

# Electricity Network Safety Management System Performance and Bushfire Preparedness Report

Part A 1 July 2022 to 30 June 2023

Part B 1 October 2022 to 30 September  
2023



Protecting people, property and the environment from  
safety risks posed by our electricity network

October 2023

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## Case Studies

Case studies are provided throughout the document to highlight key initiatives and achievements, and/or provide background information for the reader.

## Introduction

This document is the Annual Performance Report for the Essential Energy Electricity Network Safety Management System (ENSMS).

It is produced to meet the requirements set out in the Independent Pricing and Regulatory Tribunal (IPART) Electricity networks reporting manual – Safety management system performance measurement (September 2022)(reporting manual). As such, it is intended to provide sufficient information for IPART or members of the public and our customers to assess our performance against our ENSMS objectives.

The report is structured in two parts:

- > Part A sets out the annual safety performance for the period 1 July 2022 to 30 June 2023
- > Part B sets out our bushfire preparedness activities undertaken for the period 1 October 2022 to 30 September 2023

The timeframes for Parts A and B differ due to the relative focus of the content, with Part A aligned to financial year and Part B aligned to fire season.

## Context

We build, operate and maintain the electricity network that services regional, rural and remote communities across 95 per cent of New South Wales (NSW) and parts of southern Queensland. We maintain and develop the infrastructure that delivers power to more than 880,000 homes and businesses, 170 hospitals, and 1,250 schools.

We aim to continuously improve safety performance for employees, contractors and the community, while also striving to deliver on our other customer priorities including reliability and affordability.

The ENSMS is critical to delivery of network safety outcomes. It translates safety objectives into effective and efficient actions for the control of safety risks associated with the electricity network. These risks include public and worker safety, bushfire and other environmental impacts, safety risks arising from any loss of electricity supply, and risks to public property and network assets. It applies a 'Plan-Do-Check-Act' approach, supporting continuous improvement in all aspects of safety performance and practices.

Figure 1 depicts the 'whole of lifecycle' approach to safety that is taken by the ENSMS.



**Figure 1 Network and asset lifecycle phases considered by the ENSMS**

The ENSMS works in harmony with other key management systems within the business, including the Asset Management System, Work Health and Safety Management System and Environmental Management System.

## Background

As critical infrastructure that is co-located in the communities it serves, the safety risks associated with an electricity network need to be managed accordingly. This is a core function of a Distribution Network Service Provider (DNSP).

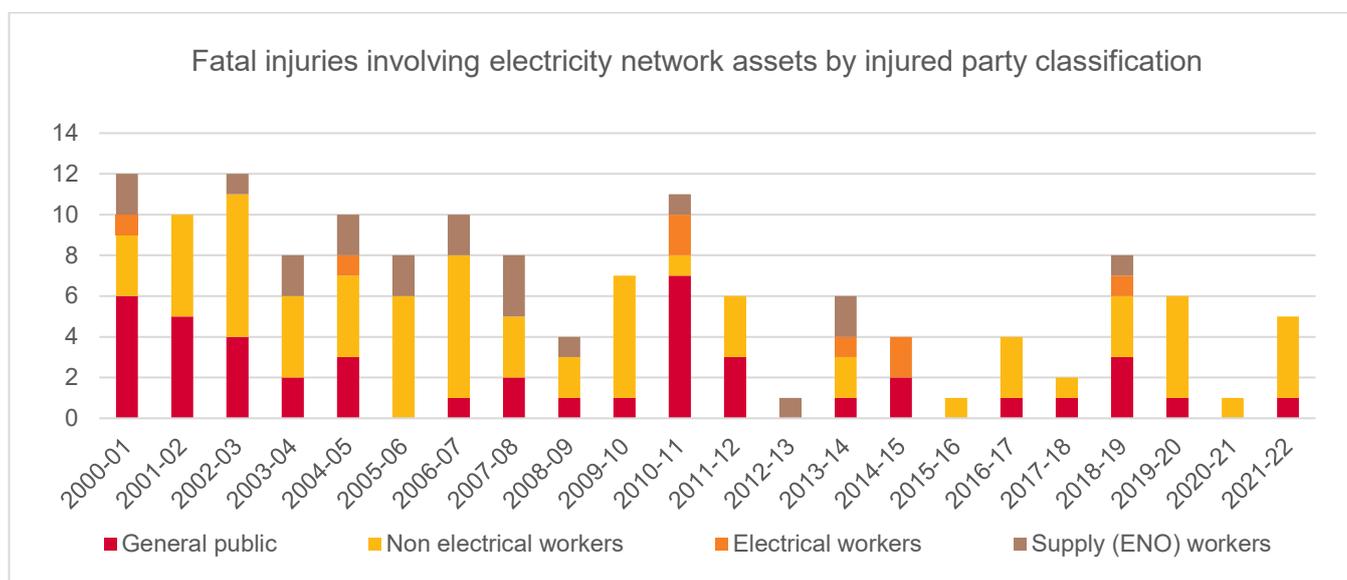
The hazards associated with an electricity network have the potential to cause harm to network and other workers, the public and the environment. Contact with electrical energy can cause significant and fatal injuries and arcing may start fires in adjacent vegetation. In addition to these hazardous events, the loss of supply in some circumstances can result in harm, particularly to vulnerable persons dependent on electricity supplied medical

equipment, and populations that have a greater risk of impact from heat illness. Electricity network operators must take account of all these hazards and take steps to manage them *so far as is reasonably practicable*<sup>1</sup>.

The Electricity Regulatory Authorities Council (ERAC) provide an annual report<sup>2</sup> on electricity network related fatalities in Australia and New Zealand. A chart of the fatality statistics that involve electricity distribution network equipment and injured party classification for the period 2000-2022 can be found in Figure 2. Over the last 22 years, through the improvements in safety performance of electricity networks, there has been a downwards trend in the number of fatal injuries associated with electricity networks.

We operate and maintain a safety management system which provides a systematic approach to the identification, analysis and control of hazards associated with the electricity network. We also report incidents to our industry regulator within specified timeframes and collate incidents that have occurred over a year to provide a view of the overall safety performance.

The performance measures contained in this report are a combination of lead measures (that indicate future performance) and lagging measures (that indicate past performance) of the safety of our electricity network. These are consistent with the expectations of our regulator, IPART.



**Figure 2 Fatal injuries involving electricity network assets by injured party classification**

<sup>1</sup> This is a key concept in safety management and is a requirement in law in many jurisdictions. It requires ensuring that all 'reasonably practicable' measures to manage safety are in place, where the limit of what is reasonably practicable involves weighing the risk against the measures necessary to eliminate or reduce it, in what is essentially a benefit-cost comparison.

<sup>2</sup> [https://www.erac.gov.au/wp-content/uploads/2022/12/ERAC\\_Electrical\\_fatality\\_report\\_2021-2022.pdf](https://www.erac.gov.au/wp-content/uploads/2022/12/ERAC_Electrical_fatality_report_2021-2022.pdf)

## Part A – ENSMS Annual Performance Report

Part A reports against a framework of safety performance indicators defined within the reporting manual as per Figure 3.

Part A is structured around the four 'Tiers' defined in Figure 3 as follows:

- > Section 1 describes Tier 1 indicators (Major incidents)
- > Section 2 describes Tier 2 indicators (Minor incidents)
- > Section 3 describes Tier 3 indicators (Control failure near misses)
- > Section 4 describes Tier 4 indicators (Control implementation)

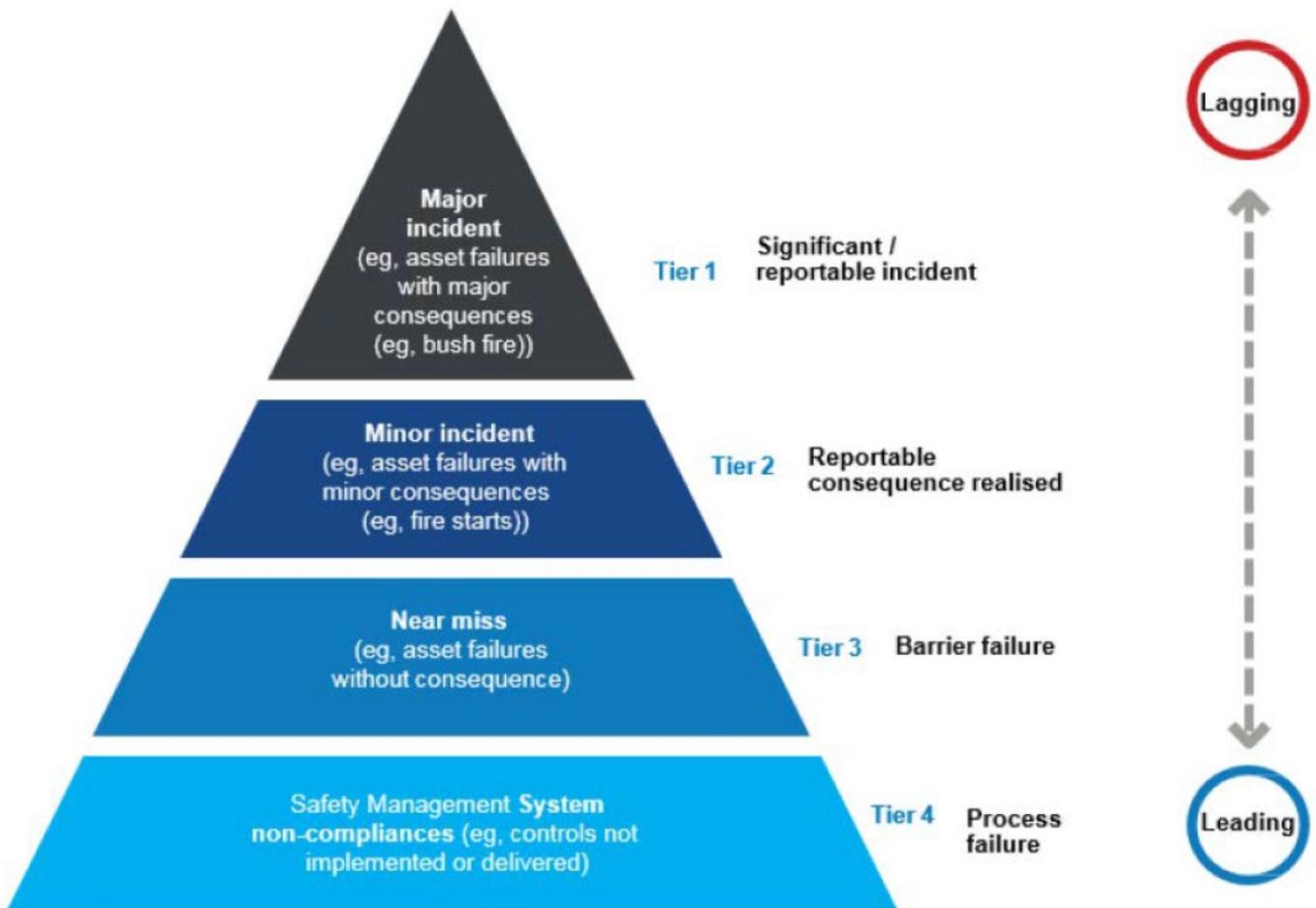


Figure 3 IPART Safety Performance Monitoring Framework

Trends of the key statistics from the FY2023 ENSMS Annual Performance Report and from previous reporting periods are shown in Figure 4 below.

