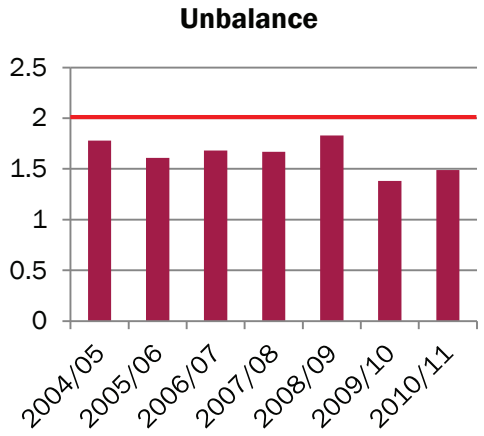
This survey studies parameters such as steady state voltage, voltage total harmonic distortion (THD), voltage sags and voltage unbalance on three phase sites.

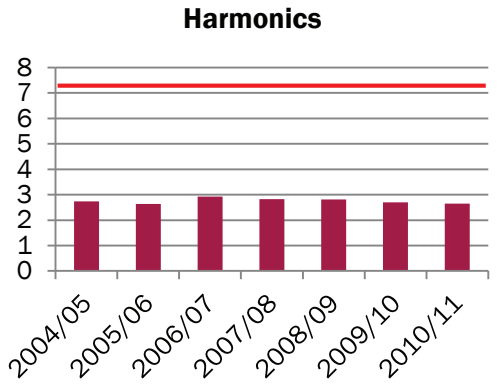
4.3.2 Performance Data
Trend of primary indices

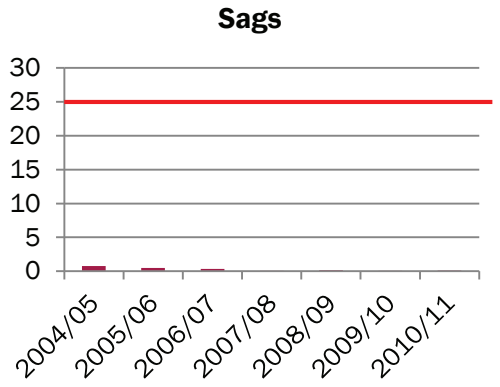
Low Voltage Sites

Disturbance	Voltage		Unbalance		Harmonics		Sags	
Limit	8%		2%		7.3%		25	
	Index	% of limit	Index	% of limit	Index	% of limit	Index	% of limit
2010/11	6.61	83	1.49	74	2.65	36	0.10	0
2009/10	6.54	82	1.38	69	2.70	37	0.04	0
2008/09	7.04	88	1.83	92	2.81	38	0.16	1
2007/08	6.70	84	1.67	83	2.82	39	0.02	0
2006/07	7.17	90	1.68	84	2.93	40	0.33	1
2005/06	7.22	90	1.61	80	2.64	36	0.51	2
2004/05	7.46	93	1.78	89	2.73	37	0.80	3



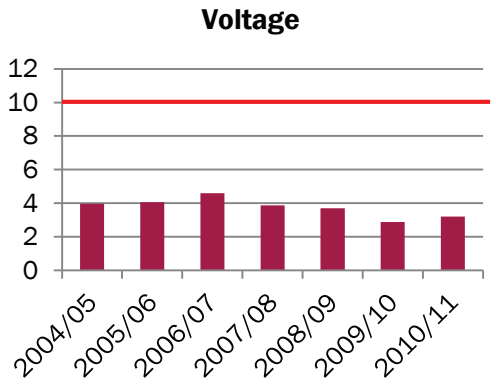


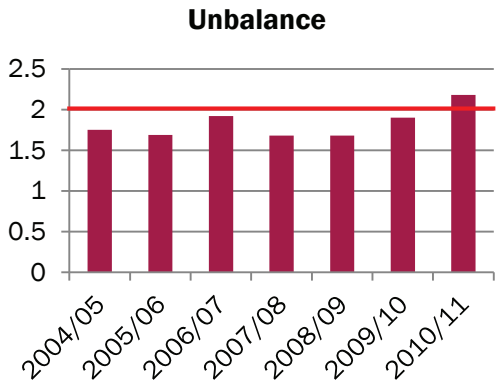


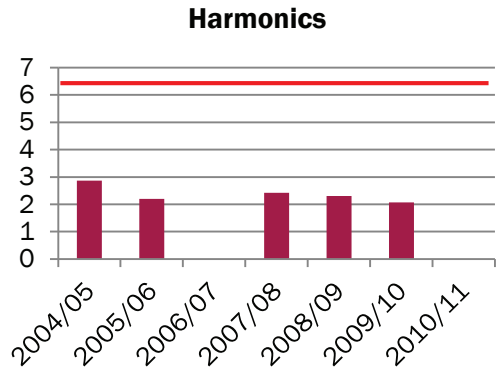


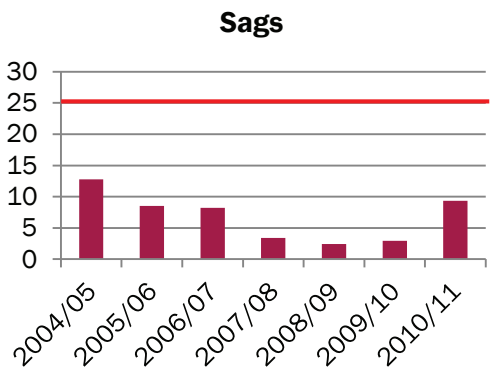
Medium Voltage Sites

Disturbance	Voltage		Unbalance		Harmonics		Sags	
Limit	10%		2%		6.6%		25	
	Index	% of limit	Index	% of limit	Index	% of limit	Index	% of limit
2010/11	3.20	32	2.18	109	0	0	9.35	37
2009/10	2.89	29	1.90	95	2.07	31	2.94	12
2008/09	3.70	37	1.68	84	2.30	35	2.43	10
2007/08	3.88	39	1.68	84	2.42	37	3.38	14
2006/07	4.60	46	1.92	96	0	0	8.23	33
2005/06	4.06	41	1.69	84	2.20	33	8.55	34
2004/05	3.96	40	1.75	87	2.86	43	12.75	51









Summary

All LV disturbance levels with the exception of sags show a long term downward trend. Unbalance has shown a marked increase this year, but more data is required to determine if this represents an upward trend or just an aberration. The long term sag trend is unreliable with significant variation from year to year.

