energysafe VICTORIA

Creating a safer state with electricity and gas

Safety performance report on Victorian electricity networks

November 2023

VICTORIA State Government

This report has been endorsed by the Victorian Energy Safety Commission

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Glossary

ACR	Automatic Circuit Recloser
AER	Australian Energy Regulator
BMP	Bushfire Mitigation Plan
CFA	Country Fire Authority
EDO	expulsion drop out (a type of fuse)
ELCA	Electric Line Construction Area
ELCMP	Electric Line Clearance Management Plan
ESMS	Electricity Safety Management Scheme
HBRA	hazardous bushfire risk area
LBRA	low bushfire risk area
ORP	other responsible person
REFCL	rapid earth fault current limiter
RIN	Regulatory Information Notice
RIT-T	Regulatory Investment Test for Transmission applied by the AER. Further details can be found at www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/regulatory-investment-test-for-transmission-rit-t-and-application-guidelines-2010.
SWER	single wire earth return (a type of overhead powerline)
TOA	Transmission Operations (Australia) Pty Ltd
TOA2	Transmission Operations (Australia) 2 Pty Ltd

Contents

Introduction

Energy Safe Victoria is Victoria's independent safety regulator for electricity, gas and pipelines. Our role is to ensure Victorian gas and electricity industries are safe and meet community expectations. As part of this role, we protect and assist the community by ensuring that Victoria's electricity networks operate safely.

While the 10 major electricity companies (five distribution businesses and five transmission businesses) comprise the largest part of Victoria's electricity networks, there are several other entities with responsibilities under the *Electricity Act 1998* and its subordinate Regulations.

Of the 79 councils in Victoria, 67 have electric line clearance responsibilities.

There are also 94 organisations that own or operate electric lines in Victoria that are not major electricity companies. These are collectively referred to as 'other responsible persons' and all have responsibilities to maintain vegetation in accordance with the Electricity Safety (Electric Line Clearance) Regulations 2020. Of these, 24 own or operate overhead powerlines in hazardous bushfire risk areas (specified operators) and these businesses have additional requirements under the Electricity Safety (Bushfire Mitigation) Regulations 2013.

Each year, Energy Safe produces the Safety Performance Report on Victorian Electricity Networks to inform the community, government and industry on the state of the electricity networks and how the aforementioned entities are meeting their safety obligations, although the primary focus is on the major electricity companies.

Copies of previous years' reports can be found at esv.vic.gov.au/about-esv/reports/technical-reports/electrical-safety-performance-reports/.

Incidents, investigations and enforcement actions

The safety of the public and energy sector workforce is Energy Safe's highest priority, with the investigation of serious electrical incidents being a key function. Serious incidents are defined as those that cause or have the potential to cause the death or injury to a person, significant damage to property or a serious risk to public safety.

During the 2022–23 period, there were no fatalities and one serious injury associated with Victoria's electricity network assets.

Our investigations and ongoing audit and inspection activities may warrant specific enforcement actions to be implemented to modify unsafe behaviours. The enforcement actions undertaken during the year are discussed below.

Fatalities

There were no fatalities associated with Victoria's electricity networks in 2022–23.

Serious injuries

Farmer contact with overhead lines

On 20 January 2023, a farmer was seriously injured when they contacted a 22 kV overhead line. The farmer was found unresponsive and airlifted to the Alfred Hospital with burns.

The Energy Safe investigation found that the farmer had climbed a substation pole where it is believed they contacted the high voltage line. The injuries sustained are consistent with the effects of an electrical shock.

The farmer had an extended period in hospital and has kidney and liver damage as result of this incident.

Any injury could have been avoided if the farmer had considered the risks posed by overhead lines before climbing the pole. This incident could have easily resulted in a fatality rather than a serious injury. Energy Safe is undertaking several initiatives to address the risks of overhead lines, including awareness campaigns targeting farm safety (see page 22 for further details).

Major investigations

Glenmore grassfire

On 17 February 2023, a 165-hectare grass fire occurred in Glenmore in country Victoria. Energy Safe commenced a detailed investigation regarding the fire, examining whether the fire was ignited by powerlines close to non-compliant vegetation, and whether any contraventions of the Electricity Safety Act or Electricity Safety (Electric Line Clearance) Regulations had occurred. The investigation remains ongoing.

Enforcement actions

Energy Safe has enforcement powers that are defined in the Electricity Safety Act and subordinate regulations. In exercising these powers, our approach is to consider and select the most appropriate actions available to achieve compliance and/or deterrence, as articulated in the *Energy Safe Compliance and Enforcement Policy*.

The compliance and enforcement action(s) selected in each case is guided by a series of principles in ensuring that the response is targeted, proportionate, consistent, factual, impartial, proactive and constructive. Other factors considered include the seriousness of the non-compliance, the harm or potential harm involved, the conduct and behaviour of the responsible parties, and the resulting effects or outcomes of the available actions.

The range of compliance and enforcement actions available to Energy Safe include:

- providing education and supporting awareness of compliance obligations
- requiring particular actions to be taken to rectify a safety issue or prevent potential harmful consequences (through voluntary rectification or enforcement notices as appropriate)
- providing warnings to motivate immediate and ongoing compliance
- punitive actions such as issuing infringement notices or commencing a prosecution in the courts.

Distribution businesses' electric line clearance performance

Last year's report detailed the declining performance, or sustained high levels of poor performance, by AusNet Services, Powercor and United Energy in clearing vegetation around electric lines. This trend had been observed over several years (see Figure 9). Energy Safe's concern is that escalating vegetation non-compliance rates, particularly in Victoria's hazardous bushfire risk areas (HBRA), can increase the likelihood of bushfires starting when trees touch bare powerlines.

In 2022–23, United Energy was charged with 24 offences pursuant to section 90 of the Electricity Safety Act in that it failed to comply with the Code of Practice for Electric Line Clearance. The charges related to the failure to maintain vegetation clearance around powerlines through south-east Melbourne and the Mornington Peninsula in the 2021–22 bushfire season. Nine of the charges involved vegetation detected 300 mm or less from an uninsulated powerline, with two involving spans that displayed evidence of contact with the lines. On 11 October 2023, United Energy was convicted and fined $80,000 in the Frankston Magistrates Court and ordered to pay costs of $13,200.

Further investigation is ongoing into the non-compliance observed by Energy Safe on the other networks, with consideration of appropriate enforcement action to be completed in 2023–24.

New powers for line clearance breaches

From 27 June 2022, Energy Safe was given a new power enabling it to issue infringement notices for breaches of clause 3(1) of the Code of Practice for Electric Line Clearance (the Code). Previously, the enforcement options available under the Electricity Safety Act and the Electricity Safety (Electric Line Clearance) Regulations only included engagement with responsible persons to promote voluntary compliance or prosecution. There was no intermediate option available.

To ensure use of this power is aligned with the Energy Safe Compliance and Enforcement Policy, additional policy was developed specifically for the minimum clearance space. Without limiting our right to issue an infringement notice for any non-compliance with clause 3(1) of the Code, we are most likely to issue an infringement notice in circumstances where the non-compliance poses a high safety risk (as defined in the Energy Safe policy for *Compliance and enforcement of the minimum clearance spaces for electric lines*).

Extensive consultation occurred with responsible persons prior to the implementation of this policy, including the major electricity companies and councils as the largest groups with electric line clearance responsibilities. The consultation was completed to ensure our intentions for using this new enforcement power were understood by responsible persons.

Since this new power came into effect Energy Safe has issued 60 infringement notices in total (39 occurred in HBRA and 21 in Low Bushfire Risk Area [LBRA]). Of the infringement notices issued, 35 were issued to the distribution businesses (five to AusNet Services, 13 to Powercor and 17 to United Energy). Councils also received 25 infringement notices (two to Bayside, one to Boroondara, two to Casey, four to Glen Eira, three to Maroondah, four to Melbourne, one to Port Phillip and eight to Yarra Ranges).

No Go Zone incidents

Energy Safe has partnered with WorkSafe for more than a decade to develop and promote the No Go Zone rules that provide a safe system of work to prevent people and machinery breaching the minimum regulatory clearances set out in Part 6 of the Electricity Safety (General) Regulations 2019 and contacting powerlines. In 2022–23, Energy Safe issued seven infringement notices and 25 warning letters to individuals and companies for various offences in relation to No Go Zone incidents.

Further discussion of our activities in ensuring safety of workers in the No Go Zone can be found on page 22.

AusNet Services Transmission improvement notice

AusNet Services Transmission network contains a number of spans that are closer to the ground than current design standards would permit. These spans were constructed under earlier engineering design and land use requirements. These can pose a safety risk under certain circumstances.[1]

The accepted AusNet Services Transmission Electricity Safety Management Scheme (ESMS) commits to implementing various controls to mitigate risks around low lines that could pose a safety risk under certain operating conditions. These controls include installing warning signs and engaging with land users to ensure they are aware of the hazard and risks.

In 2022, Energy Safe commenced enquiries into the extent of low lines across the AusNet Services Transmission network and its compliance with the corresponding commitments in its accepted ESMS. We found:

- 37 low-hanging spans across 13 transmission lines
- a project was in place to erect signs where they were missing
- AusNet Services Transmission had not kept records of its engagement with land users.

In June 2023, Energy Safe issued an improvement notice to AusNet Services Transmission requiring it to remedy the failure to inform land users. This was accompanied by a direction to establish a record management system and, upon request, be capable of providing records of all correspondence with land users and photographic evidence of low lines and warning signs to Energy Safe.

AusNet Services Transmission complied with the improvement notice and direction and completed the project to erect all warning signs by the end of July 2023. Energy Safe remains concerned with the quality of AusNet Services Transmission's engagement with the community.

Energy Safe is continuing to review the appropriateness of the controls to manage transmission line ground clearances and the AusNet Services process for engaging with the community.

[1] Transmission lines, when managed and maintained properly, pose a very low risk of starting a fire. This is due to factors such as the height clearance between the transmission lines and the ground, as well as the managed vegetation beneath the lines that runs for the length of the line.

In this instance, Energy Safe's concern regarding potentially low-hanging lines was the risk of third-party contact rather than the potential bushfire risk.

Keeping the public safe

Reducing bushfire risk

Understanding fire trends

Victoria is susceptible to large, intense bushfires. The failure of network assets has been a cause of previous major bushfires in the state. Part of our purpose as a regulator, and of the regulatory regime we oversee, is to promote the prevention and mitigation of powerline bushfire danger to ensure the likelihood and consequences of such events are minimised.

Given the seriousness of this threat to public safety, fires represent a large component of incidents reportable to Energy Safe by the networks. We require all fires to be reported, no matter whether they are large or small. This information is helping us understand where the fire risk is coming from and when an ignition may escalate into a bushfire.

There were 1,009 reportable incidents involving the electricity networks this year, of which 42 per cent involved a fire. Due to our focus on fire reporting, such a high proportion of fires is normal. The number of reportable incidents involving fire normally ranges from 40-60 per cent.

The number of incidents resulting in a fire are shown in Figure 1, with their relative contributions to total network fires. There were 102 fewer fires in 2022–23 than in 2021–22, comprising 91 fewer asset fires and 11 fewer ground fires.

Where fires occurred this year, 62 per cent resulted in damage only to assets and where there was no ground or vegetation fire. Such events typically include candling of overheated fuses or fires contained within enclosures where the risk of spreading is minimised.

Localised fires can involve hot assets or debris such as electrocuted wildlife that falls to ground and chars the immediate vegetation but where a fire does not ignite and spread. These fires are smaller than 10 square metres and normally comprise 20-25 per cent of network fires.

Small fires are classified as between 10 and 1,000 square metres. While a fire is ignited in these instances, unfavourable ground or weather conditions or human intervention prevent the fire from spreading. Small fires normally comprise about 10 per cent of network fires.

While medium and large fires only comprise two to four per cent of network fires (or one to two percent of reportable incidents), the Glengarry incident below shows that even localised and small fires can spread under the right conditions and impact the community.

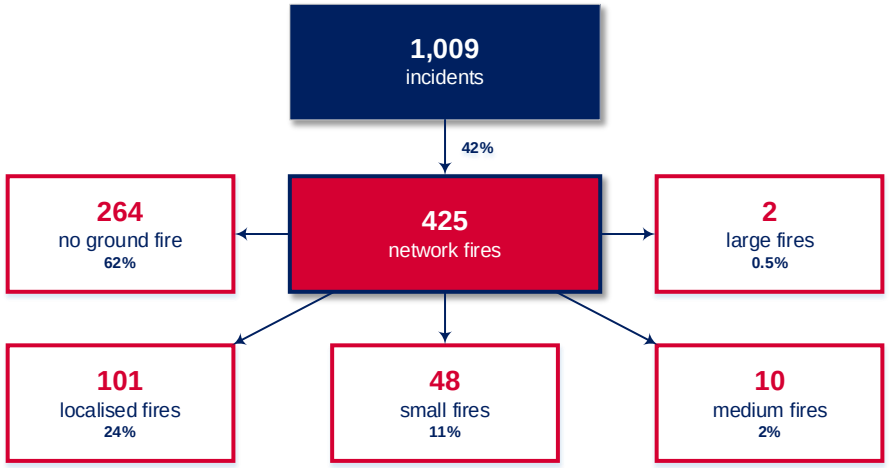

Figure 1 Breakdown of fires by size in 2022–23

Localised = less than 10 m^2, small = 10-1,000 m^2, medium = 1,000 m^2 - 10 ha and large = greater than 10 ha

There were two large fires attributable to the electricity networks in 2022–23.

On 29 January 2023, a fuse on the AusNet Services network in the Glengarry area tripped under high current flows but did not eject from its housing. The fuse caught fire and then sparks or molten metal fell to the ground and started a ground fire approximately 2,200 square meters in size. AusNet Services has previously replaced the highest risk expulsion drop-out (EDO) fuses across its network. It has also committed to progressively replace the remaining EDO fuses in hazardous bushfire risk areas with lower fire risk alternatives as part of a program to replace boric acid and EDO fuses across its network. Under this program, fuses are to be replaced at 1,082 sites by December 2023, with a further 676 sites by December 2024 and 570 sites by December 2025.

On 17 February 2023, a fire occurred on the Powercor network close to a site of non-compliant vegetation near Glenmore. This incident is currently the subject of an Energy Safe investigation (see page 6).

All 10 medium-sized fires occurred on the Powercor network. Two were due to lightning strike and one each due to:

- a pole fire spreading to the ground
- a crossarm failure
- a dropper lead connection failure
- an isolator failure
- an excavator contacting overhead lines
- a tarpaulin being blown onto overhead lines
- bridging between conductor phases
- an overhead line being brought down by vegetation blown in from outside the clearance space.

One of Energy Safe's priorities is to reduce fires due to asset failure or degradation and inappropriate infrastructure management. We are currently developing a comprehensive strategy to address contact incidents. We will continue to require improvement in this area by the major electricity companies.

The averages and bounds in Figure 2 show a clear seasonal trend in ground fires due to both asset failures and contact events. Throughout most of the year, there are similar numbers of fires from asset and contact events; however, there is a more pronounced peak in asset-related ground fires in January and February.

The numbers of asset-related ground fires (red bars in Figure 2a) were at or below the 2010 to 2022 average for most of the year. The exception was the small peak in August, which was still within the expected range. The number of fires across the bushfire season (November to April) were below the long-term average for each month.

Figure 2b shows that the numbers of contact-related fires were below the 2010 to 2022 average for most of the year, with the exceptions of March and June. The peaks in both these months were still well within the expected range.

While these fires may fall within an expected range based on historic records of incidents, Energy Safe's expectation is that the electricity networks continue to drive improvement in this area.

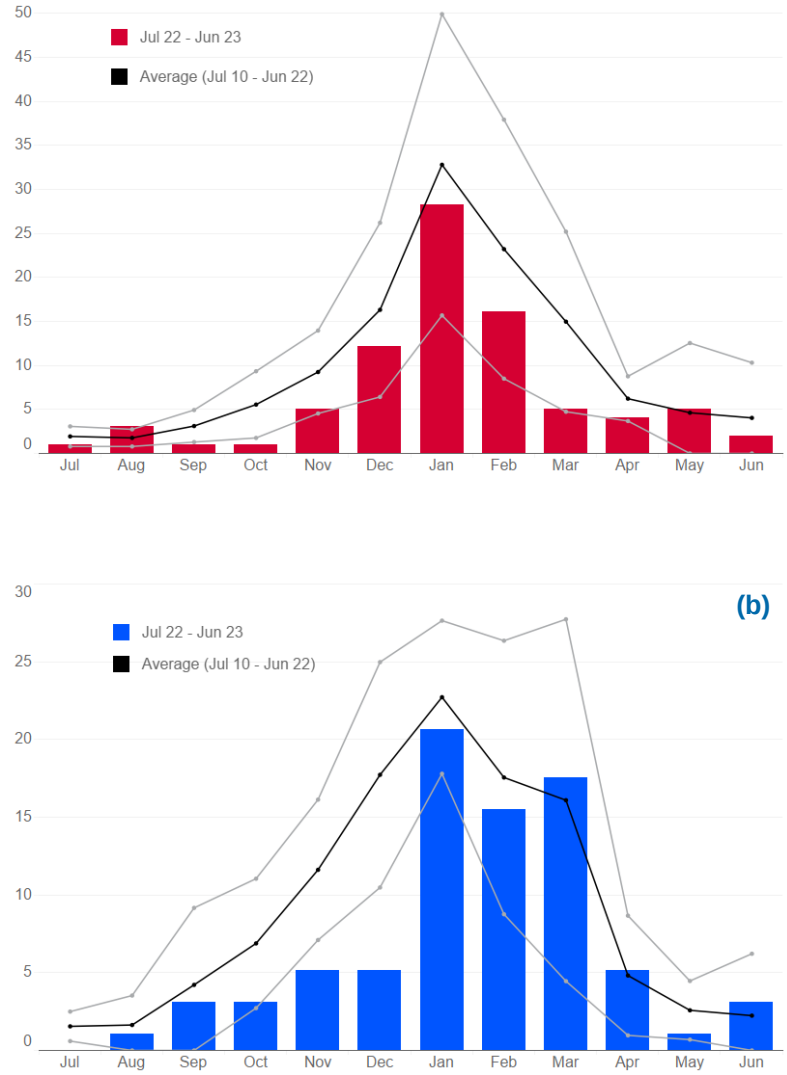

Figure 2 Ground fire incidents due to (a) asset failures and (b) contact events

The grey line is one standard deviation above and below the average

Figure 3 shows the cumulative number of ground fires throughout the fire season (October to April). The number of ground fires was lower than in previous years across the entire fire season, with the total fires being at the lowest level in the last seven years.

The risk of a fire occurring, and spreading once initiated, depends on several variables such as time of year, weather, longer-term climate (for example, La Nina conditions experienced this year), and type and curing of vegetation (among others). Inter-annual variability of these factors can mask or emphasise the numbers of fires involving the electricity networks. Therefore, it is important that Energy Safe considers data from similar years in making comparisons of performance.

The Country Fire Authority (CFA) declares fire danger periods for municipalities when ground conditions are conducive to grassfires and bushfires; we use these declarations as an indicator of increased fire risk. This allows us to compare inter-annual risks and place this fire season within a historic context.

The declarations for this year's season started much later than in previous years, and then took a further 10 weeks for the entire state to be under declaration in week 22 (Figure 4). After seven weeks at full declaration, the CFA removed declarations so that all declarations had been removed by week 34.

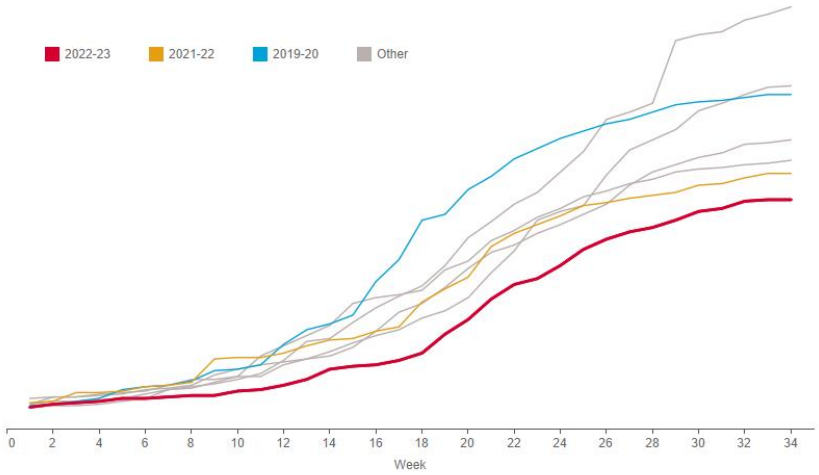

Figure 3 Cumulative fires across the fire season

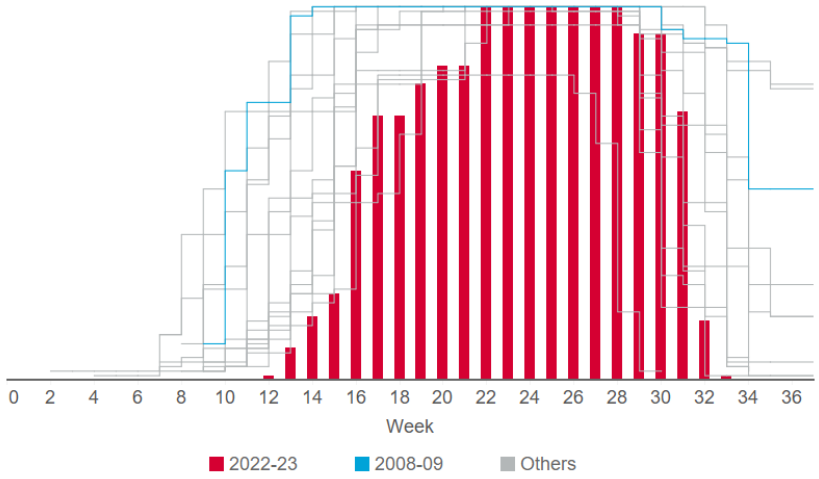

Figure 4 Summary of CFA fire declarations from 2008 to 2023

Figure 5 shows the number of ground fire events on the Victorian networks. The green arrows show the reduction from the long-term average across the 2010 to 2022 period (improvement), and the red arrows show the increase (decline).