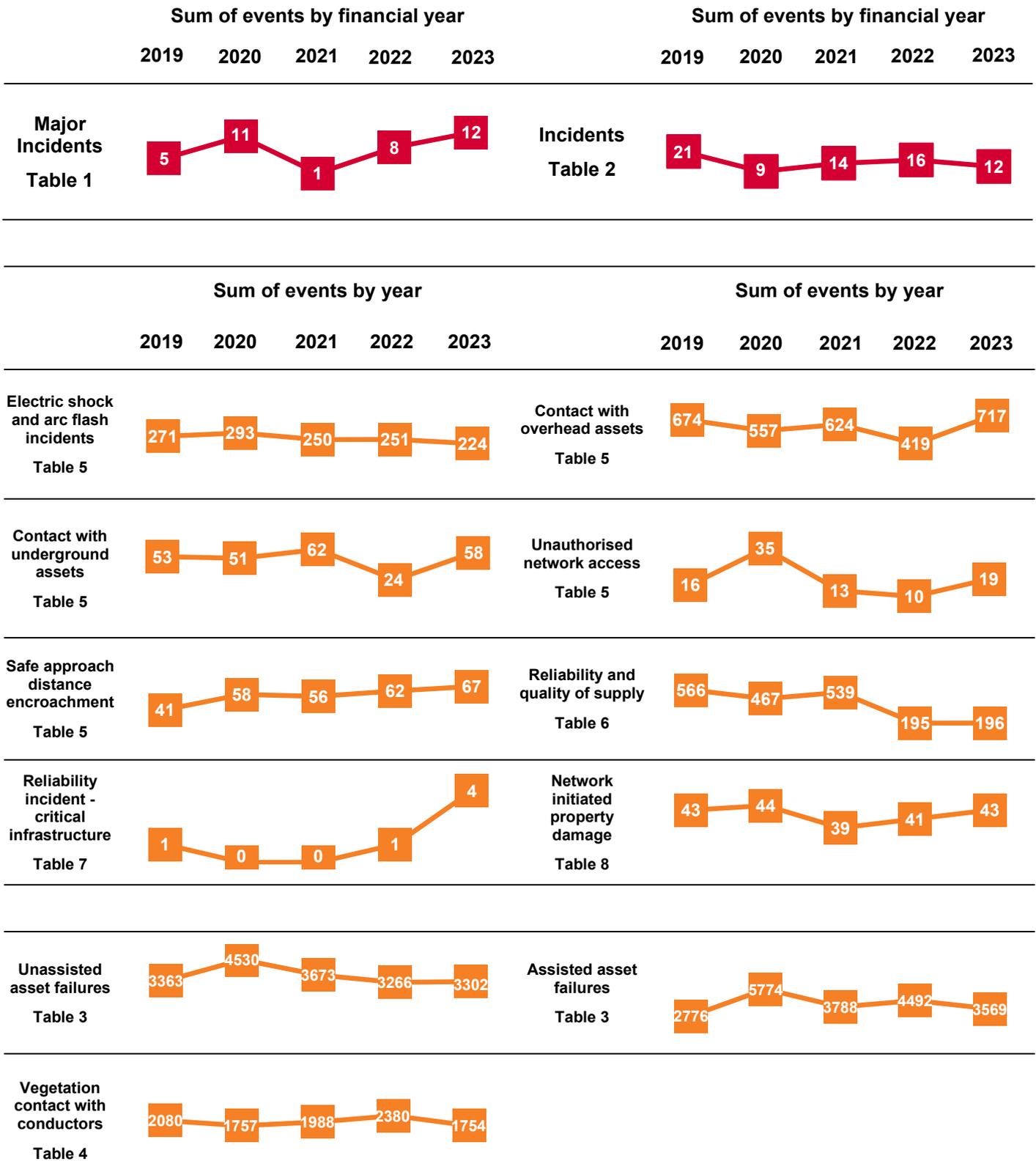


Figure 4 Key statistic trends from the ENSMS Annual Performance Report

This reporting period has seen an increase in major incidents, predominately driven by loss of electricity supply events that meet the criteria of major incidents caused by storms. There were also two tragic incidents (one Major Incident and one Incident) involving public workers operating equipment near our network.

## Case Study – Outstanding asset task recovery

The management of our asset task pool is a key control for managing the risk to the safety of our people, the public and the environment. In last year's ENSMS Annual Performance Report, we outlined management actions we were taking to address outstanding asset tasks that had arisen from persistent wet weather and boggy ground impeding access to large areas of our electricity network. These actions included:

- > Travelling resources across our footprint to complete tasks that we could access
- > Increased reporting and monitoring of performance at shorter intervals
- > Inspecting outstanding tasks to confirm task categorisation and appropriate prioritisation is applied.

Corrective tasks that we identify are categorised according to the time that we would expect the identified condition to deteriorate to failure. One corrective task severity category is CAT 3, where we would expect the condition to deteriorate to failure over the near term and we aim to rectify these identified conditions within 9 months. Shown in Figure 5, over the last 6 months of FY2023 we saw a substantial reduction in CAT 3 outstanding tasks<sup>3</sup>, through the implementation of management actions and a whole of business focus.

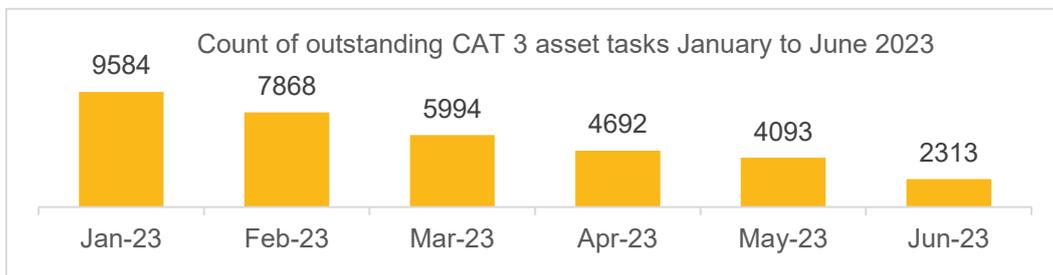


Figure 5 Count of outstanding CAT3 asset tasks January to June 2023



Figure 6 Essential Energy maintaining the electricity network during wet and boggy conditions

<sup>3</sup> There are 1,940 outstanding CAT 3 tasks at the 16 October 2023, see Table 22 for descriptions of task severity descriptions

## Section 1 and 2

These tables summarise electricity network-related incidents that resulted in harm to the public, our workers, network assets, public or private property, or the environment. Table 1 and Table 2 are a record of these incidents that have been reported to IPART in accordance with the Electricity networks reporting manual – Incident reporting (June 2023).

### 1. Tier 1 – Major Incidents

Major Incidents are defined as those that have resulted in significant consequences such as fatalities, life changing or life-threatening injuries where the electricity network was the cause of the incident, for example due to an asset failure. Major incidents also include incidents resulting in significant loss of property such as major bushfires that were started by the network, as well as significant power outages.

Table 1 provides a brief description of all Major Incidents that occurred on or involved our network during the reporting period.

**Table 1 A1 Major Incidents**

ESSNM <sup>4</sup> Objective		Description of major incident reported under the incident reporting requirements
Safety of members of the public		A public worker flying a gyrocopter and undertaking cattle mustering operations contacted the electricity network and subsequently crashed. The pilot suffered fatal injuries from the impact.
Safety of persons working on the network		Nil incidents
Protection of property	Third party property	Nil incidents
	Network property <sup>5</sup>	<ul style="list-style-type: none"> <li>&gt; October 2022 - Murray district flooding - \$605k</li> <li>&gt; October 2022 - Bellata Zone Substation flood - \$952k</li> </ul>

<sup>4</sup> Electricity Supply (Safety and Network Management) Regulation 2014

<sup>5</sup> Network property damage events in this table are not considered Major Incidents in the IPART Incident Reporting Manual

ESSNM <sup>4</sup> Objective	Description of major incident reported under the incident reporting requirements
<p>Safety risks arising from loss of electricity supply</p>	<ul style="list-style-type: none"> <li>&gt; 28 August 2022 - An urgent task was identified on a sub transmission pole through the asset inspection process. The site required significant earth works to allow pole replacement, with wet weather delaying these works. In addition, delays in the delivery of the poles meant that the outage planned for the pole replacement was cancelled and a subsequent emergency outage taken to replace the pole once material was available.</li> <li>&gt; 1 November 2022 - Storms across NSW caused an outage affecting more than 5,000 customers for more than 4 hours in Orange, Gunnedah, Guyra, Coonabarabran, Dubbo, Hillston and Yass.</li> <li>&gt; 12 November 2022 - During a storm high wind gust speeds of 93km/h were recorded at Grafton. At this time an anchor on a 66kV subtransmission pole failed resulting in a pole failure on the line supplying Grafton South, Shannon Creek, and Nymboida Zone Substations and 6000 customers being without supply for more than 4 hours. The pole fell onto the adjacent 66kV line that provides a ring supply to the affected zone substations.</li> <li>&gt; 14 November 2022 - A widespread storm with high winds and rainfall impacted large parts of the Essential Energy electricity network with more than 5,000 customers without supply for more than 4 hours on the North Coast, Mudgee, Molong, and Manildra.</li> <li>&gt; 19 November 2022 – Voltage (instrument) transformer failure at TransGrid site resulted in over 5,000 customers supplied from the Barham, Moama and Deniliquin Zone Substations to be without supply for over 4 hours.</li> <li>&gt; 12 December 2022 - Storms in the New England area resulted in over 5,000 customers for over 4 hours.</li> <li>&gt; 3 February 2023 - Port Macquarie - A severe storm impacted the city of Port Macquarie resulting in more than 5,000 customers to be without supply for more than 4 hours.</li> <li>&gt; 3 February 2023 - Coffs Harbour Hospital- An 11kV transformer failure at a substation caused a loss of supply to the Coffs Harbour Hospital Chiller Plant for more than 2 hours. There was no customer back up generation or generator connection points at this substation.</li> <li>&gt; 9 February 2023 - Dubbo - A severe storm with heavy rain, lightning, hail and winds reported up to 100km/h has resulted in more than 5,000 customers to be without supply for more than 4 hours in the Dubbo area.</li> </ul>

## Case Study – Electrical safety of public workers

The electricity network in regional, rural and remote New South Wales (NSW) crosses a range of land, with a variety of uses, including agriculture and farming activities. During construction, facility maintenance and agricultural work, public workers face risks when close to electrical infrastructure. To help public workers plan work around the electricity network infrastructure to manage the risk of contact with the network, Essential Energy has made its electricity network visible on the 'Look Up and Live' site and app ([Look Up And Live \(essentialenergy.com.au\)](http://essentialenergy.com.au)).

The 'Look Up and Live' website and app allows public workers to identify where overhead electricity network infrastructure is located on their job sites and provides links to resources that provide advice on working safety near the electricity network and request to have aerial markers fitted to overhead electricity conductors in the vicinity of a work site. This helps public workers plan to control risks arising from work near the electricity network. Figure 7 is an excerpt from the Look Up and Live website showing Essential Energy's assets and information.

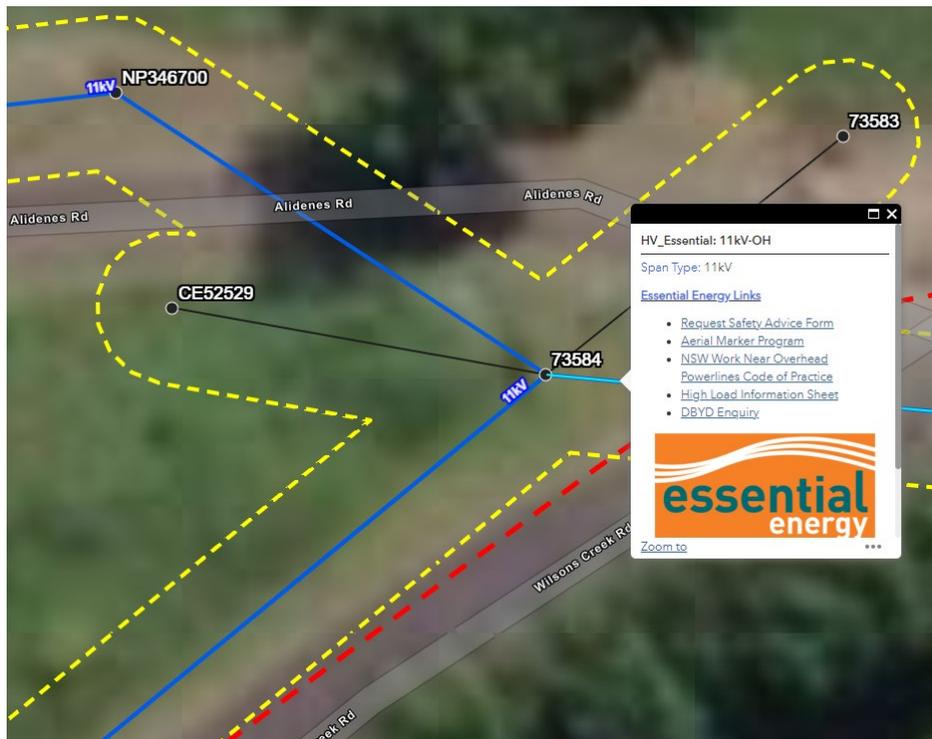


Figure 7 An excerpt from the Look Up and Live website showing Essential Energy's assets and details (source: Look Up and Live)

## 2. Tier 2 – Incidents

Incidents are defined in IPART's Electricity networks reporting manual – Incident reporting as incidents that result in safety consequences such as hospitalisation and a person receiving care from a health care professional, where the electricity network was the cause of the incident, for example due to an asset failure. This category also includes lower-level impacts to public property (such as smaller fires) and smaller power outages.