For MV sites, the strongest trend seen is for unbalance which shows a strong upward trend over the past 3 years. Trends for voltage, harmonics and sags are downward over time. In spite of this, sag levels have shown a significant increase this year.

Note: red line indicates limit.

4.4 Distribution Reliability

4.4.1 Overview

Essential Energy conducts its reliability reporting in accordance with the *NSW Design, Reliability and Performance Licence Conditions.*

Essential Energy has 298 Urban Feeders, 901 Short Rural Feeders and 240 Long Rural Feeders. Over 60 per cent of our customers are on Short Rural Feeders and the average length of these feeders is approximately 56 kilometres.

ENMAC has achieved an automated interface between systems, producing accurate reliability information to a distribution substation level for outage reporting; previously outage data was only recorded to a distribution feeder segment level.

During the year, Essential Energy's network reliability was favourable to the targets defined in our licence conditions, ensuring we deliver reliable essential services to families and businesses across regional NSW.

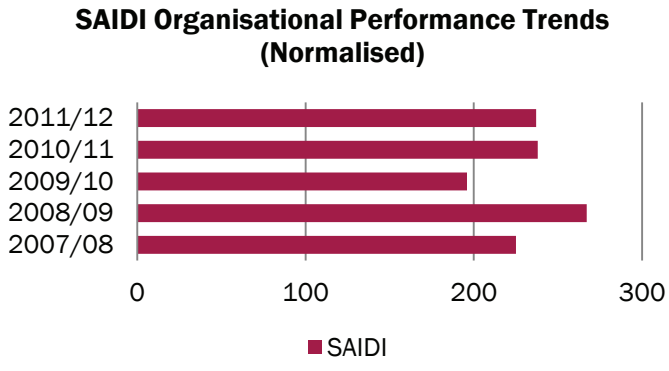
The System Average Interruption Duration Index (SAIDI) normalised figure is 237 minutes per customer against a target of 321 minutes. The System Average Interruption Frequency Index (SAIFI) normalised figure averaged 2.12 supply interruptions per customer, compared to 2.14 the previous year and well under the target of 2.94.

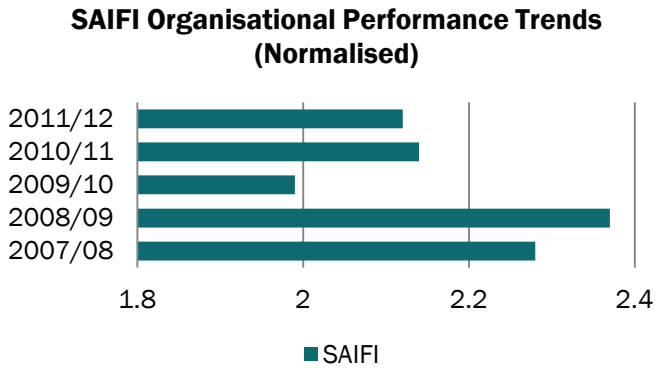
4.4.2 Organisational Performance (Normalised) Trend

Reliability data for SAIDI and SAIFI (Normalised) is reported in Table 4.1 and the graphs show the organisation trends over five years.

Table 4.1 Organisational Performance Trends (Normalised)

	Previous Years				Current Year
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
SAIDI	225	267	196	238	237
SAIFI	2.28	2.37	1.99	2.14	2.12





Comment on Performance

Essential Energy's network performance during the year is better than mandated in the licence conditions, and a testament to the network improvement strategies that Essential Energy is implementing.

4.4.3 Organisational Detailed Performance Current Year

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

Table 4.2 Organisational Detailed Performance Current Year

Sustained Interruption Data Sets		Whole Organisation and Feeder Category				
Category		ORG*	CBD	Urban	Short Rural	Long Rural
Customer Numbers		798,004	N/A	192,541	481,260	124,203
SAIDI	Overall	424	N/A	190	421	794
	Planned	149	N/A	84	151	246
	Unplanned	271	N/A	105	266	543
	Normalised	237	N/A	80	238	478
SAIFI	Overall	2.28	N/A	1.56	2.96	4.61
	Planned	0.62	N/A	0.33	0.61	1.08
	Unplanned	2.23	N/A	1.21	2.30	3.52
	Normalised	2.12	N/A	1.16	2.21	3.28

* Refers to the average performance of the organisation overall.

Note: Normalised data represents unplanned outages with 'excluded interruptions' subtracted e.g. those defined as being outside the control of the distributor.

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	N/A	N/A	N/A	N/A	N/A
	Target	N/A	N/A	N/A	N/A	N/A
SAIFI	Actual	N/A	N/A	N/A	N/A	N/A
	Target	N/A	N/A	N/A	N/A	N/A

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	80	110	69	66	80
	Target	134	131	128	125	125
SAIFI	Actual	1.21	1.36	1.04	0.85	1.16
	Target	1.92	1.88	1.84	1.80	1.80

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	233	285	204	245	238
	Target	324	316	308	300	300
SAIFI	Actual	2.42	2.58	2.19	2.31	2.21
	Target	3.18	3.12	3.06	3.00	3.00

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	431	483	384	493	478
	Target	730	720	710	700	700
SAIFI	Actual	3.50	3.47	2.88	3.37	3.28
	Target	4.80	4.70	4.60	4.50	4.50

Comment on Performance

It can be seen from Tables 4.3 to 4.6 that Essential Energy has consistently out-performed its target across all feeder categories, due to our strategic reliability improvement programs.

Excluded Events

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
29/09/2011	Strong winds – North Coast region	29,012	1,435	10.35	Major Event Day
29/11/2011	Storms – Southern region	24,634	2,942	8.98	Major Event Day
20/02/2012	Storms – Northern and North Coast regions	26,721	2,797	6.73	Major Event Day
05/03/2012	Flooding – Griffith area	6,268	70,708	7.02	Major Event Day

Major Event Day TMED

The value of TMED for 2011/12 was 5.92 minutes.