The four most common causes of ground fires were connection faults, tree contact, animal contact and vehicle impacts (including mobile plant and farming equipment). The same four events comprised last year's top four causes, although connection faults increased to be the top cause this year with levels now 35 per cent higher than the long-term average.

When compared to the long-term averages across the period from January 2010 to June 2022, fire numbers in 2022–23 were worse in two categories (connections and other contact events), improved in 10 categories and stable (that is, within five per cent) in two.

Figure 6 shows the trend over the last 13 years for the four most common causes of ground fires. This indicates that:

- after decreases in the last two years, fires from connection faults rose again in 2022–23 and there is a pronounced steady rise in such fires over the 13-year period
- fires from tree contact have dropped again this year and are now 38 per cent below the historic average, with the decrease most likely due to the wet summer
- animal contact fires also dropped again this year and are now 43 per cent below the historic average
- fires from vehicle and mobile plant contacts dropped for a second year and are 11 per cent above the historic average.

In 2023–24, Energy Safe is reviewing the conductor and connection management practices of the distribution companies, with a particular focus on asset lifecycle, performance and risk management. We will ensure any practicable improvements identified are reflected with commitments in the accepted ESMS and/or Bushfire Mitigation Plans (BMP).

Figure 5 Ground fire-related incidents occurring on Victorian networks

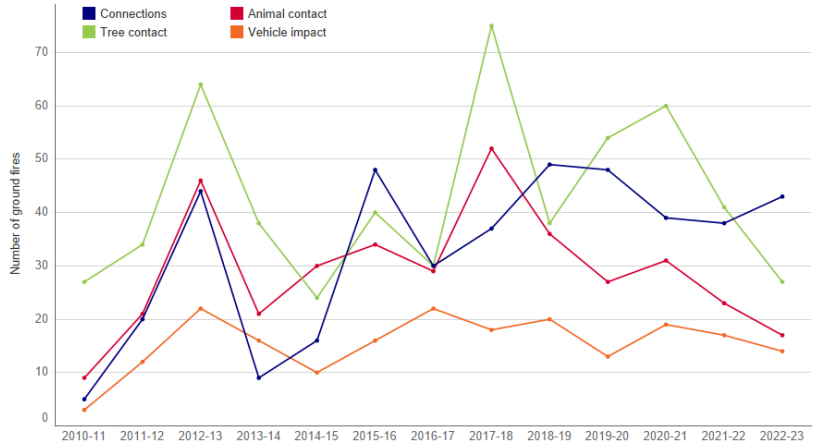

Figure 6 Historic trends for common ground fire events

Managing the safety risk from non-compliant vegetation

Vegetation contact with powerlines can cause electrocution, fires and bushfires, and impact the reliability of electricity supply. Vegetation close to electric lines may also place vegetation management workers at risk when clearing around lines. These risks must be managed by major electricity companies, municipal councils and other responsible persons.

Vegetation clearance is the primary method for managing these risks, with minimum clearing requirements prescribed by the Code of Practice for Electric Line Clearance. The Code is a schedule to the Electricity Safety (Electric Line Clearance) Regulations.

In 2022–23, Energy Safe undertook a range of activities to ensure responsible persons were adequately managing vegetation in compliance with their electric line clearance responsibilities. We evaluated and approved 20 Electric Line Clearance Management Plans (ELCMPs), audited 29 vegetation management systems and inspected 12,285 vegetated spans.

These activities are designed to ensure that those responsible have suitable plans and systems in place to keep vegetation clear of powerlines, protecting against the threat of bushfires, outages and other contact incidents.

Major electricity companies

The average rate of non-compliant vegetation detected across the networks in HBRA increased this year. There has been an upward trend over the last six years. In 2022–23, there were increases on the AusNet Services and United Energy networks (Figure 9a). While there was a decrease on the Powercor network, non-compliances are still elevated. Jemena's non-compliance remained constant this year when compared to last year.

A major non-compliance is regarded as a high-risk situation where vegetation is touching, or could soon touch, uninsulated conductors. The average rate of major non-compliances increased in HBRA this year. The decrease on the Powercor network was offset by increases on the AusNet Services and United Energy networks (Figure 9b).

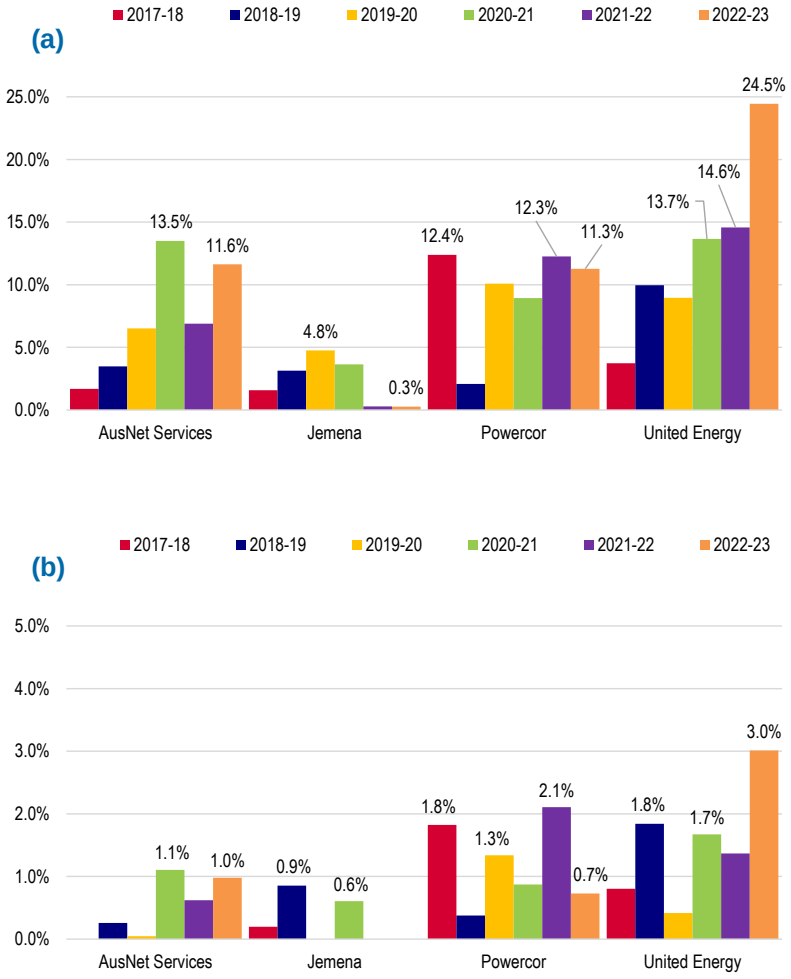

Figure 7 Non-compliance rates in HBRA (a) all non-compliances and (b) major non-compliances

The rate of non-compliant vegetation affecting the distribution networks in LBRA has increased this year, driven by the poor performance of AusNet Services, Jemena and United Energy networks (Figure 10a). The rate of major non-compliances affecting the distribution networks in LBRA is similarly increased this year due to the poor performance of AusNet Services, Jemena and United Energy (Figure 10b).

Energy Safe issued notices to the responsible distribution businesses under section 86(1) of the Act for rectification of any non-compliant spans identified in the audits. The notices specified the timeframes within which clearing of vegetation is to be completed. All non-compliant spans (both HBRA and LBRA) were promptly cleared by the relevant network owners, resulting in the elimination of these potentially hazardous situations.

The individual performance of each major electricity company is detailed in the appendices to this report.

Factors affecting electric line clearance programs

During the year each of the major electricity companies reported various challenges they faced in being able to meet their electric line clearance duties and obligations.

AusNet Services Distribution and Powercor, and to a lesser extent United Energy, reported their vegetation management programs had been affected by the extensive flooding that occurred.

The challenges reported by the major electricity companies, either collectively or individually, in managing their electric line clearance obligations included:

- wet ground conditions preventing safe access for work crews
- inspection cycles and vegetation classifications not adequately accounting for the growth rates experienced
- limited numbers of Victorian-based cutting crews and competition for that resource
- program inefficiencies created by the combination of the points above.

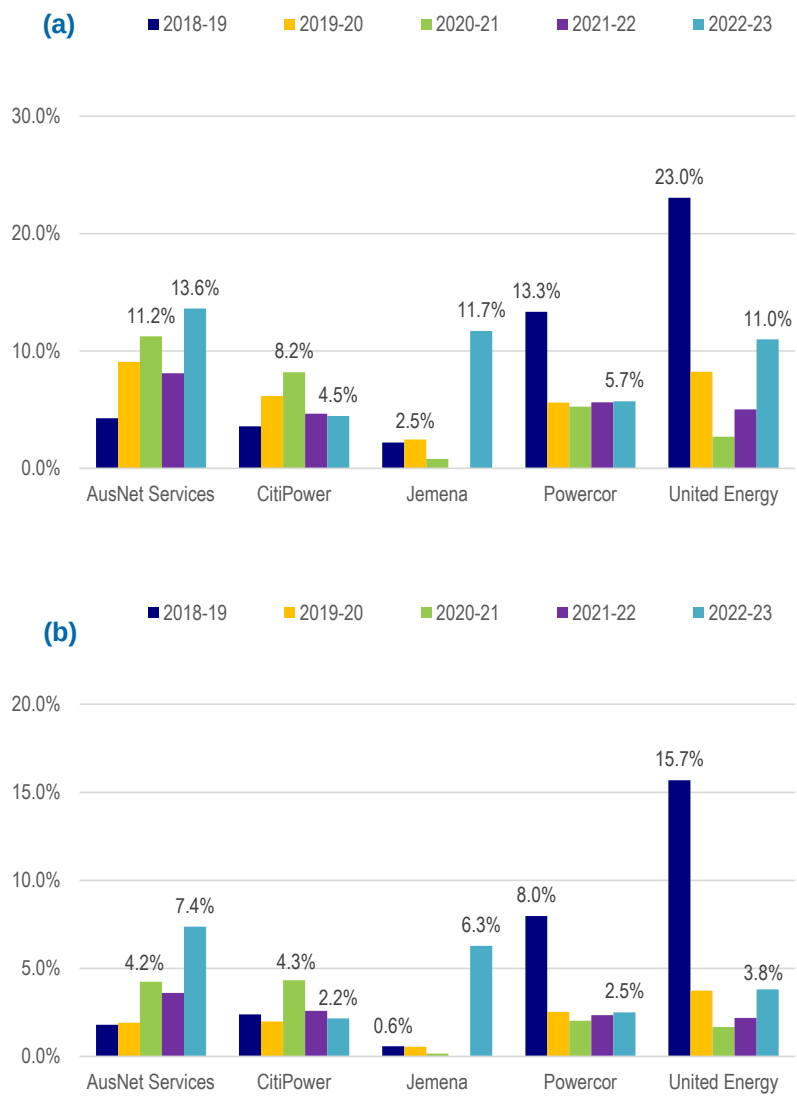

Figure 8 Non-compliance rates in LBRA (a) all non-compliances and (b) major non-compliances

While Energy Safe notes the difficulties the major electricity companies have faced, such matters do not absolve them from meeting their electric line clearance duties and obligations. Each company should develop strategies to ensure their vegetation management programs are adaptable and resilient to the external circumstances.

We have seen some evidence of the major electricity companies reforming their historical vegetation management processes and practices to mitigate these risks. Further adaptations and innovative approaches may be needed to ensure improved and sustained standards of compliance.

Municipal councils

In 2022–23, Energy Safe inspected 11 municipal councils with electric line clearance responsibilities. Councils are responsible for maintaining clearance of trees located on public land managed by the council. These responsibilities are contained to LBRA.

Figure 11 shows the non-compliance rates observed for each of the councils inspected. The rate of non-compliance in LBRA in 2022–23 is much higher for councils (20.6 per cent on average) than for the distribution businesses (9.3 per cent on average).

A total of 784 non-compliant spans were identified across the 11 councils we inspected. Notices made under section 86(1) of the Act were issued for all non-compliant spans, and included timeframes within which the non-compliant vegetation was to be cleared.

Energy Safe worked with each council throughout the year to ensure they appropriately managed the risks caused by the non-compliance and that clearing occurred as it should.

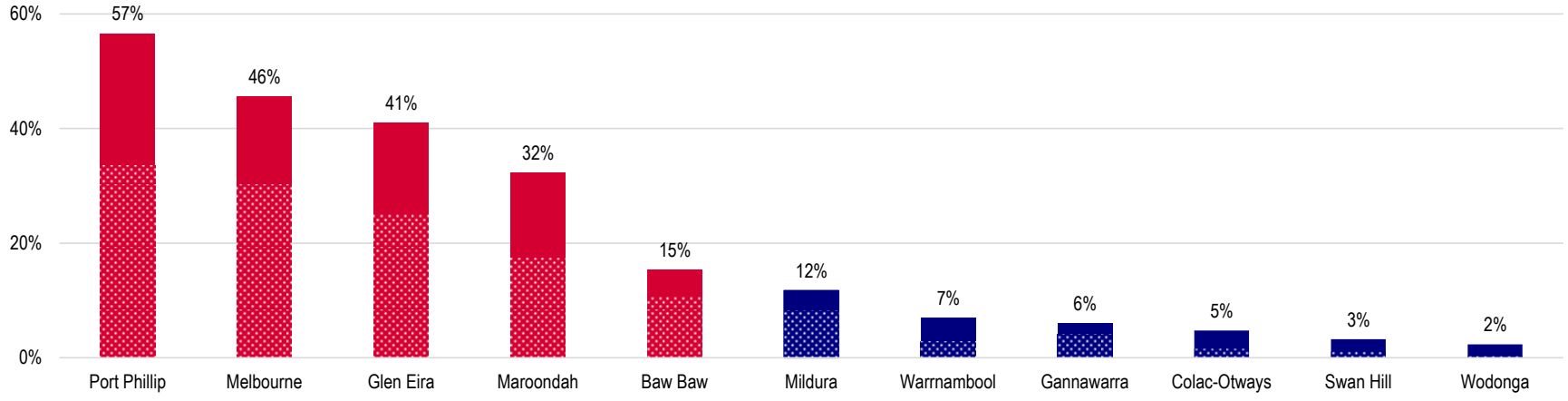

Figure 9 Non-compliance rates for councils inspected in 2022–23

The councils shown in red had non-compliance rates in excess of the council average.
The dotted area shows the levels of high-risk non-compliance within the overall non-compliance rate.

The extent of council non-compliance does not create a significant bushfire risk for Victoria as councils predominantly only have electric line clearance responsibilities in LBRA. That said, non-compliant vegetation can:

- impact on the reliability of electricity supply for metropolitan Melbourne, regional cities and townships
- pose other safety risks to the community
- pose risks to vegetation management workers that need to get closer to electric lines, more often, to clear non-compliant vegetation.

When a council creates unacceptable electricity safety risks by systemically failing to comply, Energy Safe may require the council to reform its vegetation management systems and functions. The reforms must allow the council to work toward achieving acceptable standards of compliance. Energy Safe monitors implementation of the reforms until it is satisfied the council is appropriately managing its electricity safety risks.

Where compliance cannot be achieved by a council within an acceptable timeframe, we have the power to direct the relevant distribution business to undertake any necessary clearance works.

Adapting to changes in the environment

The Code of Practice for Electric Line Clearance specifies minimum clearance distances to be maintained between vegetation and electric lines to mitigate risks from vegetation contact. The clearance distances required in HBRA are bigger than those required in LBRA due to the greater safety risks in the former, particularly the risk of bushfire.

Electrical asset inspection and maintenance cycle requirements are dependent on whether the asset is in an HBRA or LBRA. This ensures those requirements are proportionate to the prevailing risks.

The CFA is responsible for assigning HBRA and LBRA boundaries across most of Victoria. The cyclical reviews undertaken by the CFA lapsed in 2013. In 2019, Energy Safe arranged to have the reviews reinstated, including arranging for their ongoing funding.

The review program began in 2019 with the Powercor network, which was completed before the end of 2020. Review of the Jemena and United Energy networks followed with these reviews being completed by mid-2021. Review of the AusNet Services network commenced in 2021 and concluded in late 2022.

Where boundaries changed from LBRA to HBRA, increased vegetation clearance distances and more frequent pole inspection regimes apply to better manage the elevated risk.

Each of these major electricity companies transitioned to the increased vegetation clearance standards and increased pole inspection standards prior to the new boundaries being applied.

AusNet Services has identified several spans where it felt that implementing the required clearing would adversely affect the condition of the trees that existed at those sites. In preference to clearing, it plans to change the electrical assets at those sites so that the extent of clearing needed will be greatly reduced. As the required engineering solution cannot be implemented until 2024, AusNet Services will conduct enhanced inspection of these sites in the interim to ensure management of any vegetation clearance risks.

Energy Safe will inspect each of these sites prior to the 2023–24 fire danger period to ensure it is satisfied the risks are being appropriately managed.

Managing hazards outside the clearance space

Most network incidents involving vegetation are due to trees, or parts of trees, falling onto electric lines from outside the minimum clearance space required by the Code. Such trees are often referred to as hazard trees.

The distribution businesses have methods for managing hazard trees. These methods are described in their Electric Line Clearance Management Plans (ELCMP). Hazard tree management does not apply to the transmission businesses.

In 2019–20, Energy Safe initiated an investigation to examine if hazard trees are being managed according to the methods described in each distribution business' ELCMP. The investigation also sought to test if the methods being used provide an appropriate framework to manage the electricity safety risks caused by hazard trees.

The investigation commenced in 2019–20 and, despite some delays caused by COVID-19 restrictions, hazard tree inspections for all distribution businesses were completed in 2021.

The inspections found that each of the distribution businesses was generally managing hazard trees according to the methods described in its ELCMP, with any exceptions being isolated and not resulting in significant risk. The inspections identified opportunities to improve the way hazard trees are being managed that included improved marking methods for easier identification, clearer management instructions and improved processes to ensure all hazard trees (or parts thereof) affecting a span are actioned.

While this commenced as a strategic project, Energy Safe has now incorporated hazard tree inspections into its regime of safety regulation programs as an ongoing program of inspection. This has been done to ensure the electricity distribution businesses continue to monitor and manage the risks posed by hazard trees.

When Energy Safe identified a hazard tree during its inspections that had not been appropriately managed, the responsible distribution business was required to take the necessary actions to address the related risks.

In responding to the findings of our hazard tree investigation, each of the distribution businesses indicated a commitment to the ongoing review and amendment of their hazard tree management programs and to consider the improvement opportunities identified by Energy Safe. We will continue to monitor this issue to ensure commitments are met.

Upgrading the networks to reduce fire risk

The Electricity Safety Act and the Electricity Safety (Bushfire Mitigation) Regulations 2013 and 2023[2] require major electricity companies to ensure that:

- all polyphase electric lines originating from prescribed zone substations can reduce the energy delivered into phase-to-earth faults to a specified level within defined timeframes to reduce the risk of fire ignition
- each electric line within an Electric Line Construction Area with a nominal voltage of between 1 kV and 22 kV that is constructed, or wholly or substantially replaced, after 1 May 2016 will be a covered or underground electric line
- an Automatic Circuit Recloser is installed on each Single Wire Earth Return line in its supply network by 1 January 2021.

Installing Rapid Earth Fault Current Limiters

Rapid Earth Fault Current Limiters (REFCLs) are being deployed as a potentially cost-effective way of reducing the risk of fire ignitions from 22 kV (polyphase) powerlines. The regulations require REFCLs to be installed at 45 zone substations, with 22 in the AusNet Services network, 22 in the Powercor network and one in the Jemena network. Figure 12 shows the coverage of the substations with REFCLs mandated by the regulations.

The REFCL rollout program was largely complete at 30 June 2023. As of 1 May 2023, Powercor had commissioned REFCLs at its 22 substations, Jemena had completed its single site, and AusNet Services had completed REFCL installations at 21 of 22 zone substations. AusNet Services has been granted a time extension until 1 November 2023 to commission its remaining REFCL at the Benalla zone substation.

In addition to the mandated REFCLs, United Energy has voluntarily installed REFCLs at Frankston South, Mornington and Dromana zone

[2] The Electricity Safety (Bushfire Mitigation) Regulations 2013 applied for the majority of the 2022–23 period. The Electricity Safety (Bushfire Mitigation) Regulations 2023 came into effect on 16 June 2023.

substations, and Jemena has voluntarily installed a base-level REFCL system at the Sydenham zone substation.[3]

Replacing bare overhead powerlines in Electric Line Construction Areas

AusNet Services and Powercor each have about 1,400 km of bare overhead powerlines within the Electric Line Construction Areas (ELCA).[4] In accordance with the regulations, these are to be progressively replaced with insulated or underground lines as new lines are constructed or old lines are wholly or substantially replaced.

While some undergrounding of overhead lines has occurred, both businesses have adopted covered-conductor technologies as a preferred alternative to undergrounding for future powerline construction and reconstruction works in ELCA. These technologies achieve the same risk reduction as undergrounding at a significantly lower cost to customers.

As of 30 April 2023, AusNet Services reports that it has replaced 19 per cent of bare overhead lines in Electric Line Construction Areas and Powercor reports it has replaced 30 per cent.

Installing Automatic Circuit Reclosers

Automatic Circuit Reclosers (ACRs) on single wire earth return (SWER) lines can be set remotely so that they turn off those powerlines quickly when faults occur and, thereby, reduce the risk of these lines starting fires.

The Electricity Safety Act required the distribution businesses to install a new-generation ACR on each SWER line within their distribution network by 1 January 2021. All distribution businesses had complied with this requirement before the 2022–23 period.

