



TransGrid

# Electricity Network Performance Report 2014/15

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October 2015

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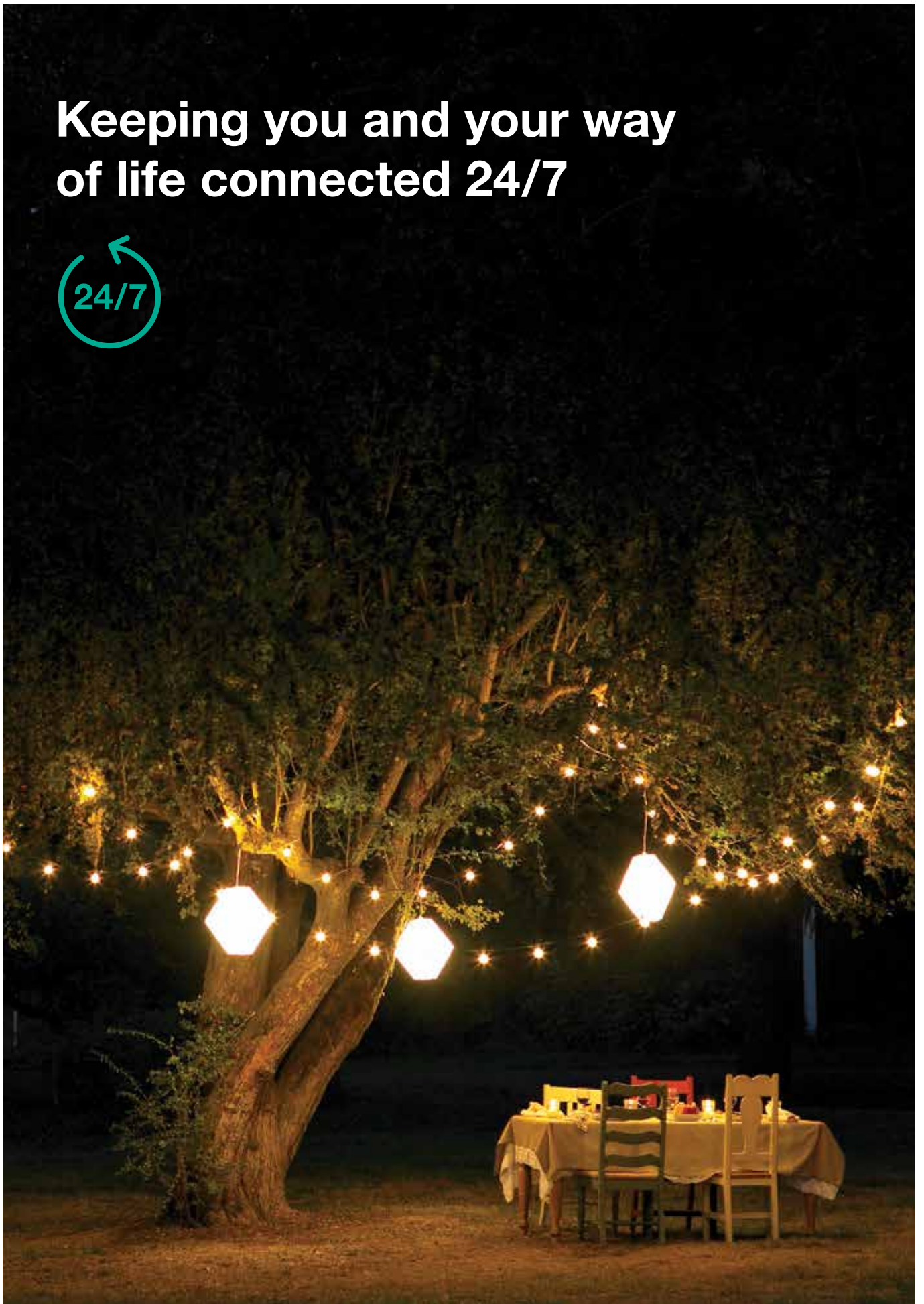
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# Introduction

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This Electricity Network Performance Report has been prepared by TransGrid to fulfil the requirements of the Electricity Network Operator reporting regime and the Electricity Supply (Safety and Network Management) Regulation 2014.

This report outlines TransGrid's performance in meeting its NSW regulatory objectives for the 2014/15 Financial Year.



# 1. Profile

## 1.1 Overview

TransGrid is Australia's largest electricity transmission company with its network comprising around 13,000 kilometres of high voltage transmission line and underground cables, as well as 99 substations and switching stations.

TransGrid is responsible for planning and developing the New South Wales transmission system to meet the requirements of customers within NSW and the ACT, and to facilitate operation of the National Electricity Market.

The TransGrid network operates at voltage levels of 500 000, 330 000, 220 000 and 132 000 volts. TransGrid's substations and switching stations are located on land owned by TransGrid. Transmission lines are generally constructed on easements acquired across private or public land.

TransGrid has staff strategically based at locations throughout NSW. They are responsible for day-to-day operations and maintenance activities, as well as emergency response.

The main administrative office is located at 180 Thomas Street, Ultimo. Field staff are co-ordinated from major depots located in Tamworth, Newcastle, Orange, Eastern Creek, Yass and Wagga Wagga.