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 figures contained in the ministerially imposed licence conditions are shown in Table 4.8.

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	N/A	400	1,000	1,400
SAIFI	N/A	6	8	10

Performance outside this range results in the following actions:

- immediate investigation of the causes for each feeder exceeding the individual feeder standards
- 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
- complete any operational actions identified in the investigation report by the end of the third quarter following the quarter in which the feeder first exceeded the standard, and
- 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			
	CBD	Urban	Short Rural	Long Rural
Feeders (Total Number each Type)	N/A	298	901	240
Feeders that Exceeded the Standard During the Year (Total Number)	N/A	19	106	45
Feeders Not Immediately Investigated (Total Number)	N/A	0	0	0
Feeders Not Subject to a Completed Investigation Report by Due Date (Total Number)	N/A	10	77	26
Feeders Not Having Identified Operational Actions Completed by Due Date (Total Number)	N/A	1	9	8
Feeders Not Having a Project Plan Completed by Due Date (Total Number)	N/A	3	21	12

Comment on Performance

Following periods of high network activity, an increased number of feeders require investigation. In all cases, the investigation commenced on time and interim remedial actions taken where appropriate, even though the report may not have been completed in the required timeframe. Essential Energy has implemented processes to expedite investigations.

4.5 Transmission Reliability

Essential Energy has no requirement to provide this data.

5

Network Safety

5.1 Overview

Essential Energy is Australia's largest regional utility business. The safety, security, health, and well-being of our employees, customers, contractors, visitors, labour hire employees, the public and the environment are our highest priority.

Our aim is to integrate Safety, Security, Health and Environmental (SSHE) responsibilities into all that we do.

To demonstrate our commitment to SSHE, we will:

- strive to be an incident free organisation
- provide a safe, secure, healthy and environmentally conscious working environment through the effective implementation of this policy
- apply a risk management approach to the full scope of our activities, products and services to reduce hazards
- comply with relevant legislation, regulations, standards, codes, licences and commitments
- ensure all employees are trained and have the knowledge and skills they need to undertake their work in a safe, secure, healthy and environmentally responsible manner
- require supervisors, employees, contractors, labour hire employees and visitors to abide by all SSHE policies, procedures and other requirements
- engage in effective consultation and open communication about SSHE issues with our employees, employee representatives, contractors and labour hire employees
- conduct incident investigations fairly, with a focus on implementing preventative actions
- ensure appropriate resources are applied to fulfil the aims of this policy
- establish measurable objectives and targets based on our significant SSHE hazards to continually review and improve our safety, security, health and environmental performance
- minimise the impact of pollution generated by our activities on the environment by reducing emissions, discharges and wastes by promoting energy conservation and recycling of wastes
- promote a 'Safety First' culture where everyone watches out for their workmates, families and local communities.

Essential Energy also publishes a Public Electrical Safety Awareness Plan to educate the general public, industry workers and emergency service personnel on the hazards associated with electricity in relation to its transmission and distribution system. Essential Energy has the following processes in place to achieve these objectives:

- Development and dissemination of electrical safety awareness collateral incorporating;
  - Electrical infrastructure safety fact sheets
  - Practical instructional safety DVD
  - Storm safety advice
  - Electrical safety stickers for plant and equipment
- Delivery of Electrical Hazard Awareness presentations to at risk groups
- Targeted media campaigns based on seasonal activities within the agricultural sector
- Reporting of incidents as specified by the Department Trade and Investment, Resources and Energy under the Significant Electricity Networks Incident (SENI) requirements.

5.2 Public Injuries

Essential Energy's Public Electrical Safety Awareness Plan provides strategies to raise public awareness of the numerous hazards that may result from contact with electricity network assets, and provide simple yet effective ways to minimise the risk.

Our strategy of targeting 'at risk' groups - providing education and assistance to prevent and solve electrical safety issues - is the key to reducing the number of public safety incidents.

Increased agricultural activity and bumper harvest seasons after a decade of drought appears to be the major contributing factor to an increase of public safety incidents during the 2011/12 financial year.

Much has been done to raise awareness throughout the community regarding these hazards including targeted print media and radio campaigns, face-to-face door knocks and Electrical Hazard Awareness presentations to industry and farmers in the lead up to harvest season and attendance at agricultural field days.

The 'at risk' groups include Emergency Services, earthmovers, construction workers, cotton growers, pilots, transport groups, and relevant Local and State Government workers. Essential Energy consults widely and tailors practical, effective training sessions free of charge.

Table 5.1 Public Injuries

	Previous Years				Current Year	
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**July 2011 – April 2012**	**May 2012 – June 2012**
Non-Fatal	2	1	2	4	13	1
Fatal	0	0	2	1	0	0
Total	2	1	4	5	13	1

Non-Fatal Incidents

- a child received an electric shock when he contacted a damaged aerial service hanging approximately 20 cm above the ground
- a public worker received an electric shock when the building being manoeuvred via a crane contacted energised HV conductors
- an army parachutist received injuries when blown off course by winds landing on energised HV conductors
- an elderly man received an electrical shock and burns when he lifted a tipper body into energised HV conductors
- a member of the public received an electric shock when he felled a tree over an energised SWER line
- a member of the public received an electric shock when the tape measure he was using contacted a metal fence. A low voltage conductor failed mid span, falling onto the fence some distance away and remained energised
- a homeowner received an electric shock from a streetlight column when gardening around it. The insulation within the column had failed, energising the column
- the mast of a yacht being sailed on a private lake contacted energised HV conductors resulting in a person on board receiving an electric shock
- the driver of a vehicle which backed over a pillar box received an electric shock when alighting from the vehicle due to energised LV being in contact with the vehicle
- a member of the public received an electric shock when attempting to move a deceased cow adjacent to a transformer pole. The cow was electrocuted when it came into contact with the pole due to faulty windings within the transformer
- a child received an electric shock from a conductive pop rivet on a pillar box. The pop rivet which secured the asset label became energised by a fault within the internal shroud covering the energised LV cables
- a member of the public received an electric shock from a streetlight column due to insulation failure within the column
- a member of the public received an electric shock from the service riser bracket. The neutral bond had been connected to an active conductor by a contractor some time previously
- an electrical contractor working for a home owner contacted a damaged section of aerial service and received an electric shock.