There is an ongoing requirement to maintain and operate these ACRs, and Energy Safe monitors the distribution businesses to ensure this commitment is met.

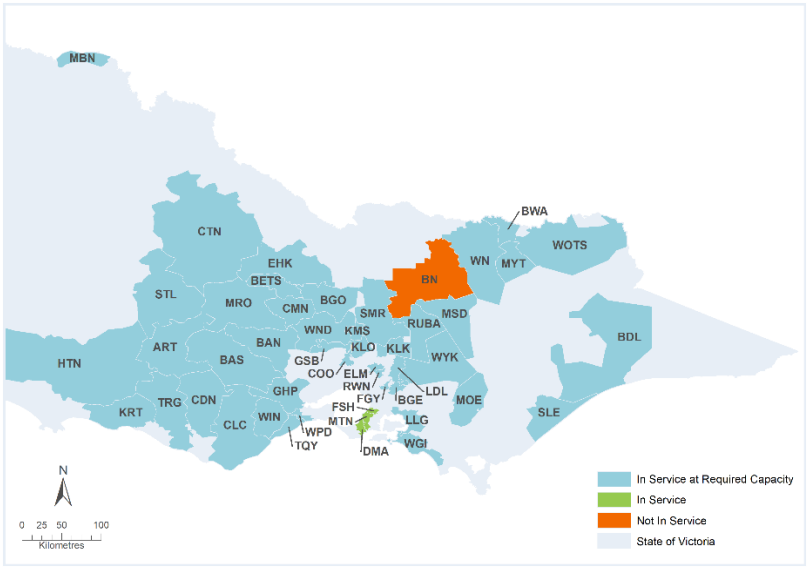

Figure 10 Mandated REFCLs and their status at 30 June 2023

[3] A base-level REFCL consists of an arc suppression coil only and cannot achieve the same performance as a mandated REFCL.

[4] Electric Line Construction Areas are areas identified by the Powerline Bushfire Safety Program as subject to the greatest consequence from a bushfire originating from the electricity distribution networks.

Making network infrastructure safer

Understanding asset failure trends

Figure 13 shows the number of network safety incidents on the Victorian networks in 2022–23, including fires. The numbers of asset failure incidents and contact events are reported separately.

The historical average for the period January 2010 to June 2023 shows a seasonal trend with increased asset failures over the summer period (Figure 13a). The numbers of asset failure incidents in the last year were well below the 2010 to 2022 average, with most months being around one standard deviation below the average.

The numbers of contact events show less seasonality and a less pronounced peak occurring in March (Figure 13b). Such events are largely outside the direct control of the networks to manage.

Contact events this year also showed a high degree of variability. Two months were around one standard deviation below the long-term average, nine months were in the expected range (one standard deviation around the average) and one month (May) higher than the expected range.

The peak in May 2023 was primarily due to third-party contact with network assets — vehicles and mobile plant contacting overhead lines (53 per cent) and other contact events such as vandalism and interference (21 per cent). Vehicle contact incidents were primarily on the Powercor and United Energy networks and other contact events were primarily on the United Energy network.

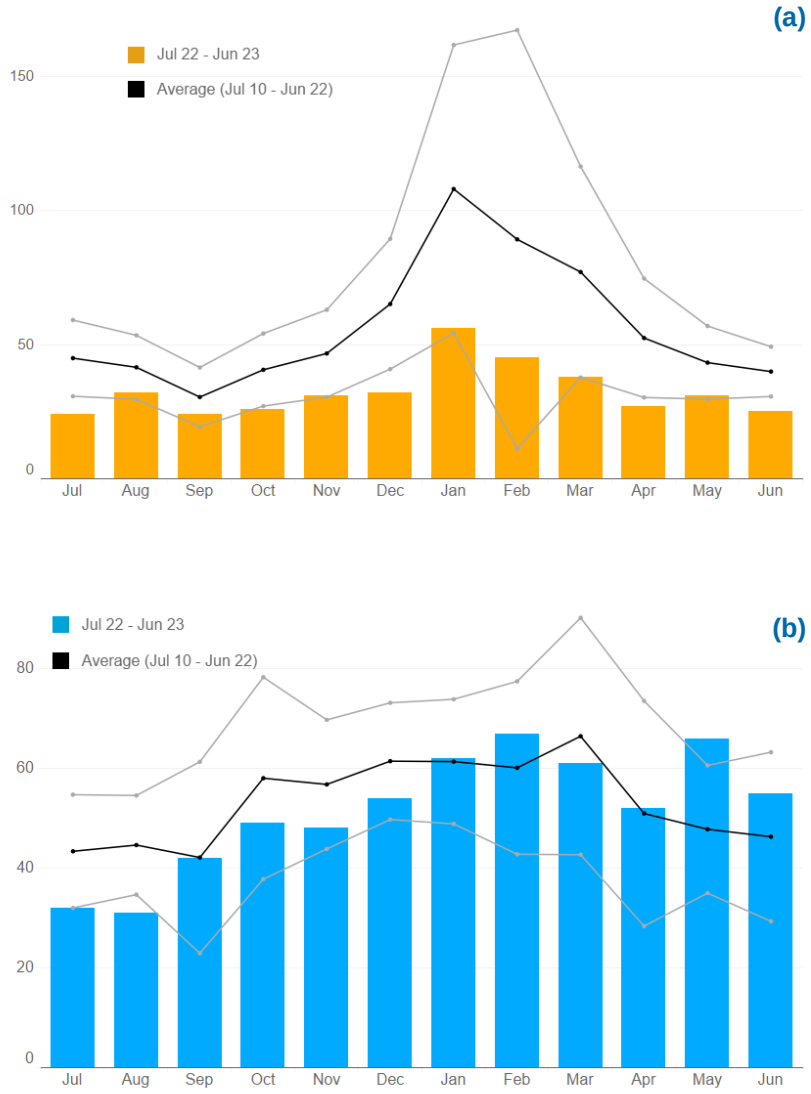

Figure 11 All incidents in the period due to (a) asset failures and (b) contact events

The grey line is one standard deviation above and below the average

Figure 14 shows the number of incidents on the Victorian electricity networks. The green arrows show the reduction from the long-term average across the 2010 to 2022 period (improvement), and the red arrows show the increase (decline).

The four most common incidents were vehicle impacts, connection faults, other contact events and interference with underground assets (dug-ups). Three of these events are outside the direct control of the networks to manage (vehicle impacts, other contact events and dug-ups) and one is within their control (connection faults).

When compared to the long-term averages across the period from January 2010 to June 2022, the incidents in 2022–23 are worse in three categories, improved in 10 categories and stable (that is, within five per cent) in one category.

Of note is that all the incidents involving asset failures are much lower than the long-term average, with the exception of underground asset faults where the numbers of incidents annually are very low. Vehicle contact with overhead powerlines (including contacts from construction and farming equipment) and dug-ups show the biggest increases compared to the long-term averages.

Figure 15 shows the trend over the last 10 years for the top four events above. This indicates that:

- vehicle impacts have increased for four consecutive years and are 49 per cent higher than the long-term average
- connection faults have decreased slightly and are 31 per cent lower than the long-term average
- other contact events increased slightly to offset last year's increase, and are now 41 per cent lower than the long-term average
- dug-up events increased markedly this year and are now 73 per cent higher than the long-term average.

Several actions are currently being taken by Energy Safe and industry to reduce contact by mobile plant, to reduce contact with underground cables and to increase safety in the No Go Zone. Further details can be found on page 22.

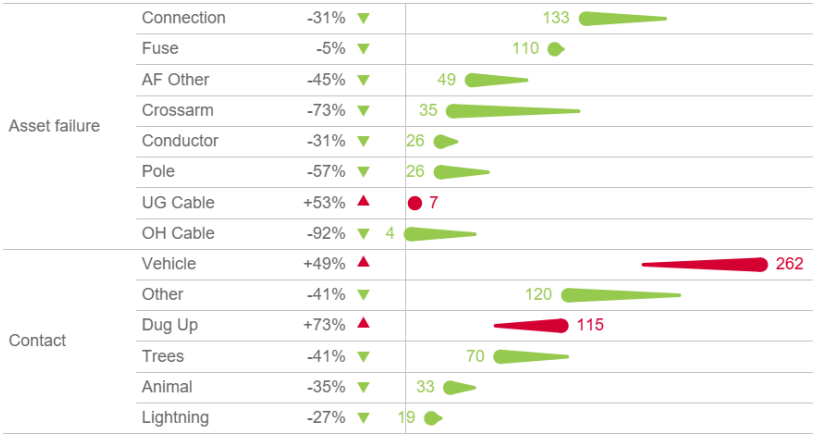

Figure 12 Incidents occurring on Victorian networks

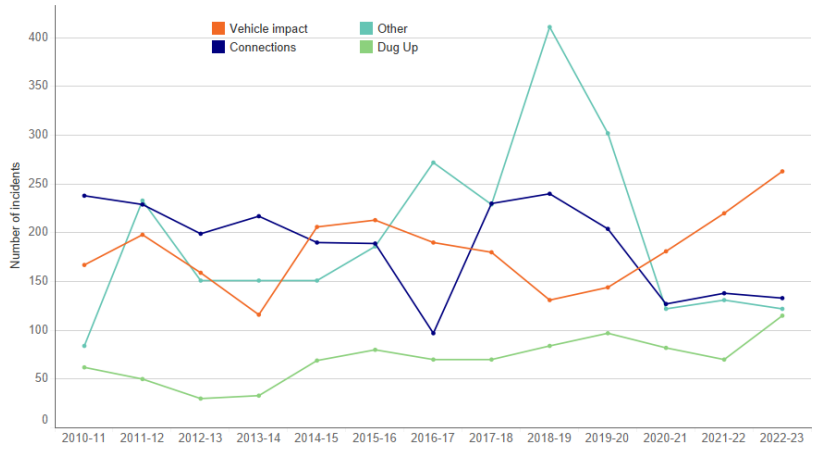

Figure 13 Historic trends for common incident events

Reviewing the performance of wood poles

Energy Safe published the final technical reports on the wood pole management practices of Powercor in March 2020 and of AusNet Services in February 2022, following a period of public consultation.

Powercor is now required to deliver a minimum of 34,650 wood pole interventions (replacement or reinforcement) between 1 January 2022 and 31 December 2026. This includes the requirement to:

- deliver a minimum of 25,241 wood pole interventions in the HBRA and/or electric line construction areas (with a minimum of 13,614 of these interventions to be replacements)
- replace not less than 3,519 reinforced wood poles.

Powercor committed to meeting this overall requirement through annual minimum volumes within its BMP.

Powercor submitted the final year-end volumes for its 2022 pole intervention program. While it exceeded six of the seven minimum annual targets, Powercor did not meet the 2022 annual target for the replacement of reinforced poles in HBRA. Powercor advised that it had been unable to meet the target due to floods in October and November 2022 and the resulting access issues. Powercor's 2023 minimum annual requirement includes the recovery of volumes for the target that was missed.

Energy Safe determined that Powercor had failed in its planning of the interventions required to meet the pole replacement target. We subsequently issued a warning letter to Powercor, and we continue to monitor Powercor's compliance in delivering the volumes committed in its BMP.

Following our publication of the final report on the wood pole management practices of AusNet Services, we are now monitoring AusNet Services' delivery of the recommendations in the report.

In June 2023, Energy Safe issued a section 109 notice to AusNet Services requiring it to submit a revised BMP before 1 October 2023. The notice requires the revised plan to commit to reducing the inspection frequency of poles and attached assets from three to 2.5 years in HBRA. This change is to ensure that AusNet Services meets its general duties under the Act as the previous change from 2.5 to three years was seen to have potentially increased the risk of asset failure.

Other outstanding matters arising from the pole management review will be addressed through our assessment of the revised BMP.

In 2021–22, Energy Safe undertook an investigation of the United Energy program. A draft public report on the wood pole management practices of United Energy was released for consultation in September 2022. The final report was published in June 2023. The final report included six recommendations and incorporated feedback from the consultation process.

United Energy has submitted an improvement plan to address all recommendations and findings in the report and Energy Safe are monitoring the delivery of this plan. United Energy has begun delivery against the recommendations. Energy Safe will require the next United Energy BMP includes any recommendations still outstanding at the time the plan is submitted for acceptance.

We have since undertaken a similar assessment of the capacity of Jemena's wood pole management practices to deliver sustainable safety outcomes for the community. A draft technical report was published in July 2023 for public consultation.

Improving worker safety in the No Go Zone

The No Go Zone rules provide a system of work to prevent people and machinery breaching the minimum regulatory clearances set out in Part 6 of the Electricity Safety (General) Regulations and subsequently contacting overhead and underground powerlines.

The highest number of breaches of the No Go Zone are due to mobile plant operating near powerlines, vehicle transit and high loads, and unauthorised access.

In the past year, the No Go Zone Working Group (Energy Safe and industry) has continued to develop solutions to reduce the rate of

occurrence of No Go Zone breaches and contact incidents with overhead powerlines. It also continued its risk-based approach focusing on the key industries of farming and construction which were identified as having the highest risk.

The No Go Zone Working Group has implemented the following actions to improve safety outcomes:

- undertaking ongoing awareness campaigns targeting farm safety, backhoe and excavator safety, and tipper truck safety
- developed a draft guidance paper on the use of emerging technologies (such as proximity warning devices) that can be used to improve safety of mobile plant operating near overhead powerlines, with publication scheduled for 2023–24.

Energy Safe has liaised with Government to identify gaps in building planning and permit requirements for new buildings to ensure applications demonstrate compliance to the Electricity Safety Act and related regulations in maintaining suitable clearances from overhead powerlines. Energy Safe has recommended specific amendments and continues to engage with government to implement these.

Over the 2022–23 period, Energy Safe has been reviewing how the major electricity companies comply with their general duty to minimise as far as practicable the safety risk arising from their supply networks. Energy Safe will ensure that any deficiencies are addressed via commitments in their revised ESMSs, noting that all the distribution companies are due to resubmit in December 2023.

While overhead powerlines have historically been impacted more frequently, we are starting to see increasing numbers of incidents involving underground assets. Energy Safe has already undertaken the following activities:

- joint publication with WorkSafe Victoria of a new guidebook on undertaking work near underground services, including the requirement to use a registered spotter.[5]
- delivery of industry safety awareness training sessions jointly with Before You Dig Australia.

We will work with the No Go Zone Working Group to develop additional strategies that can complement these activities.

[5] The guidebook can be found at https://www.esv.vic.gov.au/sites/default/files/2023-06/WS4609_UNDERGROUND-SERVICES-GUIDEBOOK_D3.pdf

Appendix A : Energy Safe Victoria

A1 The risk management hierarchy

Energy Safe undertakes a wide range of functions to ensure safety risks are being appropriately managed by the Victorian transmission and distribution networks. Figure 16 shows a hierarchy of controls that illustrate how the Electricity Safety Act and associated regulations flow down through the various plans into processes and are finally deployed as practices on the ground. The blue boxes designate the levels within the hierarchy and examples of elements at each level.

As the regulator, Energy Safe attempts to gain insight into the various levels of the hierarchy to ensure that failures at the top levels don't manifest as systemic issues at the lower levels. Examples of the tools we use to gain insight are shown as the red boxes in Figure 16.

Section A2 provides an overview of our activity this year in gaining such insights, and Appendices B to J provide specific findings on each of the major electricity companies.

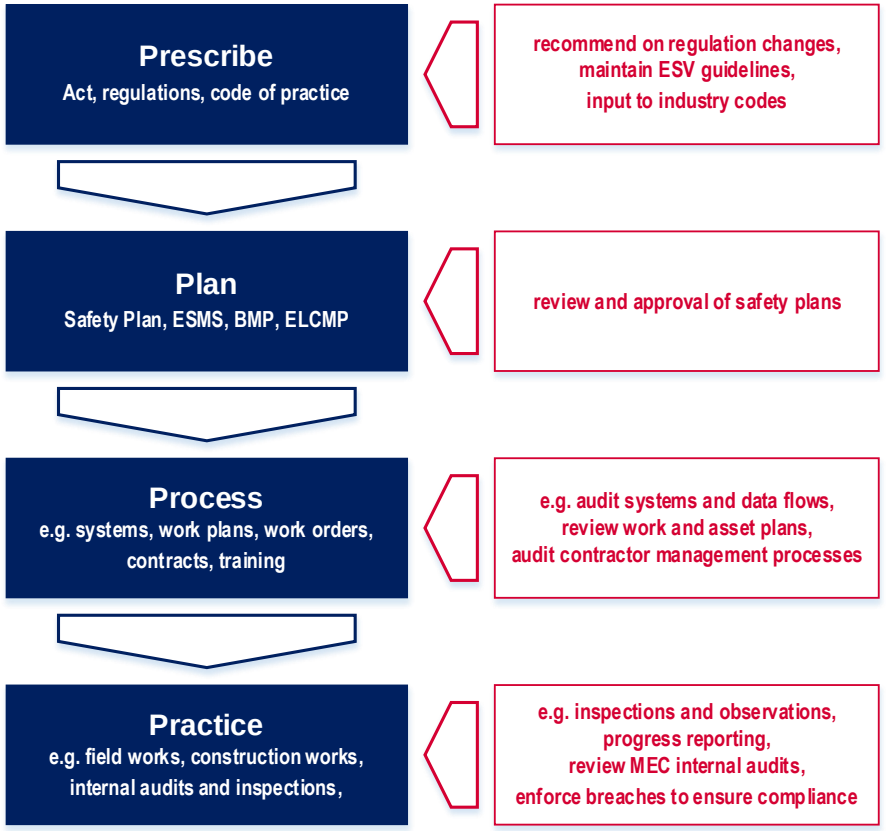

Figure 14 The regulatory hierarchy of controls

A2 Operational performance

A2.1 Statutory plans

Electricity Safety Management Schemes (ESMS)

All major electricity companies are required to submit an ESMS to Energy Safe for acceptance every five years, or after any changes to the regulations or significant changes to company practices.

The numbers of ESMSs processed each year are shown in Figure 17. No ESMSs were received or required acceptance in 2022–23.

This year, Energy Safe focused on auditing the implementation of the current ESMSs.

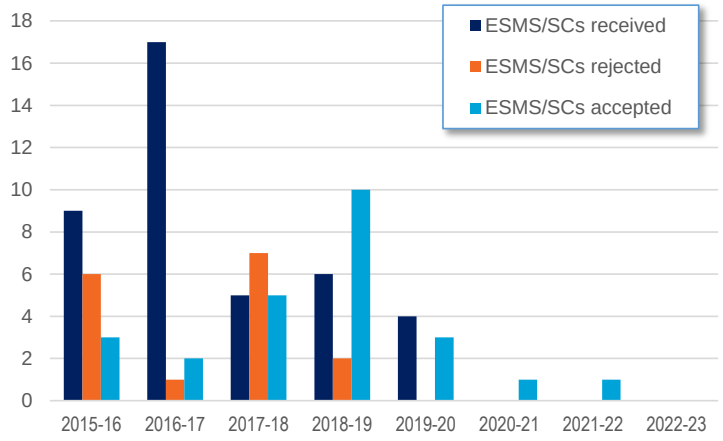

Figure 15 ESMSs and safety cases received and accepted

Bushfire Mitigation Plans (BMP)

All major electricity companies are required to submit a BMP to Energy Safe for acceptance every five years, or after any changes to the regulations or significant changes to company practices.

Specified operators that own or operate an overhead line in HBRA are also required to submit a BMP to Energy Safe before 1 July every year. There are 24 specified operators across Victoria. In 2022, many specified operators submitted plans on or just after the 1 July statutory date, which is shown in the large numbers of BMPs received in the 2022–23 period. Energy Safe determined that the late submissions did not warrant penalties. Instead, we sent reminders to every specified operator in 2023 and only two plans were received late in 2023.

The numbers of BMPs received and approved by Energy Safe each year are shown in Figure 18.

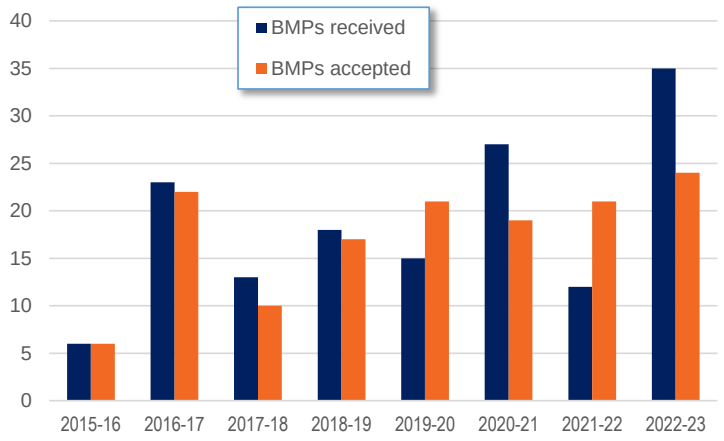

Figure 16 Bushfire Mitigation Plans received and accepted

Electric Line Clearance Management Plans (ELCMP)

The Electricity Safety (Electric Line Clearance) Regulations now require all major electricity companies to prepare and submit an ELCMP for the five-year period from 1 July 2021 to 30 June 2026.

Each of the major electricity companies submitted their five-year ELCMPs to Energy Safe as required, and we had approved all plans by June 2021.

In 2022–23, CitiPower, Powercor, TOA, TOA2 and United Energy submitted amended ELCMPs that included changes to their vegetation management processes. We evaluated the amended ELCMPs to ensure they remained fit for purpose and complied with the requirements of the Regulations. Each of the amended ELCMPs was approved by Energy Safe.

To ensure the previously approved five-year ELCMPs remain compliant and fit for purpose, Energy Safe also reviewed the AusNet Services (distribution and transmission) and Basslink plans in April 2023. The reviews found these ELCMPs remained valid as they met the minimum criteria for an approved plan.