**Table 1.1 – Network Operator Statistics**

	Number at end of 2013/14	Number at end of 2014/15
Customer Numbers (Total)	15	21
Maximum Demand (Aggregated System MW)	12,100	10,750
Energy Received to Year End (GWh)	62,000	63,100
System Loss Factor (%)	2	2
High Voltage Overhead (km)	12,878	12,953
High Voltage Underground (km)	51	82
Substation (Number)	96	99
Structures (Number)	37,650	37,948
Poles (Number)	39,120	40,663
Employees (Full Time Equivalent Number)	1057	1040
Contractors (Full Time Equivalent Number)	172	177

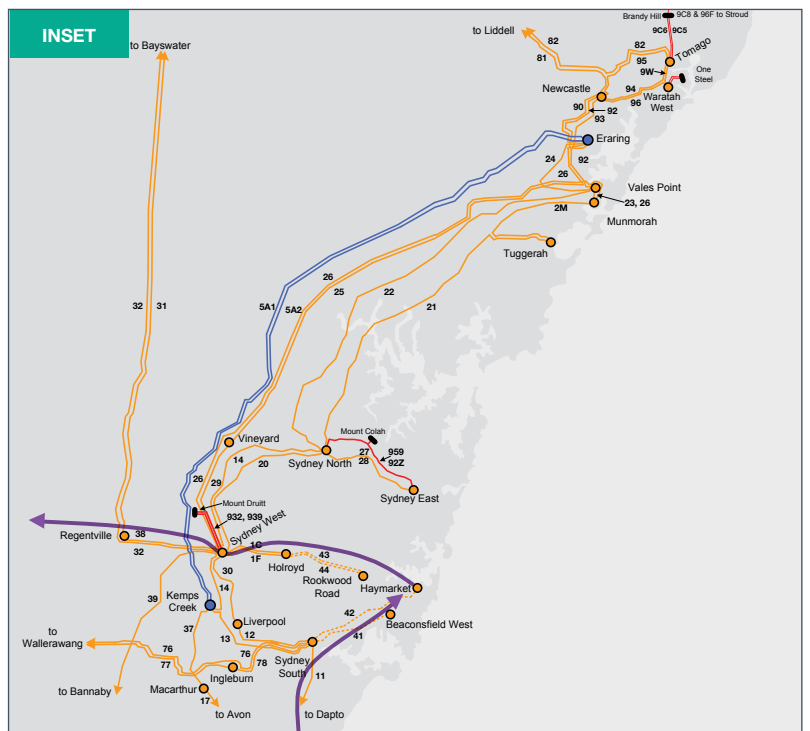
# 1. Profile

Figure 1.1 – TransGrid’s Transmission Network



## OPERATING SYSTEM VOLTAGES

- 500 kV Transmission Lines
- 330 kV Transmission Lines
- 220 kV Transmission Lines
- 132 kV Transmission Lines
- - - 330 kV Underground Cable
- | Customer Exchange Point
- ↔ Interstate Exchange Point
- 500 kV Substations
- 330 kV Substations
- 220 kV Substations
- 132 kV Substations
- Inset



## 1. Profile

### 1.2 Capital Works Program

TransGrid's capital works program is needed to ensure the NSW electricity transmission network continues to deliver a secure, reliable and safe supply of electricity to businesses and consumers in the NSW and ACT. The capital works program is primarily driven by the need to augment the network as demand grows and the need to replace assets when an assessment of the risk of failure indicates they have reached the end of their serviceable life.

For the 2014/15 financial year TransGrid's capital expenditure was \$309.2 million. Table 1.2 shows TransGrid's capital expenditure in the last 5 financial years.

#### Recently Completed Projects

##### Western Sydney Supply

TransGrid and Ausgrid undertook work to increase the capacity of the transmission system supplying the Sydney inner metropolitan area to meet current and emerging constraints.

The major components of the work include:

- > Construction of sections of a new double circuit 330 kV line and conversion of parts of an existing double circuit line to operate at 330 kV between Sydney West 330/132 kV substation and the new Holroyd 330/132 kV substation
- > Construction of the new Holroyd substation and associated connections to the existing 132 kV network

- > Construction of the new Rookwood Road 330/132 kV substation and associated connections to the existing 132 kV network
- > Installation of two 330 kV cables between the new Holroyd substation and the new Rookwood Road substation.

The above works were all completed in September 2014.

##### Boggabri East Switching Station

Boggabri Coal Mine requested a connection to the 132 kV transmission network for expansion of their mine operation. This involved the cutting and looping a 12.5 km section of the existing 9U3 Gunnedah to Narrabri 132kV line into the Boggabri East 132 kV switching station. These works were completed in September 2014.

##### Boggabri North Switching Station

Maules Creek Coal Mine also requested a connection to the 132 kV transmission network for the expansion of their mine. The 9UH Narrabri – Boggabri East line was cut and three km section of looped connection was constructed to supply Boggabri East 132 kV switching station. These works were completed in April 2015.

##### Remediation works for 97G 132 kV transmission line

The 97G Murray – Guthega 132 kV line was originally constructed by the Snowy Mountains Hydro Electricity Authority in the 1960s and supplies Guthega power station and Jindabyne pumping station. Remediation work was required to restore the line to its original capacity by raising the conductors. The work was completed in March 2015.

##### Completed Transformer Replacements

- > Condition based replacement of two of the three remaining banks of single phase 330/132kV transformers with new 375 MVA three phase units at Newcastle 330/132kV substation. Works completed in October 2014.
- > Condition based replacement of three 45 MVA 132/33 KV transformers at Griffith 132/33 KV substation with two new 60 MVA units Works completed in November 2014.
- > Condition based replacement of two 45 MVA 132/33 KV transformers at Yanco 132/33 KV substation with two new 60 MVA units. Works completed in August 2014.