Preventative actions for all incidents are a continuation of outworking activities in accordance with Essential Energy's

Network Management Plan Chapter 3: Public Electricity Safety Awareness Plan. Where applicable, public electrical hazard awareness collateral was provided and offers made to conduct Electrical Hazard Awareness presentations.

5.3 Worker Injuries

There were no fatalities recorded during the reporting period. A total of 8 workers (1 incident involved medical treatment to 2 workers), 6 contractor workers and 1 ASP worker were injured. Preventative actions were implemented for the worker and contractor worker incidents through Essential Energy's incident management, investigation and contractor management processes. This incorporates performance management with the effected workers and communications across Essential Energy and with contractors regarding the findings and recommendations of selected incidents. The probable causes are detailed as dot points beneath table 5.2.

Table 5.2 Worker, Contractor and ASP Injuries

	Previous Years				Current Year	
Year	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**July 2011 – April 2012**	**May 2012 – June 2012**
Workers	4	1	0	6	6	1
Contractors	0	0	0	0	6	0
ASPs	0	0	0	0	1	0

Workers:

- electric shock received from earthed and short circuited mains after a lightning storm had passed the area
- medical treatment given to two workers following exposure to chemical applied to poles by a third party
- laceration to stomach area by broken porcelain
- loose teeth and laceration to mouth when broken insulator fell from a height glancing off workers safety helmet
- laceration to thigh caused by cordless drill inadvertently operating within pole bag
- electric shock received when tech screw inadvertently screwed through energised LV cable on a streetlight circuit
- hauling line hook struck worker in the mouth chipping teeth.

Contractors:

- crush injury when pinned between crane and truck
- fractured foot when a tree branch was cut and slid down the boom of sky trim machine, breaking through the perspex and striking the contractor on the foot
- chainsaw laceration injury to back of hand
- chainsaw laceration to leg
- electric shock received while replacing a pole that contacted energised HV conductors
- crush injury when pinned between pole being manoeuvred and EWP basket

ASPs:

- apprentice received electric shock and fell from height when attempting to dislodge tangled conductors. Apprentice went aloft to incorrect side of known open point.

5.4 Major Incident Reports

Table 5.3 Summary of Major Incident Reports

Date	Incident Description	Locality
01/07/2011	Contractor received crush injury when pinned between HIAB crane and truck	Dubbo
17/07/2011	A child received an electric shock when he contacted a damaged aerial service hanging approximately 20 cm above the ground	Hay
28/9/2011	A public worker received an electric shock when the building being manoeuvred via a crane contacted energised HV conductors	Mullumbimby
03/10/2011	An army parachutist received injuries when blown off course by winds landing on energised HV conductors	Narrandera
16/11/2011	Fractured foot when tree branch cut slid down boom of 'sky trim' machine breaking through Perspex screen at operators position striking contractor on the foot	Lismore
18/12/2011	A child received an electric shock from a conductive pop rivet on a pillar box. The pop rivet which secured the asset label became energised by a fault within the internal shroud covering the energised LV cables	Wellington
21/02/2012	Electric shock received when replaced pole leant into energised HV conductors	Wagga
11/04/2012	Apprentice received electric shock and fell from height when attempting to dislodge tangled conductors. Apprentice went aloft to incorrect side of known open point	Tamworth
18/04/2012	A member of the public received an electric shock when attempting to move a deceased cow adjacent to a transformer pole. The cow was electrocuted when it came into contact with the pole due to faulty windings within the transformer	Port Macquarie
12/07/2011	Loss of supply to Bootawa and Wingham zone subs	Taree
09/08/2011	Loss of Supply to Batemans Bay Zone substation	Batemans Bay
15/08/2011	Part loss of supply to Whitbread Street zone sub	Taree
16/08/2011	Loss of supply to Clearwater zone sub	Port Macquarie
18/08/2011	Major customer outage due to loss of 132kV feed to Batemans Bay and Moruya North zone sub (Endeavour)	Batemans Bay and Moruya areas
30/08/2011	Loss of supply to Rocks Ferry zone sub	Telegraph Point area
5/09/2011	Truck contacted 11kV feeder near Bungendore	Bungendore
7/09/2011	Loss of supply to Moree zone sub	Moree
15/09/2011	Loss of supply to Adelong zone sub	Adelong
25/09/2011	Loss of supply to Stroud Road 33kV zone substation	Stroud
28/09/2011	Loss of supply in Broken Hill due to lightning	Broken Hill
28/09/2011	Loss of supply to zone subs in Moulamein area due to storms	Deniliquin / Moulamein areas
28/09/2011	Loss of supply to zone sub in Holbrook area due to storms	Holbrook
28/09/2011	Tripping of 220kV TransGrid feeder transmision line	Balranald
28/09/2011	Loss of supply to Moree zone sub	Moree
29/09/2011	Loss of supply to Temora / West Wyalong area due to storms	Temora
29/09/2011	Tripping of Deniliquin 132 to Moama zone sub	Deniliquin
06/10/2011	Loss of supply to Goulburn zone sub	Goulburn
08/11/2011	Loss of supply to Cootamundra zone sub due to lightning strike	Cootamundra
09/11/2011	Lightning strike to 132kV feeder from Albury 132 to Corowa 132 and Mulwala zone subs	Albury area
13/11/2011	Loss of supply Currabubula zone sub	Quirindi
29/12/2011	Loss of supply to Alstonville zone sub due to vandalism	Alstonville

