

# AusNet Services Wood Pole Management

An assessment of sustainable wood pole safety outcomes

Draft for consultation  
Public Technical Report

August 2021

## Preface

This report has been prepared by Energy Safe Victoria (ESV) pursuant to the objectives, powers and functions conferred on it by the *Electricity Safety Act 1998* (the Act).

Specifically, this report provides a summary of the detailed technical review undertaken by ESV into the Wood Pole Management policies and practices of AusNet Services.

This investigation follows a similar investigation into the Wood Pole Management policies and practices of Powercor published in December 2019, and forms part of a program of work to investigate the Wood Pole Management policies and practices in place across the state of Victoria.

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This report has been endorsed by the Commissioner and Chairperson of Energy Safety in Victoria.

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# Executive summary

## Overview

Following the outcome of a detailed investigation into the cause of the 2018 Garvoc fire, Energy Safe Victoria (ESV) completed a comprehensive investigation in December 2019 reviewing the wood pole management systems and practices in place at Powercor. ESV also committed to undertaking a review of the wood pole management practices for all Victorian Major Electricity Companies (MECs). The investigations are part of ESV's work to ensure that the asset management practices of the MECs will deliver sustainable safety outcomes for the community in the long term.

Drawing from the experience of the Powercor review, an investigation of the wood pole management systems and practices at AusNet Services was identified as the next priority. The service area of AusNet Services includes a large rural network area exposed to some of the highest bushfire risk and consequence areas of Victoria.

This report presents the findings and recommendations of our investigation of AusNet Services' wood pole management systems and practices.

## Objectives of the investigation

The objective of the investigation was to assess whether AusNet Services' asset management objectives, strategies, processes and practices relating to wood pole management will deliver sustainable safety outcomes for the community in the long term.

The investigation applied an assessment framework to determine if:

- (i) the systems and processes utilised by AusNet Services are adequate to ensure the right poles are identified and replaced or reinforced at the right time to ensure sustainable safety performance
- (ii) the practices and competency of the workforce are adequate to ensure consistency of application of systems and processes.

ESV acknowledges the contributions of AusNet Services staff to this investigation.

## Summary of key findings and implications

### Key findings

ESV is satisfied that the wood pole management systems and practices undertaken by AusNet Services have historically resulted in low safety risk to the community. ESV has identified a number of actions that, when fully implemented, will ensure that the safety risk remains low moving forward.

ESV concludes that:

1. AusNet Services' wood pole management system has historically achieved, and is currently achieving, the lowest unassisted wood pole failure rate of all Victorian MECs.
2. AusNet Services' wood pole management practices have generally, and historically, been equivalent to, or more conservative compared to other Victorian MECs. If maintained, the historical approach is likely to continue achieving sustainable safety outcomes into the future.
3. AusNet Services has recently introduced changes to its wood pole management approach that it has not yet thoroughly and adequately assessed. The changes have also not demonstrated long-term sustainable safety outcomes or minimise risk 'as far as practicable' (AFAP).

ESV also identified other opportunities for improvement regarding inconsistent and out-dated documentation during the investigation across the suite of asset management and inspection practices, particularly with the added risk controls for the adoption of recent significant changes.

## Relationship to other reviews of AusNet Services

This investigation is separate to the Electricity Distribution Price Review (EDPR) which is conducted by the Australian Energy Regulator (AER). ESV was in regular communication with the AER regarding the EDPR; however, the two review processes are quite separate. ESV notes that the AusNet Services proposed capital expenditure for this regulatory control period included wood pole management expenditure similar to the level that it has been incurring. The AER identified a small reduction to the capex forecast proposed by AusNet Services in its Draft Decision published on 31 October 2020 and AusNet Services accepted this decision for repex.

ESV is primarily concerned with safety outcomes for the community. ESV notes that AusNet Services has made several recent changes relating to its wood pole management systems and practices, however, ESV has identified further areas for improvement to be implemented by AusNet Services.

## Implications to sustainable safety outcomes

ESV is concerned that a recent significant change to AusNet Services inspection frequency may lead to an increase in network safety risk, and a deterioration of network safety outcomes, due to pole management practices, in the medium to long-term. If this is the case, this may be inconsistent with the intent of the legislation, to minimise safety risks as far as practicable and community expectations.

Accordingly, ESV has made nine recommendations for AusNet Services to:

- (i) implement an improvement plan, including reporting protocols, to be accepted by ESV
- (ii) demonstrate and assure itself, ESV and the community by the completion of the required improvement actions that it will continue to meet its safety obligations.

A further recommendation requires ESV to develop and implement a framework for assessment of minimum asset inspector training requirements. ESV will closely monitor AusNet Services' delivery of the wood pole management improvement plan.

## Benefits of long-term modelling

ESV is supportive of the development of long-term scenario modelling of wood pole intervention volumes undertaken by AusNet Services, based on the best available information as to the condition and sustainability of its wood pole population.

ESV considers that this type of modelling should be updated on a regular basis to reflect changes to the wood pole population, systems and practices of AusNet Services that may have an impact on the sustainable management of the wood pole population over the long term.

Assessment and modelling of the longer-term implications of systems and practices on key asset classes such as wood poles, is reflective of the type of asset management approaches that ESV recommends should be undertaken by MECs.

## Summary of recommendations

The recommendations are summarised below.

1. AusNet Services is to develop a wood pole management improvement plan to address all recommendations and findings in the investigation report and submit it to ESV no later than 26 November 2021. The plan is to include clear and measurable milestones for all identified actions that can be monitored through regulator reporting.

2. AusNet Services is to establish a reporting protocol agreeable to ESV by 25 February 2022, for ESV to monitor AusNet Services' progress against its wood pole management improvement plan. AusNet Services will report progress to ESV quarterly until all planned actions to implement the recommendations have been delivered.
3. AusNet Services is to update its wood pole management strategy and submit it to ESV to clearly demonstrate the alignment between objectives, strategies, performance measures, delivery, forecast intervention volumes, failure analysis and improvement initiatives. It is to also address all ESV's findings regarding the shortcomings of its Asset Management Strategy document.
4. AusNet Services is to demonstrate to ESV by 27 May 2022 how its current asset inspection approach to pole management, and frequency of pole inspection in hazardous bushfire risk areas (HBRA) meets the general duties under section 98 of the *Electricity Safety Act 1998* (the Act), including the application of AusNet Services' Electricity Safety Management Scheme (ESMS). In responding to this recommendation, AusNet Services should demonstrate how it meets the same duties for all other pole top asset classes impacted by its revised approach. It is to refer to the [Energy Infrastructure Safety Management Policy](#) and the guidance document [Electricity Safety Case \(ESMS\) Preparation and Submission Guideline for MECs](#) prepared by ESV to assist with understanding the requirements for an ESMS to specify an approach that meets AFAP.
5. AusNet Services is to update its failure investigation process to ensure the requirements and responsible parties undertaking various aspects of the investigation are clear, and the investigation findings and actions are adequately monitored and reported to management. The updated process is to be demonstrated to ESV to ensure it will provide for proper and accurate reporting of electrical incidents.
6. ESV, through consultation with all Victorian MECs, is to develop and implement a framework for assessment of minimum training requirements and guidance for maintaining competence for persons assigned to carry out inspections, with clear requirements to which the MECs must adhere.
7. AusNet Services is to submit its current asset inspection training course content to ESV for acceptance in accordance with the requirements of the Electricity Safety (Bushfire Mitigation) Regulations 2013.
8. AusNet Services is to update its asset inspection documentation to be consistent and compliant with its ESMS and Bushfire Mitigation Plan (BMP) (and to otherwise address ESV's findings regarding the shortcomings of its current asset inspection documentation).
9. AusNet Services is to demonstrate that an effective change management approach is in place and applied to changes or improvements made to its asset management or inspection practices. It is to specifically describe each of the steps undertaken by AusNet Services within that change management approach.
10. AusNet Services is to update its BMP to clearly demonstrate the alignment between the inspection cycle, training and maintenance timeframes nominated for all condition states of wood poles (and to otherwise address ESV's findings regarding the shortcomings of its current BMP). The revised BMP is then to be submitted to ESV for acceptance.

## Implications for further investigations by ESV

During the investigations<sup>1</sup> undertaken by ESV, it has become apparent that further work is required for ESV to clarify its expectations of MECs when demonstrating compliance with the general duties of the *Electricity Safety Act 1998*.