##### Other Completed Works

- > In April 2015 replacement of all wood poles with concrete on 967 Koolkhan- Lismore 132 transmission line was completed,
- > TransGrid completed the relocation of some structures on lines 14, 26 and 29 to allow for the development of Marsden Park,
- > Addition of new 80MVAR and 120 MVAR 132kV capacitor bank at Yass 330/132kV and Canberra 330/132kV substation consecutively substation, to maintain adequate power transfer from the southern generators towards Sydney and the NSW South Coast was completed in September 2014.

Table 1.2 – Capital Works Program Trend

Year	Previous Years			Current Year	
	2010/11	2011/12	2012/13	2013/14	2014/15
Capital works program (\$m)	378.6	384.4	547.3	588.2	309.2



## 2. Network Management

### 2.1 Overview

In the 2014/15 financial year TransGrid has completed a number of initiatives related to improving the management of the transmission network.

These include:

- > TransGrid achieved certification for its asset management system under the ISO 55001 Asset Management standard. ISO 55001 is an internationally recognised framework setting out the requirements for good asset management practise. It also allows asset management performance to be objectively measured against a maturity scale, and to enable the targeting of improvement programs in those areas considered to give the best value to the business. This initiative provided formal recognition of TransGrid's asset management capabilities and provide a framework for the continuing development of core asset management skills and competencies.
- > TransGrid implemented an Electricity Network Safety Management System to meet the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014. The first audit of the system was completed in April 2014 with no major non-conformances recorded.

### 2.2 Network Complaints

There were 34 complaints registered during 2014/15. This result is slightly higher than 2013/14 and is within the long term average for this measure. Natural fluctuations in the number of complaints can be expected due to the differing number and types of major capital projects being undertaken in each financial year.

The majority of complaints were associated with the major capital works program and primarily relate to:

- > Issues with impacts of construction such as noise, dust, restriction to business opening hours and other impacts.
- > Objections to specific project works, including consultation processes, compensation and visual amenity concerns.

Complaints are formally registered with TransGrid's Corporate Communications team and all attempts are made to address with the complainant. A summary of complaints and outcomes are provided to senior management at regular intervals to ensure a satisfactory response from the organisation..

Table 2.1 – Complaint Performance Data

Year	Previous Years				Current Year
	2010/11	2011/12	2012/13	2013/14	2014/15
Complaints Total	3	26	41	31	34
Complaints regarding Vegetation Management	1	0	1	2	7

## 3. Network Planning

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### 3.1 Overview

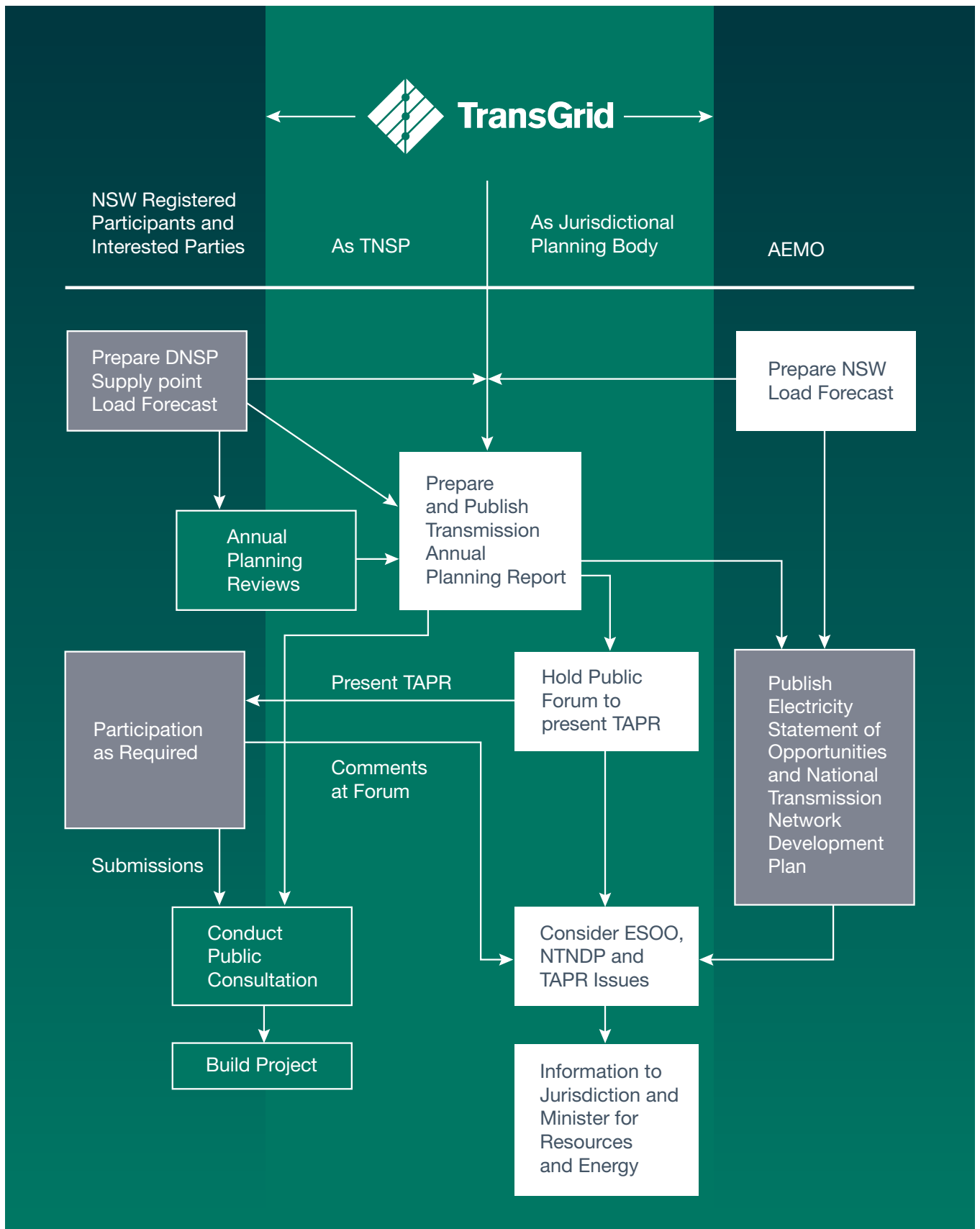
TransGrid carries out planning in accordance with its regulatory obligations under the National Electricity Rules (NER), Jurisdictional requirements and customer expectations. As the Jurisdictional Planning Body (JPB) for NSW, TransGrid works with the Australian Energy Market Operator (AEMO) to provide input to the Electricity Statement of Opportunities (ESOO) and National Transmission Network Development Plan.