As the major electricity companies hold the greatest risk with electric line clearance, Energy Safe prioritises evaluation and approval of their plans. During the 2022–23 period, all the major electricity companies were operating under approved ELCMPs.

Councils and other responsible persons are required to have annual ELCMPs that are to be updated by 31 March of each year. There is no requirement to submit these plans to Energy Safe unless requested to do so.

Municipal councils and other responsible persons carry different electric line clearance risk profiles when compared to the major electricity companies. Their risk profiles have less bushfire risk and more focus on minimising harm and maintaining reliable electricity supply.

The numbers of ELCMPs received and approved by Energy Safe each year are shown in Figure 19.

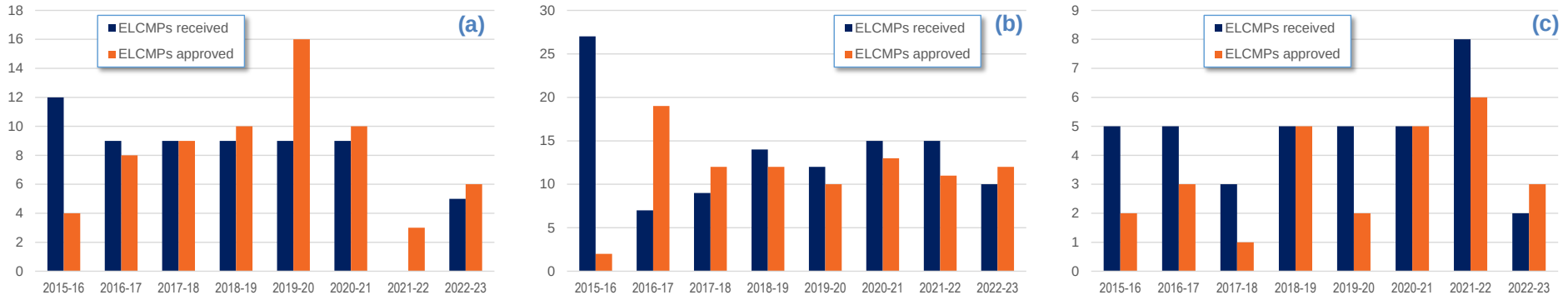

Figure 17 ELCMPs received and approved for (a) major electricity companies, (b) councils and (c) other responsible persons

A2.2 Exemptions

The Governor in Council has the power to grant an exemption related to the Powerline Bushfire Safety Program under section 120W of the Act on recommendation from the Minister. Energy Safe then has the power to grant matching exemptions to the relevant parts of the Electricity Safety (Bushfire Mitigation) Regulations. In practice, both exemptions are informed by our evaluation and analysis in consultation with the Department of Energy, Environment and Climate Action.

Energy Safe issued four exemptions and one time extension relating to the REFCL program in 2022–23. Two additional time-extension requests relating to the REFCL program were received but were not granted by Energy Safe.

Further information on the REFCL program, including details on all exemptions and time extensions granted can be found on our website at esv.vic.gov.au/about-esv/reports/technical-reports/victorian-refcl-program-status/.

Non-network parties wishing to install electric lines on public land need an exemption from section 46 of the Electricity Safety Act. The exemption is granted under an Order in Council subject to meeting specific conditions outlined in section 47 of the Act. Energy Safe is responsible for assessing applications to ensure the required conditions have been met.

The number of such applications has fallen dramatically from its peak in 2016–17 (Figure 21). The bulk of applications received in recent years related to the installation of the National Broadband Network (NBN). Those applications have tapered off significantly now that most of the network backbone has been deployed.

Of the 56 applications evaluated in 2022–23, 21 related to work being performed on behalf of water authorities. Energy Safe has noted that most applications are incomplete. Once applicants have supplied this information and obtained the necessary consents, we have not objected to the proposed works. We will continue to educate applicants to ensure the process is clear and as streamlined as possible.

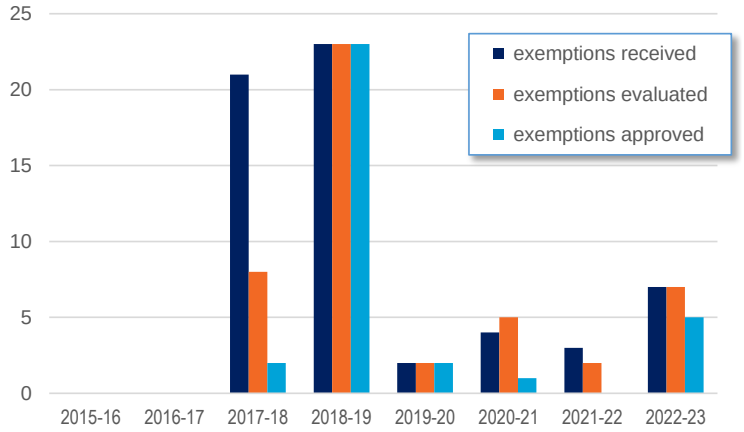

Figure 18 Bushfire Mitigation Plan exemptions

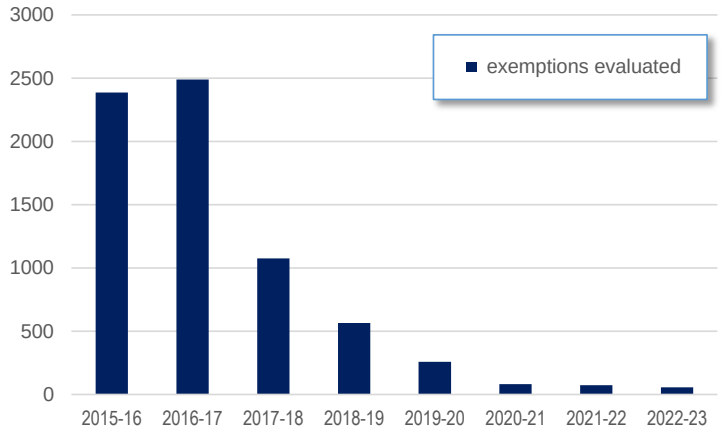

Figure 19 Electric lines on public lands exemptions

A2.3 Audits, inspections and observations

This section provides details on the works undertaken by Energy Safe in managing the audit and inspection program. Details of the individual audits can be found in Appendices B to J.

Electricity Safety Management Scheme audits

Each major electricity company is required to have an accepted ESMS in place. Energy Safe regularly audits for compliance with the accepted scheme.

Figure 22 shows the numbers of ESMS audits undertaken each year.

During 2022–23, we carried out two system audits on each of the major electricity companies. These audits reviewed their asset maturity and the processes and procedures they use to measure and evaluate their safety performance. The asset maturity of Basslink and Transgrid were not audited.

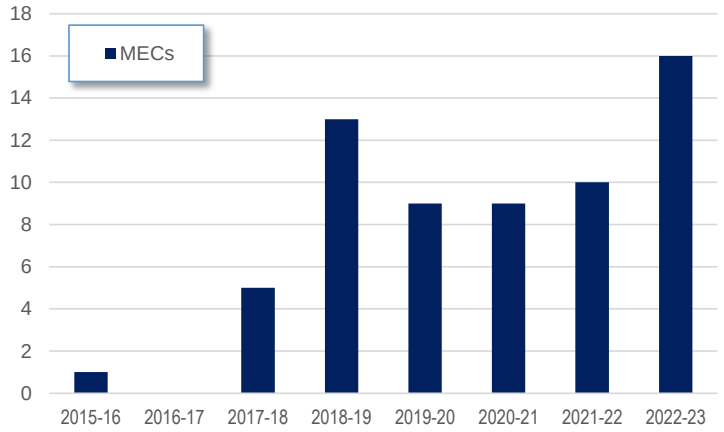

Figure 20 Numbers of ESMS audits

Bushfire mitigation audits and inspections

The major electricity companies and specified operators are required to have an Energy Safe-accepted BMP in place. Energy Safe regularly audits for compliance with the accepted plan.

Figure 23 shows the numbers of bushfire mitigation audits undertaken each year. All 10 major electricity companies were audited this year. The peak in 2017–18 resulted from secondary pole audits of four of the distribution businesses due to stakeholder concerns.

We aim to undertake bushfire mitigation audits of at least two specified operators each year. These businesses represent a low risk of fire ignition compared to the major electricity companies due to the small length of lines they operate. In 2022–23, we performed audits on MacArthur windfarm (AGL Hydro) and Fosterville gold mine overhead powerlines.

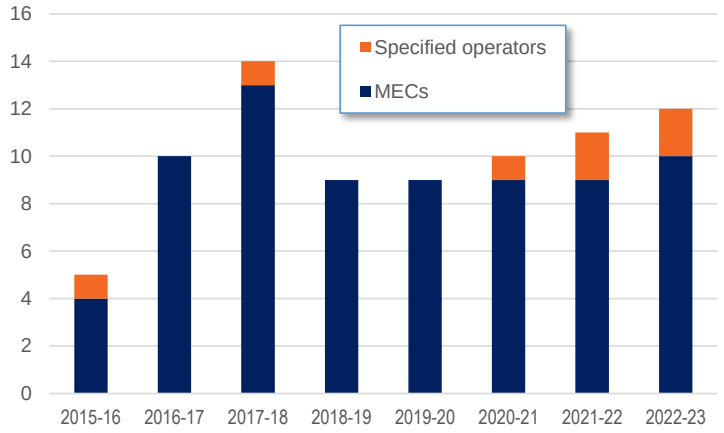

Figure 21 Numbers of bushfire mitigation audits

Electric line clearance audits and inspections

Figure 24(a) shows that the numbers of audits have remained relatively stable over the last eight years, although there was a peak in 2021–22. Figure 24(b) shows that the volume of spans inspected by Energy Safe has increased from 2,000-3,000 spans in 2015–16 to a peak in 2018–19. The number of spans inspected each year has been stable at 12,000-13,000 spans since 2020–21.

Energy Safe cannot inspect all spans across all networks in Victoria. Instead, we inspect sufficient numbers of spans in HBRA and LBRA to provide a statistically-representative sample of the networks. This provides us with an understanding as to whether there are systemic issues in managing line clearance responsibilities.

There will be instances of non-compliance that are not detected in our inspections. These may be identified through complaints or as a result of incidents. Energy Safe investigates these instances to determine whether further inspections and enforcement action are warranted.

This audit and inspection information helps us hold the major electricity companies, councils and other responsible persons (ORPs) accountable for their maintenance of vegetation around the state's powerlines, and thereby ensure that electricity safety risks (including the risk of bushfire in HBRA) are being properly managed.

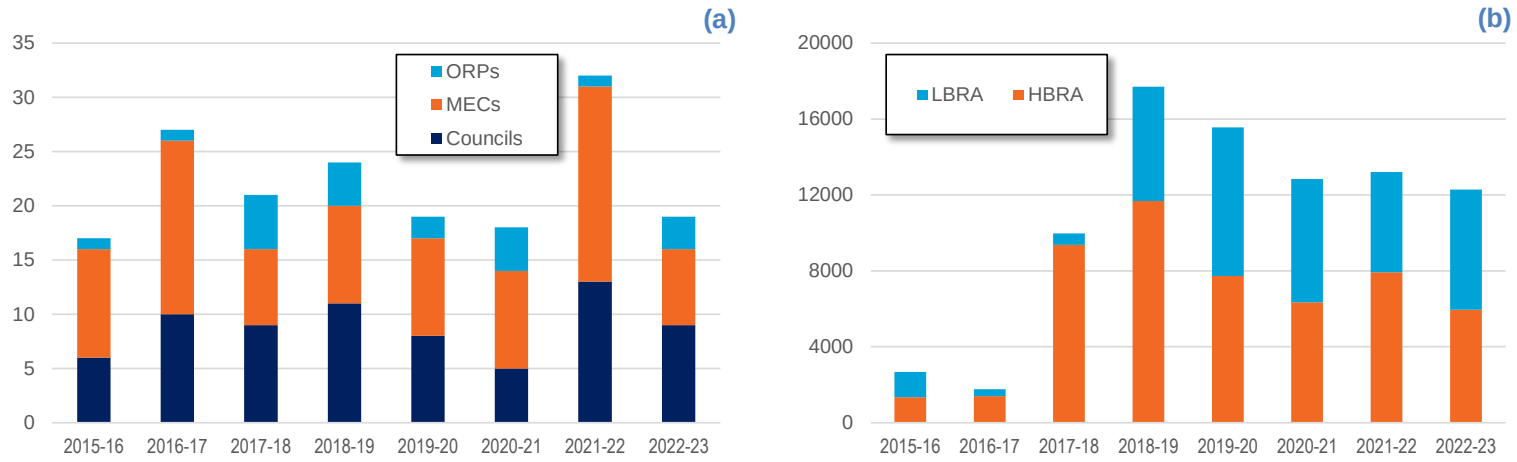

Figure 22 Electric line clearance audits and inspections showing (a) the number of audits and (b) the volume of spans inspected during these audits

Note: The number of inspections reported last year was for the distribution businesses rather than for all major electricity companies.

Work practice observations

Work practice observations provide key insights into the ability of the major electricity companies to plan and deliver safety outcomes. Breakdowns in the process may become evident when works in the field are monitored.

Energy Safe conducts two types of work practice observations:

- planned observations are organised with the distribution businesses, and our work practice advisers often attend the pre-work meetings before observing the work being undertaken
- opportunistic observations involve our work practice advisers identifying work locations from the distribution businesses' websites and arriving unannounced to observe the work being undertaken.

Figure 25 shows the number of work practice observations undertaken each year. We conducted a total of 25 field-based observations this year, including observations of asset inspectors. No major non-compliances were identified. This work was interspersed with education and consultation activities working with industry committees, urban and rural businesses, and other relevant organisations across the state.

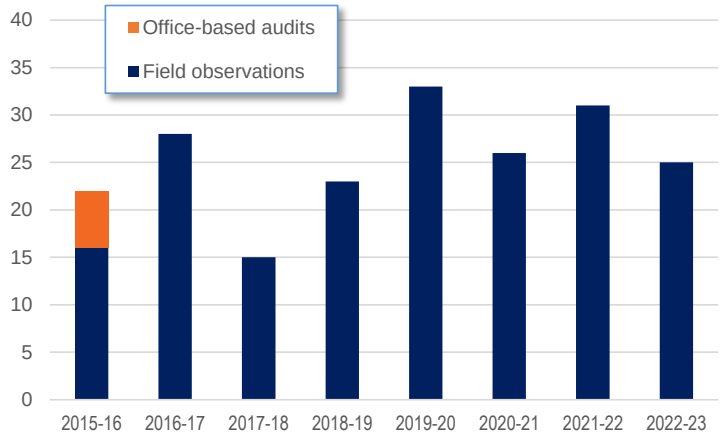

Figure 23 Numbers of works practice observations

A2.4 Investigations

Energy Safe undertakes assessment of all complaints raised with us about the electricity networks or network-related incidents reported to us in accordance with the Electricity Safety Act. Comprehensive investigations are then undertaken if this assessment identifies that there is a potential serious breach of legislative requirements, where multiple recurrences indicate systemic problems with how businesses and individuals are managing a safety risk they are responsible for or where there has been a significant consequence such as a serious injury or fatality. These detailed investigations determine whether enforcement action is warranted and, if so, support a successful outcome.

Figure 26 shows the numbers of new investigations opened each year and the number that have been completed. The low numbers in 2022–23 reflect a decrease in serious incidents requiring investigation this year.

Energy Safe also investigates less serious breaches of the Electricity Safety (General) Regulations, but these are not included in Figure 26.

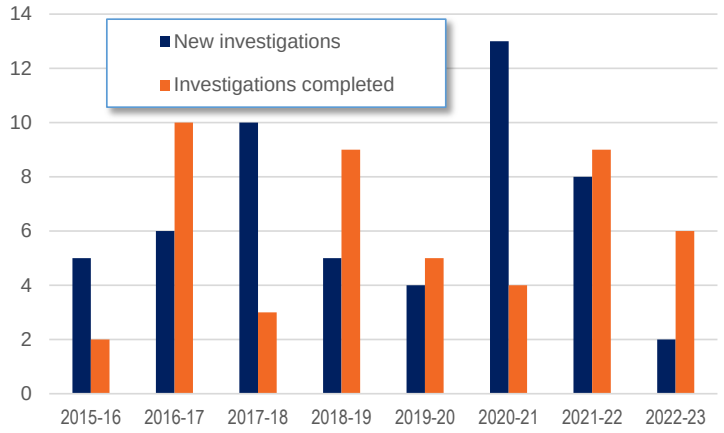

Figure 24 Numbers of new and completed investigations

Appendix B : AusNet Services

AusNet Services[6] is wholly owned by Australian Energy Holdings No. 4 Pty Ltd, a company controlled by the Canadian multinational Brookfield Asset Management.

AusNet Services has two operating electricity subsidiaries: AusNet Services Transmission (owns and operates the electricity transmission business) and AusNet Services Distribution (owns and operates the electricity distribution business). As the two subsidiaries are managed by the same chief executive officer and Board and use similar procedures, Energy Safe combines the two subsidiaries into a single entity for reporting purposes. Where the discussion relates to a specific area of the business, this is identified within this report.

AusNet Services is the only major electricity company in Victoria operating both transmission and distribution networks.[7]

The transmission network includes all of Victoria (500kV and 220kV) and the interconnections with New South Wales and South Australia (330kV and 275kV respectively). It comprises approximately 6,500 km of transmission lines and 13,200 towers.

The distribution network covers an area of approximately 80,000 km^2. It includes Melbourne's outer-eastern suburbs and runs north to the New South Wales border and south and east to the coast (Figure 27). It comprises approximately 38,085 km of overhead line, 7,960 km of underground cable, 333,800 power poles and 99,300 public lighting poles.

Most of the AusNet Services distribution network (81 per cent) is in HBRA.[8]

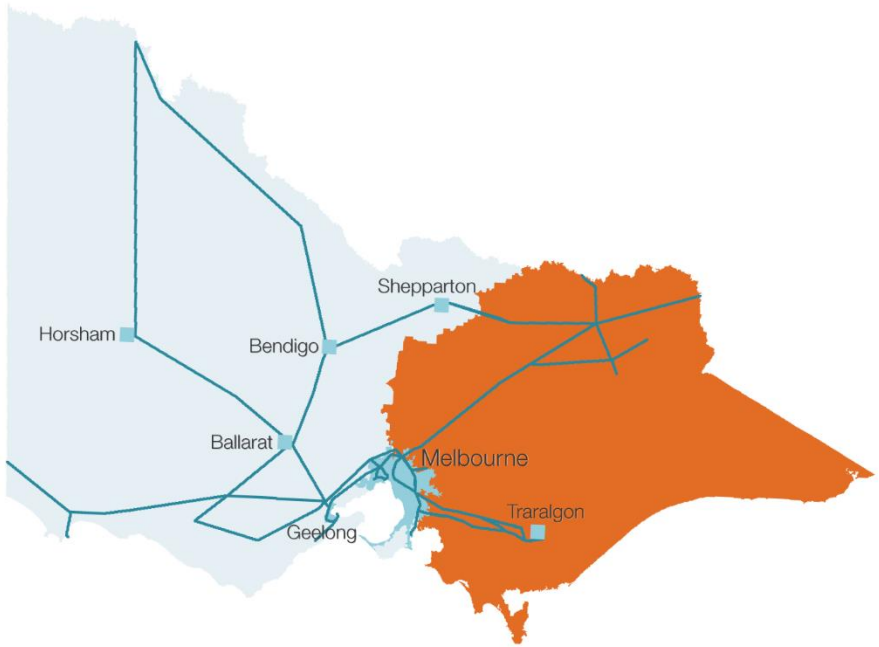

Figure 25 Service area for the AusNet Services distribution network (orange area) and transmission lines (dark blue)

[6] AusNet Transmission Group Pty Ltd and AusNet Electricity Services Pty Ltd are the listed holders of the electricity transmission and distribution licences respectively.

[7] While TOA and TOA2 are closely associated with CitiPower/Powercor, these have been established as separate companies. Their transmission assets are also limited in comparison to those of AusNet Services.

[8] The percentage is based on the proportion of route line length in HBRA as reported in Section 2.7 of its annual Category Regulatory Information Notice (RIN) submission to the Australian Energy Regulator (AER). The percentage in previous years' reports was based on network area.

B1 Plans and processes

AusNet Services is required to submit the following documents to Energy Safe for review and acceptance/approval:

- an ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

AusNet Services Transmission is due to resubmit its ESMS in November 2024 and its BMP in September 2024. AusNet Services Distribution is due to resubmit its ESMS in December 2023.

In June 2023, ESV issued a section 109 notice to AusNet Services Distribution requiring it to submit a revised BMP before 1 October 2023. The notice requires the revised plan to commit to reducing the inspection frequency of poles and attached assets from three to 2.5 years in HBRA.

AusNet Services submitted its 2021–26 transmission and distribution ELCMPs to Energy Safe in March 2021, and both were approved in advance of the 2021–22 fire danger period. These plans remained in place, unchanged, throughout the 2022–23 period.

B2 Directions

There are currently no directions on AusNet Services.

B3 Powerline bushfire safety programs

To meet its bushfire mitigation obligations, AusNet Services was required to implement REFCL technology at 22 nominated zone substations by 1 May 2023. AusNet Services commissioned REFCLs and achieved compliance at 21 out of 22 zone substations, including at Wodonga and Kalkallo zone substations (see Section B4).

AusNet Services experienced technical challenges in achieving the required capacity at the Benalla zone substation due to some very long feeders and some feeders with a high proportion of single-phase spurs. Energy Safe granted AusNet Services a time extension until 1 November 2023 to achieve REFCL compliance at the Benalla zone substation.

B4 Exemptions

On 28 April 2023, Energy Safe granted a time extension and corresponding exemption for the AusNet Services REFCL program due to third-party delays beyond its reasonable control and technical issues at the Benalla zone substation. This effectively changed AusNet Services' regulatory deadline to 1 November 2023.