ESV's review of asset management practices assesses how a MEC enacts or demonstrates the approach to minimising risk as far as practicable and the compliance of these practices to the accepted ESMS and BMP.

It has become clear to ESV during this investigation that not all MECs have a common understanding of the requirements of the Act, specifically to minimise risk rather than to reduce or maintain risk to an MEC pre-determined acceptable level/mark.

ESV has referred to these overarching requirements in this investigation and, where required, referred to the obligations of the Act in making recommendations for improvement.

This is a broader industry issue that ESV will consider in future revisions of the [Energy Infrastructure Safety Management Policy](#) and the supporting [Electricity Safety Case \(ESMS\) Preparation and Submission Guideline for MECs](#).

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<sup>1</sup> Powercor wood pole management, and AusNet Services wood pole management

# Introduction

## Purpose of this report

This public technical report summarises the findings and recommendations of the detailed technical investigation undertaken by Energy Safe Victoria (ESV) into AusNet Services' wood pole asset management practices. The objective was to ascertain whether those practices would produce sustainable safety outcomes.

## Background to this report

In December 2019 ESV completed a comprehensive investigation, with a published technical report, into whether the wood pole management practices of Powercor would deliver sustainable safety outcomes for the community in the long term.

At that time, ESV committed to undertaking a review of the wood pole management practices of the other Victorian MECs, prioritised on the basis of risk. This review of AusNet Services wood pole management was identified to follow Powercor.

This report presents the findings and recommendations following ESV's investigation of AusNet Services' wood pole management regime.

## Consultation

ESV is committed to providing an opportunity for public comment on its investigation into the management of wood poles. This is an important step in providing community confidence in the safety of the electricity distribution network across Victoria.

ESV invites interested parties to make a submission on this draft report. The closing date for submissions is 1 September 2021.

Email your submission to [consultation@energysafe.vic.gov.au](mailto:consultation@energysafe.vic.gov.au)

or

Post your submission to:

Energy Safe Victoria  
Consultation Response  
PO Box 262  
Collins St West VIC 8007

# Overview of AusNet Services' wood pole population

AusNet Services has a large service area predominantly located in the eastern half of Victoria, with the majority of the network located in bushfire prone areas including approximately 190,000 wood power poles in the distribution network. While the observed historical failure performance has been good, ESV has reviewed the extent to which the performance measures accurately reflect the condition of the wood poles, and the extent to which the systems and practices used by AusNet Services will ensure the safety risk is minimised in accordance with the *Electricity Safety Act 1998* (the Act).

## Business overview

AusNet Services operates and manages an electricity distribution network serving the fringe of the northern and eastern Melbourne metropolitan area and the eastern half of rural Victoria (see Figure 1). It delivers electricity to more than 729,000 consumers.

Figure 1: AusNet Services service area<sup>2</sup>



Source: AusNet Services Distribution Annual Planning Report 2019 – 2023

The network contains 44,800 kilometres of power lines,<sup>3</sup> with more than 80 per cent being of overhead construction. Approximately two-thirds of the distribution network is in areas designated as “bushfire prone”.

<sup>2</sup> AusNet Services Distribution Annual Planning Report 2019 – 2023, Figure 1, [https://www.ausnetservices.com.au/-/media/Files/AusNet/About-Us/Regulatory-Publications/AusNet-Services\\_Distribution-Annual-Planning-Report-2019\\_2023.ashx?la=en](https://www.ausnetservices.com.au/-/media/Files/AusNet/About-Us/Regulatory-Publications/AusNet-Services_Distribution-Annual-Planning-Report-2019_2023.ashx?la=en)

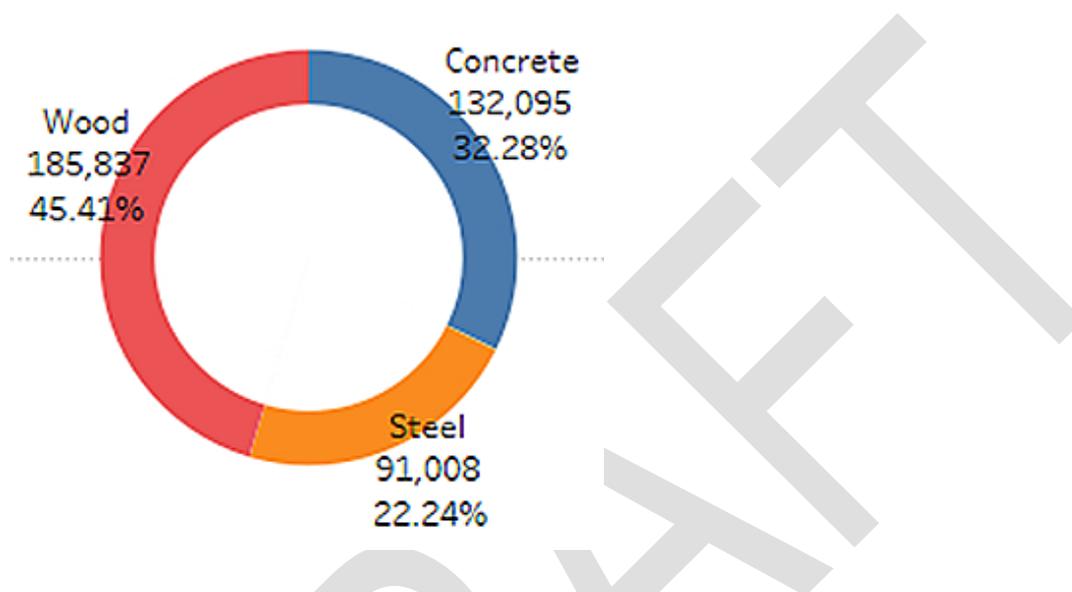
## Wood pole population

There are approximately 409,000 poles supporting distribution and sub-transmission networks across the AusNet Services network, with 185,837 (or 45 per cent) being wood poles, as at July 2020.<sup>4</sup>

The remainder of the power pole types used to support the overhead electricity distribution network include concrete poles, steel poles (or towers) and public lighting poles.

The composition of poles by material type is shown in Figure 2 and bushfire risk classification is shown in Table 1 below.

**Figure 2: Composition of pole materials**



Source: AusNet Services data provided during investigation

**Table 1: Number of wood poles by bushfire risk area and material type**

Bushfire Risk Area	Material Type			
	Wood	Concrete	Steel	Total
High Bushfire Risk Area (HBRA)	106,822	91,393	21,920	220,135
Low Bushfire Risk Area (LBRA)	79,015	40,702	69,088	188,805
<b>Total</b>	<b>185,837</b>	<b>132,095</b>	<b>91,008</b>	<b>408,940</b>

Source: AusNet Services data provided during investigation

A large number of concrete poles are currently installed on the AusNet Services network. In the past decade, approximately 62 per cent of new power poles installed have been concrete. Compared to other Victorian MECs, AusNet Services has the highest percentage of concrete poles in its network.

Timber used for wood poles are classified by strength and durability (i.e. class 1, 2, 3 and 4 poles)<sup>5</sup>. Timbers of the same durability class may deteriorate at different rates due to local environmental

<sup>3</sup> AusNet Services Distribution Electricity Safety Management Scheme, page 18