As a registered Transmission Network Service Provider (TNSP) in the National Electricity Market (NEM), TransGrid is required to perform a yearly planning review and produce a Transmission Annual Planning Report (TAPR) with information relevant to supply demand balance, transmission network planning and distribution network planning.

The roles of AEMO, TransGrid and other parties in the planning process are set out in Figure 3.1.

### 3. Network Planning

Figure 3.1 – TransGrid’s Planning Roles



### 3. Network Planning

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## 3.2 System Design Criteria (Planning Standards)

Under NSW legislation, TransGrid has responsibilities that include planning for future NSW transmission needs and interconnections with other networks. The NSW Government has specified the Transmission Network Design and Reliability Standard to be applied by TransGrid.

In addition, as a TNSP in the NEM, TransGrid is obliged to meet the requirements of Schedule 5.1 of the NER. In particular, TransGrid is obliged to meet the requirements of clause S5.1.2.1.

The NER sets out the required processes for developing networks as well as minimum performance requirements of the network in a range of areas. These include contingency events, power transfer capability, power, voltage, and frequency quality, line ratings and protection systems. It also requires TransGrid to consult with AEMO, Registered Participants, Distribution Network Service Providers (DNSPs) and interested parties and to apply the AER's Regulatory Investment Test for Transmission (RIT-T) to development proposals.

In meeting these obligations, TransGrid's approach to network planning is socially and economically based and is consistent with NER and the RIT-T. It includes consideration of non-network options such as demand side response (DSR) and demand management (DM) and/or embedded generation, as an integral part of the planning process. Joint planning with DNSPs, directly supplied industrial customers, generators and interstate TNSPs is carried out to ensure that the most economic option, whether network or non-network, is identified and implemented to meet customer and community requirements.

In addition to meeting requirements imposed by the NER, environmental legislation and other statutory instruments, TransGrid is required by the NSW Government to plan and develop its transmission network on an "n-1" basis. That is, unless specifically agreed otherwise by TransGrid and the affected distribution network owner or directly connected end-use customer, there will be no loss of load (other than load which is interruptible or dispatchable) following the occurrence of a credible contingency on the network at any time. In fulfilling this obligation, TransGrid must recognise specific customer requirements as well as AEMO's role as system operator for the NEM.

TransGrid's planning obligations are also interlinked with the licence obligations placed on DNSPs in NSW. TransGrid must ensure that the system is adequately planned to enable their licence requirements to be met. For instance, if the mandatory DNSP license obligation is an "n-1, 1 minute" reliability standard for sub-transmission lines and zone substations supplying loads greater than or equal to specified minimums, eg 15 MVA in urban and non-urban areas, the requirement imposes a consequential obligation on TransGrid to provide a commensurate level of reliability in its network supplying the sub-transmission line or zone substation. In addition to adherence to NER and regulatory requirements, TransGrid's transmission planning approach takes into account the historical performance of the components of the NSW system, the sensitivity of loads to supply interruption and asset maintenance procedures. It has also been recognised that there is a need for an orderly development of the system taking into account the long-term requirements of the system to meet future load and generation developments.

Ultimately, TransGrid's planning must consolidate with AEMO's future plans detailed in National Transmission Network Development Plan.

## 3. Network Planning

### 3.3 Demand Management

The primary drivers for investment in new assets on the NSW transmission network is the need to replace ageing assets due to their condition and the need to augment capacity due to increases in peak demand. System constraints emerge as the maximum capability of existing assets is reached. These constraints are usually due to growth in demand, or in some cases a reduction in rating for ageing assets due to their condition. To relieve constraints, investments in new transmission assets may be required. However, if the peak demand can be managed, it is possible to reduce, defer or eliminate the need for new transmission investment and thereby reduce the costs and environmental impacts associated with construction of new assets.

There are two broad ways to achieve this: demand management (DM) and embedded or local generation. Collectively, these are referred to as non-network options.

DM reduces peak electricity consumption at points of end-use through tariff and load curtailment incentives, energy storage systems, standby generators or power factor correction.

Embedded or local generation options may include generation or cogeneration facilities located on the load side of a transmission constraint. They may utilise alternative energy sources such as bagasse, biomass, gas, hydro or solar.

TransGrid actively promotes these non-network options by informing the market of constraints via the TAPR, external consultations, joint planning and reviews with distributors and joint sponsorship of research projects.