Energy Safe received an exemption application from AusNet Services in relation to the Kalkallo zone substation. The exemption related to replacing bare powerlines with underground or covered conductor instead of REFCL protection to overcome technical challenges. It is expected that the alternative solution will deliver an equivalent or better safety outcome. The exemption request relating to the Kalkallo zone substation was assessed and a recommendation was provided to the Minister for consideration. The Governor in Council granted an exemption for the Kalkallo zone substation in October 2022 and Energy Safe granted a corresponding exemption. These works were completed prior to 1 May 2023.

Energy Safe received an exemption application from AusNet Services in relation to the Wodonga Terminal Station. The REFCL exemption request followed significant technical challenges in achieving compliance. The request was to provide an alternative bushfire mitigation solution instead of REFCL protection to part of one 22 kV feeder. The alternative was to install early fault detection equipment to monitor a minimum of 193 km of non-REFCL protected powerlines on one feeder. We assessed the proposed solution and provided a recommendation to the Minister for consideration. The Governor in Council granted an exemption for Wodonga Terminal Station in April 2023 and Energy Safe granted a corresponding exemption. The works are to be completed prior to 1 November 2023.

B5 Audit performance

B5.1 Electricity Safety Management Scheme

In May 2022, Energy Safe commenced an audit of the AusNet Services asset management systems for both transmission and distribution. The audit, which was finalised in 2022–23, focused on the processes and procedures used by AusNet Services to manage its assets. We found one minor non-compliance relating to the lapsing of ISO 55001 certification. AusNet Services will provide an update to the ESMS in December 2023 to address the audit findings.

In March 2023, Energy Safe audited the AusNet Services process and procedures relating to the measurement and evaluation systems used for both transmission and distribution. This audit focused on the processes and procedures used by AusNet Services to measure, evaluate and improve their safety performance. We did not find any non-compliances during this audit.

B5.2 Electric line clearance

Distribution network pre fire danger period audit

For the 2022–23 fire danger period, an audit and inspection was conducted on the AusNet Services distribution network to confirm it was managing its electric line clearance responsibilities effectively in HBRA. The audit and inspection was to ensure AusNet Services was operating in compliance with its approved ELCMP.

The audit found three major non-compliances and two minor non-compliances. The non-compliances related to procedural deficiencies for vegetation inspection timeframes, clearing rectification timeframes, vegetation coding and recording of minimum clearance space distances.

Through the audit and inspection process, Energy Safe concluded that AusNet Services did not comply with all five of the elements of its approved ELCMP that were audited. Each of the identified non-compliances compromises the ability of AusNet Services to manage its electricity safety risks as far as practicable.

The field inspection component of our audit found the extent of non-compliant vegetation present across the network had increased when compared to its previous year's inspection results.

In its formal response to the audit, AusNet Services committed to revise the procedures in its ELCMP to address the procedural deficiencies identified by Energy Safe.

Energy Safe will review the application of these changes as part of the 2023–24 auditing and inspection programs, including during our pre-fire season audits. We will continue to closely monitor this situation and, if necessary, intervene or undertake enforcement action to ensure AusNet Services meets its electric line clearance duties and obligations.

Distribution network inspection

During the 2022–23 period, Energy Safe inspected 4,205 spans on the AusNet Services distribution network, with 2,140 being in HBRA and 2,065 in LBRA. The numbers of spans inspected provide a statistical representative sample of the network in HBRA and LBRA.

We identified 530 non-compliant spans across the network — 249 in HBRA and 281 in LBRA. We issued section 86(1) notices to AusNet Services for all identified non-compliant spans. All were cleared by AusNet Services as a matter of priority, as it was required by the section 86(1) notices, resulting in the elimination of these potentially hazardous situations.

We observed an increase in the rate of major non-compliances affecting the AusNet Services distribution network this year when compared to the rates observed in 2020–21 (Figure 28). A major non-compliance is regarded as a high-risk situation where vegetation is touching, is growing through, or could soon touch, uninsulated conductors.

Leading into the 2020–21 period, Energy Safe had observed a decline in the performance of AusNet Services (see Figure 9 and Figure 10). We subsequently issued a warning to AusNet Services asking it to show cause as to why it should not be prosecuted. AusNet Services subsequently improved its performance and we detected lower rates of non-compliance

and major non-compliance in both HBRA and LBRA during 2021–22 (based on the spans inspected).

We saw another decline in performance in 2022–23. In considering the enforcement options to address the extent of non-compliance, we opted to use the new power available to issue infringement notices where high risk non-compliance has been identified. This resulted in the issue of five infringement notices, totalling $23,115 in fines.

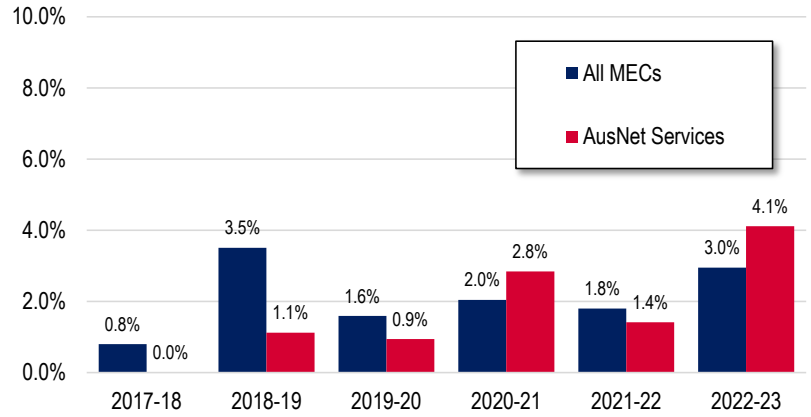

Figure 26 Rate of major non-compliances (HBRA and LBRA)

Transmission network pre fire danger period audit

Energy Safe also completed an audit and inspection for the AusNet Services transmission network to confirm AusNet Services was managing its electric line clearance responsibilities effectively in HBRA. The audit and inspection was to ensure AusNet Services was operating in compliance with its approved ELCMP.

The audit found one major non-compliances and one minor non-compliance. As with the distribution network, the non-compliances related to procedural deficiencies for vegetation clearing rectification timeframes accuracy of vegetation coding and recording of minimum clearance space distances.

We concluded that AusNet Services did not comply with two of the four elements of its approved ELCMP that were audited. Each of the identified non-compliances compromises the ability of AusNet Services to manage its electricity safety risks as far as practicable.

The field inspection component of the audit found there was little to no risk of fires being started by vegetation growing and contacting the network since the transmission network has large well-established clearance easements. The matters identified during the audit related to vegetation that existed on the outer fringe of the required minimum clearance space.

AusNet Services has committed to addressing the procedural deficiencies identified by Energy Safe through revised procedures in its ELCMP.

B5.3 Bushfire mitigation

Transmission network

Energy Safe reviewed 13,609 asset records from transmission lines across the entire AusNet Services transmission network. The review found no structures outside the inspection interval required by the Electricity Safety (Bushfire Mitigation) Regulations.

We also reviewed the active maintenance records along the powerlines from Heywood. to Portland, Heywood to South East (interconnector), Mortlake to Heywood and Mortlake to Moorabool.[9] We identified fifty instances where maintenance had not been delivered or reassessed within the timeframe specified in AusNet Services Transmission BMP. We also identified that AusNet Services was using priority timeframes that were not specified in its BMP. We required that AusNet Services rectify the identified

[9] The selection of powerlines for audit considers lines/areas included in recent audits, recent failure incidents reported to Energy Safe and any complaints received by Energy Safe.

issues in accordance with the priorities documented in its BMP and demonstrate to Energy Safe that rectification had occurred.

Energy Safe inspected 73 structures along these powerlines and identified one major safety concern regarding the uncertain timeframe for delivery of maintenance on structures that had been identified for replacement. The justification, internal approval, market approval (through a RIT-T process) and delivery of tower replacement can take a period of years. In response to our findings, AusNet Services provided a tower maintenance plan that includes additional inspections and assessments to monitor the condition of these towers until such time as they are replaced. The plan also includes regular reporting to Energy Safe. We will continue to monitor the safety and compliance of practices undertaken to manage these towers until their replacement in the next three years.

We also identified additional defects and requested that AusNet Services assess each and prioritise rectification in accordance with its maintenance practices. We identified 11 instances where the assessed priority by AusNet Services was lower than the priority assessed in the field, without a documented basis that could be explained to us. Subsequently, we required that AusNet Services manage the identified issues by assigning an appropriate priority in its maintenance system and demonstrate to Energy Safe that rectification had occurred.

Distribution network

Energy Safe reviewed 416,152 asset records from across the AusNet Services distribution network and found that the recorded last inspection dates for all in-service structures were compliant with the inspection cycle timeframes in the AusNet Services BMP.

The review identified 27 structure records where the serviceability status had not been updated or had not been updated correctly. AusNet Services committed to undertaking periodic checks of maintenance records to detect, investigate and rectify this in the future. Energy Safe undertakes annual data reviews to confirm that any errors are identified and fixed.

We inspected 213 structures across the AusNet Services network in the Foster, Bright and Leongatha areas.[9] The inspections found no issues requiring immediate attention and 23 priority issues, including broken conductor or conductor tie strands, damaged insulators and HV fuses with moisture ingress.

These issues found would normally be identified and repaired as part of routine inspection and maintenance activities undertaken by AusNet Services. We required that AusNet Services rectify the identified issues in accordance with its accepted maintenance practices.

B5.4 Work practices

In 2022–23, Energy Safe undertook five observations of AusNet Services work practices. Four observations were on field crews and one observation was on asset inspectors. Five observations were found during the AusNet Services transmission network observations and there were no observations on the AusNet Services distribution network. All were planned observations.

The findings of the observations were as follows:

- AusNet Services distribution network
  - major non-compliances 0
  - minor non-compliances 0
  - opportunities for improvement 0
- AusNet Services transmission network
  - major non-compliances 0
  - minor non-compliances 2
  - opportunities for improvement 3
- Asset inspectors
  - major non-compliances 0
  - minor non-compliances 0
  - opportunities for improvement 0

The key areas of concern identified by these observations related to:

- management and supervision of apprentices
- inspection and testing of operational earths.

We recommended that AusNet Services work practices specifically focus on ensuring adequate apprentice management and supervision and improved management of operational earths. AusNet Services conducted refresher training for all trades personnel involved in electrical apprentice supervision and amended procedures for the management of operational earths in response to our findings.

B6 Safety indicators

Figure 29 shows the number of serious electrical incidents reported to Energy Safe by AusNet Services during the 2022–23 period. The green arrows show the reduction from the long-term average across the 2010 to 2022 period (improvement), and the red arrows show the increase (decline). Figure 30 shows the same for those incidents that resulted in a ground or vegetation fire.

The most common incidents on the AusNet Services network in 2022–23 were HV fuse failures, tree contact, animal contact and connection failures. The numbers of all asset failure incidents were lower in 2022–23 than the long-term average, except for fuse failures which were 16 per cent above the average. Contact incidents were lower than the long-term average for all categories except dug-up cables, which jumped to 130 per cent above the long-term average. These events are largely outside the control of AusNet Services.

Tree contact, HV fuse failures, animal contact and conductor and connection faults were the most common causes of network-related fires. The numbers of fires from asset failure incidents were lower in 2022–23 than the long-term average in all categories, except for HV fuse failures and conductor failures. The numbers of fires from contact incidents were higher than the long-term average in two categories (other contact events and lightning strike), lower in three categories (tree contact, animal contact and vehicle contact) and stable in one (dug-up cables).

Tree contact is within the control of AusNet Services when it involves vegetation growing into powerlines or identified hazard trees falling onto powerlines, and outside of its control when it involves vegetation from outside the clearance space that fails and contacts their powerlines. Animal faults are also only partly within the control of AusNet Services. HV fuse failures and conductor and connection faults are within the control of AusNet Services to improve performance.

We are monitoring the progress of the AusNet Services fuse management action plan, which includes root cause analysis to inform corrective actions and updates to its condition monitoring regime and proactive replacement programs. The action plan also includes replacement targets, with 1,082 sites planned for fuse replacement by December 2023 and more in future years (see page 9).

In 2023–24, Energy Safe will review the conductor and connection management of the distribution networks, with a particular focus on asset lifecycle, performance and risk management. We will also continue to monitor the AusNet Services wood pole management improvement plan until all actions are complete.

Vegetation clearance is discussed in more detail on page 14.

Several actions are currently being taken by Energy Safe and industry to reduce contact incidents and increase safety in the No Go Zone, both for mobile plant and impacts to underground assets. Further details can be found on page 22.

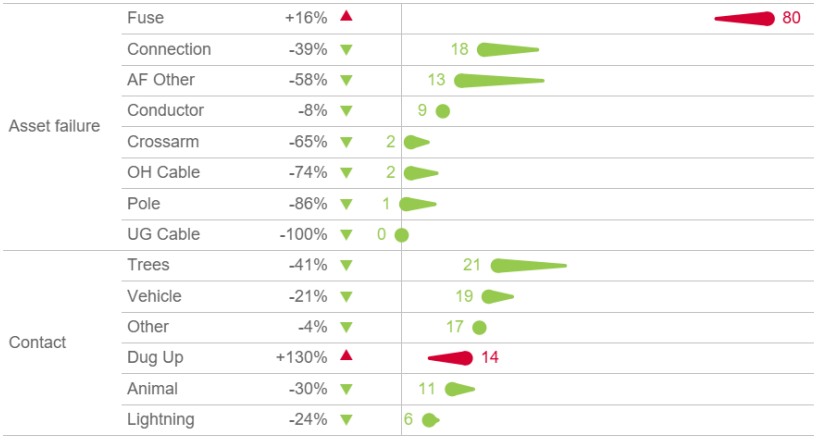

Figure 27 Incidents on the AusNet Services network

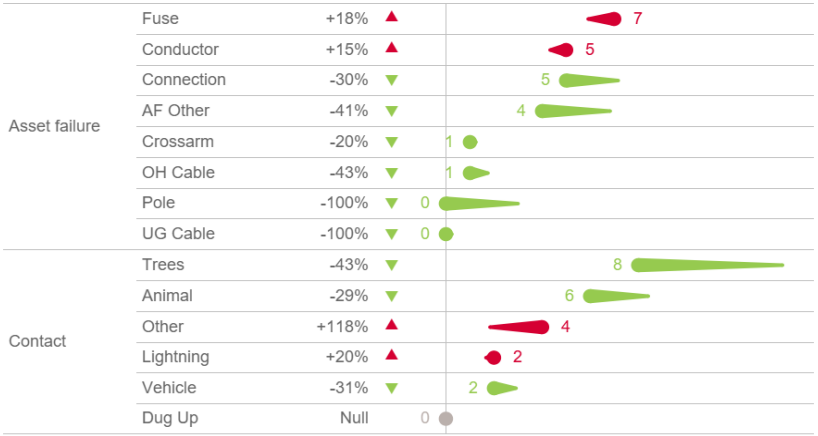

Figure 28 Incidents on the AusNet Services network resulting in ground fires

Appendix C : Basslink

Basslink was formerly owned by Keppel Infrastructure Trust, an entity listed on the Singapore stock exchange.[10] On 12 November 2021, Basslink was placed into receivership and put up for sale. APA Group acquired Basslink in October 2022. During and subsequent to the sale, Basslink continued to operate in accordance with its accepted ESMS.

Basslink owns and operates the high-voltage direct-current interconnector between Victoria and Tasmania. In Victoria, its assets comprise the Loy Yang converter station connected to the 500kV transmission system via 3.2 km of overhead line. From the converter station, 57 km of overhead line and 6.4 km of underground cable connect to the submarine cables that cross Bass Strait to Tasmania (Figure 31). Only the onshore assets in Victoria are subject to regulation by Energy Safe.

The Basslink asset base in Victoria is significantly smaller than that of AusNet Services Transmission; it has only one per cent of the towers that AusNet owns and maintains. Its assets are also newer, having been commissioned in April 2006.

All of the Basslink network is in HBRA.

Figure 29 Location of Basslink transmission assets (dark blue line)

[10] Basslink is registered as a Market Network Service Provider.

C1 Plans and processes

Basslink is required to submit the following documents to Energy Safe for review and acceptance/approval:

- an ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

Basslink is due to resubmit its ESMS in January 2025 and its BMP in December 2024.

Basslink submitted its 2021–26 ELCMP to Energy Safe in March 2021, and the plan was approved ahead of the 2021–22 fire danger period. This plan remained in place, unchanged, throughout the 2022–23 period.

C2 Directions

Energy Safe has not had cause to issue directions to Basslink.

C3 Powerline bushfire safety programs

There are no requirements on Basslink under Part 10A of the Electricity Safety Act (Additional bushfire mitigation requirements for major electricity companies).

C4 Exemptions

Basslink has sought no exemptions from regulations.

C5 Audit performance

C5.1 Electricity Safety Management Scheme

In March 2023, Energy Safe audited the processes and procedures used by Basslink to measure, evaluate and improve its safety performance.

We found two minor non-compliances, being:

- The Basslink *Incident Management & Reporting Procedure* had not followed the documented Basslink document control process as required by section 4.5.3 “Records” of AS 5577-2013 Electricity networks safety management systems (AS 5577)
- Basslink had no formal audit process or procedure, and it did not have an audit plan in place as required by section 4.5.4 of AS 5577.

Basslink provided a plan to address the audit findings and implement changes in 2023.

C5.2 Electric line clearance

For the 2022–23 fire danger period, an audit and inspection was completed for the Basslink network to confirm it was managing its electric line clearance responsibilities effectively in HBRA. The audit and inspection was to ensure Basslink was operating in compliance with its approved ELCMP.

The audit found Basslink was compliant with all five of the elements of its approved plan that were audited. No non-compliances or opportunities for improvement were identified.

Energy Safe inspected 30 of the 142 spans on the Basslink network; all were found to be compliant. The easement was being managed to a high standard. We considered this to be an excellent result, particularly given this has been the case for seven consecutive years.

While there had been a complaint regarding a one-metre high manuka tree in the easement, this was found to not breach the requirements of the legislation.

C5.3 Bushfire mitigation

Energy Safe reviewed 142 asset records from the 400kV DC powerlines running between the Loy Yang converter station and the coastal transition station. The review found no structures outside the inspection cycle timeframes identified in the Basslink BMP.

We inspected 35 structures along the 400kV DC powerline and found the transmission assets to be generally in very good condition. There were no issues requiring immediate attention and only minor issues relating to birds' nests and a wombat hole.

C5.4 Work practices

The Basslink transmission line operates almost continually, with scheduled detailed inspections occurring every three years and unscheduled surveillance inspections occurring monthly. Maintenance activities are determined by the severity of defects identified.

Energy Safe did not conduct any observations of Basslink works practices this year, as there was no planned work undertaken on the Basslink transmission line in the period.

C6 Safety indicators

Transmission infrastructure generally has a low level of incidents, due to the nature of the assets and the clearances maintained around these higher voltage assets. Transmission assets are concentrated in fewer, larger and better-defined easements than distribution assets, thereby reducing exposure to environmental threats and third-party impacts. This also makes them easier to maintain.

Basslink has the further advantage of having a relatively short transmission line in Victoria.

Basslink recorded no incidents on its transmission network during the 2022–23 period.

Appendix D : CitiPower

CitiPower/Powercor[11] is part of the Victoria Power Networks group of companies jointly owned by a Cheung Kong Group consortium (51 per cent) and Spark Infrastructure (49 per cent). The Cheung Kong Group consortium comprises CK Infrastructure Holdings and Power Assets Holdings. Spark Infrastructure is owned by Kohlberg Kravis Roberts & Co. L.P., Ontario Teachers' Pension Plan Board and Public Sector Pension Investment Board.

In May 2017, the Cheung Kong Group consortium purchased the DUET Group, thereby giving it majority ownership (66 per cent) of United Energy. This has resulted in some consolidation of activities and processes across the companies the consortium controls. Of most relevance from a safety perspective was the introduction into United Energy of CitiPower/Powercor procedures for vegetation management.

CitiPower and Powercor are managed by a single executive management team using common procedures and systems across the two distribution businesses. As a result, the ESMS audit (Section D5.1) and the work practices observations (Section D5.3) have been undertaken jointly across the two businesses. The remaining sections within this appendix refer to the specific assets within the CitiPower network and have therefore been assessed independently of the Powercor assets.

The CitiPower distribution network covers an area of approximately 157 km^2 and includes Melbourne's central business district and inner suburbs (Figure 32). It comprises approximately 2,530 km of overhead line, 2,710 km of underground cable, 48,200 power poles and 235,500 public lighting poles.

All of the CitiPower network is in LBRA.

Figure 30 Service area for the CitiPower distribution network (orange area)

Jemena and United Energy service boundaries are shown as orange lines

[11] CitiPower Pty Ltd is the listed holder of the electricity distribution licence.

D1 Plans and processes

CitiPower is required to submit the following documents to Energy Safe for review and acceptance/approval:

- an ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

CitiPower is due to resubmit its ESMS in December 2023 and its BMP in December 2024.

CitiPower submitted its 2021–26 ELCMP to Energy Safe in March 2021, and the plan was approved in advance of the 2021–22 fire danger period.

CitiPower later submitted an amended plan to Energy Safe that included changes to its vegetation management processes. We evaluated the amended plan to ensure it remained fit for purpose and complied with the requirements of the electric line clearance regulations. We have now approved the amended ELCMP.

D2 Directions

There are currently no directions on CitiPower.

D3 Powerline bushfire safety programs

There are no requirements on CitiPower under Part 10A of the Electricity Safety Act (Additional bushfire mitigation requirements for major electricity companies).

D4 Exemptions

There are no current exemptions applicable to CitiPower.