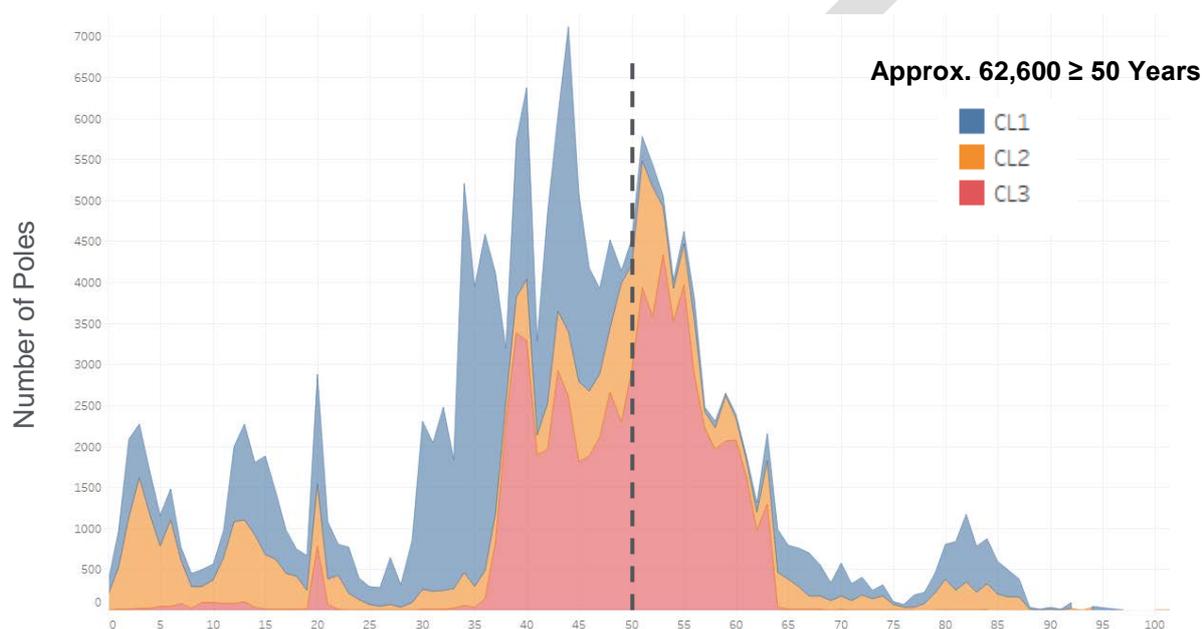
<sup>4</sup> ESV analysis of spread sheet, Pole asset management data 2\_1 M2, AusNet Services

conditions. The national timber pole standard<sup>6</sup> states that only durability class 1 and 2 can be used for power poles without preservative treatment<sup>7</sup>.

AusNet Services' wood pole fleet also contains a variety of timber species, installed over the life of the distribution network. The top ten timber species collectively constitute around 90 per cent of the entire wood pole population. The largest volume by strength and durability class of wood poles is the 69,000 Class 3 Messmate and Mountain Grey Gum species of timber.

The life expectancy of wood poles varies widely across the network with the average service age of 40 years, and approximately 62,000 wood poles (34 per cent of the total wood pole population) are more than 50 years old. The distribution of wooden power poles by age and by durability class is shown in Figure 3.

**Figure 3: Age profile of wood poles installed by durability class (as at July 2020)**



Source: AusNet Services data provided during investigation

The age of a wood pole is not the sole determinant of its condition. For example, the service life of a wood pole can be extended by using wood preservatives, termiticide and pole reinforcement techniques. ESV has considered how the age of the wood pole populations vary between Victorian MECs.

Lower durability Class 3 and 4 timbers make up 38 per cent of the wood pole population and represent 20 per cent of wood poles in High Bushfire Risk Area (HBRA).

## Current condition assessment of wood poles

In managing its wood poles, AusNet Services undertakes cyclic condition assessments and classifies the poles as Serviceable, Limited Life or Unserviceable. Table 2 provides a definition of each classification.

<sup>5</sup> Australian Standard AS 5604-2005 Timber - Natural durability ratings

<sup>6</sup> Australian Standard AS 2209-1994 Timber - Poles for overhead lines

<sup>7</sup> Australian Standard AS 1604.1:2012 Specification for preservative treatment Sawn and round timber

**Table 2: Definition of serviceability classifications**

Classification	Definition <sup>8</sup>
Serviceable	Safe until at least next inspection visit.
Limited Life	Pole could become unserviceable before the next cyclic inspection.
Unserviceable	Must be changed, reinforced or made safe within a time prescribed in the Bushfire Mitigation Plan and Standard Maintenance Instructions.

Source: Adapted from AusNet Services Asset Inspection Manual

The AusNet Services Asset Inspection Manual establishes the serviceability criteria that are to be met to allow a pole to be classified as Serviceable or Limited Life.

Table 3 shows the breakdown of the pole population by serviceability status. At the time of this analysis AusNet Services had identified 1,097 Unserviceable wood poles and 2,657 Limited Life poles on its network.

**Table 3: Current number of wood poles by serviceability classification (as at July 2020)<sup>9</sup>**

Classification	Number of Poles	Percentage
Serviceable	161,498	86.9%
Reinforced	20,560	11.1%
Limited Life	2,657	1.4%
Unserviceable <sup>10</sup>	1,097	0.06%

Source: AusNet Services data provided during investigation

In addition, AusNet Services has introduced a condition scoring methodology that is used to monitor changing trends in pole condition. This is a high-level indicator only, which is used to support longer term forecasting. There are five different condition scores that have been applied to each distribution pole, ranging from “Very Good” to “Very Poor”.

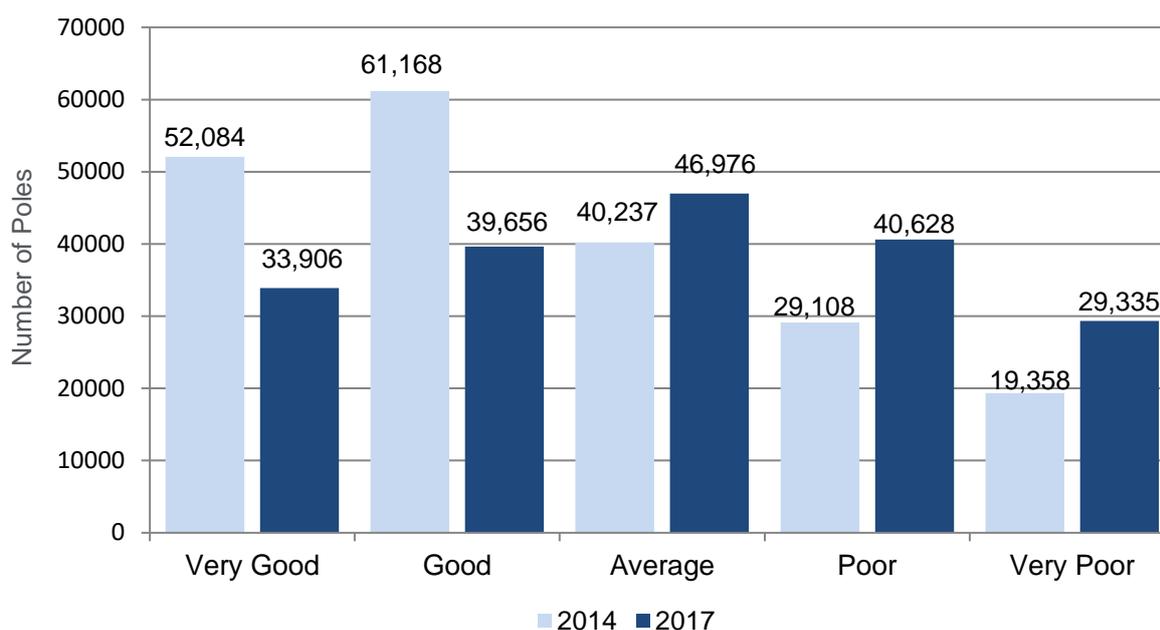
The condition score provides an estimate of the remaining asset life, where a score of “Poor” and “Very Poor” represents an estimate of the poles that will require intervention over the next 15 years. It should be noted that as poles deteriorate over time, the inspection and maintenance requirements intensify as the pole approaches the end of its life. During this time, the pole is inspected and classified as per Table 2; this determines any required wood pole intervention.

ESV has reviewed the condition scoring system for this representation shown in Figure 4 and is comfortable that this generally represent a population of safe wood poles. In addition, ESV has inspected more than 1,000 wood poles during this investigation and those results support this finding.

<sup>8</sup> AusNet Services, Asset Inspection Manual, Feb 2017, Table 3.4.1, page 3-13

<sup>9</sup> Total pole numbers may vary through the report due to alternate sources

<sup>10</sup> Note: These Poles were identified at last inspection and marked for treatment by reinforcement or replacement

**Figure 4: Comparison of the number of poles by condition score between 2014 and 2017**

Source: AusNet Services data provided during investigation

AusNet Services uses this type of analysis to gain high-level insights into the condition of its pole fleet and inform the development of intervention strategies. AusNet Services notes in the Poles AMS<sup>11</sup> that:

- 65 per cent of the total pole population has a condition score of “Good” or “Very Good”, however only 39 per cent of wood poles have the same condition score (as shown in Figure 4)
- White Stringybark and Messmate timbers increasingly feature in replacement volumes
- to defer increasing replacement rates the introduction of new wood pole life-extension techniques, including alternative reinforcement methods, rebutting and pole head reinforcement systems will be required.