#### Consideration of Non-Network Options by TransGrid

TransGrid's Transmission Annual Planning Report (TAPR) provides advance information to the market on the nature and location of emerging network constraints. This is intended to encourage interested parties to formulate and propose feasible non-network options to relieve emerging network constraints.

TransGrid considers non-network options on an equal footing with network options when planning its network augmentations or asset renewals. For a non-network option to be considered during the evaluation and analysis process, it must be feasible and capable of being implemented in time to relieve the emerging constraint. The option can then be recommended and implemented if it satisfies the Regulatory Investment Test-Transmission (RIT-T) for augmentations, or economic test if it is an asset renewal.

It is expected that DM and local/embedded generation options would emerge from joint planning with distribution network service providers (DNSPs), from the market or from interested parties through the provision of advance information such as that contained in the TAPR.

#### Price Signals and Financial Incentives to Encourage DM and Local Generation

TransGrid is a provider of bulk transmission network services and is therefore best placed to implement 'bulk' DM options. For instance, a monthly maximum demand charge on customers encourages the implementation of demand side response at the time of maximum demand on the transmission network.

Additionally, TransGrid can provide financial incentives via direct payments under network support contracts to providers of demand reductions.

#### Promotion of DM and Local Generation Alternatives by TransGrid

TransGrid actively promotes DM and local generation alternatives through:

- > identifying opportunities for DM and local generation options through joint planning with the DNSPs and engaging expert external consultants where warranted
- > informing the market of constraints via the TAPR and consultations for alleviating individual constraints
- > participation in initiatives and reviews that include consideration of DM and its relationship to the development of electricity networks, and
- > joint sponsorship of research projects involving DM and embedded generation.



## 3. Network Planning

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### 3.3 Demand Management

#### Recent Innovation Activities

The four key demand management innovation activities undertaken by us to date in the 2014/15 financial year are:

1. Commissioning RMIT University to undertake research into co-managing home energy demand. The project sought to determine how residential electricity consumers conceptualise peak demand, how they respond to various demand management programs enabled by smart meters and smart grids, and what types of demand management incentives are most and least effective.
2. In September 2014, hosting a Demand Management Innovation Forum to facilitate collaboration on emerging demand management needs and innovation projects. Participants included representatives from AEMO, the Australian Energy Market Commission (AEMC), demand response aggregators, major electricity consumers, network businesses and academics.
3. Commissioning the iDemand management system. iDemand facilitates research into demand management, and promotes development of, and education in, demand management in NSW. The system was commissioned at our Sydney West site in October 2014 and has the target of reducing electrical demand by 50%. The iDemand system consists of a 400 kilowatt-hour energy storage system, almost 100 kilowatts of solar generation capacity (including some thin film technology and some polycrystalline panels), energy efficient LED lighting, and a web portal that provides iDemand's live status and historical data for download. To find out more about iDemand visit: [www.transgrid.com.au/iDemand](http://www.transgrid.com.au/iDemand).
4. Network Opportunity Maps — we are a partner in the Institute of Sustainable Futures at the University of Technology Sydney's Network Opportunity Maps project, funded by ARENA. The purpose of this project is to develop online maps of network constraints that are freely available and updated annually. The maps will include planned investment, the potential value of renewable energy, and demand management and decentralised energy generation resources.



## 4. Asset Management

### 4.1 Overview

TransGrid's Asset Management System has been developed based on "best practice" asset management guidance from internationally recognised sources, including the ISO 50000 document series, the Global Forum on Maintenance and Asset Management (GFMAM), the Institute of Asset Management (IAM) and Australia's Asset Management Council.

TransGrid is focused on delivering optimal and sustainable electricity transmission services, which provide the required safety, environmental and reliability performance at efficient costs over the asset lifecycle. Hence, the Asset Management System is designed to manage the assets to meet TransGrid's performance requirements and Corporate Objectives, whilst optimising the balance between risks and costs.

### 4.2 Technical Service Standards

The AER Service Target Performance Incentive Scheme sets out TransGrid's primary technical service standards. The measures are:

- > Reliability, based on the number of Energy Not Served (ENS) events.
- > Availability, based on transmission line, transformer, and reactive plant availability.
- > Average unplanned-outage duration.
- > Market impact of transmission congestion.

Further details of this scheme are available in the Service Target Performance Incentive Scheme Guideline published by the AER, available on its website:

<http://www.aer.gov.au/node/8966>

The measures reported in tables 4.1, 4.2 and 4.3 are the performance based on the targets set by the AER for reliability, availability and unplanned outage duration. These targets are set on the basis of the 5 year average for the previous regulatory control period.

### 4.3 Transmission Reliability

The availability of transmission lines, transformers and reactive plant were below target for the 2013/14 financial year. This is mainly because of TransGrid's large capital work program for transmission line rebuilds, pole replacements and transformer replacements. Also, a small number of reactive plant failure events have resulted in prolonged reactive plant outages.

Of TransGrid's 15 connected customers, 13 did not experience any unplanned outages causing loss of supply or interruption to generation. No interconnectors experienced an unplanned outage.

**Table 4.1 – Transmission Asset Availability (%) Trend**

	Years					
	Target	2010/11	2011/12	2012/13	2013/14	2014/15
Transmission Lines	99.26%	98.99%	99.08%	98.89%	98.98%	98.66%
Transformers	98.61%	98.43%	97.82%	97.59%	96.73%	96.62%
Reactive Plant	99.12%	95.71%	96.16%	96.13%	98.20%	93.04%

The reactive plant unavailability trend is a result of long term outages of a small number of reactive plant. System voltage control, being the primary purpose of reactive plant, is maintained in the interim by restricting planned outages of other reactive plant items and temporary changes to network configuration.