Date	Incident Description	Locality
30/12/2011	Loss of supply to Grafton and Nymboida areas	Grafton
08/01/2012	Loss of supply to Coonabarrabran and Dunedoo zone subs	Coonabarabran
23/01/2012	Loss of supply to Moonee and Woolgoolga zone subs	Woolgoolga
11/02/2012	Loss of supply to Coffs Harbour North zone sub	Coffs Harbour
20/02/2012	Loss of supply to Stroud Road 132	Stroud area
21/02/2012	Loss of supply to Glen Innes and Inverell zone subs	Inverell
24/02/2012	Loss of Supply to Maclean, Yamba subs	Maclean, Yamba
22/03/2012	Loss of supply to Moree zone sub	Moree
12/04/2012	Loss of supply to Nyngan area	Nyngan
28/04/2012	Loss of supply to Wynne St zone sub	Inverell
05/06/2012	Loss of supply to Orange North zone sub	Orange

6

Customer Installations

Monitoring of installations is carried out in accordance with regulations and industry codes of practice. In addition to the *Electricity Supply (Safety and Network Management) Regulation 2008*, installations must be consistent with the *Electrical Safety (Electrical Installations) Regulation 1998,* the *Code of Practice for Installation Safety Management,* and the *Code of Practice for Contestable Works Accreditation.*

Essential Energy's *CEOP8004 Network Management Plan* Chapter 2: Customer Installation Safety Plan outlines the approach taken to managing all aspects of customer installation work. The plan defines our approach with respect to the roles of both contractors and Essential Energy.

6.1 Reports against Customer Installation Safety Plans

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)	19,721	18,771	26,614	54,152	31,085
Number of Inspections	8,555	7,297	10,920	25,706	12,634
Installation Inspection Rate (%)	43.4	38.9	41	47	40
Major Safety Defect Rate (%)	2.4	2.8	2.5	2.1	1.6
Safety Breach Notices Issued (%)	2.5	2.9	2.6	0.44	0.59
Number of Warnings Issued	212	214	280	1,148	496
Reports to Fair Trading (No.)	5	4	5	3	6
Number of Audits by Distributor	37	28	91	212	247

6.2 Customer Installation Shock Reports

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)	834	719	678	654	666

Table 6.3 Customer Installation Safety- Categories of Shocks Analysed 2011/12

Category	Number		% of Total
	Fatal	Non-Fatal	
Cause Category Installation Related			
Contact with Consumer's Mains – Faulty Mains	0	9	1.4%
Contact with Consumer's Mains – Human error	0	5	0.8%
Contact with Live Parts at Switchboard – Faulty Switchboard	0	13	2.0%
Contact with Live Parts at Switchboard – Human Error	0	4	0.6%
Faulty Mains Box	0	53	8.0%
Induced Voltage	0	19	2.9%
Poor Earthing	0	9	1.4%
Unsafe Installation Work by Licensed Contractor	0	7	1.1%
Failure of Part of Installation (not water related)	0	19	2.9%
Defective or Unsuitable Appliance	0	24	3.6%
Working on or Interference with Installation	3	4	0.6%
Working on or Interference with Appliance	0	0	0.0%
Water Damage or Ingress	0	18	2.7%
Static Electricity	0	12	1.8%
No Cause Found (Including Static Electricity)	0	21	3.2%
Other (Installation Related)	0	68	10.2%
Sub Total	**3**	**285**	**43%**
Cause Category Network Related			
Contact with Network Mains - Faulty mains	0	3	0.5%
Contact with Network Mains - Human error	0	0	0.0%
Contact with OH Service Mains - Faulty mains	0	4	0.6%
Contact with OH Service Mains - Human error	0	1	0.2%
Faulty OH Mains Joint	0	40	6.0%
Faulty OH Service Joint	0	104	15.6%
Faulty OH Network Splice	0	6	0.9%
Faulty Underground Mains Joint	0	20	3.0%
Faulty Underground Service Joint	0	18	2.7%
Faulty OH Open Service	0	10	1.5%
Faulty OH Twisted Service	0	10	1.5%
Faulty UG Service	0	6	0.9%
Faulty UG Mains	0	0	0.0%
Long LV Run	0	37	5.6%
LV Leakage (salt/dust)	0	14	2.1%
HV Leakage	0	1	0.2%
Nuisance Tingles <10 volts	0	68	10.2%
Incorrect Polarity	0	3	0.5%
Other (Network Related)	0	19	2.9%
Sub total	**0**	**364**	**54.4%**
Other Cause Categories			
Lightning/Storm	0	14	2.1%
N/A	0	2	0.3%
Undefined (under investigation)	0	1	0.2%
Subtotal	**0**	**17**	**2.6%**
TOTAL	**3**	**666**	
TOTAL PER 1,000 CUSTOMERS		**0.833**	

Essential Energy in the reporting period 2011/12 recorded a 1per cent increase in reported shocks. In this period there were three fatalities at customer's electrical installations where electrocution is thought to be the main contributing factor.

Two of the incidents involved electrically qualified persons inadvertently coming into contact with live cables, one working in the roof space the other working in an open trench.

The third incident involved the home owner (not electrically qualified) undertaking DIY renovations in which a gas stoves electrical supply lead, three pin plug top, had been removed to run the lead through a cupboard and was reconnected with the incorrect polarity. This resulted in the metal frame of the stove and associated metal gas line becoming alive in which the person involved made contact when attempting to reconnect the gas line.

Essential Energy's Safety Group continues to campaign on the dangers associated with electricity.

7

Essential Energy's Contestable Works Scheme

Essential Energy monitors Level 2 works in our Web Form Manager (WFM) system, Level 1 and Level 3 information is collected regionally by the Quality Control Coordinators in the Contestable Works Database and internal inspection information is collected in CRM Redback.

2011/12 has seen the following trends:

- **Level 1 –** Internal project notifications are down and inspection rates falling in line with this decline. Previous internal inspection information may have included internal inspections that were not related to contestable works.
- **Level 2 –** The 2011/12 trends have highlighted the drop off in growth and involvement by all stakeholders particularly with the closure of the solar bonus scheme.
- **Level 3 –** The decrease is in line with the reduction in project notifications.