D5 Audit performance

D5.1 Electricity Safety Management Scheme

In May 2022, Energy Safe commenced an audit of the CitiPower asset management systems (together with Powercor, TOA and TOA2). The audit, which was finalised in 2022–23, focused on the processes and procedures used by CitiPower to manage its assets. We did not find any non-compliances during this audit.

In February 2023, Energy Safe audited CitiPower (together with Powercor, TOA and TOA2) with a focus on the processes and procedures used by CitiPower to measure, evaluate and improve its safety performance. We found one minor non-compliance relating to the late reporting of incidents to Energy Safe. CitiPower provided a plan to address the audit findings and implement these changes in 2023.

D5.2 Electric line clearance

Network inspection

During the 2022–23 period, Energy Safe inspected 695 spans on the CitiPower network and identified 31 non-compliant spans. We issued section 86(1) notices to CitiPower for all identified non-compliant spans. All were cleared by CitiPower as a matter of priority, resulting in the elimination of these potentially hazardous situations.

We observed a decrease in the rate of major non-compliances affecting the CitiPower network when compared to the previous year (Figure 33). A major non-compliance is regarded as a high-risk situation where vegetation is touching, or could soon touch, uninsulated conductors.

While Energy Safe had been observing the performance of CitiPower to be getting progressively worse since 2017–18 (see Figure 10), improvements have been seen for the last two years. While the noted improvement trend is a positive outcome, further improvement is needed.

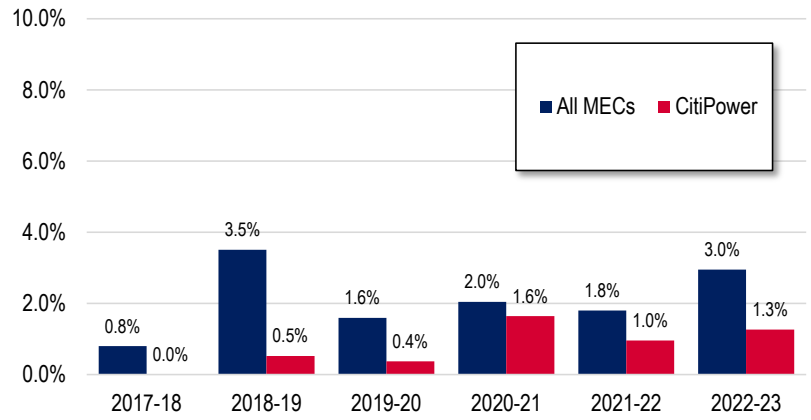

Figure 31 Rate of major non-compliances (LBRA only)

D5.3 Bushfire mitigation

The CitiPower area is entirely urban and, although comprised of only low bushfire risk area, an annual bushfire mitigation audit is conducted to verify the inspection of above-ground assets.

Energy Safe reviewed 57,577 asset records from across the entire CitiPower network and found no structures outside the inspection cycle timeframes identified in the CitiPower BMP.

Energy Safe inspected 93 structures from across the Deepdene and West Brunswick areas.[12] The inspections found one deteriorated low voltage underground cable requiring immediate attention and five additional priority issues. The five priority issues were minor in nature and would be expected to be identified and repaired as part of routine inspection and maintenance activities undertaken by CitiPower. We required that CitiPower rectify the identified issues in accordance with its accepted maintenance practices.

D5.4 Work practices

In 2022–23, Energy Safe undertook two observations of CitiPower work practices and both were planned observations One was on a CitiPower work crew and one was on CitiPower's asset inspectors.

The findings of the work crew observations were:

- major non-compliances 0
- minor non-compliances 0
- opportunities for improvement 0

The findings of the asset inspector observations were:

- major non-compliances 0
- minor non-compliances 3
- opportunities for improvement 0

The key areas of concern identified by these observations related to:

- the use of the incorrect tools
- following undocumented procedures
- the scope for asset inspection tasks being unclear to the inspector at each inspection.

We recommended CitiPower's work practices specifically focus on ensuring:

- all asset inspection procedures are fully documented
- inspectors clearly understand the tasks they are expected to perform.

D6 Safety indicators

Figure 34 shows the number of all serious electrical incidents reported to Energy Safe by CitiPower during the 2022–23 period. The green arrows show the reduction from the long-term average across the 2010 to 2022 period (improvement), and the red arrows show the increase (decline).

[12] The selection of structures for audit considers lines/areas included in recent audits, recent failure incidents reported to Energy Safe and any complaints received by Energy Safe.

Figure 35 shows the same for those incidents that result in a ground or vegetation fire.

The most common incidents on the CitiPower network in 2022–23 were vehicle contact, dug-up cables, connection faults and other contact events. One of these items is within the control of CitiPower (connection faults) and the other three are largely outside its control.

The numbers of asset failure incidents were higher in 2022–23 than the long-term average in five categories and lower in three categories. Contact incidents were higher in two categories, lower in three categories and stable (within five per cent) in one category.

Connection failures was the sole source of fire incidents. The numbers of fires from asset failure events were higher than the long-term average in one category and stable (or zero) in the other seven categories. The numbers of fires from contact events were zero in all categories.

Energy Safe is reviewing the conductor and connection management practices of all distribution networks in 2023–24.

Several actions are currently being taken by Energy Safe and industry to reduce contact incidents and increase safety in the No Go Zone, both for mobile plant and impacts to underground assets. Further details can be found on page 22.

Figure 32 Incidents on the CitiPower network

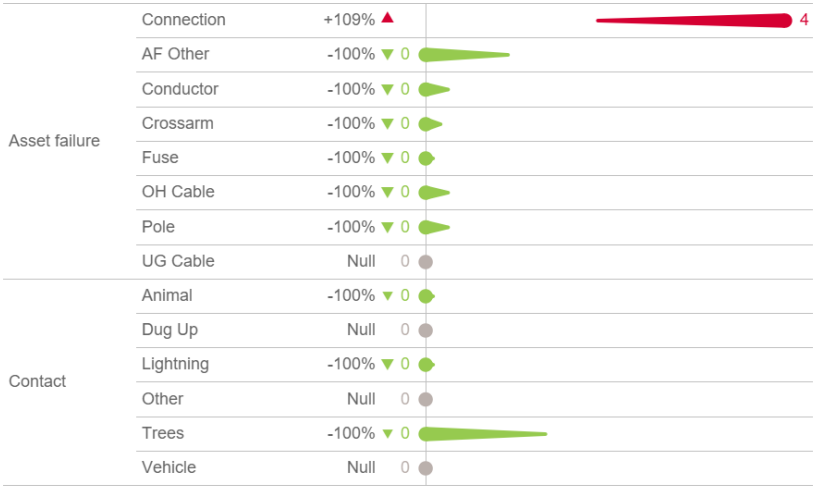

Figure 33 Incidents on the CitiPower network resulting in ground fires

Appendix E : Jemena

Jemena[13] is one of the subsidiaries of SGSP (Australia) Assets Pty Ltd, which is jointly owned by the State Grid International Development Australia Investment Company Limited (SGIDAIC) and Singapore Power International Pte Ltd (SPI). SGIDAIC holds a 60 per cent shareholding in SGSPAA and SPI holds the remaining 40 per cent.

SGIDAIC is owned by the State Grid Corporation of China. SPI is owned by Singapore Power Limited and its ultimate holding company is Temasek Holdings (Private) Limited.

As well as 100 per cent ownership of Jemena, SGSPAA also owns a 34 per cent interest in United Energy Distribution Holdings Pty Ltd, the holding company of United Energy Distribution Pty Ltd.

The Jemena distribution network covers an area of approximately 950 km^2, across Melbourne's northern and western suburbs, including Melbourne International Airport (Figure 36). It comprises approximately 4,500 km of overhead line, 2,300 km of underground cable, 94,300 power poles and 29,900 public lighting poles.

Most of the Jemena network (84 per cent) is in LBRA. Only 16 per cent is in HBRA.[14]

Figure 34 Service area for the Jemena distribution network (orange area)

CitiPower and United Energy service boundaries are shown as orange lines

[13] Jemena Electricity Networks (Vic) Ltd is the listed holder of the electricity distribution licence.

[14] The percentage is based on the proportion of route line length in HBRA as reported in Section 2.7 of its annual Category Regulatory Information Notice (RIN) submission to the Australian Energy Regulator (AER). The percentage in previous years' reports was based on network area.

E1 Plans and processes

Jemena is required to submit the following documents to Energy Safe for review and acceptance/approval:

- an ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

Jemena is due to resubmit its ESMS in June 2024.

Jemena submitted a revised BMP to Energy Safe on 29 June 2021. On 10 November 2022, Energy Safe issued a notice requiring Jemena to provide additional information regarding its BMP submission. Jemena responded to the request on 9 December 2022. At the time of writing the BMP remained under review by Energy Safe.

Jemena submitted its 2021–26 ELCMP to Energy Safe in March 2021, and the plan was approved in advance of the 2021–22 fire danger period. This plan remained in place, unchanged, throughout the 2022–23 period.

E2 Directions

There are currently no directions on Jemena.

E3 Powerline bushfire safety programs

Jemena has completed its mandated REFCL installation program by installing a REFCL at the Coolaroo zone substation. This was completed before the required date of 1 May 2023.

Jemena also operates at Sydenham a base-level[15] REFCL that is not prescribed in legislation.

Jemena also owns and operates feeders originating from the AusNet Services prescribed Kalkallo zone substation. These feeders are now either fully underground or REFCL-protected from Coolaroo zone substation.

E4 Exemptions

On 2 December 2020, Energy Safe granted an exemption for the powerlines supplied from the Coolaroo zone substation from being REFCL protected, where those powerlines are located in low bushfire risk areas of greater Melbourne (as determined by the CFA). The remaining powerlines with bushfire ignition risk were to be REFCL-protected by 1 May 2023.

Jemena was subsequently unable to procure the land required to deliver the proposal that supported their 2020 exemption application. Jemena amended their proposal and applied for a new exemption relating to the Coolaroo zone substation. The exemption request was assessed and a recommendation was provided to the Minister for consideration. The Governor in Council granted an exemption for Coolaroo in April 2023 and Energy Safe granted a corresponding exemption. The powerlines in hazardous bushfire risk areas that originate from Coolaroo were REFCL protected prior to 1 May 2023. Any new 22kV powerlines supplied from Coolaroo must be covered, underground or REFCL-protected.

E5 Audit performance

E5.1 Electricity Safety Management Scheme

In May 2022, Energy Safe commenced an audit of the Jemena asset management systems. The audit, which was finalised in 2022–23, focused on the process and procedures used by Jemena to manage its assets. We did not find any non-compliances during this audit.

[15] A base-level REFCL includes an arc suppression coil but does not include the power electronics that a complete REFCL uses for active fault compensation.

In February 2023, Energy Safe audited the processes and procedures used by Jemena to measure, evaluate and improve its safety performance. We did not find any non-compliances during this audit.

E5.2 Electric line clearance

Network pre fire danger period audit

For the 2022–23 fire danger period, an audit and inspection was conducted on the Jemena network to confirm it was managing its electric line clearance responsibilities effectively in HBRA.

The audit found no major non-compliances and three minor non-compliances. The non-compliances related to procedural deficiencies for vegetation inspection timeframes, clearing rectification timeframes and the accuracy of vegetation coding.

Through the audit and inspection process, Energy Safe concluded that Jemena did not comply with three of the four elements of its approved ELCMP that were audited. Each of the identified non-compliances compromises the ability of Jemena to manage its electricity safety risks as far as practicable.

The field inspection component of the audit found the extent of non-compliant vegetation present across the network had remained low, as were its previous year's inspection results.

The procedural deficiencies identified during the audit and inspections have been addressed by Jemena in its 2021–26 ELCMP. We will review the application of the revised procedures as part of the 2023–24 auditing and inspection program.

Network inspection

During the 2022–23 period, Energy Safe inspected 950 spans on the Jemena network, with 360 in HBRA and 590 in LBRA. The numbers of spans inspected provide a statistical representative sample of the network in HBRA and LBRA.

We identified 70 non-compliant spans across the network (one in HBRA and 69 in LBRA) and issued section 86(1) notices to Jemena for the identified non-compliance. All were cleared by Jemena as a matter of priority, as it was required by the section 86(1) notices, resulting in the elimination of that potentially hazardous situations.

In 2022–23, Energy Safe found no major non-compliances affecting the Jemena network in HBRA, as was the case last year. A major non-compliance is regarded as a high-risk situation where vegetation is touching, or could soon touch, uninsulated conductors.

Between 2017–18 and 2021–22, the combined rate of major non-compliances on the Jemena network was less than the average across all the distribution networks (Figure 37). In 2022–23, Jemena was the second worst performing network for line clearance due to the significant increase in major non-compliances in LBRA (Figure 9 and Figure 10).

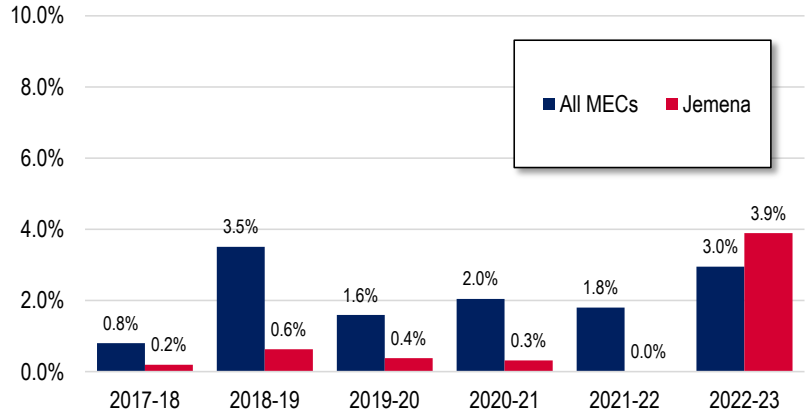

Figure 35 Rate of major non-compliances (HBRA and LBRA)

E5.3 Bushfire mitigation

Energy Safe reviewed 109,907 asset records from across the Jemena network and found that the recorded last inspection dates for all in-service structures were compliant with the inspection cycle timeframes in the Jemena BMP.

Energy Safe inspected 143 structures across the Sydenham and Tottenham areas.[16] The inspections identified no issues requiring immediate attention, and 45 priority issues relating to the condition of low voltage overhead service insulation and terminations, broken conductor strands and general hardware. The issues found were not major and would normally be identified and repaired as part of routine inspection and maintenance activities undertaken by Jemena.

We requested that Jemena assess these identified issues and prioritise rectification in accordance with its maintenance practices. We identified one instance where the assessed priority by Jemena was lower than the priority assessed by us in the field and, as such, was not appropriate for the risk. We required that Jemena rectify the identified issues by assigning an appropriate priority in its maintenance system and demonstrate to Energy Safe that the issues had been fixed.

E5.4 Work practices

In 2022–23, Energy Safe undertook two observations of Jemena work practices, one on a field crew and one on asset inspectors. Both observations were planned.

The findings of the field crew observations were as follows:

- major non-compliances 0
- minor non-compliances 0
- opportunities for improvement 3

The findings of the asset inspector observations were as follows:

- major non-compliances 0
- minor non-compliances 0
- opportunities for improvement 0

The key areas of concern identified by these observations related to:

- the electrical status of apparatus in secondary control compartment was not confirmed
- a switchboard rescue kit was not at the designated location
- SWMS were not dated when issued and amended.

We recommended that Jemena's work practices specifically focus on ensuring:

- the electrical status of all apparatus is confirmed before commencing work
- all SWMS are up to date
- specific requirements are followed when placing high voltage apparatus.

E6 Safety indicators

Figure 38 shows the number of all serious electrical incidents reported to Energy Safe by Jemena during the 2022–23 period. The green arrows show the reduction from the long-term average across the 2010 to 2022 period (improvement), and the red arrows show the increase (decline). Figure 39 shows the same for those incidents that result in a ground or vegetation fire.

The most common incidents on the Jemena network in 2022–23 were other contact events, dug-up cables, vehicle impacts and crossarm failures. Three of these events are outside of the direct control of Jemena and one (crossarm failures) is within its control. Only dug-up cables were higher this year than the long-term average.

[16] The selection of structures for audit considers lines areas included in recent audits, recent failure incidents reported to Energy Safe and any complaints received by Energy Safe.

All asset-related ground fire events were zero in 2022–23 except for conductor and crossarm-related fires. All contact-related ground fires were also zero this year except for animal contacts and other contact fires (vandalism, interference, etc.). No contact fires were greater in 2022–23 than the long-term average; dug-up fires were stable.

Several actions are currently being taken by Energy Safe and industry to reduce contact incidents and increase safety in the No Go Zone, both for mobile plant and impacts to underground assets. Further details can be found on page 22.

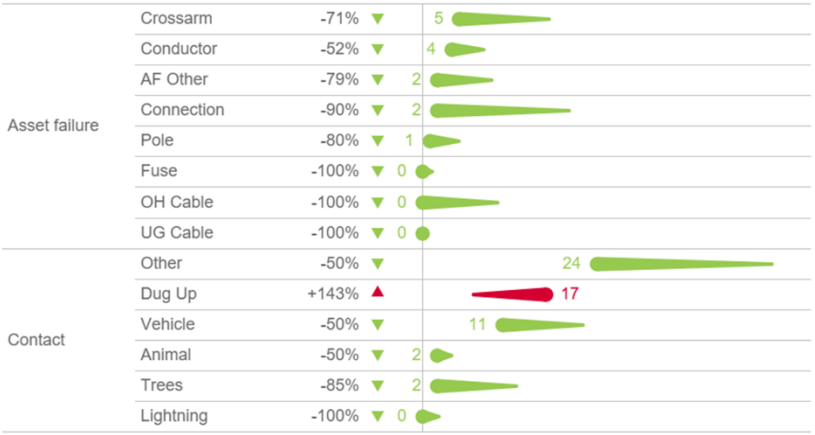

Figure 36 Incidents on the Jemena network

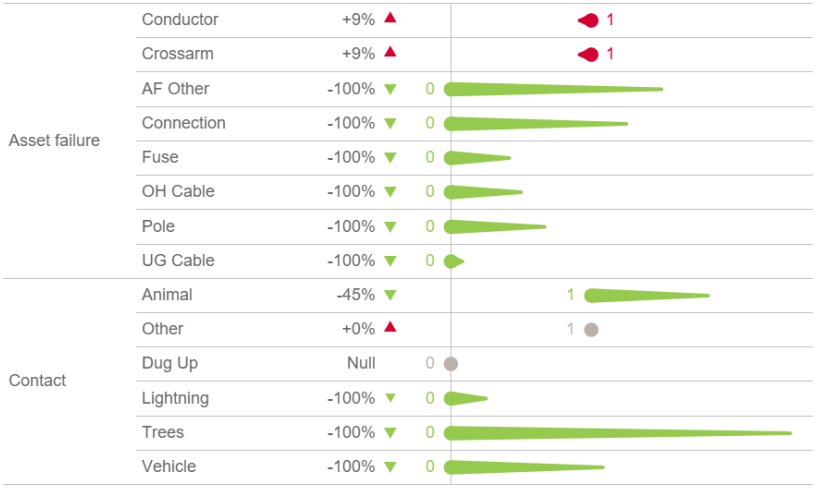

Figure 37 Incidents on the Jemena network resulting in ground fires

Appendix F : Powercor

CitiPower/Powercor[17] is part of the Victoria Power Networks group of companies jointly owned by a Cheung Kong Group consortium (51 per cent) and Spark Infrastructure (49 per cent). The Cheung Kong Group consortium comprises CK Infrastructure Holdings and Power Assets Holdings. Spark Infrastructure is owned by Kohlberg Kravis Roberts & Co. L.P., Ontario Teachers' Pension Plan Board and Public Sector Pension Investment Board.

In May 2017, the Cheung Kong Group consortium purchased the DUET Group, thereby giving it majority ownership (66 per cent) of United Energy. This has resulted in some consolidation of activities and processes across the companies the consortium controls. Of most relevance from a safety perspective was the introduction into United Energy of CitiPower/Powercor procedures for vegetation management.

CitiPower and Powercor are managed by a single executive management team using common procedures and systems across the two distribution businesses. As a result, the ESMS audit (Section F5.1) and the work practices observations (Section F5.4) have been undertaken jointly across the two businesses. The remaining sections within this appendix refer to the specific assets within the Powercor network and have therefore been assessed independently of the CitiPower assets.

The Powercor distribution network covers an area of approximately 145,700 km^2, and includes Melbourne's Docklands Precinct, west from Williamstown to the South Australian border, north to the Murray and south to the coast (Figure 40). It comprises approximately 68,790 km of overhead line, 9,800 km of underground cable, 487,090 poles and 107,050 public lighting poles.

Most of the Powercor network (96 per cent) is in HBRA.[18]

Figure 38 Service area for the Powercor distribution network (orange area)

[17] Powercor Australia Ltd is the listed holder of the electricity distribution licence.

[18] The percentage is based on the proportion of network area in HBRA. Powercor does not separate HBRA and LBRA zones in the Category RIN data it reports to the AER.

F1 Plans and processes

Powercor is required to submit the following documents to Energy Safe for review and acceptance/approval:

- an ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

Powercor is due to resubmit its ESMS in December 2023.

On 19 April 2022, Powercor submitted a revised BMP to Energy Safe. Due to the significant changes made to the plan, Energy Safe required further time to undertake a detailed assessment before acceptance. At its 27 September 2022 meeting, the Energy Safe Victoria Commission decided to extend the timeframe of provisional acceptance of Powercor's BMP. Provisional acceptance imposes limitations or conditions on Powercor until a set date by which a new plan must be submitted for full acceptance. As of 30 June 2023, Energy Safe had yet to receive a revised plan from Powercor.

Powercor submitted its 2021–26 ELCMP to Energy Safe in March 2021, and the plan was approved in advance of the 2021–22 fire danger period.