Table 2 provides a brief description of all Incidents that occurred on or involved our network during the reporting period.

**Table 2: A2 Incidents**

ESSNM Objective	Description of each incident reported under the incident reporting requirements
Safety of members of the public	Public worker operating a scissor lift from the ground, raised the scissor lift to within safe approach distances of the overhead 66kV network. Arc occurred from the powerline to the scissor lift. Operator has received electric shock and suffered serious injuries.
Safety of persons working on the network	Nil incidents
Protection of third-party property	<ul style="list-style-type: none"> <li>&gt; 1 January 2023 - Low voltage service shorted and started a fire that burnt 40 ha</li> <li>&gt; 10 January 2023 - A bird strike resulting in a flash over and blown high voltage fuse started a fire that burnt 17.3 ha</li> <li>&gt; 2 February 2023 - A high voltage insulator failed, causing conductor to fall to ground started a fire that burnt 18.2 ha</li> <li>&gt; 18 February 2023 - A failed bridging connection has caused a high voltage conductor to fail, initially resulting in a fire 2 ha in size. The fire was not adequately extinguished, reigniting and burning a further 77 ha</li> <li>&gt; 21 February 2023 - A gum tree has fallen through high voltage conductors, causing multiple breakages and started a fire that burnt 30 ha</li> <li>&gt; 27 February 2023 - A timber crossarm has failed, causing a high voltage conductor to contact the ground and started a fire that burnt 12 ha</li> <li>&gt; 11 March 2023 - A bird has caused a flash over that started a fire that burnt 405 ha</li> <li>&gt; 4 March 2023 - The failure of a high voltage mid span splice started a fire that burnt 254 ha</li> <li>&gt; 24 March 2023 - A lightning strike struck a timber pole shattering a large portion of the pole causing the entire fibreglass crossarm construction with conductors attached to fall to the ground. The conductors remained suspended and energised above ground line in close proximity with long grass until the following afternoon (24th March) and started a fire that burnt 288 ha.</li> </ul>
Safety risks arising from loss of electricity supply	<ul style="list-style-type: none"> <li>&gt; 12 November 2022 - Storms and high winds in the Northern Rivers and Far West area</li> <li>&gt; 9 February 2023 - Storms across Central NSW</li> </ul>

### 3. Tier 3 – Control failure near miss

Failure of electricity network assets, particularly functional failure where assets stop performing a required function, for example supporting electrical conductors at a prescribed height above the ground, or the carriage of electrical energy from source to load, can result in a dangerous release of energy. Eliminating the failure of assets is not practically or financially achievable, and Essential Energy manages these risks so far as is reasonably practicable.

Various inspections are performed on our assets to identify conditions that lead to asset failure. Analysis of inspection data and failure rates influence replacement programs to manage the risk that is associated with failure. These tables demonstrate how effective the inspection and maintenance programs are in minimising asset failures.

This section sets out events such as an asset failure or where a worker, member of the public or livestock or a pet came into contact with the network, but that did not result in a safety consequence that meets the criteria reported in Sections 1 and 2 above. These are categorised as 'near misses' and are reported across six tables:

- > Table 3 sets out near misses related to 'functional' failures of network assets
- > Table 4 sets out near misses related to trees or branches ('vegetation') contacting overhead wires ('conductors')
- > Table 5 sets out near misses related to unintended contact, unauthorised access and electric shocks originating from network assets. 'Unintended contact' describes incidents such as construction or agricultural vehicles coming into contact with overhead or underground conductors. 'Unauthorised access' describes incidents such as trespass onto the Essential Energy network e.g. into zone substations
- > Table 6 sets out near misses related to electric shocks, due to specific causes related to network assets and workmanship and near misses related to the quality of the electricity supply
- > Table 7 sets out near misses due to supply interruptions to 'critical infrastructure' e.g. hospitals and road tunnels
- > Table 8 sets out network-initiated property damage events, for example where public property including cars, buildings, crops or livestock have been damaged by the network
- > Table 8 also includes events where non-electrical assets belonging to Essential Energy have been damaged by the network e.g. damage to Essential Energy vehicles or buildings.

The remainder of this section provides a brief description of each of the tables, to explain the terms used and provide some context for the reported performance. This is followed by each of the tables that sets out the performance for the reporting period.

#### 3.1 Network asset failures

Table 3 lists those asset failures that occurred on our network during the reporting period, split by the major asset types. These are reported in the context of the total population for each asset type and the 5-year average annual failure numbers.

For each asset type, the table reports the failures that occurred during the reporting period, broken out by:

- > 'Unassisted' and 'Assisted' failure types, where:
  - 'unassisted' failures are those considered to be within our control. For example, failures caused by asset degradation and aging due to corrosion, termite attack and wood decay.
  - 'assisted' failures are those attributed to external causes, for example vehicle impacts, vandalism, lightning, fires and storms that resulted in wind speeds in excess of relevant design standards.
- > Whether the failure resulted in a fire, or no fire; and
- > If the failure did result in a fire, was the fire limited to the asset ('Contained'), or did it spread to the surrounding environment ('Escaped')

**Table 3: A3 Network asset failures**

Performance measure	Population	5-year average annual functional failures	Functional failure total FY2023 <sup>6</sup>	Annual functional failures (for reporting period)					
				Unassisted			Assisted		
				No fire	Fire		No fire	Fire	
					Contained	Escaped		Contained	Escaped
Towers	188	0	0	0	0	0	0	0	0
Poles (including street lighting columns/poles & stay poles)	1,415,704	992	556	91	8	19	385	0	53
Pole top structures		845	726	357	11	20	337	0	1
Pole top structures - crossarms	1,483,227								
Pole top structures - Insulators	4,493,629								
Pole top structures - Conductor ties	4,724,824								
Conductor HV <sup>7</sup> (inc. subtransmission) OH <sup>8</sup>	157,711 km	1,155	1,038	473	2	33	485	0	45
Conductor HV (inc. subtransmission) UG <sup>9</sup>	3,055 km	45	41	28	0	0	13	0	0
Conductor LV <sup>10</sup> OH	25,225 km	659	490	278	1	3	203	0	5
Conductor LV UG	7,382 km	324	267	135	2	1	128	0	1

<sup>6</sup> This column is the sum of the columns to the right.

<sup>7</sup> High voltage (HV)

<sup>8</sup> Overhead (OH)

<sup>9</sup> Underground (UG)

<sup>10</sup> Low voltage (LV)

Performance measure	Population	5-year average annual functional failures	Functional failure total FY2023 <sup>6</sup>	Annual functional failures (for reporting period)					
				Unassisted			Assisted		
				No fire	Fire		No fire	Fire	
					Contained	Escaped		Contained	Escaped
Service line OH	573,942	2,069	1,633	1,080	2	3	546	0	2
Service line UG	178,950	38	28	23	0	0	5	0	0
Power transformers	700	1	1	1	0	0	0	0	0
Distribution transformers	139,097	1,263	1,047	363	2	3	678	0	1
Reactive plant	428	14	4	0	1	2	0	0	1
Switchgear - zone/subtransmission/transmission substation	14,558	12	4	4	0	0	0	0	0
Switchgear - distribution OH	580,639	1,422	910	229	1	7	669	0	4
Switchgear - distribution ground based	48,008	27	12	4	1	0	7	0	0
Protection relays or systems	5,458	40	18	18	0	0	0	0	0
Zone/ sub transmission / transmission substation SCADA system	368	47	46	46	0	0	0	0	0
Zone/subtransmission/transmission protection batteries	706	36	50	50	0	0	0	0	0
Network SAPS	3	0	0	0	0	0	0	0	0

## 3.2 Vegetation contact with conductors

Table 4 breaks out the numbers and causes of vegetation contact with conductors into the following categories:

- > 'Grow in' vegetation is any vegetation that has grown into the space around the conductors, allowing contact to occur. This might come from trees that are below, to the side or above electricity network conductors.
- > 'Fall in' vegetation is usually dead, diseased, or, dying vegetation from trees surrounding or above the electricity network conductor that has fallen onto the electricity network conductor e.g. dead branches that fall onto electricity network conductors when they drop from a nearby tree.
- > 'Blow in' vegetation is usually branches that have been picked up by high winds from some distance away from electricity network conductors and which has been 'blown into' the electricity network conductors.

For context, Essential Energy operates and maintains approximately 816,000 vegetated spans across our electricity network.

**Table 4: A4 Vegetation contact with conductors**

Performance measure	Event count – 1 July 2022 – 30 June 2023	Event count – 1 July 2021 – 30 June 2022	Event count – 1 July 2020 – 30 June 2021	Event count – 1 July 2019 – 30 June 2020	Event count – 1 October 2018 – 30 September 2019
Fire starts – grow in	0	0	0	1	1
Fire start – fall in and blow in	26	25	22	48	43
Interruption – grow in	229	158	132	138	147
Interruption – fall-in and blow in	1,499	2,197	1,834	1,570	1,883

### Case Study – Reducing exposure to contact with the electricity network

Electricity networks are designed and constructed to reduce the likelihood of exposure to the public, public workers and network workers to the hazard of unintended discharge of electricity. There is a variety of design aspects that reduce the likelihood of exposure to unintended discharge, with many included in the applicable Australian Standards the electricity network is constructed to. Some of these include:

- > Conductor height above ground (overhead networks)
- > Cable construction, burying depths and protection (underground assets)
- > Security arrangements (substation sites)

Asset inspections provide verification that the electricity network is being maintained and is in its 'as designed' condition. Essential Energy also creates an annual Public Electricity Safety Awareness Plan (see Section 4.5 of this report for details) to create public awareness of the hazards of electricity.

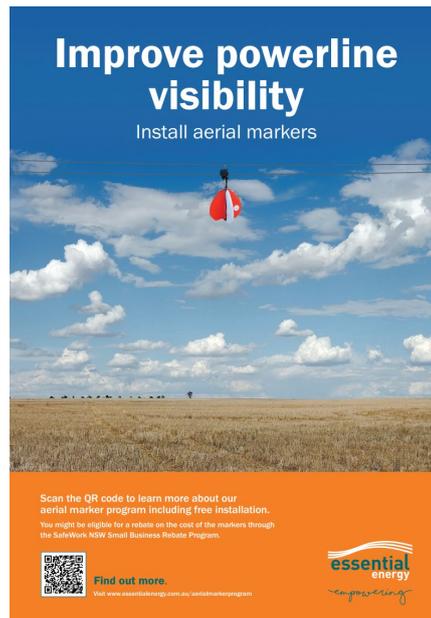


Figure 8 Public safety messaging related to contact with the electricity network

### 3.3 Unintended contact, unauthorised access and electric shocks

Table 5 displays events that resulted in electric shocks that were not classified as 'Major Incidents' or 'Incidents' in accordance with IPART's Electricity networks reporting manual – Incident reporting. Table 5 also records instances of unintended or unauthorised contact or close access to the electricity network that had the potential to result in an electric shock.

Examples of events included in Table 5 include:

- > Member of the public receiving an electric shock (not classified as a major or incident), due to a faulty network connection to a residence;
- > Tipper truck contacting overhead powerlines while operating;
- > Construction excavator contacting underground powerlines while operating;
- > Theft of copper earth wires from power poles; and
- > Construction scaffolding erected too close to the network.