Table 7.1 Contestable Works Trend

	Previous Years								Current Year	
	2007/08		2008/09		2009/10		2010/11		2011/12	
	Int	Ext	Int	Ext	Int	Ext	Int	Ext	Int	Ext
Network Work (Level 1)										
Project Notifications	1,520	1,103	778	1,269	538	1,434	153	1,830	54	1,266
Initial Inspections of Completed Projects	540	623	786	947	595	907	391	1,026	4	1,654
Of Projects Inspected, Number Initially Nonconforming	109	146	220	200	46	159	87	228	0	294
Customer Connection Work (Level 2)										
Notifications (NOSW)	5,573	13,238	5,518	17,135	3,338	19,910	2,653	49,163	723	32,193
Inspections by Network Operator	3,143	11,807	3,485	12,919	2,526	12,433	1,891	31,554	359	16,783
Major Defects	0	102	3	107	2	62	2	379	0	477
Network Design Work (Level 3)										
Designs Certified	1,225	1,114	778	947	538	1,234	158	1,825	46	1,410

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

8

Bush Fire Risk Management

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 %	70%	100%	100%	100%	100%
Private lines in bush fire prone areas checked by pre-summer inspection %	70%	100%	100%	100%	100%
Fire ignitions by network assets (Number) [5]	71	98	169	120	189[6]
Complaints from the public regarding preparation for the bush fire season (Number)	7	7	22	37	22

Notes: Complaints increased significantly in 2011/12 due to modification to reporting system, larger network area flown including low voltage supply to rural homes, and introduction of a new contracted service provider flying lower altitude.

Inspections

Essential Energy inspections pertaining to bushfire risk mitigation include:

- Annual pre-summer aerial inspection of overhead lines to identify assets or vegetation with potential bushfire risk prior to the fire danger declaration period.
  Annual inspection of the entire rural overhead network by aircraft and ground support vehicles was satisfactorily completed in 2011/12 prior to the commencement of the declared fire season (October 2011).
  There was an overall 30per cent reduction in reported number of vegetation sightings near powerlines from the previous year's patrol.
- 4 yearly cycle of ground-line inspection and assessment of overhead poles and structures.
  The Essential Energy ground-line asset inspection program was slightly behind schedule at 30 June 2012 due to above average wet weather conditions. This leaves approximately 60,000 poles as overdue, generally by less than 12 months. A program is in place to address this situation with priority given to areas of high bushfire risk. It is envisaged that the backlog will be completed by early 2014.
- 2 yearly cycle of ground-line inspection of vegetation in rural areas.
  Vegetation inspections and cutting have remained a significant focus throughout 2011/12 year. This activity is the largest component of the Essential Energy annual operating investment and has produced significant improvement in clearances to powerlines as noted in this year's Aerial Inspections. Trials in the use of other technologies (Lidar) to monitor clearances is continuing for the purposes of better managing the risk trees pose to powerlines.
- 4 yearly earth integrity testing program.
  This inspection program is generally aligned with the Pole and Line inspection program.

5 Fire ignitions from network assets are those fires where the network was the ignition source regardless of causes. This includes network ignitions caused by 3rd parties e.g machinery contacting lines and excludes fire damage to assets by non-network ignition sources e.g bushfires, grassfires, uncontrolled burn-offs.
6 Improved monitoring and reporting procedures have contributed to this increased result.

Private lines

Essential Energy inspects and monitors the maintenance requirements for rural private lines to manage potential bushfire risk. Where possible, rural private low voltage lines are generally inspected under the same regimes Essential Energy applies to its own network eg. 4 year ground-line inspection of poles and lines that resemble the overhead electricity network, 2 year vegetation inspections, and annual pre-summer inspection of assets and vegetation clearances.

The results of the 2011/12 asset inspection program are shown below.

Table 8.2 Asset Inspection Program

Poles Inspected	Target Pole Population	Inspection Completion Rate %	Poles for replacement or reinforcement	Condemn Rate %
337,756	338,950	99.6	8,043	2.38

The average pole condemn rate of 2.38 per cent is consistent with expectations and the previous year (2.3 per cent).

Annual Bushfire Patrol

The results of the annual pre-summer bushfire patrols for the 2012 Calendar Year[7] are shown below.

Table 8.3 Annual Patrol Defects Identified

Annual Bushfire Patrol Defects Identified in Rural Areas 2012			
Defect Category	**Assets**	**Vegetation**	**Total Urgent Risk Defects**
Number of defects identified 01/01/2012 – 20/08/2012	253	957	1,210
Defects rectified by 20/08/2012	253	920	1,173

It is expected that all risk defects identified by Annual Bushfire Patrols will be completed prior to the RFS fire danger declaration period. These are given high priority in the work programs and typically actioned within a short period of time.

Audit of Activities

Essential Energy carries out a number of audits on key activities associated with bushfire mitigation. These include activities relating to;

- ground-line pole and line inspections
- vegetation inspections
- annual bushfire patrols in rural areas.

The purpose of the audits is to ensure the activities are carried out in accordance with Essential Energy's policies and procedures.

Community Awareness

Essential Energy has developed materials relating to bushfire risk and safety which are available to the public via its website through other marketing channels each year. The Vegetation Management Plan and Network Management Plan Chapter 4: Bushfire Risk Management Plan is available to the public for comment.

Bushfire related electrical safety topics include:

- bushfire and storm safety tips
- dangers of trees near powerlines
- electrical safety for emergency services personnel
- advice on safety when burning off near electrical network assets
- safe operation of farm equipment such as grain augers, harvesters and irrigation systems, and advice on electrical safety for heavy plant operators.

Essential Energy remains an active member of the local Bush Fire Management Committees with employee representatives on some 45 committees across the state.

7 Essential Energy reports Aerial Annual Inspections on a calendar year basis to ensure data coincides with the relevant flight schedule.

Bushfire Mitigation Initiatives

Essential Energy has implemented, or is currently implementing, many bushfire mitigation initiatives including;

- Continued review and implementation of activities associated with the eight Victorian Bushfire Royal Commission recommendations relating to electrical caused fires. In particular the focus in 2011/12 has been on:
  - The identification of Hazard Trees with training of staff and system changes to record these.
  - Continued focus on identification and installation of required low voltage spreaders and high voltage dampers.
  - A review of the current recloser protection policy for high risk days in line with the requirements of ISSC33. A new process was trialled for HV Feeders in the Victorian Franchise Area however the mild conditions last season did little to put this to the test.