Powercor later submitted an amended plan that included changes to its vegetation management processes. We evaluated the amended plan to ensure it remained fit for purpose and complied with the requirements of the electric line clearance regulations. The amended ELCMP was subsequently approved by Energy Safe.

F2 Directions

There are currently no directions on Powercor.

F3 Powerline bushfire safety programs

To meet its bushfire mitigation obligations, Powercor implemented REFCL technology at 22 nominated zone substations over three delivery tranches. Powercor completed its REFCL delivery program before the legislated deadline of 1 May 2023.

F4 Exemptions

In 2019–20, Energy Safe granted an exemption regarding Powercor's obligation to install REFCLs at Corio and Geelong. Instead, a REFCL was to be installed at the new Gheringhap zone substation that now supplies the powerlines in hazardous bushfire risk areas formerly supplied by Corio and Geelong. This reduced the number of Powercor REFCLs from 22 to 21.

In 2020–21, Powercor advised Energy Safe that it would split the existing Waurn Ponds network and supply one half from a new REFCL-protected Torquay zone substation. This took the total number of Powercor REFCLs back up to 22.

F5 Audit performance

F5.1 Electricity Safety Management Scheme

In May 2022, Energy Safe commenced an audit of the Powercor asset management systems (together with CitiPower, TOA and TOA2). The audit, which was finalised in 2022–23, focused on the processes and procedures used by Powercor to manage its assets. We did not find any non-compliances during this audit.

During February 2023, Energy Safe audited Powercor (together with CitiPower, TOA and TOA2) with a focus on the processes and procedures used by Powercor to measure, evaluate and improve its safety performance. We found one minor non-compliance relating to the late reporting of incidents to Energy Safe. Powercor provided a plan to address the audit findings and implement these changes in 2023. We continue to monitor incident reports to ensure submission occurs in a timely manner.

F5.2 Electric line clearance

Network pre fire danger period audit

For the 2022–23 fire danger period, an audit and inspection was conducted on the Powercor network to confirm it was managing its electric line clearance responsibilities effectively in HBRA. The audit and inspection was to ensure Powercor was operating in compliance with its approved ELCMP.

The audit found four major non-compliances and one minor non-compliance. The non-compliances related to procedural deficiencies for inspection timeframes and rectification timeframes, the accuracy of vegetation coding and the recording of minimum clearance space distances.

Through the audit and inspection process, Energy Safe concluded that Powercor did not comply with all five of the elements of its approved ELCMP that were audited. Each of the identified non-compliances compromised the ability of Powercor to manage its electricity safety risks as far as practicable.

The level of non-compliant vegetation detected in the field inspection component of the audit was lower than last year's inspection results.

Powercor has committed to addressing the procedural deficiencies identified by Energy Safe through revised procedures in its ELCMP. In addition, it continues to seek additional resources to better enable it to manage its electric line clearance duties and obligations.

Energy Safe will review the application of these mitigation strategies as part of the 2023–24 auditing and inspection programs. We will continue to closely monitor this situation and, if necessary, intervene or undertake enforcement action to ensure Powercor meets its electric line clearance duties and obligations.

Network inspection

During the 2022–23 period, Energy Safe inspected 4474 spans on the Powercor network, with 2199 in HBRA and 2275 in LBRA. The numbers of spans inspected provide a statistical representative sample of the network in HBRA and LBRA.

We identified 378 non-compliant spans across the network (248 in HBRA and 130 in LBRA) and issued section 86(1) notices to Powercor for all identified non-compliant spans. All were cleared by Powercor as a matter of priority, as it was required by the section 86(1) notices. This resulted in the elimination of these potentially hazardous situations.

In 2022–23, Energy Safe observed a decrease in the rate of major non-compliance affecting the Powercor network when compared to the rate observed in 2021–22 (Figure 41). A major non-compliance is regarded as a high-risk situation where vegetation is touching, or could soon touch, uninsulated conductors.

The rate of non-compliant vegetation in HBRA on the Powercor network has been elevated and generally increasing over the last four years (Figure 9). Energy Safe is concerned that non-compliance rates could return to the historic high of 2017-18 if this trend is not arrested now. The rate of non-compliant vegetation in LBRA has remained stable since 2019–20 (Figure 10).

Energy Safe is closely monitoring the performance of Powercor through its safety regulation programs.

In considering its enforcement options to address the extent of non-compliance, Energy Safe opted to use the new power available to issue infringement notices where high risk non-compliance has been identified. This resulted in the issue of 13 infringement notices to Powercor, totalling $60,099 in fines.

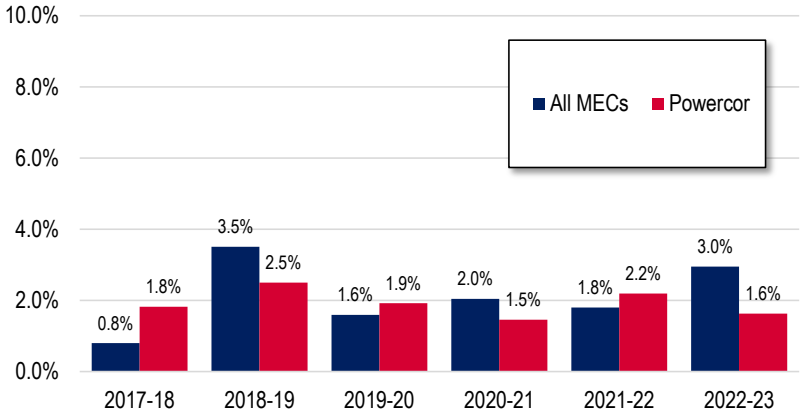

Figure 39 Rate of major non-compliances (HBRA and LBRA)

F5.3 Bushfire mitigation

Energy Safe reviewed 597,762 asset records from across the Powercor network and identified no in-service structures with recorded inspection dates outside the risk assessment procedures and inspection cycle timeframes identified in the Powercor BMP.

We inspected 184 structures from across the Ballarat, Maryborough and Echuca areas.[19] The inspections identified no issues requiring immediate attention, and 13 priority issues relating to broken conductor ties, deteriorated wooden crossarms and damaged HV fuse fire chokes. The issues found would normally be identified and repaired as part of routine inspection and maintenance activities undertaken by Powercor.

We required that Powercor rectify these issues in accordance with its accepted maintenance practices.

F5.4 Work practices

In 2022–23, Energy Safe undertook three observations of Powercor work crews, two on field crews and one on asset inspectors. All of the observations were planned.

The findings of the work crew observations were as follows:

- major non-compliances 0
- minor non-compliances 3
- opportunities for improvement 0

The findings of the asset inspector observations were as follows:

- major non-compliances 0
- minor non-compliances 1
- opportunities for improvement 1

The key areas of concern identified by these observations related to:

- the establishment of drop zones
- ensuring earths remain effectively earthed for the duration of the job
- ensure asset inspectors are correctly sounding and drilling poles.

We recommended that Powercor's work practices specifically focus on ensuring:

- drop zones are established before work begins
- earths are securely attached and connected before work begins
- asset inspectors are compliant with Powercor's Asset Inspection Manual.

F6 Safety indicators

Figure 42 shows the number of all serious electrical incidents reported to Energy Safe by Powercor during the 2022–23 period. The green arrows show the reduction from the long-term average across the 2010 to 2022 period (improvement), and the red arrows show the increase (decline).

[19] The selection of structures for audit considers lines/areas included in recent audits, recent failure incidents reported to Energy Safe and any complaints received by Energy Safe.

Figure 43 shows the same for those incidents that result in a ground or vegetation fire.

The most common incidents on the Powercor network in 2022–23 were vehicle impacts, connection faults, dug-up cables and other contact events (vandalism, interference, etc.). Three of these events are largely outside the control of the Powercor; connection faults are within the direct control of Powercor. The numbers of incidents were lower in 2022–23 than the long-term average in all asset failure categories, with the exception of underground cables. Vehicle impacts and dug-up cables are currently higher than the long-term average, and the remaining four contact categories are less than the average.

Connection faults, vehicle impacts, other contact events and tree contacts were the most common causes of network-related fires. One of these (connection faults) is within full control of Powercor to manage, one is partially in its control (tree contacts) and two are largely outside its control (vehicle impacts and other contact events).

The numbers of fires in the period were also stable or lower than the long-term average for all asset failure and contact categories except for fires due to connection faults and other contact events.

In 2023–24, Energy Safe will review the conductor and connection management of the distribution networks, with a particular focus on asset lifecycle, performance and risk management. We will also continue to monitor the Powercor wood pole management improvement plan until all actions are complete.

Several actions are currently being taken by Energy Safe and industry to reduce contact incidents and increase safety in the No Go Zone, both for mobile plant and impacts to underground assets. Further details can be found on page 22.

Vegetation clearance is discussed in more detail on page 14 (performance) and page 7 (enforcement actions).

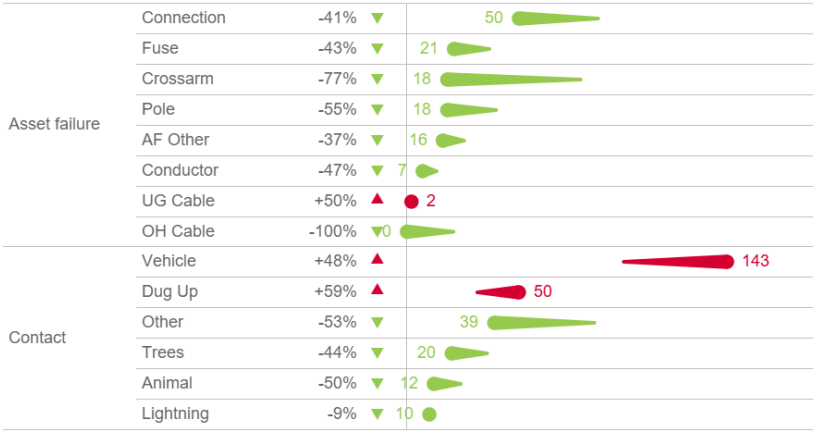

Figure 40 Incidents on the Powercor network

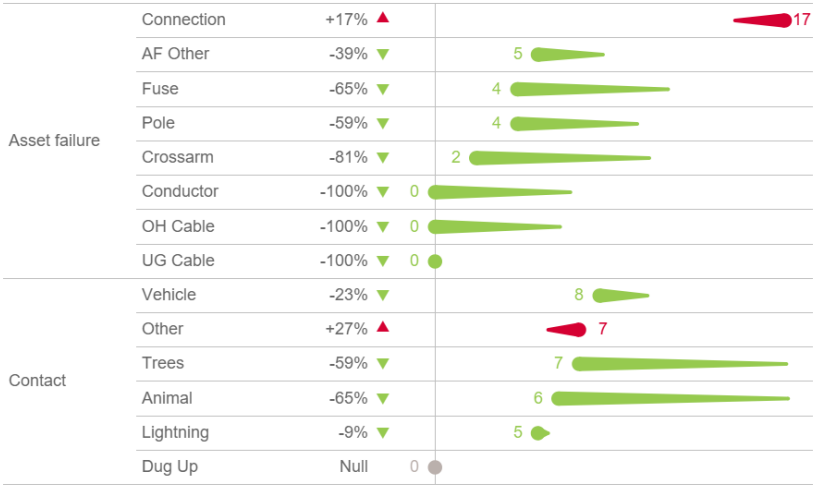

Figure 41 Incidents on the Powercor network resulting in ground fires

Appendix G : Transgrid

Transgrid[20] is jointly owned by Canadian pension funds CDPQ and OMERS (22.505 and 19.99 per cent respectively), Utilities Trust of Australia (22.505 per cent), Abu Dhabi Investment vehicle Tawreed Investments Limited (19.99 per cent) and Australian infrastructure manager Spark Infrastructure (15.01 per cent).

Transgrid operates and manages the high voltage electricity transmission network in New South Wales and the Australian Capital Territory. Recently, Transgrid has expanded its asset base to include assets in Victoria where it is servicing specific customer projects. These assets include the Deer Park Terminal Station, the Kiamal Terminal Station and the Berrybank Terminal Station and Zone Substation. Transgrid also operates a 7.5 km 220kV overhead transmission line from Berrybank Terminal Station to Berrybank Zone Substation (Figure 44).

Transgrid also owns and operates assets that link Victoria to the New South Wales transmission networks at the Red Cliffs Terminal Station near Mildura. In Victoria, the transmission line consists of 1.5 km of single circuit 220 kV powerline supported on four steel towers built in 1979.

The Deer Park Terminal Station is in LBRA. The other Transgrid assets are in HBRA.

Figure 42 Locations of Transgrid assets (orange squares)

[20] Transgrid Services Pty Ltd is the listed holder of the electricity transmission licences.

G1 Plans and processes

Transgrid is required to submit the following documents to Energy Safe for review and acceptance/approval:

- an ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

Transgrid is due to resubmit its ESMS in July 2025 and its BMP in May 2025.

Transgrid submitted its 2021–26 ELCMP to Energy Safe in March 2021, and the plan was approved in advance of the 2021–22 fire danger period. This plan remained in place, unchanged, throughout the 2022–23 period.

G2 Directions

Energy Safe has not had cause to issue directions to Transgrid.

G3 Powerline bushfire safety programs

There are no requirements on Transgrid under Part 10A of the Electricity Safety Act (Additional bushfire mitigation requirements for major electricity companies).

G4 Exemptions

Transgrid has sought no exemptions from regulations.

G5 Audit performance

G5.1 Electricity Safety Management Scheme

In February 2023, Energy Safe audited the processes and procedures used by Transgrid to measure, evaluate and improve their safety performance. We found one minor non-compliance as the plan did not list all Victorian assets owned and managed by Transgrid.

Transgrid plans to address the audit finding by providing an updated ESMS and BMP that includes all Victorian assets. This will be provided by December 2023.

G5.2 Electric line clearance

Network pre fire danger period audit

For the 2022–23 fire danger period, Energy Safe conducted an audit and inspection on the Transgrid transmission network to confirm it was managing its electric line clearance responsibilities effectively in HBRA. The audit and inspection was to ensure Transgrid was operating in compliance with its approved ELCMP.

The audit found one minor non-compliance that related to a procedural deficiency relating to vegetation coding.

We concluded that Transgrid did not comply with one of the four elements of the approved Transgrid ELCMP that were audited. The identified non-compliance compromised the ability of Transgrid to manage its electricity safety risks as far as practicable.

The field inspection component of the audit found there was no immediate risk of fires being started by vegetation contacting the network.

Transgrid has committed to addressing the procedural deficiencies identified by us through revised procedures in its ELCMP. Energy Safe will review the application of these mitigation strategies as part of the 2023–24 auditing and inspection programs.

Network inspection

During the 2022–23 period, Energy Safe inspected all 24 spans on the Transgrid transmission network, and two of those inspected were found to be non-compliant.

We issued a section 86(1) notice to Transgrid for the identified non-compliant spans. These were cleared by Transgrid as a matter of priority as required by the section 86(1) notices, resulting in the elimination of that potentially hazardous situation.

Transgrid is a relatively new transmission network that has large and typically well-established clearance easements. The non-compliance identified during the inspections related to vegetation that existed on the outer fringe of the required minimum clearance space and, therefore, did not create a significant risk.

This is the third year Energy Safe has inspected the Transgrid transmission network. Its performance has declined when compared to 2021–22 when we identified one non-compliant span.

G5.3 Bushfire mitigation

Energy Safe reviewed 24 asset records for 220kV overhead transmission line from Berrybank Terminal Station to Berrybank Zone Substation, which is situated entirely within hazardous bushfire risk area. The review found no assets outside the inspection cycle timeframes identified in the Transgrid BMP.

We inspected 24 structures along the Transgrid line. The inspections identified no issues requiring immediate attention, and generally found the line to be in good condition and reflective of its relatively young age.

G5.4 Work practices

Energy Safe is yet to undertake a work practice observation of Transgrid as its assets are relatively new (commissioned in 2017) requiring very little maintenance at this stage of its life cycle.

G6 Safety indicators

Transmission infrastructure generally has low levels of incidents due to the nature of the assets and the clearances maintained around these higher voltage assets. Transmission assets are concentrated in fewer, larger and better-defined easements than distribution assets, thereby reducing exposure to environmental threats and third-party impacts. This also makes them easier to maintain.

The risks associated with Transgrid are reduced by it currently comprising only terminal station and zone substation assets and only having been operating for a short time. As such, Transgrid's Victorian assets also have not entered a phase of their life cycle where major maintenance is required.

Transgrid recorded no incidents involving its network assets during the 2022–23 period.

Appendix H : Transmission Operations Australia

Transmission Operations (Australia)[21] (TOA) is jointly owned by Cheung Kong Infrastructure Holdings Ltd (50 per cent) and Power Assets Holdings Ltd (50 per cent). Both are part of the Cheung Kong Group of companies. Trading together as Australian Energy Operations, they also own Transmission Operations (Australia) 2.

Together they hold a majority ownership (51 per cent) of the CitiPower/ Powercor Group of companies, which are contracted to provide services in support of ongoing TOA operations. Cheung Kong Infrastructure also holds majority ownership (66 per cent) of United Energy.

TOA owns and operates the connections from the Mt Mercer Wind Farm and from the Moorabool North and South Wind Farms to the electrical transmission network (Figure 45). The Mt Mercer transmission line is a 22km 132kV powerline and the Moorabool North and South transmission line is a 30km 132kV powerline. Both connect to the Elaine Terminal Station, which steps the voltage up from 132kV to 220kV for injection into the AusNet Services transmission network.

The TOA asset base in Victoria is significantly smaller than that of AusNet Services Transmission; it has only 2-3 per cent of the towers and poles that AusNet Services owns and maintains. Its assets are also newer, with the Mt Mercer transmission line having been commissioned in November 2013 and the Moorabool North and South transmission line being commissioned in July 2020.

All of the TOA network is in HBRA.

Figure 43 Location of TOA transmission assets (orange square)

[21] Transmission Operations (Australia) Pty Ltd is the listed holder of the electricity transmission licence.

H1 Plans and processes

TOA is required to submit the following documents to Energy Safe for review and acceptance/approval:

- ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

A joint TOA/TOA2 ESMS and BMP are due to be submitted in October 2025.

TOA submitted its 2021–26 ELCMP to Energy Safe in March 2021, and the plan was approved in advance of the 2021–22 fire danger period.

TOA later submitted an amended plan to Energy Safe that included changes to its vegetation management processes. We evaluated the amended plan to ensure it remained fit for purpose and complied with the requirements of the electric line clearance regulations. We have now approved the amended ELCMP.

H2 Directions

Energy Safe has not had cause to issue directions to TOA.

H3 Powerline bushfire safety programs

There are no requirements on TOA under Part 10A of the Electricity Safety Act (Additional bushfire mitigation requirements for major electricity companies).

H4 Exemptions

TOA has sought no exemptions from regulations.

H5 Audit performance

H5.1 Electricity Safety Management Scheme

In May 2022, Energy Safe commenced an audit of the TOA asset management systems (together with CitiPower, Powercor and TOA2). The audit, which was finalised in 2022–23, focused on the processes and procedures used by TOA to manage its assets. We did not find any non-compliances during this audit.

In February 2023, Energy Safe audited TOA (together with CitiPower, Powercor and TOA2) with a focus on the processes and procedures used by TOA to measure, evaluate and improve its safety performance. We found one minor non-compliance relating to the late reporting of incidents to Energy Safe. TOA provided a plan to address the audit findings and implement these changes in 2023. We continue to monitor incident reports to ensure submission occurs in a timely manner.

H5.2 Electric line clearance

Network pre fire danger period audit

For the 2022–23 fire danger period, an audit and inspection was conducted for the TOA transmission network to confirm it was managing its electric line clearance responsibilities effectively in HBRA. The audit and inspection was to ensure TOA was operating in compliance with its approved ELCMP.

The audit found one minor non-compliance. The non-compliance related to procedural deficiencies for the accuracy of vegetation coding.

Through the audit and inspection process, Energy Safe concluded that TOA did not comply with one of the four elements of the approved TOA ELCMP that were audited. The identified non-compliance compromised the ability of TOA to manage its electricity safety risks as far as practicable.

While the TOA transmission network has large well-established clearance easements, seven non-compliances were identified during the audit.

We issued a section 86(1) notice to TOA for the identified non-compliant spans. The spans were cleared by TOA as a matter of priority as required

by the section 86(1) notices, resulting in the elimination of that potentially hazardous situation.

TOA has committed to addressing the procedural deficiency identified in the audit through revised procedures in its ELCMP. Energy Safe will review the application of these mitigation strategies as part of the 2023–24 auditing and inspection programs.

Network inspection

During the 2022–23 period, Energy Safe inspected 75 of the 262 spans on the TOA transmission network. Seven spans were found to be non-compliant.

There had been a steady increase in the rate of non-compliant vegetation affecting the TOA network between 2016–17 and 2019–20. This upward trend was addressed and we saw improved performance in 2020–21 and 2021–22; however, the non-compliance rate increased again in 2022–23 (Figure 46). That said, this is not a matter of immediate concern as the non-compliances existed on the edge of the minimum clearance space of what is wide transmission easement. As such, they did not pose an imminent risk of contact. Energy Safe will closely monitor the performance of TOA during the 2023–24 period to confirm its performance does not continue to decline.

H5.3 Bushfire mitigation

Energy Safe reviewed 371 asset records for both powerlines running from the Elaine Terminal Station — one to the Mt Mercer wind farm and the other to the Moorabool North and South wind farms. The review found no structures outside the inspection cycle timeframes identified in the TOA BMP.

We inspected 56 structures along the TOA lines. The inspections identified no issues requiring immediate attention, and 11 minor issues relating to loose insulator brackets and nuts. Generally, the inspection found the lines to be in good condition, as would be expected given they are relatively new assets.