As shown in Figure 4, AusNet Services has identified that more than 29,000 wood poles have a condition score of “Very Poor”; this means that 15 per cent of the wood pole population will require intervention in a five-to-10 year period. The increasing trend of deteriorated poles shown in this analysis, and the increased volume of poles now in a deteriorated state, suggest that more may need to be replaced in the future to mitigate any increase in safety risk. This hypothesis was tested in the ESV assessment that follows.

## Failure performance of wood poles

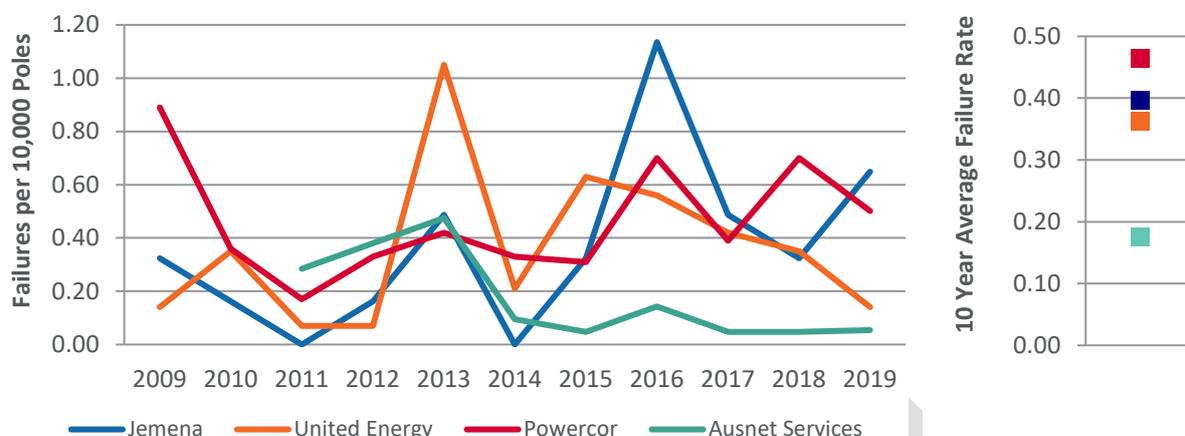
The cause of a pole failure can be classified as assisted or unassisted, being as a result of forces and factors beyond the reasonable control of AusNet Services (assisted) or within the control and design parameters for normal service (unassisted). Assisted pole failures includes those which are damaged or broken from third-party damage or storm events that are beyond the design specifications of the pole. ESV has focussed on the performance of unassisted pole failures.

AusNet Services 10-year average of 0.17 unassisted pole failures per 10,000 poles is the lowest of the Victorian MECs presented in Figure 5. AusNet Services has maintained this level of performance or

<sup>11</sup> AusNet Services, Pole Asset Management Strategy 20-70 V7, page 13-16

close to it since 2014. Each MEC’s unassisted wood pole failure statistics were adversely affected by weather events in 2013.

**Figure 5: Comparison of unassisted wood pole failures per 10,000 poles by MEC**



Source: ESV analysis of Regulatory Information Notices and ESV quarterly reports<sup>12</sup>

Victorian MECs have an obligation to report pole failure data to ESV (for safety reporting) and the AER (as part of the Regulatory Information Notice (RIN) process). ESV has observed that the pole failure data submitted to the AER by AusNet Services appears to be aligned with its definition of functional failure and inconsistent with RIN submission of other Victorian MECs.

Notwithstanding AusNet Services’ low unassisted wood pole failure rate, from 2015 there has been an increasing proportion of limited life, reinforced and unserviceable poles in the population. ESV observed a decreasing trend in the percentage of serviceable poles over time, with commensurate increases to limited life, reinforced and unserviceable serviceability conditions.

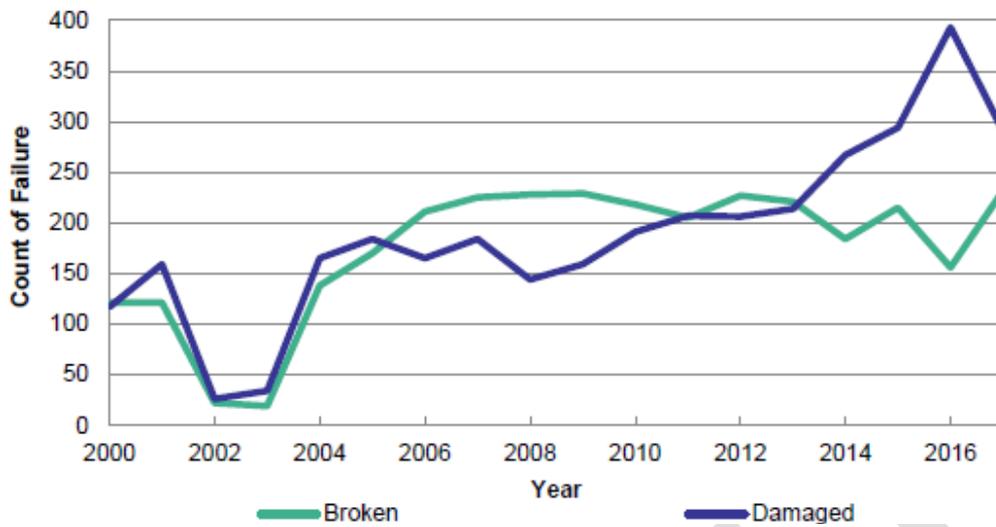
This provides further support to the observation of an apparent increasing number of deteriorated poles in the population (as shown in Figure 4) and indicates that additional interventions may be required to mitigate any increase in safety risk. This hypothesis was tested by ESV in the assessment of AusNet Services’ practices.

AusNet Services’ pole strategy documentation assesses pole failure performance as a functional failure, e.g. when the pole is unable to fulfil its function to the accepted standard of performance. AusNet Services further categorises a pole failure as either broken or damaged. A broken pole refers to a pole which is deemed to be unserviceable and a replacement is the only option. Whereas a damaged pole is where a failure has occurred, and remedial maintenance works can restore the pole to a serviceable status.

As shown in Figure 6, there has been an increasing trend in the number of damaged poles, while the number of broken poles is relatively constant.

<sup>12</sup> Analysis has used AER RIN data from businesses with comparable failure definitions. AusNet Services data was obtained from ESV quarterly reports.

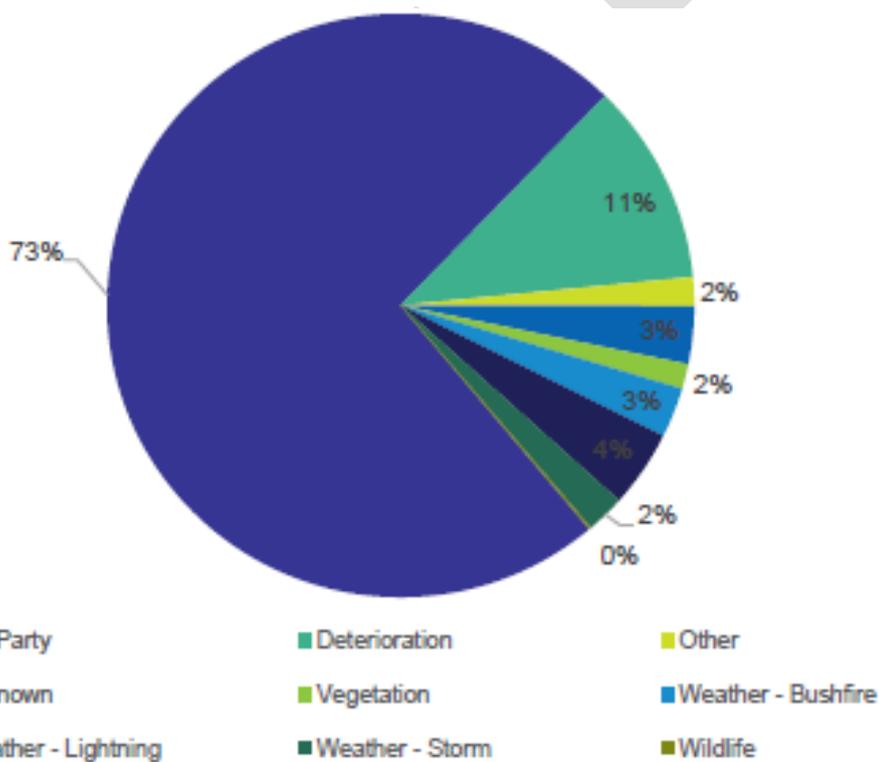
**Figure 6: AusNet Services trend analysis of wood pole failures**



Source: AusNet Services documents provided during investigation

As shown in Figure 7 the major cause of pole failure is third party damage, comprising 73 per cent, with deterioration at 11 per cent.