- Continued investigation into the application of a consistent bushfire risk geographic model based on the Phoenix model. Working with the Energy Networks Association to provide NSW Distributors with a more sophisticated Fire Risk Modelling tool.

- RFS consultation:
  - Essential Energy's Network Operations Centre now receives 4 day fire weather forecasts provided by RFS. This ensures planning for high risk days and application of field work restrictions to reduce potential fire starts.
  - Essential Energy attends the state wide agency briefings on the seasonal outlook in NSW conducted by RFS. The RFS's Chief Superintendent was invited to provide pre-season briefs and attend Essential Energy's Bushfire Risk Working Group and Bushfire Risk Assurance Panel in 2011/12.

- Trials and research into new technologies in 2011/12 included:
  - Preparation of further field trials of Light Detection and Ranging (LIDAR) technology to assess vegetation density near powerlines.
  - Ongoing review of high voltage fuse options in high fire risk locations.
  - Review of the Powerline Bushfire Safety Taskforce final report to the Victorian Government.
  - Aerial assessment of timber cross arm condition to monitor fungal decay causing unplanned failures.

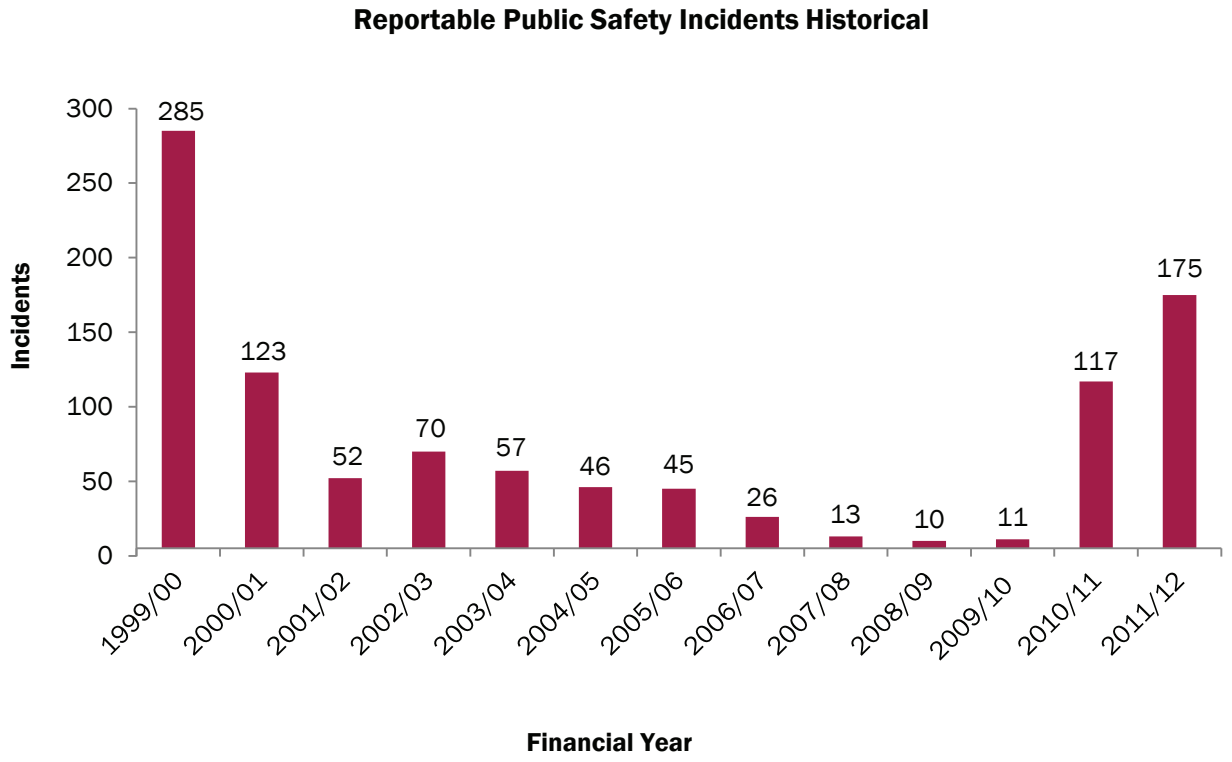
- The Essential Energy operated assets, located in the Victorian Franchise area were transferred to Victorian distributor SP Ausnet in 2011/12. Whilst this is not specifically an initiative to mitigate fire risk, the transfer of responsibility does reduce Essential Energy's risk exposure in this region.

9

Public Electrical Safety Awareness

The number of reportable Public Safety incidents increased from 117 in 2010/2011 to 175 in 2011/12. Continuation of the increased agricultural activity and bumper harvest seasons after a decade of drought appear to be the major contributing factor to the increase. Other contributing factors include anecdotal evidence that itinerant workers (backpackers) have been utilised as hired labour in many agricultural sectors. These workers may not have had the benefit of previous electrical hazard awareness education thus contributing to the rise in incident numbers. Research has commenced to identify labour hire agencies in an attempt to incorporate electrical hazard awareness into induction programs.

As a result of these increased incidents, adherence to the requirements of the Network Management Plan Chapter 3 – Public Electrical Safety Awareness Plan has focussed heavily on the planned activities within section 12.1 looking at key strategies to improve electrical hazard awareness in the agricultural sector.