**Table 4.2 – Network Reliability Trend (Off Supply Event Numbers)**

	Years					
	Target	2010/11	2011/12	2012/13	2013/14	2014/15
Measure A >0.05 System Minutes Events	4	2	2	4	5	1
Measure B > 0.25 System Minutes Events	1	1	0	1	0	0

## 4. Asset Management

Table 4.3 – Outage (Un-Planned) Average Duration (Minutes) Trend

	Years				
Target	2010/11	2011/12	2012/13	2013/14	2014/15
824	926	1688	1705	2030	2184

The Average Unplanned Outage Duration is presently tracking at a relatively high level as a result of the occurrence of a small number of events, the nature of which has necessitated longer than average repair times. Plant restoration is also prioritised on the basis of system need at that particular time of outage versus the costs associated with an immediate and often out of hours response to determine the best strategy to return the plant to service. The root cause of these events has been reviewed and no particular trends or risks have been determined warranting corrective action.

Table 4.4 – Connection Point Interruptions (Unplanned) Current Year

Connection Point Interruptions (Unplanned) Current Year		
Connection Point	Customer	Interruption Duration Total (Minutes)
Orange 66kV Bus No.2 & No.3 Section	Essential Energy	121
Yanco No.4 Transformer 66/33/11kV	Essential Energy	12
Darlington Point 132kV A and B bus section	Essential Energy	13
Sydney West 132kV Bus Section A2	OneSteel	12
Sydney South 132kV Bus Section B2	Ausgrid	15
828 Mt Piper 132 - Portland tee APCL tee BCSC	Endeavour Energy	150
964 Pt Macquarie - Taree tee Herons Creek	Essential Energy	8
261 Beaconsfield West - Zetland tee Clovelly	Ausgrid	11
Balranald 22kV Bus	Essential Energy	10
Balranald 220kV No.1 Transformer	Essential Energy	173

Connection point interruptions summarise those unplanned outages resulting in a loss of supply seen by the customer. The connection point performance for the current reporting year is consistent with performance over the last 5 years.

Table 4.5 – Connection Point Numbers

Connection Point Numbers End Current Year	
Number of Connection Points (Total Number)	455 + 6 interconnectors

Note: for the purpose of connection point interruption reporting, the connection point numbers are defined as the number of individual supply points to all customers.

# 5. Network Safety

## 5.1 Overview

TransGrid's goal is zero harm for all our staff, contractors and the public. Safety is our first priority and we firmly believe that all harm is preventable. Working safely is a condition of employment for all staff and contractors. One of TransGrid's key principles is that the network is operated safely; health and safety is an integral part of all our business decisions.

### Our Systems

Our health and safety management system is certified to AS/NZ ISO 4801. Our environmental management system is certified to AS/NZ ISO 14001.

TransGrid's health and safety, and environmental management systems are overseen by the Executive Health, Safety and Environment Committee. This Committee meets quarterly and is chaired by the Managing Director. Other representatives on the Committee include the relevant Executive General Manager for each business unit and a number of senior management representatives from the Health, Safety and Environment group.

TransGrid also has a Board Health and Safety Committee that meet on a quarterly basis to review the efficacy of the health and safety management system and its associated risk profile.

### Corporate Plan 2014-2019

The Corporate Plan 2014-2019 defines the organisation's vision, mission, principal objectives, key initiatives and measures. It is the central reference point for decision making across the business over the coming year and will provide clarity of purpose into the future. The Plan reflects input from TransGrid's Board, Executive and the organisation's Group Managers.

One of the key initiatives in the Corporate Plan 2014 – 2019 is Corporate Initiative 1: Ensuring an effective safety culture. The initiative is aimed to improve safety outcomes by strengthening the safety culture of our employees and contractors and maintaining employee safety engagement.

Traditionally an area with consistent focus, questions are emerging regarding the safety culture within the organisation. There has been an increase in high consequence incidents, that is, incidents that could have had serious consequences, and opportunities exist to use more up to date risk methodologies and better understand control failures. Contractor safety performance remains below that achieved by employees. Based on injury rates TransGrid is performing to a high standard and is continuing to improve. However, consistent with the organisation's vision of zero incidents for employees and contractors TransGrid is committed to moving the organisation to the next level in terms of safety culture, engagement and performance. This initiative supports TransGrid's intent to extend beyond traditional process management activities to a broader cultural shift in order to firmly embed safety risk awareness in the core of the organisation and its people.

### Nine High Consequence Risks

During 2014/15 the safety focus shifted from lagging indicators such as lost-time injury rates to understanding the risks that lead to incidents that have the potential to cause serious injury or to be fatal. These are known as TransGrid high consequence risks (HCRs). This work culminated in the launch of a communications program that draws attention to these risks and the contribution that all staff members must make to manage them.

TransGrid identified nine high consequence risks are:

- > Electricity
- > Working at height
- > Motor vehicle (driving)
- > Mobile powered plant
- > Heavy lifting operations
- > Falling or moving objects
- > Traffic control
- > Hazardous substances and dangerous goods
- > Confined spaces

In 2015/16 the initiative will maintain a focus on some key areas around procedures, communication, safety work tension, low voltage safety, contractor management and control gaps for HCRs.