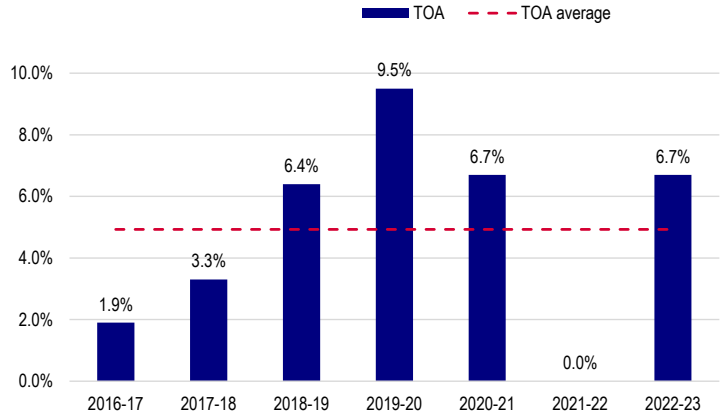

Figure 44 Non-compliance rates for TOA

The issues found were minor in nature and would normally be identified and repaired as part of routine inspection and maintenance activities undertaken by TOA. We required that TOA rectify the identified issues in accordance with its priority maintenance practices.

H5.4 Work practices

Energy Safe is yet to undertake a work practice observation of TOA as the transmission line is expected to be operational almost all the time. Furthermore, this is a relatively new asset (commissioned in November 2013) requiring very little maintenance at this stage of its life cycle.

H6 Safety indicators

Transmission infrastructure generally has a low level of incidents due to the nature of the assets and the clearances maintained around these higher voltage assets. Transmission assets are concentrated in fewer, larger and better-defined easements than distribution assets, thereby reducing exposure to environmental threats and third-party impacts. This also makes them easier to maintain.

The risks associated with TOA are reduced by it being a short transmission line and only having been operating for a short time.

TOA recorded one incident during the 2022–23 period. Arcing was reported from an overheated isolator. TOA undertook a controlled emergency outage and notified the Australian Energy Market Operator.

Appendix I : Transmission Operations Australia 2

Transmission Operations (Australia) 2[22] (TOA2) is jointly owned by Cheung Kong Infrastructure Holdings Ltd (50 per cent) and Power Assets Holdings Ltd (50 per cent). Both are part of the Cheung Kong Group of companies. Trading together as Australian Energy Operations, they also own Transmission Operations (Australia).

Together they hold a majority ownership (51 per cent) of the CitiPower/ Powercor Group of companies, which are contracted to provide services in support of ongoing TOA operations. Cheung Kong Infrastructure also holds majority ownership (66 per cent) of United Energy.

TOA2 owns and operates the connection from the Ararat Wind Farm to the electrical transmission network (Figure 47). This includes a 21 km 132kV powerline and the Ararat Terminal Station, which steps the voltage up from 132kV to 220kV for injection into the AusNet Services transmission network.

The TOA2 asset base in Victoria is significantly smaller than that of AusNet Services Transmission; it has less than one per cent of the towers and poles that AusNet Services owns and maintains. Its assets are also newer, having only been commissioned in June 2016.

All of the TOA2 network is in HBRA.

Figure 45 Location of TOA2 transmission assets (orange square)

[22] Transmission Operations (Australia) 2 Pty Ltd is the listed holder of the electricity transmission licence.

I1 Plans and processes

TOA is required to submit the following documents to Energy Safe for review and acceptance/approval:

- an ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

A joint TOA/TOA2 ESMS and BMP are due to be submitted in October 2025.

TOA2 submitted its 2021–26 ELCMP to Energy Safe in March 2021, and the plan was approved in advance of the 2021–22 fire danger period.

TOA2 later submitted an amended plan to Energy Safe that included changes to its vegetation management processes. We evaluated the amended plan to ensure it remained fit for purpose and complied with the requirements of the electric line clearance regulations. We have now approved the amended ELCMP.

I2 Directions

Energy Safe has not had cause to issue directions to TOA2.

I3 Powerline bushfire safety programs

There are no requirements on TOA2 under Part 10A of the Electricity Safety Act (Additional bushfire mitigation requirements for major electricity companies).

I4 Exemptions

TOA2 has sought no exemptions from regulations.

I5 Audit performance

I5.1 Electricity Safety Management Scheme

In May 2022, Energy Safe commenced an audit of the TOA2 asset management systems (together with CitiPower, Powercor and TOA). The audit, which was finalised in 2022–23, focused on the processes and procedures used by TOA2 to manage its assets. We did not find any non-compliances during this audit.

During February 2023, Energy Safe audited TOA2 (together with CitiPower, Powercor and TOA) with a focus on the processes and procedures used by TOA2 to measure, evaluate and improve its safety performance. We found one minor non-compliance relating to the late reporting of incidents to Energy Safe. TOA2 provided a plan to address the audit findings and implement these changes in 2023.

I5.2 Electric line clearance

Network pre fire danger period audit

For the 2022–23 fire danger period, an audit and inspection was conducted for the TOA2 transmission network to confirm it was managing its electric line clearance responsibilities effectively in HBRA. The audit and inspection was to ensure TOA2 was operating in compliance with its approved ELCMP.

The audit, which included vegetation management system data analysis, found one minor non-compliance and one opportunity for improvement. The non-compliance related to procedural deficiencies for accuracy of vegetation coding.

Through the audit and inspection process, Energy Safe concluded that TOA2 did not comply with one of the four elements of the approved TOA2 ELCMP that were audited. The identified non compliances compromised the ability of TOA2 to manage its electricity safety risks as far as practicable.

TOA2 has committed to addressing the procedural deficiency identified by the audit through revised procedures in its ELCMP. We will review the application of these mitigation strategies as part of the 2023–24 auditing and inspection programs.

While the TOA2 transmission network has large well-established clearance easements, one non-compliance was identified during our inspections.

We issued a section 86(1) notice to TOA2 for the identified non-compliant span. The span was cleared by TOA2 as a matter of priority as required by the section 86(1) notice, resulting in the elimination of that potentially hazardous situation.

Network inspection

During the 2022–23 period, Energy Safe inspected 14 of the 106 spans on the TOA2 transmission network. One of those inspected was found to be non-compliant.

The non-compliance rate for 2022–23 has increased when compared to last year (Figure 48); however, this is not a matter of immediate concern. Energy Safe will closely monitor the performance of TOA2 during the 2023–24 period to confirm its performance does not continue to decline.

I5.3 Bushfire mitigation

Energy Safe reviewed all 107 asset records for the 132kV line from Ararat wind farm to Ararat terminal station, which is situated entirely within hazardous bushfire risk area. The review found no assets outside the inspection cycle timeframes identified in the joint TOA/TOA2 BMP.

Energy Safe inspected 24 structures along the TOA2 line. The inspections identified no issues requiring immediate attention, and generally found the line to be in good condition and reflective of its relatively young age (commissioned in July 2016).

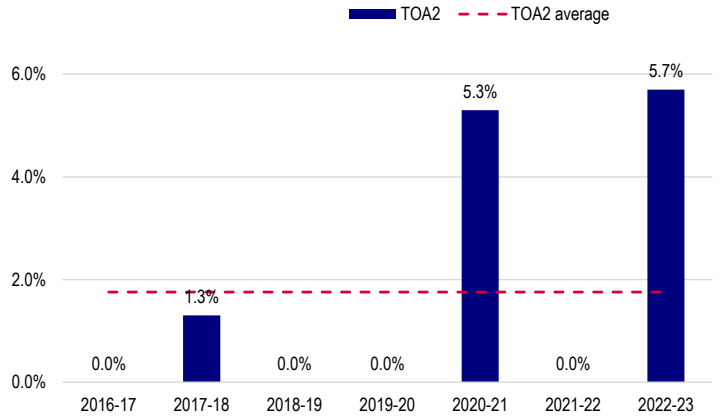

Figure 46 Non-compliance rates for TOA2

I5.4 Work practices

Energy Safe is yet to undertake a work practice observation of TOA2 as the transmission line is expected to be operational almost all the time. Furthermore, this is a relatively new asset (commissioned in June 2016) requiring very little maintenance at this stage of its life cycle.

I6 Safety indicators

Transmission infrastructure generally has low levels of incidents due to the nature of the assets and the clearances maintained around these higher voltage assets. Transmission assets are concentrated in fewer, larger and better-defined easements than distribution assets, thereby reducing exposure to environmental threats and third-party impacts. This also makes them easier to maintain.

The risks associated with TOA2 are reduced by it being a short transmission line and only having been operating for a short time.

TOA2 recorded no incidents on its transmission network during the 2022–23 period.

Appendix J : United Energy

United Energy[23] is jointly owned by a Cheung Kong Group consortium (66 per cent) and SGSP (Australia) Assets Pty Ltd (34 per cent).

SGSP (Australia) Assets owns 100 per cent of Jemena.

The Cheung Kong Group consortium also owns 51 per cent of CitiPower/Powercor and 100 per cent of Transmission Operations (Australia) and Transmission Operations (Australia) 2. These assets were owned prior to the purchase of United Energy. After gaining majority ownership of United Energy, several activities and processes were consolidated across the companies the consortium controls. Of most relevance from a safety perspective was the introduction into United Energy of CitiPower/Powercor procedures for assessing vegetation clearance at height.

The United Energy distribution network covers an area of approximately 1,470 km^2 across Melbourne's eastern and south-eastern suburbs and the Mornington Peninsula (Figure 48). It comprises approximately 10,020 km of overhead line, 3,620 km of underground cable, 168,200 poles and 35,600 public lighting poles.

Half of the United Energy network (50 per cent) is in HBRA.[24]

Figure 47 Service area for the United Energy distribution network (orange area)

Jemena and CitiPower service boundaries are shown as orange lines

[23] United Energy Distribution Pty Ltd is the listed holder of the electricity distribution licence.

[24] The percentage is based on the proportion of network area in HBRA. United Energy does not separate HBRA and LBRA zones in the Category RIN data it reports to the AER.

J1 Plans and processes

United Energy is required to submit the following documents to Energy Safe for review and acceptance/approval:

- an ESMS and BMP five years after it was last accepted by Energy Safe
- an ELCMP for the period 1 July 2021 to 30 June 2026 by 31 March 2021, with the subsequent plan due to be submitted before 30 June 2026.

Submissions of revised plans may occur more frequently to reflect changes in the regulations or company practices or when required by Energy Safe.

United Energy submitted a revised BMP on 27 October 2022. The revised BMP is being reviewed by Energy Safe. United Energy continues to operate under its current BMP until such time as the revised BMP is accepted by Energy Safe.

United Energy is due to resubmit its ESMS in December 2023.

United Energy submitted its 2021–26 ELCMP to Energy Safe in March 2021, and the plan was approved in advance of the 2021–22 fire danger period.

United Energy later submitted an amended plan to Energy Safe that included changes to its vegetation management processes. We evaluated the amended plan to ensure it remained fit for purpose and complied with the requirements of the electric line clearance regulations. We have now approved the amended ELCMP.

J2 Directions

There are currently no directions on United Energy.

J3 Powerline bushfire safety programs

While United Energy had no regulatory obligation to install REFCLs at any of its zone substations, it elected to install REFCLs at the Frankston South, Mornington and Dromana zone substations prior to December 2019.

J4 Exemptions

There are currently no directions on United Energy.

J5 Audit performance

J5.1 Electricity Safety Management Scheme

In May 2022, Energy Safe commenced an audit of the United Energy asset management systems. The audit, which was finalised in 2022–23, focused on the processes and procedures used by United Energy to manage its assets.

We found two minor non-compliances during this audit being:

- inconsistent references to document review periods across the provided asset class Life Cycle Strategy documents
- an increase in forecasted expenditure for the conductor asset class (the highest among those presented) and the deteriorating failure performance for the asset class should have triggered an update to the Conductor and Connectors Life Cycle Strategy.

United Energy provided a plan to address the audit findings and implement these changes by December 2023.

In April 2023, Energy Safe audited the processes and procedures used by United Energy to measure, evaluate and improve its safety performance. We did not find any non-compliances during this audit.

J5.2 Electric line clearance

Network pre fire danger period audit

For the 2022–23 fire danger period, an audit and inspection was conducted on the United Energy network to confirm it was managing its electric line clearance responsibilities effectively in HBRA. The audit and inspection was to ensure United Energy was operating in compliance with its approved ELCMP.

The audit found three major and one minor non-compliances. The non-compliances related to procedural deficiencies for vegetation inspection timeframes, rectification timeframes, accuracy of vegetation coding and recording of minimum clearance space distances.

Through the audit and inspection process, Energy Safe concluded that United Energy did not comply with four of the five elements of its approved ELCMP that were audited. Each of the identified non-compliances compromised the ability of United Energy to manage its electricity safety risks as far as practicable.

United Energy has committed to addressing the procedural deficiencies identified by the audit through revised procedures in its ELCMP. In addition, it continues to seek additional vegetation management resources to better enable it to manage its electric line clearance duties and obligations.

Energy Safe will review the application of these mitigation strategies as part of the 2023–24 auditing and inspection programs. We will continue to closely monitor this situation and, if necessary, intervene or undertake enforcement action to ensure United Energy meets its electric line clearance duties and obligations.

Network inspection

During the 2022–23 period, Energy Safe inspected 1,806 spans on the United Energy network — 1,096 in HBRA and 710 in LBRA. The numbers of spans inspected provide a statistical representative sample of the network in HBRA and LBRA.

We identified 346 non-compliant spans across the network, with 268 in HBRA and 78 in LBRA. We issued section 86(1) notices to United Energy for all identified non-compliant spans. All were cleared by United Energy as a matter of priority as required by the section 86(1) notices, resulting in the elimination of these potentially hazardous situations.

In 2022–23, we observed an increase in the rate of major non-compliance affecting the United Energy network for two consecutive years (Figure 50). A major non-compliance is regarded as a high-risk situation where vegetation is touching, or could soon touch, uninsulated conductors.

Since 2017–18, the overall rate of non-compliant vegetation on the United Energy distribution network has been getting progressively worse in HBRA (Figure 9). While the rate of major non-compliances in HBRA improved between 2020–21 and 2021–22, in 2022–2023 United Energy recorded its worst major non-compliance rate since Energy Safe commenced compiling electric line clearance inspection data in 2017–18 (Figure 9).

The rates of non-compliance and major non-compliance in LBRA has increased for two consecutive years (Figure 10).

Significant improvement is needed to address the rates of non-compliance affecting the United Energy HBRA network. We are closely monitoring the performance of United Energy through its safety regulation programs.

In considering its enforcement options to address the extent of non-compliance, Energy Safe opted to use the new power available to issue infringement notices where high risk non-compliance has been identified. This resulted in the issue of 17 infringement notices to United Energy, totalling $78,591 in fines.

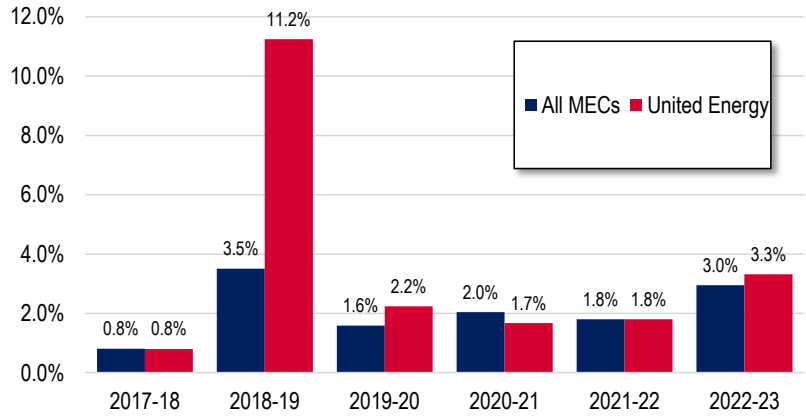

Figure 48 Rate of major non-compliances (HBRA and LBRA)

J5.3 Bushfire mitigation

Energy Safe reviewed 168,488 asset records from across the United Energy network. The recorded last inspection dates for all in-service structures were found to be compliant with the inspection cycle timeframes in the United Energy BMP.

We inspected 128 structures across the Carrum and Dromana areas.[25] The inspections identified one issue requiring immediate attention, being contact between an overhead service and an installation metal raiser bracket. We also identified five priority issues relating to the condition of low voltage overhead service insulation and terminations and a conductor tie with a broken strand. The priority issues found would normally be identified and repaired as part of routine inspection and maintenance activities. We requested that United Energy assess these identified issues and prioritise rectification in accordance with its maintenance practices.

Energy Safe identified three instances where the priority assessed by United Energy was lower than the priority assessed by us and, as such, was not appropriate for the risk. We required that United Energy rectify the identified issues by assigning an appropriate priority in its maintenance system.

J5.4 Work practice

In 2022–23, Energy Safe undertook five observations of United Energy, four on work crews and one on asset inspectors Three of the observations were planned and two were opportunistic.

The findings of the work crew observations were as follows:

- major non-compliances 0
- minor non-compliances 0
- opportunities for improvement 3

The findings of the asset inspector observation were as follows:

- major non-compliances 0
- minor non-compliances 0
- opportunities for improvement 2

The key area of concern identified by these observations related to:

- earthing of mobile plant to a permanent earth where available
- no reference in the Asset Inspection Manual to a tool for measuring the girth of a pole
- work crew member walked through the drop zone.

We recommended that United Energy's work practices specifically focus on:

- connect mobile plant to permanent earths where applicable
- ensuring the Asset Inspection Manual references all tools used to inspect poles
- ensuring people keep out of the drop zone when working.

J6 Safety indicators

Figure 50 shows the number of all serious electrical incidents reported to Energy Safe by United Energy during the 2022–23 period. The green arrows show the reduction from the long-term average across the 2010 to 2022 period (improvement), and the red arrows show the increase (decline). Figure 51 shows the same for those incidents that result in a ground or vegetation fire.

The most common incidents on the United Energy network in 2022–23 were vehicle impacts, connection faults, other contact events and tree contact. One of these items is within the full control of the United Energy (connection faults), tree contacts are partially within its control and the other two are outside its control.

[25] The selection of structures for audit considers lines/areas included in recent audits, recent failure incidents reported to Energy Safe and any complaints received by Energy Safe.

The numbers of all asset failure incidents were higher in 2022–23 than the long-term average for three categories (connection faults, conductor failures and underground cable faults), stable for one (HV fuse faults) and lower in four categories (other asset failures, crossarm failures, pole failures and overhead cable faults). Contact events were higher in three categories (vehicle impacts, dug-up cables and animal contacts), stable for other contact incidents (vandalism, interference, etc.) and lower in two categories (tree contact and lightning events).

Connection faults, tree contact, animal contact and vehicle impacts were the most common causes of network-related fires. One of these is within the full control of United Energy (connection faults), two are partly within its control (tree and animal contact) and vehicle impacts are largely outside of its control. Fires are higher than the long-term average in six categories and lower (or zero) in eight categories.

Several actions are currently being taken by Energy Safe and industry to reduce contact incidents and increase safety in the No Go Zone, both for mobile plant and impacts to underground assets. Further details can be found on page 22.

Energy Safe is reviewing the conductor and connection management of the distribution networks in 2023–24. This will have a particular focus on asset lifecycle, performance and risk management.

United Energy has submitted its wood pole management improvement plan to Energy Safe. We will review the plan and commence monitoring of the actions in the plan.

Vegetation clearance is discussed in more detail on page 14 (performance) and page 7 (enforcement actions).

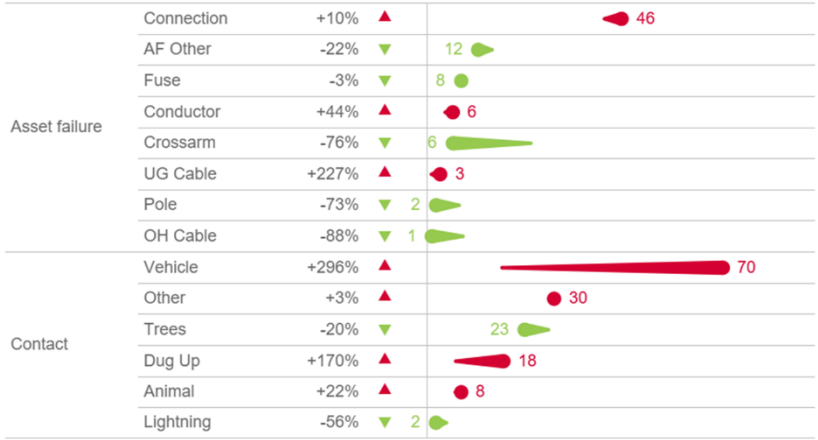

Figure 49 Incidents on the United Energy network

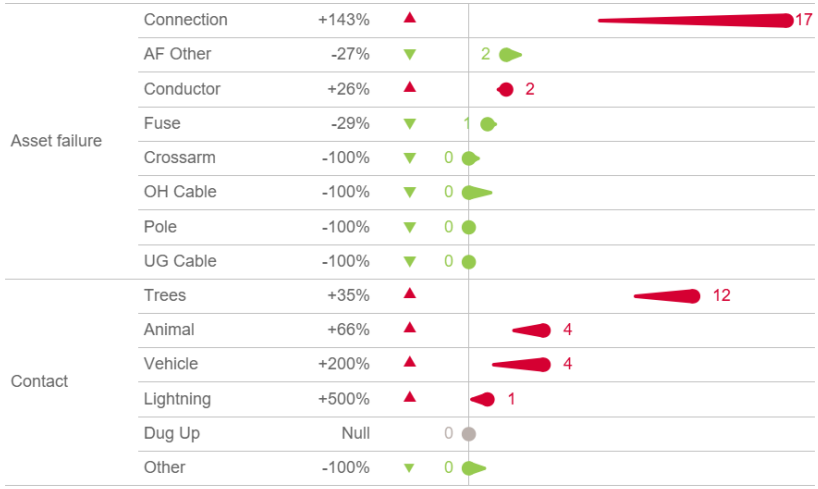

Figure 50 Incidents on the United Energy network resulting in ground fires