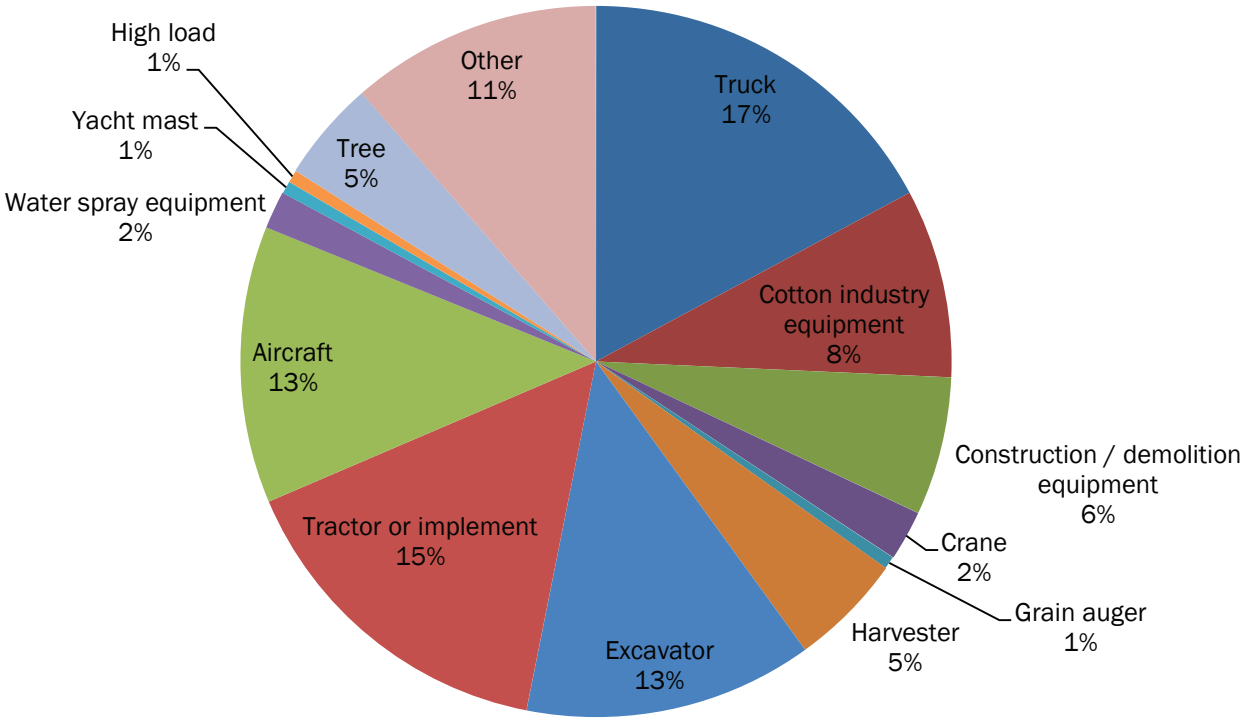


The graph below depicts the reportable public safety incidents by 'object involved' in line strikes during the 2011/12 reporting period. It is clear the at-risk groups continue to be trucks (mainly tippers), tractors contacting poles when ploughing, excavators, aircraft and cotton harvest machinery. The chart 'other' incorporates incidents such as persons receiving electric shocks or injury from fallen or faulty electrical distribution infrastructure and apparatus.

Much was done throughout the year to raise awareness throughout the community regarding these hazards including targeted print media and radio campaigns, face to face door knocks and Electrical Hazard Awareness presentations to industry and farmers in the lead up to and during harvest season; and attendance at agricultural field days.

The major 'at risk' groups for continued focus includes the agricultural, transportation, aviation and construction industries.

Reportable Public Safety Incidents by Object Involved in contact - 2011/2012 Financial Year



Public Safety Initiatives

A new series of Public Safety Electrical Hazard Awareness DVD's was completed in a joint venture between Essential Energy, Ergon Energy, Endeavour Energy and Ausgrid. This initiative has proven to be a success with more than 300 copies provided to industries during June 2012, the first month of release. Emergency Services organisations have been approached with the offer to provide this educational material in electronic format allowing the organisations to utilise the information on their internal e-learning platforms. Electronic versions have also been made available on Essential Energy's external website and YouTube.

Social media is being utilised in an attempt to further educate the younger generation. A series of 90 second Electrical Hazard Awareness movie clips are under development targeted at the aviation, excavation and cotton industries. The short films utilise industry language to ensure key messages are provided. It is planned to upload these to YouTube with the belief that in today's electronic age the campaign will go 'viral'.

Discussions are also underway to determine how other social media such as Twitter and Facebook can be utilised to increase awareness.

Effectiveness of our initiatives can only be realised through trend analysis on a seasonal basis compared to previous years.

10

Powerline Crossings of Navigable Waterways

Existing crossing numbers
In consultation with NSW Maritime, a number of waterways crossings were identified for risk assessment.

These sites are part of an ongoing inspection and risk assessment program. The table below provides the current number of sites and works carried out in the 2011/12 reporting period.

Table 10.1 Powerline Crossings of Navigable Waterways Summary

	Existing (Number)	New (Number)	Incidents (Number)	Crossings Reconstructed (Number)	Crossings Identified as Requiring Conversion to Submarine Crossings (Number)
Overhead Crossings	1,296	0	0	10	1
Submarine Crossings	60	0	0	0	0

Note: The existing numbers of overhead and submarine crossings shown in Table 10.1 are the result of consultations with the NSW Maritime Services.

Crossings Incidents
Essential Energy had no reportable incidents for the 20011/12 period.

Crossings Reconstructed
Details of the ten (10) reconstructed sites are;

- 8 x Refurbishment of existing overhead crossings
- 2 x Removal of overhead crossings
- 1 x Reconstruct OH to submarine crossing.

Activities to comply with the NSW Transport, Roads and Maritime Services (previously NSW Maritime) Crossings of Navigable Waters: Electricity Industry Code (the Code)
1. Essential Energy Navigable Waterways Risk Assessment Program

Essential Energy is in the final stages of an inspection and risk assessment program of all sites that have been identified by the NSW Maritime as crossing a navigable waterway.

The results of this program will be analysed to determine the necessary activities that may be required as treatments to reduce crossing site risks to as low as reasonably practicable.

These activities include such things as;

- installation of signage in accordance with AS6947-2009 Crossing of waterways by electricity infrastructure
- conductor re-tensioning, raising of crossarm heights, and stay installation
- taller pole installation
- conversion of the existing overhead crossing to a submarine crossing
- relocation of the crossing.

2. Network Refurbishment Works

Where network refurbishment works include a crossing of a navigable waterway these works are carried out to meet the requirements of the Code.

11

Chief Operating Officer Declaration

Essential Energy

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:

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 DTIRIS.

2. 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.

CHIEF OPERATING OFFICER Gary Humphreys

SIGNATURE

DATE 29-11-12