Table 5: A5 Unintended contact, unauthorised access and electric shocks

Detail	Event count – 1 July 2022 – 30 June 2023	Event count – 1 July 2021 – 30 June 2022	Event count – 1 July 2020 – 30 June 2021	Event count – 1 July 2019 – 30 June 2020	Event count – 1 October 2018 – 30 September 2019
Electric shock and arc flash incidents originating from network assets including those received in customer premises					
Public	202	219	231	262	241
Public worker	5	9	4	2	6
Network employee / network contractor	3	9	2	9	6

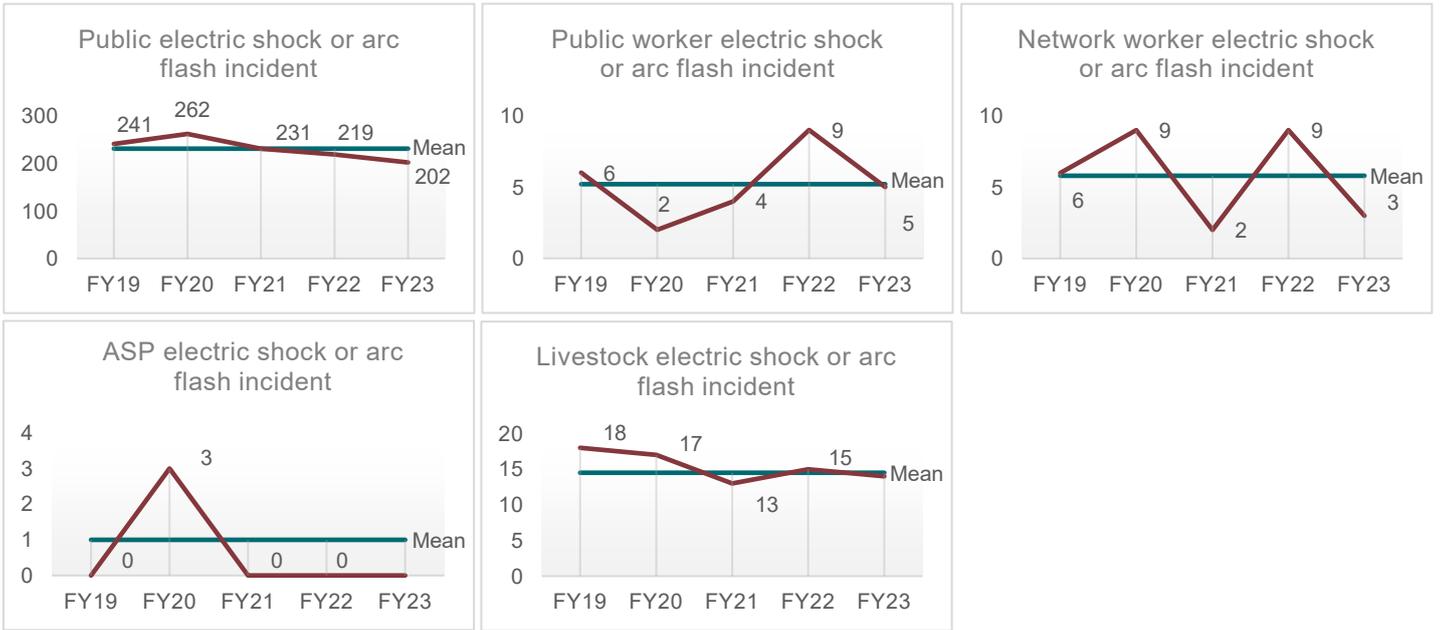
Detail	Event count – 1 July 2022 – 30 June 2023	Event count – 1 July 2021 – 30 June 2022	Event count – 1 July 2020 – 30 June 2021	Event count – 1 July 2019 – 30 June 2020	Event count – 1 October 2018 – 30 September 2019
Accredited Service Provider <sup>11</sup>	0	0	0	3	0
Livestock or domestic pet	14	15	13	17	18
Contact with energised overhead network asset (e.g. conductor strike)					
Public road vehicle	423	305	401	355	342
Plant and equipment	181	113	91	93	77
Agricultural and other	112	156	130	107	250
Network vehicle	1	0	2	2	5
Contact with energised underground network asset (e.g. conductor strike)					
Plant and equipment	54	37	55	47	52
Person with handheld tool	4	4	7	4	1
Unauthorised network access (intentional)					
Zone / BSP <sup>12</sup> / Transmission substation / switching station	0	2	0	0	3
Distribution substation	9	4	8	20	3
Towers / poles	8	8	4	14	7
Other (e.g. communication sites)	2	2	1	1	3
Safe Approach Distance (SAD)					
Network employee / network contractor	7	5	1	3	2
Accredited Service Provider	7	6	3	3	3
Public	5	11	11	8	5
Public Worker	48	60	41	44	31

The trends for electric shock, contact with the energised overhead network, and contact with the underground network for the reporting periods FY2019 - FY2023 are shown on the next page. The displayed mean for each trend is the mean of the previous 5 years. Of note are the upwards trends in incidents relating to contact with the overhead network by plant and equipment. We prepare an annual Public Electricity Safety Awareness Plan (PESAP) that is informed by these incidents (and trends). The contents of our PESAP are detailed in section 29 of this report.

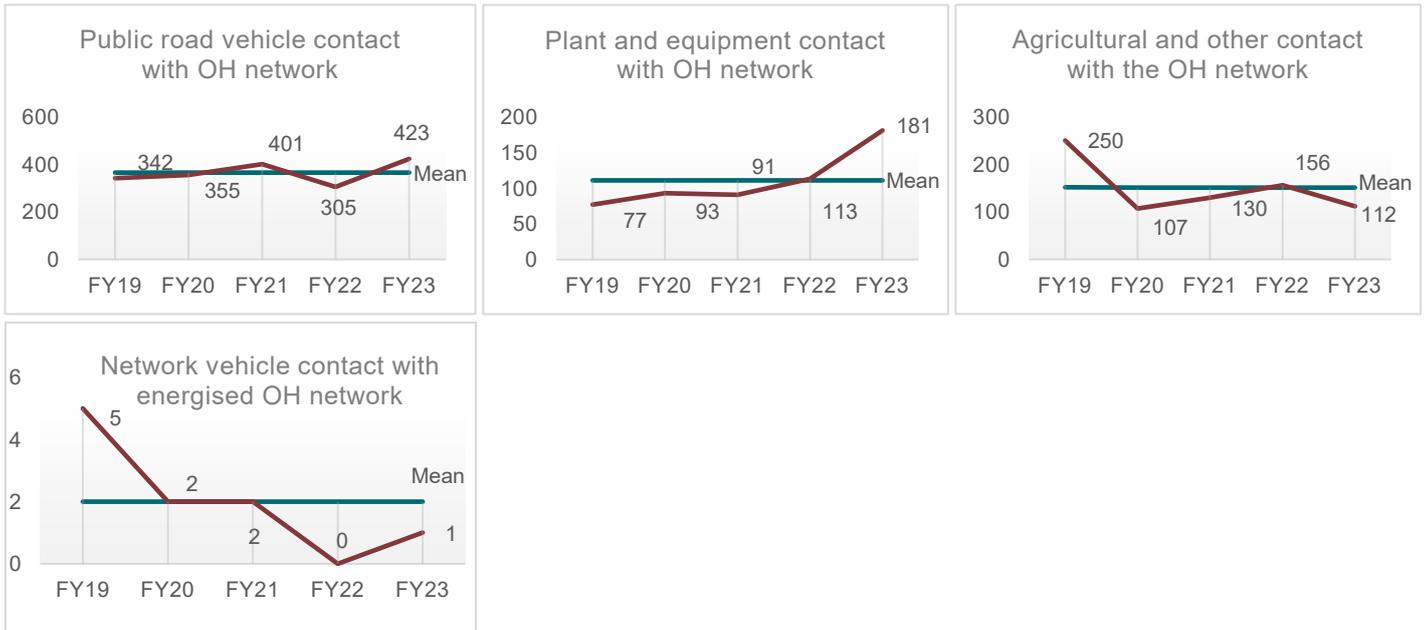
<sup>11</sup> Accredited Service Providers are persons who have been accredited through a NSW Government-recognised accreditation scheme, to undertake contestable work on the Essential Energy network

<sup>12</sup> Bulk supply point

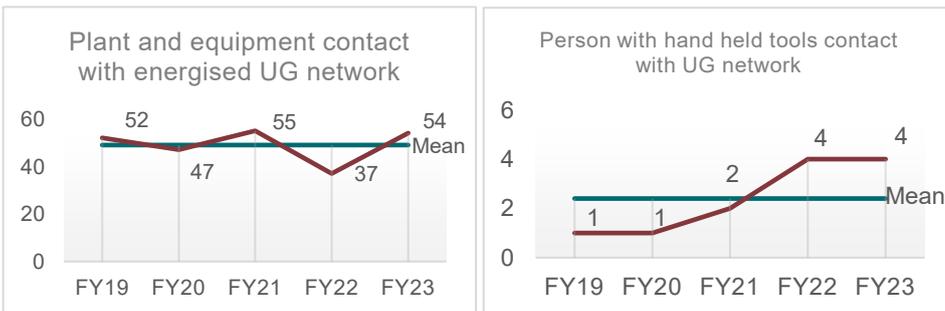
### Electric shock or arc flash incident trends FY2019-FY2023



### Contact with energised overhead (OH) network trends FY2019-FY2023



### Contact with energised underground (UG) network trends FY2019-FY2023



## Case Study – Bulk overhead service mains replacement

Overhead service mains are the connection between our network and a customer's installation. Failure of the service main terminations, particularly the neutral termination can lead to potentially hazardous conditions in the customer's installation and damage to equipment. Where a customer is supplied via an overhead service main, the service main and point of attachment are inspected as a component of the overhead asset inspection program.

To proactively manage overhead service main asset health, we undertake an overhead service main bulk replacement program that is informed by inspection results, failures and prevalence of shocks in customer premises.



Figure 9 Essential Energy workers preparing to replace an overhead service main

Expanded deployment of smart meters will help us to improve the identification of faulty service mains and terminations, in some cases before the customer is aware of a problem, via power quality data collected by smart meters. We will continue to advocate to improve smart meter penetration and for access to power quality data to better manage the safety of the network.

### 3.4 Reliability and Quality of Supply

Table 6 details occurrences of:

- > Three types of events that resulted in electric shocks that were not classified as Major Incidents or Incidents in accordance with IPART's Electricity networks reporting manual – Incident reporting but resulted in dangerous network conditions (high voltage into low voltage, reverse polarity, and neutral integrity due to poor workmanship or incorrect procedure).
- > Events resulting in sustained (longer than 10 minutes) network voltages that either exceed or are lower than the limits prescribed in the Australian Standard *AS61000.3.100-2011 Limits—Steady state voltage limits in public electricity systems*. The basis of reporting for sustained voltage excursions outside of emergency range has been updated to align with industry accepted reporting. This has resulted in a step change between the periods FY2021 and FY2022.
- > Electric shocks that were caused by a defective neutral connection that resulted from asset defects or failures, but were not reportable incidents under IPART's Electricity networks reporting manual – Incident reporting (Neutral integrity due to asset defect or failure).

**Table 6: A6 Reliability and Quality of Supply**

Performance measure	Event count – 1 July 2022 – 30 June 2023	Event count – 1 July 2021 – 30 June 2022	Event count – 1 July 2020 – 30 June 2021	Event count – 1 July 2019 – 30 June 2020	Event count – 1 October 2018 – 30 September 2019
High voltage into low voltage	25	21	21	16	13
Sustained voltage excursions outside emergency range	17	6	344	259	359
Reverse polarity	3	1	3	1	6
Neutral integrity due to poor workmanship or incorrect procedure	1	2	2	1	15
Neutral integrity due to asset defect or failure	150	165	181	190	173

## Case Study – Customer segmentation model

Recognising that our diverse customers have diverse energy needs, we have developed a customer segmentation model to help us identify those customers where the supply of electricity is critical to the continued safety of the community they serve. Our customer segmentation model utilised a data driven approach to group customers by industry segment and subsegment. With this knowledge we can understand where the safety of the community may be compromised by loss of supply and take appropriate action to manage these customers before, during and after loss of supply events.