### Contractor Management

Significant improvements have been made to TransGrid's contractor management processes over the last twelve months including a process to accredit contractors prior to working for TransGrid, and the implementation of a contractor performance management portal. This will ensure that there is a systematic approach to the accreditation, evaluation, selections and management of contractors with respect to health, safety and environmental management.



## 5. Network Safety

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### Environmental Performance

TransGrid is committed to conducting its activities and services in a manner that prevents pollution and complies with relevant legislation, industry standards and codes of practice. TransGrid implores all employees and contractors to stop and consider the potential impact to the environment from their activities.

We aim to enhance our systems and processes in a manner that promotes continuous improvement in environmental management and which will lead to the achievement of good industry practice.

In the 2014/15 financial year, TransGrid maintained good environmental performance with only one high consequence incident occurring.

### Wellbeing

The TransGrid Wellbeing program is about making lifestyle choices that benefit your total health. It is about taking care of your physical, psychological and financial health as well as engagement with your community. It is about using your mind constructively and expressing emotions effectively. The program provides principles, policies and programs to support employees in the following areas:

- > Community Wellbeing
- > Emotional Wellbeing
- > Physical Wellbeing
- > Financial Wellbeing

A number of programs were successfully rolled out in 2014/15 year including online health risk assessments, onsite health checks, Steptember, the QUIT smoking program and onsite skin checks.

### Safety Day

TransGrid's 20th annual Safety Day was held on 13 August 2014 at Regentville Substation. Along with team competitions and events, there were more stalls than ever before with business units from across the company presenting a range of creative and interactive displays. Hosting the traditional firefighting, first aid, risk assessment, fitness, and apprentice wiring challenges, teams from all areas came together to participate.

The events on Safety Day aim to reinforce TransGrid's emphasis that safety is our number one priority. The day helps to hone safety skills which positively influence workplace safety culture. It is also a fantastic opportunity for all areas of the business to come together and discuss issues related to safety and wellbeing.

### Schedule of Compliance Audits and Inspections

Compliance audits and inspections are conducted both internally and on contractors to ensure that procedures are implemented in accordance with legislative and organisational requirements. These include health and safety system audits, environmental management system audits, random unannounced safety and environmental compliance inspections, site conformance inspections, and HSE audits on construction, asset replacement projects, and maintenance activities. Non-conformances identified in audits are reported into the TransGrid Action and Risk Management System (ARMS) and are tracked by the HSE Compliance Manager. The Executive team and Board members also visit worksites across TransGrid throughout the course of the year.

### Participation in Industry Committees

TransGrid takes an active role in a number of industry and Australian Standards committees and working groups such as Energy Networks Association's Health, Safety and Environment committee, Grid Australia Health and Safety Committee, the Department of Trade and Investment, and the Regional Infrastructure and Services NSW Industry Safety Steering committee. Participation ensures that trends and expectations of legislators, industry and the community are understood and managed effectively.

## 5. Network Safety

### 5.2 Public Reportable Safety Incidents

In the 2014/15 financial year there was no Reportable Safety Incident where a member of the public was involved.

Table 5.1 – Public Injuries

Year	Previous Years				Current Year
	2010/11	2011/12	2012/13	2013/14	2014/15
Non-Fatal	0	0	0	0	0
Fatal	0	0	0	1	0
Total	0	0	0	1	0

### 5.3 Worker Reportable Safety Incidents

The injuries reportable in this section are defined in the guidelines for the Significant Electricity Network Incidents (SENI) Scheme. These definitions changed during 2012, and so the reporting is based on the following guidelines.

Table 5.1 – Public Reportable Safety Incidents

Date of Incident	Number of injuries	Guideline
Prior to 1 May 2012	Serious Electricity Network Accident + Serious Electrical Accident	Significant Electricity Network Incidents Objectives, definitions and reporting requirements February 2011
After 1 May 2012	Reportable Safety Incidents	SENI Definitions and Reporting Requirements June 2012

The five year figures for Reportable Safety Incidents as per the SENI scheme definition is shown in the table below. The details of these are reported quarterly to the Department of Industry.

Table 5.2 – Reportable Safety Incidents

Year	Previous Years				Current Year	
	2010/11	July 2011 – April 2012	July 2011 – April 2012	2012/13	2013/14	2014/15
Workers	0	0	0	2	4	3
Contractors	2	1	0	4	6	3
Total	2	1	0	6	10	6

### 5.4 Major Incident Reports

There were no major reportable safety incidents in the 2014/15 financial year.

## 6. Bushfire Risk Management

### Bushfire Risk Management Plan

TransGrid's Bush Fire Risk Management Plan has transferred to a standalone document from previously being published in the Network Management Plan. The key components of the plan are summarised in sections 6.3 and 6.4.

### Bushfire Risk Management Performance

TransGrid's network performed well during the 2014-15 reporting period.

On 8 February 2015, a tree came within electrical clearance of a 330kV transmission line, with the electrical flashover leading to a fire contained at the base of the tree. The total area of grass burned was limited to around 0.5m<sup>2</sup>, with the fire self-extinguishing. At the time of the flashover, the latest LiDAR report did not identify this location as being at risk. The location has some wind row trees with some long hanging branches directly under the line, and it is likely that part of the tree was blown up into the conductors, causing the trip but with adequate clearance under normal low wind conditions.

The following table summarises the performance outcomes, and compares these to the previous year's performance:

### Preventative Programs

TransGrid's bushfire preventative program is centred on its routine easement maintenance. Inspection of transmission line hardware and accessories provides further confidence in the reliability of the system to not pose a bushfire ignition risk, and to remain safe during any bushfire occurrence in the area.