**Figure 7: AusNet Services cause breakdown of wood pole failures**



Source: AusNet Services documents provided during investigation

# Approach to assessment of AusNet Services' wood pole management

This section describes ESV's approach to the assessment of AusNet Services' wood pole management systems and practices.

For the purpose of this review, a sustainable approach to wood pole management is defined as *"consistently minimising the safety risks presented to persons and property by the network, as far as practicable"*.

## Approach to the assessment

The approach sought to leverage, where possible, the review approach applied for the Powercor investigation. Accordingly, a two-stage approach was undertaken, consisting of a background review into current knowledge of AusNet Services' wood pole practices to inform the planning and launch of stage two, the detailed technical investigation into AusNet Services' wood pole management systems and practices.

ESV undertook discussions, workshops and field visits with representatives of AusNet Services and its key service provider. ESV reviewed AusNet Services' strategies, documents, work practices, data, pole performance, and forecast modelling to support the findings and recommendations in this report.

AusNet Services and ESV held an initial online workshop on 13 and 14 August 2020. The purpose of the workshop was to provide AusNet Services with the opportunity to inform and confirm ESV's understanding of AusNet Services' approach to managing its wood pole assets to deliver sustainable network safety outcomes. The agenda included AusNet Services':

- wood pole strategy and management plan
- inspection method and practices
- assessment of pole condition and risk
- wood pole management forecast and delivery.

AusNet Services presented additional material to ESV at subsequent online meetings. ESV also received several updates to the documentation provided at the virtual workshop and has incorporated them into this assessment.

As a consequence of Victorian workplace restrictions arising from the COVID-19 pandemic, all meetings held within ESV, and between ESV and AusNet Services, were undertaken using online facilities. Work practice observations were also limited, with a large number being deferred to a later time when it was deemed safe to recommence.

AusNet Services was provided with a draft copy of the technical review report to comment on errors of fact. ESV has made corrections to the report based upon AusNet Services' feedback, as it deemed necessary.

## Consideration given to reported performance

Each MEC is required to report serious electrical incidents, and on the progress of safety initiatives within the timeframes and in a form nominated in the reporting guidelines published by ESV. This includes wood pole failure.

When reviewing wood pole failure performance, it is important to note that failure rates are considered a lagging indicator of whether inspection and management practices have been adequate rather than a leading indicator of preventative safety performance. For example, robust inspection and management practices consistently applied to the population of wood poles may result in low failure rates, however if the underlying condition of the population of wood poles is poor and/or deteriorating, the level of intervention volumes may be high and/or increasing. Where the required intervention volume is not undertaken, the network safety risk will rise and the resulting rate and number of pole failures will some time thereafter similarly increase.

ESV has considered both the current and historical pole failure rates in its investigation of wood poles, and importantly whether recent changes in asset management practices are likely to affect the observed failure rates and safety outcomes, over the medium-to-long term.

## Requirements to demonstrate level of safety

The *Act* establishes general duties to be met by MECs as part of the safety management regime. These duties require a MEC to design, construct, operate, maintain and decommission its supply network to minimise, as far as practicable (AFAP), hazards and risks to people and property, and bushfire risks arising from the supply network.

The *Act* also requires that all MECs that operate electricity supply networks, have an accepted Electricity Safety Management Scheme (ESMS). An ESMS is a principle-based, outcome-focused requirement of the regulatory system that enables the industry to improve on the efficiency of its operations provided it does not compromise safety standards.

The purpose of the ESMS and the BMP can be described as:<sup>13</sup>

a. The ESMS:

- (i) specifies risk management systems, policies and practices, including the AFAP decision-making methodology;
- (ii) describes a Formal Safety Assessment (FSA) which identifies, assesses and addresses network safety risks arising from the supply network; and
- (iii) specifies the outcomes of risk control decisions made by the MEC in relation to network safety risks identified in the FSA.

b. The BMP:

- (iv) specifies preventative strategies and programs in place to mitigate the risk of network caused bushfire; and
- (v) specifies the management systems, processes and procedures in place to meet the prescriptive regulatory requirements to mitigate the risk of fire.

Accordingly, in legislative terms, the BMP is a specific, prescriptive document to address bushfire risk, which resides under the ESMS.

The approach to management of risk as documented in the ESMS is central to a review of asset management, and specifically how a MEC has demonstrated the assessment and application of its risk controls to minimise safety risk to AFAP.

In this investigation, ESV has referred to these overarching requirements, and where required referred to the obligations of the Act in making recommendations for improvement.

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<sup>13</sup> Energy Infrastructure Safety Management Policy, page 11

# Findings and recommendations

**ESV is satisfied that the wood pole management practices undertaken by AusNet Services have historically resulted in low safety risk to the community. ESV has identified a number of actions that, when fully implemented, will ensure that the safety risk remains low moving forward.**

## Overview

ESV has reviewed and assessed the findings regarding AusNet Services' wood pole management approach, reconciled them to the overall objectives of the review and requires AusNet Services to respond to the nine recommendations. A further recommendation is identified for ESV to develop and implement a framework for assessment of minimum asset inspector training requirements.

Drawing from the elements of the assessment approach described in the previous section, the findings are grouped into five key assessment areas:

- strategy and management plan
- pole characteristics and performance
- inspection method and practices
- assessment of pole condition and risk
- wood pole management forecast and delivery.

## Strategy and management plan

### Key findings

The key findings relating to this section are summarised in Table 4 below.

**Table 4: Summary of key findings for strategy and management plan**

Finding	Elaboration
<b>Asset management principles are consistent with good industry practice</b>	ESV observed that the asset management principles, as described in AusNet Services' Asset Management Policy, are consistent within an Asset Management System that has received accreditation to ISO 55001:2014 and align with key sources of external obligations.
<b>Risk management framework appears adequate</b>	<p>AusNet Services' corporate risk management framework is consistent with the key principles of ISO 31000:2018: Risk Management.</p> <p>While the design and documentation of the framework are adequate, the application of monitoring risk by identifying unfavourable trends and reporting them at a network level remains an area of concern, and which is assessed separately (as presented in subsequent sections of this report).</p>
<b>It is unclear how AusNet Services delivers the electricity distribution asset management objectives</b>	The alignment of objectives between different levels of the business, including corporate, asset management system and electricity distribution asset management, present a complex picture. A demonstration of how AusNet Services achieves its electricity distribution asset management objectives was not evident to ESV. The linking of objectives to measures and targets is a common method for demonstrating how objectives are achieved, and which was not made clear to ESV.
<b>The current asset management strategy does not reflect current practices</b>	The recent changes made by AusNet Services to the inspection interval in HBRAs and wood pole condition assessment methodology were made prior to the approval of the latest Asset Management Strategy for Poles. An assessment of either change was not included in the strategy.
<b>The identification and assessment of asset related risks for pole assets can be improved</b>	<p>ESV has not seen sufficient evidence that AusNet Services has undertaken the claimed, and necessary, risk assessments at an asset level for the current practices or for the recent significant changes.</p> <p>Notwithstanding the historical and current wood pole failure performance, AusNet Services has not demonstrated to ESV that the recent changes to the inspection cycles and practices will not have an adverse impact on the level of risk. If AusNet Services fails to demonstrate it meets the general duties, ESV will take corrective enforcement action.</p>
<b>Wood pole management strategies require improvement to align with good industry practice</b>	<p>While condition-based intervention triggered by inspection results, as undertaken by AusNet Services, is common across the industry, the industry is moving towards an approach that explicitly considers the risk and consequence of pole failure.</p> <p>An approach to pole management that combines a condition-based assessment with an aggregate risk of failure is consistent with good industry practice. When</p>

implemented this approach enables a quantification of pole failure risk and the prioritisation of the population that takes into account safety, reliability and other consequences. With this approach the level of pole intervention can be selected to meet targets or goals that reflect the objective of the Asset Management System and the organisation.