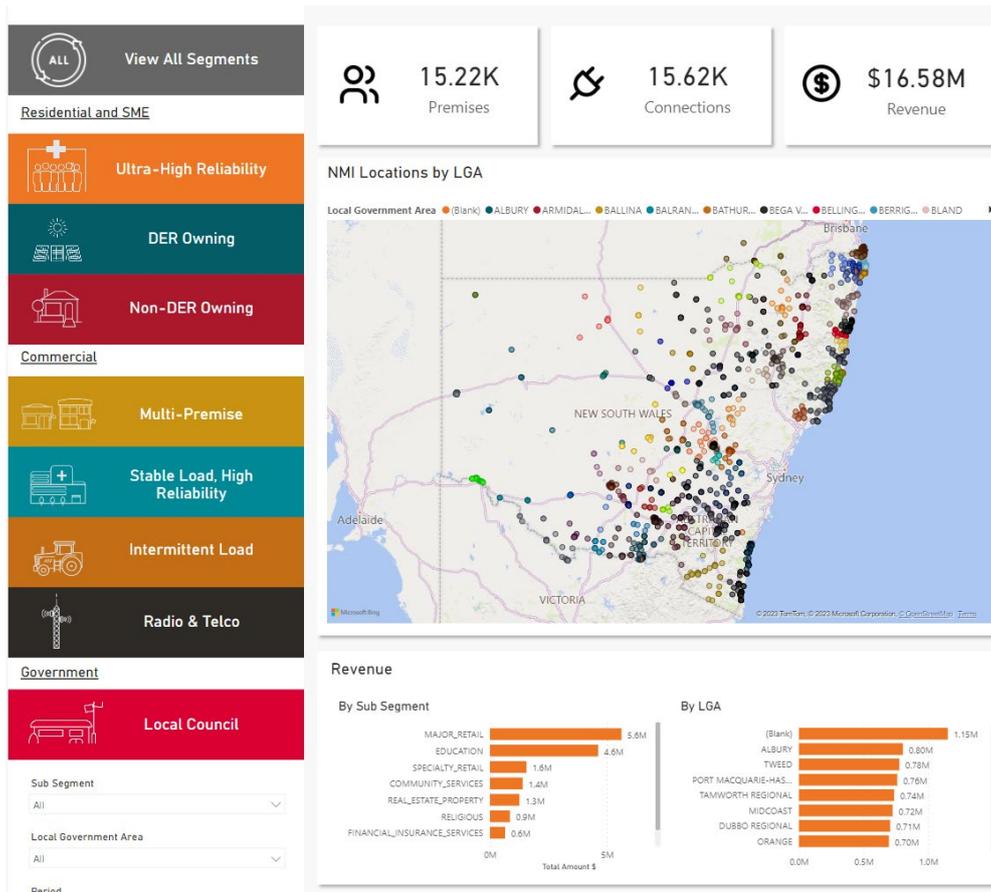


Figure 10 Customer segmentation model output

### 3.5 Reliability and Quality of Supply – Critical infrastructure incidents

Table 7 details events where supply was lost to critical infrastructure, which are defined as:

- > Peer group A1, A2, A3 and B hospitals;
- > Road tunnels on motorways that have emergency evacuation systems;
- > Events and buildings where more than 5,000 people could be affected by an outage; and
- > Other community infrastructure determined by the network operator to be of National, State or Regional significance.

Table 7: A7 Reliability and Quality of Supply – Critical infrastructure incidents

Type of critical infrastructure (e.g. hospital, tunnel)	Minutes of supply lost	Cause	Consequential safety impacts associated with supply issue
Albury Base Hospital	31	8 July 2022 – HV crossarm failed.	There were no safety impacts reported from this incident.
Coffs Harbour Base Hospital	66	13 January 2023 - Damage to network between UG connection and substation	There were no safety impacts reported from this incident.

Type of critical infrastructure (e.g. hospital, tunnel)	Minutes of supply lost	Cause	Consequential safety impacts associated with supply issue
Coffs Harbour Base Hospital	964	3 February 2023 – Transformer failure caused by internal fault in transformer windings.	There were no safety impacts reported from this incident.
Lismore Base Hospital	59	7 June 2023 - Garbage truck drove into LV mains	There were no safety impacts reported from this incident.

### 3.6 Network-initiated property damage events

Table 8 details events where public or network property was damaged, and it is considered that there is a reasonable likelihood that the damage was caused by the network.

**Table 8: A8 Network-initiated property damage events**

Detail	Event count – 1 July 2022 – 30 June 2023	Event count – 1 July 2021 – 30 June 2022	Event count – 1 July 2020 – 30 June 2021	Event count – 1 July 2019 – 30 June 2020	Event count – 1 October 2018 – 30 September 2019
Third party property (assets including vehicles, buildings, crops, livestock)					
Damage (e.g. Fire, Physical impact or Electrical)	43	43	39	44	41
Network property (including non-electrical assets including vehicles, buildings)					
Damage (e.g. Fire, Physical impact or Electrical)	0	0	1	1	2

## 4. Tier 4 - Control implementation

This section sets out Essential Energy’s performance in planning, implementing, reviewing, and delivering key safety risk controls, as set out in the ENSMS. It is structured as follows:

- > Table 9 details amendments and improvements made to Essential Energy’s suite of Formal Safety Assessments and associated risk treatments during the reporting period
- > Table 10 sets out activities undertaken in connection with design, construction and commissioning work on the Essential Energy network
- > Table 11 sets out activities undertaken and outstanding in relation to asset inspections
- > Table 12 sets out asset ‘corrective action tasks’
- > Table 13 sets out activities undertaken and outstanding in relation to vegetation inspections
- > Table 14 sets out activities undertaken in relation to public electrical safety awareness
- > Table 15 sets out internal audit activities performed on aspects of the ENSMS

> Table 16 sets out external audit activities performed on aspects of the ENSMS

## 4.1 Amendments and improvements to Formal Safety Assessments

We have continued to implement the updated formal safety assessment structure proposed in FY2022. The updated formal safety assessment structure consists of 4 Formal Safety Assessments (FSAs) addressing the hazards arising from design, construction, operation, maintenance and decommissioning of the electricity network - Network Assets FSA, Work Impact on Property FSA, Bushfire FSA and Loss of Supply FSA. Compliance demonstrations that describe how the workplace health and safety and environmental management systems comply with the requirements of AS 5577 Electricity network safety management systems, reducing duplication by managing these risks through a single system.

Table 9 describes amendments and improvements to FSAs during FY2023.

**Table 9: A9 Amendments and improvements to FSA or associated risk treatments**

FSA	Amendments / improvements
Worker Safety	<p><b>Network Fatal Risk Critical Control review</b></p> <p>We have refreshed our Network Fatal Risks - 9 risks that present potentially fatal risks to our workers - and are currently working through the implementation of a critical control framework for the identification of critical controls for Network Fatal Risks (NFRs). The NFRs Working with Electricity and Land Transport have been completed and implemented in our digital hazard identification risk assessment control (HiRAC) tool. We have a program to continue the review of critical controls for the remaining 7 NFRs through to the end of FY2024.</p> <p><b>Network Assets FSA</b></p> <p>We have developed a Network Assets FSA, which considers the control environment for the risks that the electricity network poses to the public, public workers and network workers over its lifecycle. Treatments identified include:</p> <ul style="list-style-type: none"> <li>&gt; Public shock investigation process review, update (CEOP2189)</li> <li>&gt; Trial provision of engineering advice on maintenance program prioritisation and timing</li> <li>&gt; Deploy climate change modelling to business as usual</li> <li>&gt; Future Grid loss of neutral identification - complete transition to business as usual (BAU)</li> <li>&gt; HV line fault indication trial, LV fault location calculator</li> <li>&gt; Consider conducting a cyber threat model on the network to identify areas for improvement in the protection system</li> <li>&gt; Undertake a cost benefit analysis of rapid earth fault current limiting (REFCL).</li> </ul>
Public safety	<p><b>Public Safety</b></p> <p>A treatment action plan describing action that we will take to reduce risk to the public and public workers was developed and endorsed by our Executive Leadership Team. Strategy actions to reduce risk to the public and public workers arising from the network, or the public and public workers actions and behaviours near the network include:</p> <ul style="list-style-type: none"> <li>&gt; Build awareness of public safety performance</li> <li>&gt; Develop meaningful measures</li> <li>&gt; Mature reporting culture</li> <li>&gt; Define public safety critical controls, assign ownership, benchmark, internal and external partnerships, risk and value based decision making</li> </ul>

FSA	Amendments / improvements
	<ul style="list-style-type: none"> <li>&gt; Build understanding of public safety risk profile and develop prioritised plans to reduce over time</li> <li>&gt; Develop integrated, simple, effective approaches to Public Safety through related management systems</li> <li>&gt; Review related management systems to ensure that these deliver compliance to regulatory obligations, commitments, corporate risk appetite and other stakeholder expectations.</li> </ul> <p>Within these strategy actions, there are specific actions that are monitored through the Public Safety Working Group and Peak Health, Safety and Environment Committee.</p> <p><b>Perceptions of electrical risk in agricultural workers</b></p> <p>We have entered into a partnership with the Centre for Workplace Health and Safety to investigate the perceptions of electrical risk in agricultural workers. Given the prevalence of incidents involving agricultural workers and our network, this project will improve our understanding of the drivers of behaviour, leading to improved effectiveness of the interventions designed to reduce the prevalence of agricultural workers contacting our network.</p>
Protection of property	<p>We have developed a Work Impact on Property FSA which considers the control environment for the risks of work on the electricity network asset life cycle poses to property over its lifecycle. Treatments identified include:</p> <ul style="list-style-type: none"> <li>&gt; WHSE contractor management program refresh (visiting all depots),</li> <li>&gt; Development of contractor PowerBI dashboard,</li> <li>&gt; Examine tools to streamline encroachment management and determine way ahead, Engage with similar distributors to understand industry practice for encroachment management,</li> <li>&gt; Implement plant and vehicle driver training as BAU (post the trial),</li> <li>&gt; Improve accessibility to standards in the field,</li> <li>&gt; Ask Engineering trial - implement and trial a form to obtain feedback on Engineering and Construction standards,</li> <li>&gt; Consider assurance over compliance with engineering standards,</li> <li>&gt; Review the effectiveness of Essential Energy response to Development Application review by council</li> </ul>
Loss of Supply	<p><b>Loss of Supply treatments</b></p> <p><b>Safety consequences of loss of supply during heightened bushfire risk weather</b></p> <p>Phase 1 of the Energy Networks Australia project to quantify the safety consequences of loss of supply during heightened bushfire risk weather was completed, with a qualitative model proposed to assist network operators in understanding the sensitivity and adaptability factors for customers to heat-induced illness (extreme events generally co-occur with heightened bushfire risk weather) which will aid decision making when balancing bushfire and loss of supply safety risks.</p> <p><b>Climate impact study</b></p> <p>We engaged risk modelling and actuarial consultants to develop a model to estimate the impact of climate change on the rate of failure of assets leading to outages for bushfire, windstorm and flood under RCP4.5 and RCP8.5 in the years 2030, 2050 and 2070. This model was used as an input to the 2025-2029 Regulatory Proposal - our source of funding for network renewal and maintenance. We will now look to operationalise this modelling into BAU safety and resilience decision making.</p> <p><b>Stand Alone Power Systems (SAPS) business case</b></p>

FSA	Amendments / improvements
	<p>We created a business case for the deployment of SAPS for inclusion in Essential Energy's FY2024-29 Regulatory Proposal to the Australian Energy Regulator, improving reliability of customers served by lines that are identified for replacement in the business case. There are 400 sites identified for SAPS deployment over the FY2024-29 period.</p> <p><b>Fault location calculator</b></p> <p>An algorithm to identify the location of low voltage faults, which will reduce outage response time for LV faults, has been trialled and found to provide acceptable prediction of fault location. Next steps will be to operationalise the calculator for broader deployment.</p> <p><b>Fauna Strategy</b></p> <p>A fauna strategy which has identified fauna interaction treatment options and hot spots has been prepared. The output of this work will be integrated in the next iteration of the OH System Strategy in the next review.</p>
Bushfire	<p><b>End to End Vegetation Management Strategy</b></p> <p>We are continuing to implement the End to End Vegetation Management Strategy with the objective of improving the value delivered from our vegetation management expenditure whilst managing risk SFAIRP and maintaining compliance with obligations relating to vegetation management.</p> <p><b>FaultTamer fuse trial</b></p> <p>We have been working closely with the manufacturer of FaultTamer fuses, a fault limiting unit fitted with an arc horn that has been shown to eliminate the emission of molten particles, to modify the unit to improve the operability on our network. During operability testing we identified that the FaultTamer unit shipped in the Australian market is not able to be loaded into cutouts using a link stick. The manufacturer worked with us to develop modifications to improve operability which will be tested in FY2024. If successful a field trial will be established to validate performance.</p> <p><b>Evaluation of rapid earth fault current limiting (REFCL) and early fault detection (EFD)</b></p> <p>We have performed a cost benefit analysis of REFCL and EFD technology as a treatment for bushfire risk. We found that REFCL was not reasonable in our operating context for any reasonably foreseeable scenario. However, EFD is a reasonably practicable control for bushfire, reliability and public safety risk. We will take EFD to field trial to validate its performance on our network in FY2024.</p>
Environmental	Nil

## 4.2 Design, construction and commissioning

Table 10 details metrics relating to the design, construction and commissioning of new or altered network assets during the reporting period. This includes 'contestable' designs and installation, undertaken by Accredited Service Providers (ASP), which are reviewed and certified by Essential Energy.

The greatest opportunity to influence network safety occurs during the planning and design phase of the network lifecycle. These metrics track the safety assessments and audits on those assessments, and safety reviews undertaken on Level 1 (work to extend or increase the capacity of the overhead and underground network) and Level 2 (work on overhead or underground service lines) ASP projects.