TransGrid carries out routine vegetation inspections in transmission line corridors using aerial LiDAR (Light Detection And Ranging) scanning of all lines over a three year period. Individual line inspection frequencies within this three year program are based upon vegetation growth patterns and climate areas. These inspections make sure that all vegetation is measured to the most accurate methods so that vegetation likely to encroach within electrical clearances to overhead lines under any operating circumstances is targeted for maintenance in appropriate timeframes.

### Proactive Programs

TransGrid provides corresponding representation to Bush Fire Management Committees. When required, the meetings are attended by a regional representative providing advice on matters such as the impact proposed hazard reduction burns will have on TransGrid lines and recommendations are made on how to protect these assets prior to the commencement of a burn. As part of TransGrid's Public Electrical Safety Awareness (PESA) plan, a brochure has been provided to members of the Bush Fire Management Committees outlining the fire hazards associated with overhead power lines and vegetation, and safety guidelines to be observed during firefighting in the vicinity of overhead power lines.

Table 6.1 – Bushfire Risk Management

Year	Previous Years			Current Year	
	2010/11	2011/12	2012/13	2013/14	2014/15
Assets in bush fire prone areas checked by pre-summer inspection %	100%	100%	100%	100%	100%
Private lines in bush fire prone areas checked by pre-summer inspection %	N/A	N/A	N/A	N/A	N/A
Fire ignitions by network assets (Number)	0	0	2	0	1
Complaints from the public regarding preparation for the bush fire season (Number)	0	0	0	0	0

# 7. Public Electrical Safety Awareness

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TransGrid's Public Electricity Safety Awareness Plan (PESAP) is based on a risk assessment of public safety issues associated with TransGrid's assets. This Plan has transferred from previously being published in the Network Management Plan to a standalone document.

The plan identifies a number of key hazardous events relating to safety that the organisation is concerned about, and describes how we communicate these to the key stakeholders.

The hazardous events identified are:

## For ground based assets:

- > Unauthorised access to substations (including vandalism, theft, adventurous children, unauthorised emergency services, etc.)
- > Potentially hazardous electrical conditions in proximity to TransGrid transmission lines and substations, including publicly frequented and or accessible areas
- > Unauthorised climbing of transmission and communication towers
- > Excavators and earth moving machinery operating in vicinity of high voltage cables
- > Vegetation clearing works in the vicinity of transmission lines
- > Fires under or in proximity to assets
- > Use of pesticides and herbicides
- > Fire start due to TransGrid activities or infrastructure.

## For aerial assets:

- > Tall vessels using navigable waterways under transmission lines
- > Clearance of power lines to ground
- > High machinery and extendable plant operating under transmission lines
- > Crop dusting and any low flying aerial activities in proximity to transmission lines
- > Kite and model planes flying in proximity to transmission lines.

The mechanisms to communicate and raise awareness about these are:

- > Community consultation
- > Electricity safety awareness and education programs for students
- > Communication with property owners who have TransGrid's electricity transmission network infrastructure on their land
- > Communication with emergency services
- > Dial before you dig service
- > Safety awareness and warning signage
- > Infrastructure security
- > Safe work practices.

These mechanisms are predominantly business as usual preventative controls (e.g. the dial before you dig service and design standards around safety signage and infrastructure security). In terms of proactive programs, TransGrid has continued with its Electrical safety awareness and education programs and the incorporation of electrical safety messages with community consultation in 2014/15.

## 8. Power Line Crossings of Navigable Waterways

In accordance with Australian Standard AS 6947-2009, all crossings of navigable waterways by TransGrid infrastructure have had a risk assessment completed in conjunction with NSW Maritime. The outcomes of the risk assessments do not require any crossings to be reconstructed or modified, and signage is the appropriate risk mitigation measure.

In accordance with the NSW Maritime Power Line Crossings of Navigable Waterways Electricity Industry Code, the updated signage required by the above risk assessments is in place. The signs show the maximum allowable vessel height at each crossing.

Table 8.1 – Power Line Crossings of Navigable Waterways Summary

	Existing (Number)	New (Number)	Incidents (Number)	Crossings Reconstructed (Number)	Crossings Identified as Requiring Conversion to Submarine Crossings (Number)
Overhead Crossings	41 <sup>1</sup>	44	0	0	0
Submarine Crossings	0	0	0	0	0

**Note:** <sup>1</sup> Two crossings of the Clarence River near Grafton have crossing heights that are below the expected maximum vessel height initially notified by NSW Maritime. These two crossings are by one 132kV transmission line, either side of an island in the Clarence River and have been in service at this location since the mid 1960s with no recorded incidents. Discussions have been held with NSW RMS, with the outcome being a revision of the maximum expected vessel heights to meet the 17m as marked on the new signage, with no further modification of the crossing required. RMS have not yet updated the boating maps with the revised information. A revision of this arrangement has been requested by RMS in 2018 to assess the river traffic and the suitability of the safety clearance of the crossing at that time.





## 9. Managing Director Declaration

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TransGrid

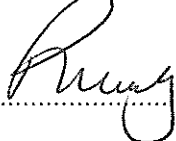
### ELECTRICITY NETWORK PERFORMANCE REPORT 2014/15

#### Declaration by Managing Director

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

1. Complies with reporting requirements prescribed under the *Electricity Supply (Safety and Network Management) Regulation 2014*, and the "Transmission 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.

NAME: ..... PETER MCINTYRE .....

SIGNATURE: .....  .....

MANAGING DIRECTOR

.....

DATE: ..... 3 / 11 / 2015. ....