## Recommendations

The recommendations relating to this section are summarised below.

### **Recommendation 1**

AusNet Services is to develop a wood pole management improvement plan to address all recommendations and findings in this report and submit it to ESV by 26 November 2021. The plan is to include clear and measurable milestones for all identified actions that can be monitored through regulator reporting.

### **Recommendation 2**

AusNet Services is to develop a reporting protocol agreeable to ESV 25 February 2022, for ESV to monitor AusNet Services' progress against its wood pole management improvement plan. AusNet Services will report progress to ESV quarterly until all planned actions to implement the recommendations have been delivered.

### **Recommendation 3**

AusNet Services is to update its wood pole management strategy, and submit for review and acceptance by ESV, to clearly demonstrate the alignment between objectives, strategies, performance measures, delivery, forecast intervention volumes, failure analysis and improvement initiatives (and to otherwise address all ESV's findings regarding the shortcomings of its Asset Management Strategy).

### **Recommendation 4**

AusNet Services is to demonstrate to ESV by 27 May 2022 how its current asset inspection and testing approach to pole management and frequency of inspection in hazardous bushfire risk areas (HBRA) meets the general duties under section 98 of the *Electricity Safety Act 1998*, including the application of AusNet Services' ESMS. In responding to this recommendation, AusNet Services should also demonstrate how it meets the general duties for poles and all attached asset classes impacted by its revised approach. It should also refer to the ESV [Energy Infrastructure Safety Management Policy](#) and the guidance document [Electricity Safety Case \(ESMS\) Preparation and Submission Guideline for MECs](#) prepared by ESV to assist with understanding the requirements for an ESMS to specify an approach that meets AFAP.

## Pole characteristics and performance

ESV reviewed the characteristics of AusNet Services' wood pole population (pole age and profile characteristics) and performance of the fleet of wood poles by referring to its wood pole performance measures and, where appropriate, industry benchmarks and comparison measures such as average age.

### Key findings

The key findings relating to this section are summarised in Table 5 below.

**Table 5: Summary of key findings for pole characteristics and performance**

Finding	Elaboration
<b>Wood pole age benchmarks amongst the lowest of Victorian MECs</b>	The asset management approach employed by AusNet Services has resulted in a wood pole, on average, being replaced earlier than a wood pole on other networks.
<b>Unassisted wood pole failure rate is the lowest in Victoria</b>	AusNet Services 10-year average pole failure of 0.17 unassisted pole failures per 10,000 poles is the lowest of the Victorian MECs.
<b>The volume of poles in a reduced serviceability state is increasing</b>	<p>Notwithstanding AusNet Services' low unassisted wood pole failure rate, from 2015 there has been an increasing proportion of limited life, reinforced and unserviceable poles in the population.</p> <p>ESV sought to understand these trends, to the extent that they reflect an aging pole network or an underlying shift in asset management strategy. As discussed in other sections of this report, the impact of recent changes has not been adequately assessed by AusNet Services.</p>
<b>Annual intervention volumes have recently been reduced</b>	<p>AusNet Services' wood pole interventions were trending up until 2017 and have been trending down since then. Over a similar period, the unassisted pole failure rates have been relatively flat (and low) ESV has observed trends like this, if sustained, can lead to a subsequent increase in pole failures.</p> <p>ESV sought to understand these trends, and the rationale for changes to the level of intervention volumes observed and whether this trend was indicative of future intervention volumes or due to the extension of inspection intervals accompanied by the introduction of WoodScan. As discussed in other sections of this report, the impact of recent changes has not been adequately assessed by AusNet Services.</p>
<b>It is not clear how pole failure measures are used to support changes to the asset management strategy</b>	<p>Notwithstanding AusNet Services' low unassisted wood pole failure rate, assessment of the trend was not evident to ESV in AusNet Services' asset management documents.</p> <p>From the reports that were made available to ESV, there was limited depth of analysis, inconsistent evidence of recording, tracking and completing recommended actions arising from investigation of failed poles.</p>

## Recommendations

This information has been used to inform the assessment and recommendations of other parts of this report. The recommendations specific to this section are summarised below.

### **Recommendation 5**

AusNet Services is to update its failure investigation process to ensure the requirements and responsible parties undertaking various aspects of the investigation are clearly identified, and the investigation findings and actions are adequately monitored and reported to management. The updated process is to be demonstrated to ESV to ensure it will provide for proper and accurate reporting of electrical incidents.

## Inspection method and practices

ESV reviewed the inspection methods, training and practices applied by AusNet Services and its inspection service provider to assess the inspection methods and practices, and to collect information regarding the strength and performance of each wood pole in its wood pole population.

### Key findings

The key findings relating to this section are summarised in Table 6 below.

**Table 6: Summary of key findings for inspection method and practices**

Finding	Elaboration
<b>Ground-based inspection practices are consistent with general Victorian MEC practice</b>	This has included retaining a reasonably consistent Asset Inspection Manual since State Electricity Commission of Victoria (SECV) times, particularly for inspection and testing instruction.
<b>Important changes to its wood pole inspection practices have been introduced that have not been incorporated into the Asset Inspection Manual</b>	In addition, there are a number of inconsistencies and areas requiring improvement in AusNet Services' documentation that suggests it may not be strictly following its own documented requirements.
<b>A ground-based pole inspection and condition assessment is not undertaken at each asset inspection in HBRA</b>	AusNet Services relies on an alternating cycle of inspection types that includes aerial inspection, a method that results in a less thorough assessment of the pole. As a result, for each pole located in HBRA, ground-based inspection of the pole is only undertaken by AusNet Services at every second inspection, e.g. every six years.
<b>It is unclear how the Aerial inspection process delivers the requirements within the Asset Inspection Manual for pole inspection</b>	ESV has not seen evidence that the documented requirements for visual inspection in the Asset Inspection Manual are being effectively delivered by AusNet Services within the aerial inspection process.
<b>Application of Non-Destructive Inspection (NDI) techniques to complement the dig, sound and drill technique is appropriate</b>	The NDI technique has limitations when compared to the dig, sound and drill, and combined with the higher cost, the rationale for not applying it to the entire wood pole population is considered reasonable.

Finding	Elaboration
<p><b>Application of competency standards to inspectors require improvement</b></p>	<p>The requirements for NDI Inspectors highlight the need for any Asset Inspector undertaking the NDI technique to have, at a minimum, an equivalent level of competency for undertaking pole condition assessment as an AusNet Services Asset Inspector.</p> <p>AusNet Services has not demonstrated that it applies the same rigour in maintaining the general asset inspection competence of its NDI inspectors.</p>
<p><b>A robust procedure for conducting audits on their Asset Inspectors is in place</b></p>	<p>The checklists used for the audits are predominately inspections with a degree of observation included. The use of both external and internal resources to conduct audits provides a balanced approach to enabling mentoring with the internal resource and the independence of the external auditor.</p>
<p><b>ESV encourages a coordinated, collaborative approach to research into Non-Destructive Inspection (NDI) technology</b></p>	<p>A collaborative industry-wide approach to developing an NDI technology to improve the flexibility, objectivity, accuracy and efficiency of pole condition assessment will be the most effective method of channelling the right investment into finding a solution to a common need for each pole population.</p>

## Recommendations

This information has been used to inform the assessment and recommendations of other parts of this report. The recommendations specific to this section are summarised below.

### **Recommendation 6**

ESV, by consultation with all Victorian MECs, is to develop and implement a framework for assessment of minimum training requirements and guidance for maintaining competence for persons assigned to carry out inspections, with clear requirements to which the MECs must adhere.

### **Recommendation 7**

AusNet Services is to submit its current asset inspection training course content to ESV for acceptance in accordance with the requirements of the Electricity Safety (Bushfire Mitigation) Regulations 2013.

### **Recommendation 8**

AusNet Services is to update its asset inspection documentation to be consistent and compliant with its ESMS and BMP (and to otherwise address ESV’s findings regarding the shortcomings of its current asset inspection documentation in the investigation report).

### **Recommendation 9**

AusNet Services to demonstrate that an effective change management approach is in place and applied for changes or improvements made to its Asset management or inspection practices, and specifically to describe each of the steps undertaken by AusNet Services within that change management approach.