**Table 10: A10 Design, construction and commissioning**

Performance measure	Event count – 1 July 2022 – 30 June 2023	Event count – 1 July 2021 – 30 June 2022	Event count – 1 July 2020 – 30 June 2021	Event count – 1 July 2019 – 30 June 2020	Event count – 1 October 2018 – 30 September 2019
Designs for which Safety in Design (SiD) Reports have been completed	913	984	809	1,200	1,455
Designs for which Safety in Design (SiD) Reports have been audited	91	984	90	58	62
Contestable designs certified	1,877	1,947	1915	1785	1,837
Contestable level 1 project safety reviews performed	398	584	447	1,554	1,569
Contestable level 2 project safety reviews performed	0	9	0		
Project closeout reports completed for contestable projects	1,220	1,250	1,266	6,432	6,234
Project closeout reports completed for non-contestable projects	2,906	4,541	3,736		
Project closeout reports audited for contestable projects	0	0	0	0	0
Project closeout reports audited for non-contestable project	1,268	4,541	3,736		

Note: Note that in FY2022 every Safety in Design Report issued has been reviewed by a Design Team Leader; this is a step change from the sample approach taken previously. We have returned to the previous approach taking note of the difference between audit and approval.

### 4.3 Inspections (assets)

Table 11 details asset inspections undertaken during the reporting period and Table 12 details ‘corrective action tasks’ addressing conditions identified from inspections undertaken during the reporting period or within previous reporting periods, that fell due during the reporting period. Within the ‘corrective action tasks’ section of Table 12:

- > ‘Tasks identified’ are those that were reported during the reporting period
- > ‘Tasks achieved’ are those that were completed during the reporting period
- > ‘Cancelled’ tasks are tasks that were not required due to equipment being placed out of service
- > ‘Open’ tasks are tasks that were identified prior to or during the reporting period, but that did not fall due during the reporting period
- > ‘Outstanding’ tasks are tasks that fell due during the reporting period, but that weren’t completed.

**Table 11: A11 Inspections (assets)**

Performance measure	Inspection tasks				
	Annual target	Achieved	Cancelled	Open	Outstanding
Zone Substations	2,522	2,342	118	0	2
Distribution Substations <sup>13</sup>	1,444	1,026	212	55	104
Distribution OH	289,270	216,752	1,021	1,810	14,185
Distribution UG	11,291	1,778	93	9,416	0
Network SAPS	0	0	0	0	0

Inspection tasks may be outstanding due to issues such as wet weather and access constraints. Outstanding inspection tasks are monitored through operational leadership and assurance forums and actioned according to risk. Additionally, tasks planned for FY2023 may have been achieved in earlier or later financial years. The scope of this report covers only those tasks completed in FY2023.

**Table 12: A11 Asset corrective action tasks**

Performance measure	Corrective action tasks			
	Tasks identified (all categories)	Achieved	Open	Outstanding
Zone Substations	2,731	2,840	551	286
Distribution Substations	2,431	2,379	3,883	426
Distribution OH <sup>14</sup>	150,109	86,153	471,498	66,920 <sup>15</sup>
Distribution UG	4,686	3,953	5,652	687
Network SAPS	0	0	0	0

Corrective tasks are assigned a task severity rating and associated completion timeframe in accordance with the severities described in Table 22. Task completion to required timeframes is monitored through operational leadership and assurance forums and prioritised according to risk.

#### 4.4 Inspections (vegetation)

Table 13 details vegetation inspection tasks undertaken during the reporting period. The table includes two types of vegetation inspections; those undertaken using aerial inspection methods and those undertaken using ground-based inspection methods.

<sup>13</sup> Excludes OH substations corrective tasks, OH substation corrective tasks are included in the Distribution OH row

<sup>14</sup> Excludes OH substations corrective tasks, OH substation corrective tasks are included in the Distribution OH row

<sup>15</sup> There are 64 CAT 2 and 1,940 outstanding CAT 3 tasks at the 16 October 2023, see Table 22 for descriptions of task severity descriptions

Table 13 does not include 101,317 aerial inspections carried out as part of the pre-summer bushfire inspection program across our 'P1' bushfire risk areas (parts of our network considered the highest bushfire risk). Table 20 in Part B of this report provides detail of our pre-summer bushfire inspection program.

Other terms used in Table 13 are similar to those used in Table 11.

**Table 13: A12 Inspections (vegetation) Aerial/Ground based**

Bushfire risk category	Population (total spans)	Target	Achieved	Outstanding
<b>Aerial</b>				
P1 <sup>16</sup>	102,878	0	0	0
P2 <sup>17</sup>	359,234	0	0	0
P3 <sup>18</sup>	582,918	0	0	0
P4 <sup>19</sup>	615,392	0	0	0
<b>Total</b>	1,660,422	0	0	0
<b>Ground-based</b>				
P1	102,878	31,744	29,265	2,479
P2	359,234	113,606	110,865	2,741
P3	582,918	143,465	143,465	0
P4	615,392	436,739	433,028	3,711
<b>Total</b>	1,660,422	725,554	716,623	8,931

Inspection tasks may be outstanding due to issues such as wet weather and access constraints. Outstanding inspection tasks are monitored through operational leadership and assurance forums and actioned according to risk.

## 4.5 Public electrical safety plans and activities

Table 14 details activities undertaken as part our Public Electrical Safety Awareness Plan (PESAP). This outlines the programs and activities that we initiate or continue to perform in order to promote public safety awareness and education relating to the electricity network.

<sup>16</sup> Areas considered to be high bushfire risk

<sup>17</sup> Areas considered to be moderate bushfire risk

<sup>18</sup> Areas considered to be low bushfire risk

<sup>19</sup> Areas considered non-bushfire prone

**Table 14: A13 Public electrical safety plans and activities**

Network operator public safety programs / campaigns	Details
PESAP - 2022/23 Marketing Campaigns and tactical activity	Awareness campaigns included motor vehicle accident - Stay Call Wait. Safety around the network during extreme weather, aerial safety and markers, Look Up and Live, high loads and excavation.
Agribusiness Safety	Annual Corporate sponsorship with NSW Farmers Association - including exhibitor at annual conference/expo, advertising, newsletter, digital media to promote aerial markers, Look Up and Live, Stay Call Wait, high loads. Attendance (exhibitor) at major agribusiness events and field days.
Monthly safety electronic direct mail and social media	Database of approx. 1000 subscribers to Essential Energy safety newsletter/electronic direct mail. Essential Energy Facebook and Instagram pages. Information targeted across all industry sectors and general public. Messaging included motor vehicle accident, Stay Call Wait, Look Up and Live, Excavation - Before You Dig, High Loads awareness, Aviation safety near the network.
Electricity Safety Week	Annual awareness campaign with links to teacher's resources for years K-6 learning.
Safety Awareness Fact Sheets and stickers	Specific to industries and equipment provided free of charge through the Essential Energy website Safety landing page.
SES Volunteers Association	Editorial in Volunteers Magazine - Electricity safety and awareness during flood and storm response.



Figure 11 Essential Energy's presence at Primex 2023

## 4.6 Internal audits

Table 15 details internal audits performed on any aspects of the ENSMS during the reporting period.

**Table 15: A14 Internal audits performed on any aspect of the ENSMS (as per AS 5577 clause 4.5.4)**

Audit scope	Summary of identified non-compliances	Summary of actions
<p>Between April and June 2023 our Internal Audit team performed a review of the ENSMS elements:</p> <ul style="list-style-type: none"> <li>&gt; Policy and Commitment,</li> <li>&gt; Planning for safe operation,</li> <li>&gt; Planning and preparation for abnormal conditions, and standards and codes.</li> </ul> <p>The objective of the review was to assess: how the business has defined and documented its commitment towards specific network outcomes that formed the basis of the ENSMS, the appropriateness of planning for safe operation during normal and abnormal conditions, assess the formal safety assessments against the principles of AS/NZS ISO 31000, validate that processes and procedures have been implemented for planning for abnormal operations, validate that the business has a process in place to identify and review published national standards and codes of practice, and how these are considered within the ENSMS.</p>	<p>The auditor identified opportunities to improve the governance of actions required to demonstrate compliance of Formal Safety Assessments, and consider whether there are sufficient resources to effectively manage the TotalSAFE Governance, Risk and Compliance module.</p>	<p>Actions to address findings were agreed, assigned and are being implemented.</p>

## 4.7 External audits

Table 16 details external audit performance on any aspect of the ENSMS during the reporting period.

During FY2023 there were two external audits performed:

- > IPART Bushfire Risk Management Audit
- > Queensland Electrical Safety Office Electricity Safety Management System Audit.

Table 16 sets out the findings from these audits, along with the recommendations and agreed actions.

**Table 16: A15 External audits performed on any aspect of the ENSMS (as per AS 5577 clause 4.5.4)**

Audit scope	Identified non-compliances		Actions
	Audit Criteria	Recommendation	
ENSMS (Bushfire Risk Management)	<p>The auditor will assess if Essential Energy's bush fire Formal Safety Assessment (FSA) and risk treatments are:</p> <ol style="list-style-type: none"> <li>1. In accordance with clause A3.2 and A4 of AS 5577 <i>Electricity Network Safety Management Systems 2013 (AS 5577)</i>, by assessing:               <ol style="list-style-type: none"> <li>a. whether the FSA has considered as a reasonably foreseeable risk that persons tasked with scoping vegetation management requirements for managing bush fire risk from fall-in vegetation hazards may not be competent to perform the task.</li> </ol> </li> </ol>	<p>Essential Energy to update the Bushfire FSA to include the reasons for grading 'Training and Competence' as 'Satisfactory' and to provide an explanation of what it considers to be the areas for improvement. Alongside this, Essential Energy should prepare a Treatment Action Plan detailing the measures it will take to remediate any gaps preventing this control from being assessed as 'Effective'.</p>	<p>Essential Energy will review the effectiveness of the control 'Training and Compliance' and update the Bushfire FSA to describe the reasons for grading 'Training and Compliance'. If 'Training and Compliance' is graded anything other than 'Effective' Essential Energy will create a treatment action plan to address any gaps.</p>
ENSMS (Bushfire Risk Management)	<p>The auditor will assess if Essential Energy's bush fire Formal Safety Assessment (FSA) and risk treatments are:</p> <ol style="list-style-type: none"> <li>2. in accordance with clause A3.2 and A4 of AS 5577 <i>Electricity Network Safety Management Systems 2013 (AS 5577)</i>, by assessing:               <ol style="list-style-type: none"> <li>a. whether the risk controls identified by Essential Energy to</li> </ol> </li> </ol>	<p>Essential Energy to develop and implement a process to risk assess fall-in vegetation hazards that become overdue so as to have a basis for prioritising treatment.</p>	<p>Essential Energy will develop and implement a process for the risk assessment of outstanding fall-in risk tasks in order to prioritise treatment.</p>
		<p>Essential Energy to update the Bushfire FSA to provide a clear line-of-sight between fall-in vegetation hazards and the risk controls to eliminate or reduce</p>	<p>Essential Energy will review and update the Bushfire FSA to provide a clear line of sight between fall-in hazards and the risk controls to eliminate</p>

Audit scope	Identified non-compliances		Actions
	Audit Criteria	Recommendation	
	manage bush fire risk from fall-in vegetation hazard have eliminated or reduced the risk to as low as reasonably practicable (ALARP) and have been fully implemented.	bushfire risk SFAIRP arising from those hazards.	or reduce bushfire risk SFAIRP using a risk management methodology appropriate for the risk under analysis as a component of the scheduled Bushfire Formal Safety Assessment review.
ENSMS (Bushfire Risk Management)	<p>The auditor will assess if Essential Energy's bush fire Formal Safety Assessment (FSA) and risk treatments are:</p> <p>3. in accordance with clause A3.2 and A4 of AS 5577 Electricity Network Safety Management Systems 2013 (AS 5577), by assessing:</p> <p>a. whether the risk controls identified by Essential Energy to manage bush fire risk from fall-in vegetation hazard have eliminated or reduced the risk to as low as reasonably practicable (ALARP) and have been fully implemented.</p>	Essential Energy to incorporate the hazard arising from water-logged ground affecting the structural stability of vegetation which may lead to vegetation fall-in to the Bushfire FSA so that the risk management implications be considered. Although outside the scope of this FSA, we would recommend that this hazard also be incorporated to Essential Energy's Loss of Supply FSA.	Essential Energy will consider and document the fall-in risk arising from vegetation affected by water-logged ground and whether there are practicable controls that could be applied to eliminate or reduce bushfire and loss of supply risk SFAIRP as a component of the scheduled Bushfire Formal Safety Assessment review.
ENSMS (Bushfire Risk Management)	<p>Essential Energy's compliance with licence condition 14 of its distributor licence to assess:</p> <p>b. whether the information relating to bush fire risk controls reported in Essential Energy's annual performance report due for submission to IPART by 31 October 2022 (Annual Performance Report), is complete and accurate, and</p>	Essential Energy to revise its quality assurance procedure relating to data capture and reporting to ensure that an appropriate review is carried out on the completeness and accuracy of the data being reported.	Essential Energy will implement improved governance and assurance over data that informs the ENSMS Performance and Bushfire Preparedness Report through the implementation of a data collation and data quality assurance platform for the ENSMS Performance and Bushfire Preparedness Report.

Audit scope	Identified non-compliances		Actions
	Audit Criteria	Recommendation	
	meets the requirements set out in IPART's Electricity networks reporting manual - Safety management system performance measurement, September 2020 (or any update released prior to 31 October 2022).		
ENSMS (Bushfire Risk Management)	4. Whether Essential Energy has provided sufficient relevant context and information in the ENSMS Annual Performance Report to assist IPART, its customers and the general public to assess Essential Energy's performance against its ENSMS.	Essential Energy to provide additional commentary that would clarify the values and supporting arguments being presented to help facilitate the understanding of the report.	Essential Energy will provide additional commentary and diagrams that will clarify values and supporting arguments being presented in the ENSMS Performance Bushfire Preparedness Report.
ENSMS (Bushfire Risk Management)	5. The adequacy and accuracy of the underlying data sources, systems and processes that Essential Energy used to prepare the Annual Performance Report including: <ul style="list-style-type: none"> <li>a. whether Essential Energy has a procedure for the preparation of the report; and</li> <li>b. the business rules used to compile the data, the asset and IT systems used to source data and any subsequent data manipulation required. The auditor must assess samples of data across the report preparation process including field delivery.</li> </ul>	We recommend that Essential Energy specify in a procedure the process to be followed by staff involved in compiling data for reporting requirements to ensure the required data is correctly captured from data sources, systems and procedures.	Essential Energy will document and implement improved governance and assurance over data that informs the ENSMS Performance and Bushfire Preparedness Report through the population of the network safety data inventory in the enterprise data governance platform and implementation of documented data quality assurance mechanisms.

Audit scope	Identified non-compliances		Actions
	Audit Criteria	Recommendation	
ESMS – WHSMS & ENSMS (all aspects)	All aspects of the ESMS audited in accordance with the Queensland Audit and Governance Guide.	Nil	Nil

## Part B – Bushfire Preparedness Report

Part B reports demonstrates our bushfire preparedness, leading up to the 2023 bushfire season, covering the period 1 October 2022 to 30 September 2023.

Part B is structured as follows:

- > Section 5 describes the bushfire risk profile across our supply area
- > Section 6 identifies the permanent and temporary fire risk declarations by Rural Fire Service and outlines the actions taken in response
- > Section 7 describes the scope of private lines ('aerial consumer mains') on bushfire prone land
- > Section 8 describes the status of our pre-summer bushfire inspections, vegetation and asset maintenance tasks

### 5. Bushfire risk profile across Essential Energy's supply area

#### 5.1 Identification of hazardous bushfire areas

Bushfire prone lands have been identified across our network footprint. The bushfire-prone lands are further segmented into bushfire risk classifications based on scientific bushfire risk modelling. The modelling considers the impact of fires which may originate from network assets.

Bushfire risk priority classifications (P1, P2, P3, & P4) are applied and determine:

- > Bushfire mitigation work priorities;
- > Pre-summer inspection requirements;
- > Investment program priorities; and
- > Operational procedures and practices.

Figure 12 is a sample map of these zones based on designated maintenance areas within our network footprint.

The P1 - P4 classifications are a blend of ratings from two different bushfire risk models:

- Essential Energy Fire Risk model; and
- Phoenix Rapid Fire model (developed by leading fire researchers and the Bushfire and Natural Hazards Cooperative Research Centre).

These are defined in Table 17: Bushfire risk classifications.

**Table 17: Bushfire risk classifications**

Bushfire Risk Classification	Definition
P1	High risk severity
P2	Moderate risk severity
P3	Low risk severity
P4	Non-bushfire prone

## Essential Energy Maintenance Area Bushfire Risk Priority Indicator

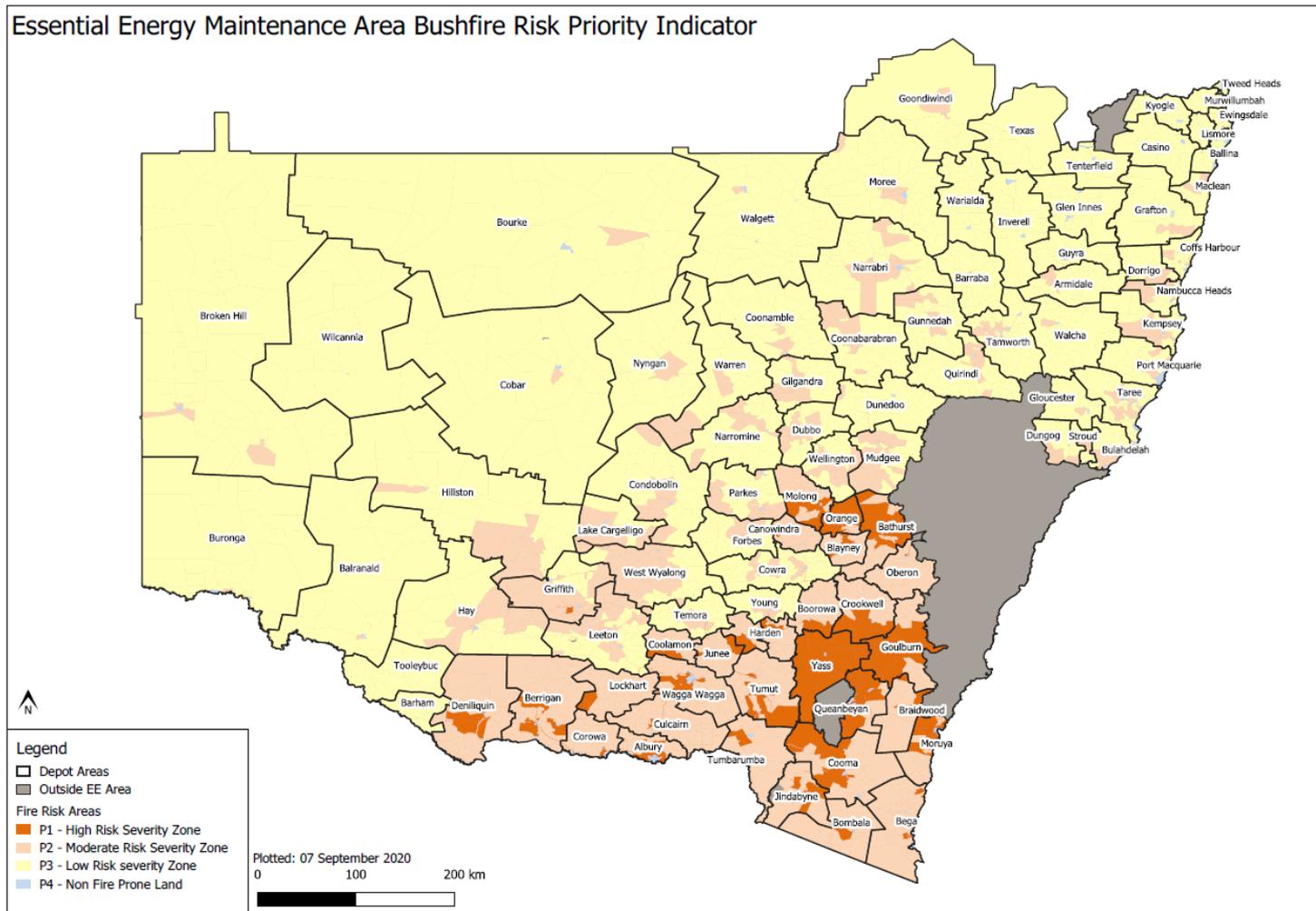


Figure 12 Maintenance area bushfire risk priority indicator

Our Bushfire Prevention Strategy provides an over-arching approach to managing bushfire risk. It sets out amongst other things, the inter-relationship with the ENSMS and associated risk controls and related plans.

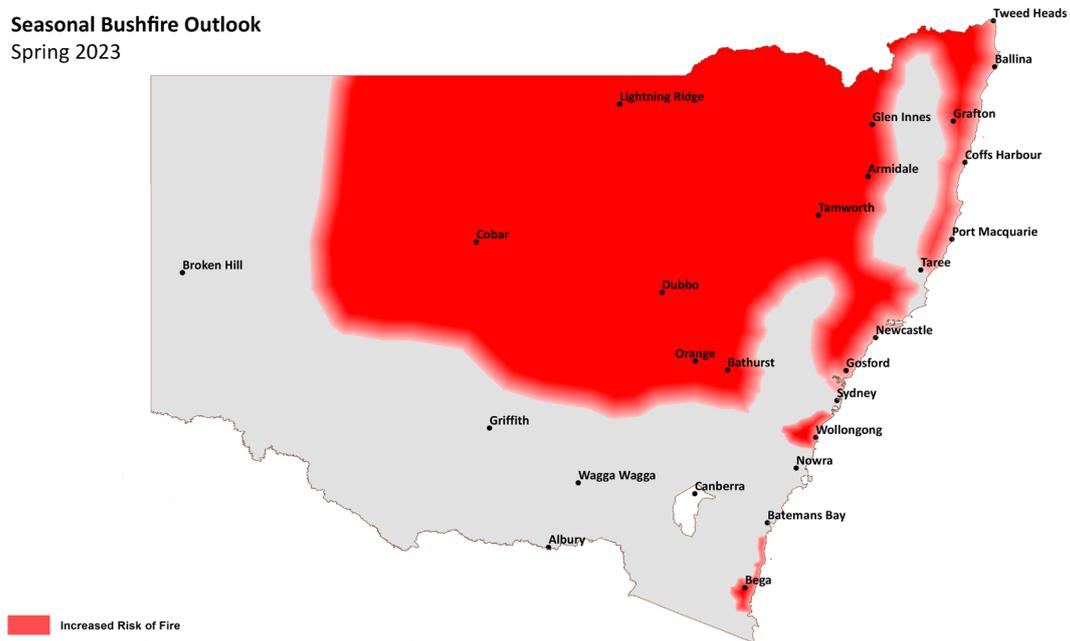
One of those plans is the Bushfire Risk Management Plan which describes the activities undertaken to mitigate potential fire ignition. The Plan is published on our website ([essentialenergy.com.au](http://essentialenergy.com.au)) and public feedback is welcomed and included.

We use intelligence obtained from national natural hazard agencies such as the Australian and New Zealand National Council for fire and emergency services (AFAC) to inform the operational posture for an upcoming fire season. An overview of the upcoming season is provided in section 5.2 below.

### 5.2 Commentary from AFAC for forthcoming bushfire season

Figure 13 shows the fire outlook for spring 2023, with a large proportion of our electricity network footprint having an above average fire risk due hotter and drier weather.

**Seasonal Bushfire Outlook**  
Spring 2023



**Figure 13 AFAC spring 2023 fire outlook (Source: AFAC)**

## 6. Permanent / temporary declaration of areas by RFS and network operator’s actions

Fire season district declaration notifications from NSW RFS are monitored closely by Essential Energy.

It is noted that 7 local government areas were declared on 1 August 2023, and a further 28 were declared on 1 September 2023.

Essential Energy undertakes a number of actions in preparation for the bushfire season. These include:

- > Producing a pre-fire season communication plan for our employees. For example, the primary communications included information on:
  - the early start to the bushfire danger period;
  - the procedures in place to be followed in periods of higher fire danger;
  - how to enrol in receiving SMS Total Fire Ban updates; and
  - information on access to the RFS Hazards Near Me app, and where to contact for further information.
- > A briefing on the upcoming fire season is conducted with key business leaders. This includes expected early starts to the fire danger period and the research from the Bureau of Meteorology (BOM), Australian and New Zealand National Council for Fire and Emergency Services (AFAC) and Natural Hazards Research Australia (NHRA). This provides an opportunity to refresh staff awareness of the relevant Essential Energy policies for days of elevated fire risk.
- > Issuing an Essential Energy Safety Brief to employees on the early start to the fire season to ensure appropriate risk mitigation measures are put in place.
- > Monitoring and reviewing of research into fires and the changing climatic conditions via relationships with organisations such as the BOM, AFAC, NHRA and universities.