## Assessment of pole condition and risk

ESV reviewed the methods applied by AusNet Services to ascertain the condition of each wood pole, and its ability to continue to meet the requirements of service (or not) as an input to the development of its wood pole management plan.

### Key findings

The key findings relating to this section are summarised in Table 7 below.

**Table 7: Summary of key findings for assessment of pole condition and risk**

Finding	Elaboration
<p><b>Serviceability classifications are aligned with industry practice, and the methods for converting condition information to serviceability classifications are reasonable</b></p>	<p>AusNet Services' classifications of pole condition as either Serviceable, Limited Life or Unserviceable are aligned with common industry practice. Introducing an interim classification is reasonable until the pole has undergone a secondary assessment.</p> <p>AusNet Services uses a combination of the quantitative (Safety Factor and measurements) and qualitative (visual inspection) condition-based approaches to determine the serviceability classification for individual poles.</p>
<p><b>The impact of recent changes has not been adequately demonstrated to ensure safety is being maintained</b></p>	<p>AusNet Services (and Powercor) contain the highest bushfire risk terrain in the state.</p> <p>AusNet Services has not yet adequately demonstrated how its serviceability assessment method, including the changes to its inspection cycles, serviceability criteria and introduction of NDI will continue to meet its safety obligations, including for bushfire prone areas.</p>
<p><b>AusNet Services has not demonstrated that the reduction in frequency of inspection in HBRA, even with changes in its risk controls, will not result in an increase in the level of risk</b></p>	<p>When compared with other MECs, AusNet Services now has the least frequent asset inspection of poles in Victoria in HBRA.</p>
<p><b>The application of added risk controls appears inconsistent and requires improvement</b></p>	<p>The documentation does not appear consistent with the review and adoption of added controls, including treatment of the new interim 'deteriorated' serviceability classification, application to all pole types and species. Others appear limited in application.</p>
<p><b>AusNet Services has identified that a proportion (particular species and age) of its wooden poles are subject to high deterioration rates, and that the number of poles with this measured condition is increasing.</b></p> <p><b>AusNet Services has not adequately demonstrated that it is effectively managing the risks associated with these identified high deterioration rate poles as far as practicable.</b></p>	<p>AusNet Services documented recommendations from an internal degradation rate study. ESV identified that these recommendations have not been delivered. It is unclear to ESV if the identified cohort of high deterioration rate poles from the study are in a hazardous bushfire risk area (HBRA), and now have an increased timeframe between inspections and testing due to changes to the inspection practice and frequency.</p> <p>The assessment of this risk, including the identification and application of additional controls, will need to demonstrate the minimising of risk as far as practicable, in accordance with recommendation 4 of this report.</p>

Finding	Elaboration
Compliance with current standards including AS/NZS 7000:2016 has not been adequately demonstrated	Derived safety factors are inconsistent across the pole types and result in lower safety margins for some poles.

## Recommendations

This information has been used to inform the assessment and recommendations of other parts of this report. The recommendations specific to this section are summarised below.

### Recommendation 10

AusNet Services is to update its BMP to clearly demonstrate the alignment between the inspection cycle, training and maintenance timeframes nominated for all condition states of wood poles (and to otherwise address ESV's findings regarding the shortcomings of its current BMP). The revised BMP is then to be submitted to ESV for acceptance.

## Wood pole management forecasting and delivery

ESV reviewed the methods applied by AusNet Services to forecast and determine the required future level of wood pole inspection and treatment (reinforcement and replacement) and its resource plans to deliver the wood pole management plan, to ensure sustainable safety outcomes are delivered to the communities in its service area.

### Key findings

The key findings relating to this section are summarised in Table 8 below.

**Table 8: Summary of key findings for wood pole management forecasting and delivery**

Finding	Elaboration
A recognised pole reinforcement method is being applied	<p>Whilst there are legacy reinforcement methods deployed in the AusNet Services network, AusNet Services has been using Utility Asset Management Pty Ltd's (UAM) proprietary RFD Pole Reinstatement System as its standard reinforcement option for some time.</p> <p>The UAM RFD System has been used successfully in Australia by several MECs for over 20 years and ESV is not aware of any significant concerns with the pole reinforcement methodology in terms of its life extension benefits.</p>
Appropriate range of options are applied by AusNet Services	As an alternate to wood, clear criteria exist for replacement of wood poles with concrete poles where the function and location require it. ESV notes that a trial of alternate reinforcing systems is also being undertaken.
No delivery risks have been identified	AusNet Services has a mature contracting approach in place, using a combination of in-source and out-sourced activities, without material change. A large proportion of work is currently outsourced, and this strategy has been in place for some time.
AusNet Services' forecasting methodology does not explicitly consider risk	ESV considers that extension of the forecasting methodology to include risk-cost assessment for high fire risk areas is an improvement opportunity.

Finding	Elaboration
<p><b>There is an apparent disconnect between the long-term forecasting and operational intervention planning methods</b></p>	<p>Annual wood pole intervention planning is based on historical rates (rather than forecast) and reviewed annually.</p> <p>Whilst AusNet Services organises its work around identified 'at risk' poles, greater alignment between the long-term forecasting methods and those relied upon for shorter term operational planning is an improvement opportunity.</p>
<p><b>Long-term modelling suggests there is no looming 'bow wave' of pole interventions</b></p>	<p>AusNet Services has provided pole intervention forecast modelling over 30 years using its Availability Workbench (AWB) simulation tool. The modelling suggests that an intervention level of about 4,100 poles per annum for the next 10 years will be sufficient to avoid the need for significant increases in pole intervention volumes in the following 20 years. This volume<sup>14</sup> is consistent with the forecast level of interventions for the next five years.</p> <p>ESV notes that the long-term modelling does not account for the impacts of AusNet Services' inspection frequency change and the introduction of the NDI inspection method. Whilst the modelling is relatively simplistic, it suggests that the forecast intervention volume is more likely to reflect a sustainable level.</p>

## Recommendations

This information has been used to inform the assessment and recommendations of other parts of this report. No specific recommendations have been included for this section.

<sup>14</sup> Including efficiency driven intervention pole volumes

# Concluding remarks

**ESV will continue to monitor the improvements to the wood pole management system proposed to be undertaken by AusNet Services, including undertaking further reviews as necessary, to ensure that AusNet Services meets its obligations to provide a safe electricity network.**

In this section, ESV provides its concluding remarks and identifies implications for further investigations arising from this review.

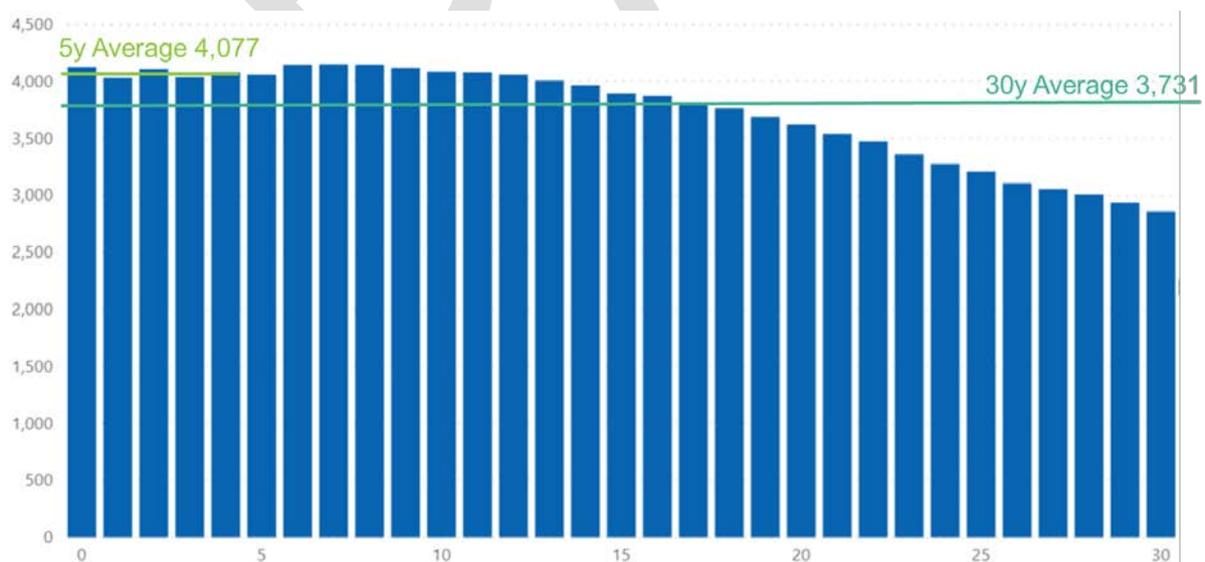
## Analysis of sustainable outcomes

ESV was presented with the results of a pole intervention forecasting model developed over a 30-year period. AusNet Services’ model predicts that an intervention level of about 4,100 poles per annum for the next 10 years will be sufficient to avoid the need for significant increases in pole intervention volumes in the following 20 years. ESV notes that the model’s intervention volumes<sup>15</sup> are similar with both the historical intervention rates realised prior to recent changes, and the forecast volumes submitted for the 2021-2026 EDPR. As presented earlier in the findings of this investigation the forecast intervention volumes are inconsistent with current budgeted and actual intervention rates.

ESV further notes that the long-term modelling should account for the impacts of AusNet Services’ inspection frequency change and the introduction of a non-destructive inspection method. While the modelling is relatively simplistic, it is beneficial for understanding the impact of asset management decisions on an asset population’s long-term requirements and to monitor one of the foreseeable risks across the operational life of the assets.

The results of AusNet Services predictive model are shown in Figure 8 below.

**Figure 8: Predicted wood pole interventions (replacement and reinforcement at historical rates)**



Source: AusNet Services data provided during investigation

<sup>15</sup> Including efficiency driven intervention pole volumes

ESV supports the development of long-term scenario modelling for wood pole interventions to assist AusNet Services in assessing whether or not the volume of pole interventions are likely to achieve sustainable safety outcomes.

## Concluding remarks

In summary, ESV concludes that:

	<p><b>AusNet Services' wood pole management system has achieved, and is currently achieving, the lowest unassisted wood pole failure rate of all Victorian MECs.</b></p>
	<p><b>AusNet Services' wood pole management practices have generally, and historically, been equivalent to or more conservative compared to other Victorian MECs. If maintained, the historical approach is likely to continue achieving sustainable safety outcomes into the future.</b></p>
	<p><b>AusNet Services has recently introduced changes to its wood pole management approach that it has not yet thoroughly and adequately assessed. The changes have also not demonstrated long-term sustainable safety outcomes or minimise risk 'as far as practicable' (AFAP).</b></p>

## Further work is required to ensure adherence to general safety duties

During the course of the investigations<sup>16</sup> undertaken by ESV, it has become apparent that further work is required to clarify the expectations of ESV in demonstrating adherence to the general duties of the *Electricity Safety Act 1998*. As this topic applies to all MECs, ESV will review recently published supporting materials and if required, develop and publish revised guidance in this regard.

<sup>16</sup> Powercor Wood Pole Management and AusNet Services Wood Pole Management

# Appendix A: Abbreviations

Term	Definition
Act	<i>Electricity Safety Act 1998</i>
ACCC	Australian Competition and Consumer Commission
AER	Australian Energy Regulator
AFAP	As Far As Practicable
ALARP	As Low As Reasonably Practicable
AS/NZS	Australian and New Zealand Standard
AWB	Availability Workbench
BMP	Bushfire Mitigation Plan
capex	Capital expenditure
COVID-19	Coronavirus Disease 2019
EDPR	Electricity Distribution Price Review
ESMS	Electricity Safety Management Scheme
ESV	Energy Safe Victoria
HBRA	High Bushfire Risk Area
ISO	International Organization for Standardization
LBRA	Low Bushfire Risk Area
MEC	Major Electricity Company
NDI	Non-Destructive Inspection
RFD	UAM proprietary Pole Reinstatement System
RIN	Regulatory Information Notice
SECV	State Electricity Commission of Victoria
STPIS	Service Target Performance Incentive Scheme
UAM	Utility Asset Management Pty Ltd
VIC	Victoria
WPO	Work Practice Observation

# Appendix B: Regulatory framework

## Regulatory bodies

The Victorian distribution and transmission network businesses are each referred to in legislation as a MEC and, although generally similar in engineering principles for transmitting electricity, are vastly different in other aspects. Each MEC's service area has very different characteristics such as network design and operating environments, geography and customer base that can affect their network safety performance. For these reasons, the MECs are assessed separately and a considered approach is taken to comparison directly between MECs.

AusNet Services is one of five MECs in Victoria that hold a distribution licence under the *Electricity Industry Act 2000* and is required to comply with the network safety regulation administered by ESV to which this report relates.

ESV is the independent technical regulator responsible for electricity, gas and pipelines in Victoria. ESV oversees a statutory regime that requires MECs to develop, submit and comply with an ESMS, five-yearly Bushfire Mitigation Plan, and an electric line clearance management plan for the period from July 2021 to June 2026, to the satisfaction of ESV. MECs must also actively participate in ESV audits to test the compliance of their safety systems.

In addition to the network safety requirements and systems, each of the MECs is regulated by the AER. The AER is the economic regulator of the wholesale electricity and gas markets in Australia. It forms part of the Australian Competition and Consumer Commission (ACCC) and enforces the national electricity rules that, among other things, provide powers to the AER to determine the revenue requirements and therefore the maximum prices that energy network owners (including the Victorian MECs) can charge.

This report does not directly detail the requirements of the AER, however references to the AER have been included where they relate to decisions on the level of investment proposed by AusNet Services for the management of its wooden power poles.

## How network safety is regulated

The safety of the Victorian electricity networks is governed by the *Electricity Safety Act 1998* and relevant regulations, under which the electricity businesses must adhere to the following:

- Electricity Safety (Management) Regulations 2019, which adopt the Australian standard for an ESMS (AS 5577) that sets out the requirements for safety management systems that must be submitted by all MECs for acceptance and audit by ESV as part of their ESMSs.
- Electricity Safety (Bushfire Mitigation) Regulations 2013, which set out the requirements for a BMP that must be submitted by all MECs for acceptance and audit by ESV
- Electricity Safety (Electric Line Clearance) Regulations 2020 which set out the requirements for an Electric Line Clearance Management Plan that must be submitted for acceptance and audit by ESV
- Electricity Safety (General) Regulations 2019, which specify the safety requirements relating to electrical installations and electrical work and certain requirements for electricity suppliers.

The Victorian electricity infrastructure safety management regime (inclusive of ESMS) utilises principle, performance and outcome based regulatory approaches rather than prescriptive

requirements. The primary reason is that the safety risks are complex, geographically diverse, have significant consequences (regardless of frequency), and often require tailored solutions. MECs also have the technical resources and engineering sophistication to effectively manage those risks. The regime also requires MECs to describe how it will meet the general duties of the Act, and comply with regulations and prescribed standards, in order to minimise safety risk.

## Who is responsible for safety outcomes?

Operating an electricity network involves managing risk and it is incumbent upon all MECs, including AusNet Services, to minimise the risk to AFAP.

It is therefore the responsibility of MECs to manage safety risk to comply with their obligations.

## How is this responsibility discharged?

MECs are required to proactively eliminate, where practicable, the risk of an incident before it occurs, or otherwise to minimise the risk of failure to the extent that the cost of doing so is not grossly disproportionate to the risk reduction achieved. This is the effect of legislative and regulatory instruments that obligate MECs to maintain a safe workplace, safe systems of work, a safe electricity supply network and the safety of staff and the public<sup>17</sup>. This goes beyond an obligation to mitigate the risks when a safety incident, despite precautions, occurs.

The required practice is to determine what is practicable by undertaking an economic test. This determines where risks should be reduced to the lowest possible level, or as far as practicable, incurring expenditure as necessary up to the point at which the expenditure would be grossly disproportionate to the benefit achieved.

ESV holds MECs to account by monitoring and enforcing the safety of the design, construction, operation, maintenance and decommissioning of their networks. It also monitors compliance with their obligations under the Act to minimise risk, as far as practicable, and comply with general safety duties as articulated in each MEC's ESMS and BMP.

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<sup>17</sup> For example: *Occupational Health and Safety Act 2004* (Vic); National Electricity Objective, National Electricity Rules, *Electricity Safety Act 1998* (Vic).