- > Conducting regular operational Bushfire Preparedness meetings to assess maintenance tasks priorities including prioritisation of tasks associated with the annual network Pre-Summer Bushfire Inspections in high fire risk areas.
- > Pre-season briefing presentations from NSW RFS management to key managers and senior leaders including seasonal outlooks.

## 7. Aerial consumer mains on bushfire prone private land (HV and LV)

### 7.1 Low voltage private lines

Our asset inspectors undertake regular ground-based patrols of private overhead lines as part of routine network asset inspections. Customers are notified of maintenance tasks identified on a private line.

As an example, in the Part B reporting period 2022-23 we inspected 28,562 private poles resulting in the identification of 1,439 private maintenance tasks which required follow up notification and consultation with our customers.

We have a dedicated private lines team that manages customer engagement regarding notifiable tasks to ensure safety related matters are dealt with. We have in place hardship arrangements for customers who may have limited financial means to deal with the costs of maintenance of private lines.

We have processes in place to regularly review private line tasks to ensure they are correctly classified as private tasks and customers receive the appropriate information to deal with maintenance of their assets.

### Case Study – Managing high voltage customer fire risk – trust but verify

For some customers, it is economically viable to take supply at high voltage and manage a small high voltage network on their property. These customers are known as High Voltage Customers (HVC) and these customers have an obligation arising from the connection agreement that they make with us, and the NSW Service and Installation Rules, to maintain a safe high voltage network and managing bushfire risk arising from the operation of their network. We have a responsibility to assure ourselves that HVCs safety management plans for their networks are maintained and that the HVCs are managing their installations in compliance with their safety management plans.

To provide us with confidence that HVCs are compliant with their obligations, we periodically ask them to provide us with a statement from a suitably qualified external auditor that they are compliant with their obligations and that bushfire safety risk is managed. This is in addition to the annual statement we ask for from HVCs, which is described below. We trust our partners to do the right thing however we are obliged to verify.

### 7.2 High voltage private lines

We communicate annually with HVCs connected to our network about their obligations to implement a suitable safety management system or plan. This includes drawing specific attention to their obligation to maintain private electrical installations such that they mitigate the risk of these assets becoming a source of bushfire ignition.

### 7.3 Activities undertaken to manage the risk of aerial consumer mains on bushfire prone private land

Table 18 details the activities undertaken to manage the risk of aerial consumer mains on bushfire prone private land. This is broken into performance measures describing activities relating to private LV lines and HVCs.

**Table 18: B1 Aerial consumer mains on bushfire prone private land (HV and LV)**

Performance measure	Event count – 1 October 2022 – 30 September 2023		Event count – 1 October 2021 – 30 September 2022		Event count – 1 October 2020 – 30 September 2021		Event count – 1 October 2019 – 30 September 2020		Event count – 1 October 2018 – 30 September 2019	
	Target	Actual								
Private LV lines checked by the network operator	23,271	28,562	25,195	22,250	27,330	22,549	23,494	23,478	25,996	24,228
Number of directions for bushfire risk mitigation issued to LV customers by the network operator	n/a	1,439	n/a	1,460	n/a	1,266	n/a	1,492	n/a	1,243
Number of directions for bushfire risk mitigation issued to LV customers by the network operator that have exceeded the timeframe for rectification in the direction notice and remain unresolved	n/a	89	n/a	121	n/a	212	n/a	212	n/a	67
HV customers <sup>20</sup> (metering point count) advised to undertake pre-season bushfire checks in accordance with ISSC 31	218	254	198	245	189	192	128	128	150	150
HV customers (metering point count) providing statements of compliance with ISSC 31	254	227	245	223	192	189	128	106	150	141
HV customers (metering point count) requiring additional risk mitigation prior to the start of the reporting year	n/a	27	n/a	22	n/a	3	n/a	22	n/a	9
HV customers (metering point count) where additional risk mitigation has been completed prior to start of the reporting year	n/a	27	n/a	22	n/a	3	n/a	0	n/a	0

<sup>20</sup> For this section HV customers includes load and generator customers

The status of the 89 outstanding private LV tasks reported in row 3 of Table 18 is shown below. We actively manage the progress of these tasks up to and throughout the statutory Bushfire Danger Period.

**Table 19: Outstanding private LV task status**

Status	Count of tasks
The LV customer has engaged an ASP to complete the works and are waiting for the works to be completed	25
The LV customer has been issued with a notice of entry for Essential Energy to enter their property, rectify the task and recover costs.	13
Essential Energy is preparing a notice of entry to enter the property and rectify the task	45
Essential Energy will assess the rectification works as the customer is unable to provide satisfactory evidence that the task has been completed	2
Awaiting customer support assessments	2
Awaiting resolution with the Energy and Water Ombudsman NSW	1

## Case Study - Pre-summer bushfire inspections



**Figure 14 Aerial patrol aircraft contracted to Essential Energy**

In the window between the storm season (mid to late summer) and the bushfire season (late spring and summer), we conduct a predominately aerial inspection of the highest bushfire risk areas of our electricity network. Our pre-summer bushfire inspections cover our P1 bushfire risk area – approximately 8% of our network – and serve to supplement our cyclic asset and vegetation inspections in preparation for bushfire season.

The purpose of these inspections is to identify powerline asset and vegetation conditions that could subsequently lead to a bushfire ignition. Identified asset conditions with a near term risk of leading to failure, and identified vegetation tasks are addressed prior to the commencement of the statutory Bushfire Danger Period.

## 8. Bushfire inspections, vegetation and asset maintenance tasks

We undertake specific preparation activities ahead of the bushfire season. Tables 20 – 22 provide a summary of the leading indicators of bushfire preparedness ahead of the bushfire season. These indicators provide an insight to our preparations for the upcoming bushfire season and the discipline applied to the management of tasks that could impact on the performance of the electricity network.

Table 20 describes the status of pre-summer bushfire inspections, predominately undertaken via aerial inspection methods and with inspection status as described in Table 13.

**Table 20: B2 Pre-summer bushfire inspections**

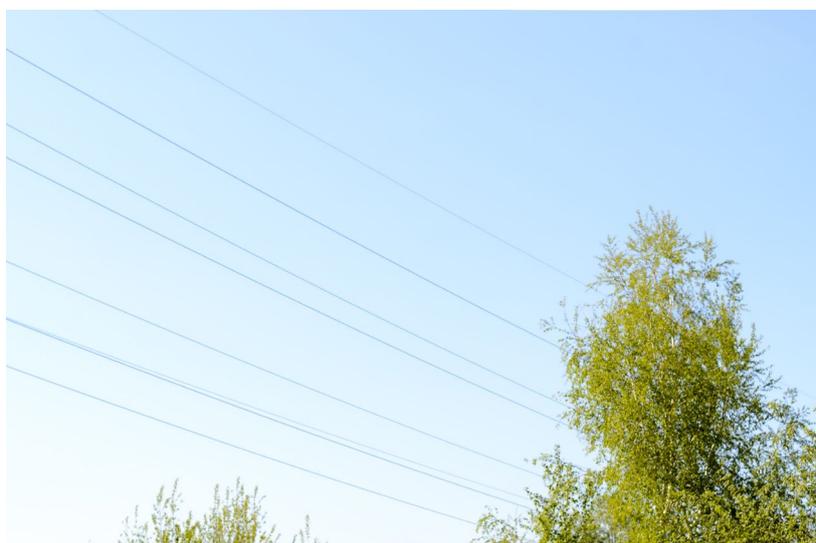
Pre-summer bushfire inspections	Population (poles)	Target	Achieved	Outstanding
Inspections	101,317	101,317	101,317	0

Table 21 describes the status of vegetation tasks as of 30 September 2023.

For Table 21 and Table 22 the following definitions apply:

- > Identified – tasks that are identified through the Pre-Summer Bushfire Inspection program
- > Achieved – identified tasks that have been completed
- > Open – identified tasks that are not yet complete, but are within the rectification timeframes for the task
- > Outstanding – identified tasks that are not yet complete and exceed the rectification timeframes for the task. For asset tasks with severity CAT 1 to 3, these tasks shall be rectified within the required timeframe for assigned severity and prior to the commencement of the statutory Bushfire Danger Period. For vegetation tasks, all tasks shall be rectified prior to the commencement of the statutory Bushfire Danger Period.

Vegetation / asset task categorisation and bushfire risk priority area categorisation is used to prioritise vegetation / asset task completion to reduce the likelihood of vegetation contact with the network or asset failure.



**Figure 15 Powerlines and vegetation - balancing risk, cost, and amenity**

**Table 21: B3 Vegetation tasks**

Bushfire risk category	Status	Encroachment Classification A1 <sup>21</sup>	Encroachment Classification A2 <sup>22</sup>	Encroachment Classification A3 <sup>23</sup>	Encroachment Classification A4 <sup>24</sup>	Fall in risk trees <sup>25</sup>
P1	Identified	275	203	102	40	47
	Completed	274	197	102	40	47
	Open	0	0	0	0	0
	Outstanding	1	6	0	0	0
P2	Identified	5	0	1	2	87
	Completed	5	0	1	2	87
	Open	0	0	0	0	0
	Outstanding	0	0	0	0	0
P3	Identified	3	0	0	0	0
	Completed	3	0	0	0	0
	Open	0	0	0	0	0
	Outstanding	0	0	0	0	0
P4	Identified	11	11	6	2	2
	Completed	11	11	6	2	2
	Open	0	0	0	0	0
	Outstanding	0	0	0	0	0
Total	Identified	294	214	109	44	136
	Completed	293	208	109	44	136
	Open	0	0	0	0	0
	Outstanding	1	6	0	0	0

Outstanding vegetation tasks were due to issues with access to private land. We are working with the landowners to secure access to land to treat vegetation.

<sup>21</sup> A1 vegetation has encroached as far as 75-100% into the minimum vegetation clearances, as defined in *ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets* (ISSC3)

<sup>22</sup> A2 vegetation has encroached as far as 50-75% into the minimum vegetation clearances, as defined in ISSC3

<sup>23</sup> A3 vegetation has encroached as far as 25-50% into the minimum vegetation clearances, as defined in ISSC3

<sup>24</sup> A4 vegetation has encroached as far as 0-25% into the minimum vegetation clearances, as defined in ISSC3

<sup>25</sup> Fall in risk trees are blow-in/fall-in vegetation hazards as defined in ISSC3

Table 22 details the status of asset tasks identified through the Pre-summer Bushfire Inspection Program as of 30 September 2023.

Our Bushfire Risk Management Plan requires that in P1 Bushfire Risk Priority Areas, asset tasks of severity CAT 1 to 3 are rectified prior to the commencement of the Statutory Bushfire Danger Period.

**Table 22: B4 Asset tasks**

Bushfire risk category	Status	CAT 1 <sup>26</sup>	CAT 2 <sup>27</sup>	CAT 3 <sup>28</sup>	CAT 3A <sup>29</sup>	CAT 4 <sup>30</sup>	Totals
P1	Identified	9	10	350	0	4	373
	Completed	9	9	72	0	0	90
	Open	0	0	0	0	0	0
	Outstanding	0	0	10	0	0	10
Total	Identified	9	10	350	0	4	373
	Completed	9	9	72	0	0	90
	Open	0	0	0	0	0	0
	Outstanding	0	0	10	0	0	10

Of the 373 asset tasks identified in a P1 bushfire risk area one CAT 2, 268 CAT 3 and four CAT 4 tasks were cancelled after evaluation of the task photos by the Asset Review Team identified that the asset condition did not require rectification, or there was an existing task identified to address the asset condition. Where an existing task has been identified, this will be managed according to the task severity rectification timeframe.

Of the 10 tasks that were outstanding at the 30 September 23, at the time of preparation of the report, one task had been completed. Of the remaining nine outstanding tasks are scheduled for rectification through October. All tasks were inspected by field crews to inform the decision to schedule the tasks out into October 2023.

<sup>26</sup> CAT 1 (Emergency) task to rectify asset condition that presents an immediate risk to safety, should be rectified within 48 hours

<sup>27</sup> CAT 2 (Urgent) task to rectify asset condition that is expected to deteriorate rapidly to present a risk to safety, should be rectified within 1 month

<sup>28</sup> CAT 3 (Risk – near term) task to rectify asset condition that is expected to deteriorate within the near term and present risk to safety, should be rectified within 9 months

<sup>29</sup> CAT 3A (Risk – medium term) task to rectify asset condition that is expected to deteriorate within the medium term, or tasks that present a low risk of failure, but present a high consequence of failure, should be rectified within 2 years

<sup>30</sup> CAT 4 (Condition assessment) tasks that present a low risk within the reassessment period (4.5 years)