Jemena wood pole management

A review of sustainable wood pole safety outcomes

Public report

March 2024

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Executive summary

Overview

Energy Safe Victoria (**Energy Safe**) is conducting a series of reviews of Victorian electricity distribution businesses pole management practices to ensure they deliver sustainable safety outcomes for all Victorians.

Energy Safe has reviewed the wood pole management practices of Jemena Electricity Networks (Vic) Ltd (ACN 064 651 083) (**Jemena**) to assess whether they are expected to deliver sustainable safety outcomes for Victorians. This includes Jemena's systems for identifying the need to replace or reinforce wood poles before they fail or otherwise become a safety concern.

This report presents the findings and recommendations of our review of Jemena's wood pole management systems and practices.

Summary of findings and implications

Summary of findings

Jemena's application of its wood pole management system has resulted in a declining trend of unassisted wood pole failure rates over the last six years.

Nonetheless, Energy Safe has identified several findings that, when addressed, will strengthen Jemena's pole management practices.

As a major electricity company (**MEC**), Jemena is required to operate and maintain its supply network to minimise hazards and risks to safety as far as practicable (**AFAP**). Energy Safe's findings through this review highlight that the methodologies and practices used by Jemena to mitigate hazards and risks across its networks could be improved. For example, while Jemena has implemented bushfire risk reduction initiatives, such as a program to remove all reinforced wood poles from its Hazardous Bushfire Risk Area (**HBRA**), Energy Safe has found that it has not applied the approach that justified this initiative to all elements of wood pole management. Several issues supporting this finding are presented in this report and provide discrete and manageable improvement opportunities for Jemena to implement.

Energy Safe has also found that Jemena has inconsistent documentation and practices relating to the area of asset inspection, audit of asset inspection practices, serviceability criteria, and the assessment of risk for application of inspection and maintenance programs as a critical control.

Implications for sustainable safety outcomes

The safe management of wooden power poles has been a compliance and enforcement priority for Energy Safe. The findings of this review suggest that Jemena may not have fully effective asset inspection and asset management controls in place to adequately monitor and identify an increase in the network safety risk posed by its population of poles.

Jemena has a relatively low historical rate of unassisted wood pole failure and a smaller population of wood poles in HBRA when compared with most other MECs. However, there may be unaddressed risk inherent in the wood pole population, namely:

- a lack of certainty about the identification and treatment of under-sized[1] poles in Jemena's network
- concern about the efficacy of Jemena's program of field asset inspection audits that are intended to ensure the competence of Asset inspectors and the effectiveness of the inspections they undertake
- Jemena's decision to extend the inspection cycle of wood poles in low bushfire risk areas (**LBRA**) from four to five years.

Response to findings

Energy Safe released a draft version of this report on 24 July 2023 and, consistent with the previous Energy Safe public reports, we invited comment from the community and other stakeholders.

No submissions were received from the community on the draft report; however, Energy Safe has considered feedback regarding general industry practice received from the previous reviews when making recommendations.

Recommendations

Jemena is to develop a wood pole management improvement plan to address all recommendations and findings in the review. In addition, in consultation with Energy Safe, Jemena is to establish a quarterly reporting protocol to monitor progress against clear and measurable milestones for all the identified actions in the plan. Jemena is to submit the plan and quarterly reporting protocol to Energy Safe no later than **19 April 2024**. Energy Safe will require Jemena to include its response to the recommendations of the report in the next BMP and/or ESMS submission, which Energy Safe will consider in its assessment of the plan submitted.

1. Jemena is to update its asset inspection practices and documentation to be consistent and compliant with its ESMS and BMP. In responding to this recommendation Jemena should demonstrate to Energy Safe the independence of its auditor and refresher training on the content of its Asset Inspection Manual (**AIM**) is periodically undertaken.
2. Jemena is to revise its asset inspection audit process to improve the quality and consistency of inspections and to ensure the competence of Asset Inspectors assigned to assess the condition of overhead electrical assets (including wood poles).
3. Jemena is to submit its training course information to Energy Safe for review for compliance with the requirements of regulation 7(1)(p) of the *Electricity Safety (Bushfire Mitigation) Regulations 2023*.
4. Jemena is to continue to identify and implement improvements in wood pole management practices in the areas of asset inspection (including Non-Destructive Inspection (**NDI**) of wood poles) and failure investigation.
5. Jemena is to demonstrate to Energy Safe how the management of undersized poles will not lead to future performance issues and the practice of reinforcing poles is compliant with current standards.

[1] An undersized pole is one where its natural girth (no external decay) is less than the minimum tabulated girth for a Serviceable pole

Introduction

Purpose of this report

This report summarises the findings of the detailed review undertaken by Energy Safe into Jemena's wood pole asset management practices. The objective of the review was to ascertain whether those practices will produce sustainable safety outcomes.

Background to this report

Energy Safe is conducting a series of reviews into Victorian electricity distribution businesses to ensure that their respective pole management practices deliver sustainable safety outcomes for Victorians.

The review forms part of Energy Safe's commitment to progressively review the adequacy and sustainability of the wood pole management practices of Victorian MECs.

This report concludes the series of reviews and summarises a detailed review of Jemena's approach.

How this report is structured

The executive summary provides an overview of the assessment and findings relating to Jemena's wood pole management. The body of this report provides the following:

- An overview of Jemena's wood pole population and performance
- The approach to the assessment undertaken by Energy Safe
- A summary of the findings from the detailed assessment undertaken by Energy Safe
- Concluding remarks.

This report also includes two appendices:

- Appendix A provides a list of abbreviations used in this report
- Appendix B outlines the regulatory bodies and oversight they apply to MECs in Victoria, and specifically how network safety is regulated.

Consultation and amendments

Energy Safe invited interested parties to make a submission through a public consultation process to determine appropriate recommendations to ensure all findings are addressed to minimise risks to the safety of people, property damage and bushfire danger as far as practicable.

The consultation period for interested parties to provide feedback was open from 24 July 2023 to 18 August 2023 and no submissions were received. However, Energy Safe has considered feedback received from the previous reviews (i.e. reviews of Powercor, AusNet Services and United Energy) when making recommendations. Submissions from the previous reviews that are also relevant to Jemena relate to:

1. management of the reinforced pole population for sustainable safety outcomes
2. ensuring that the practice of reinforcing poles is compliant with current standards.

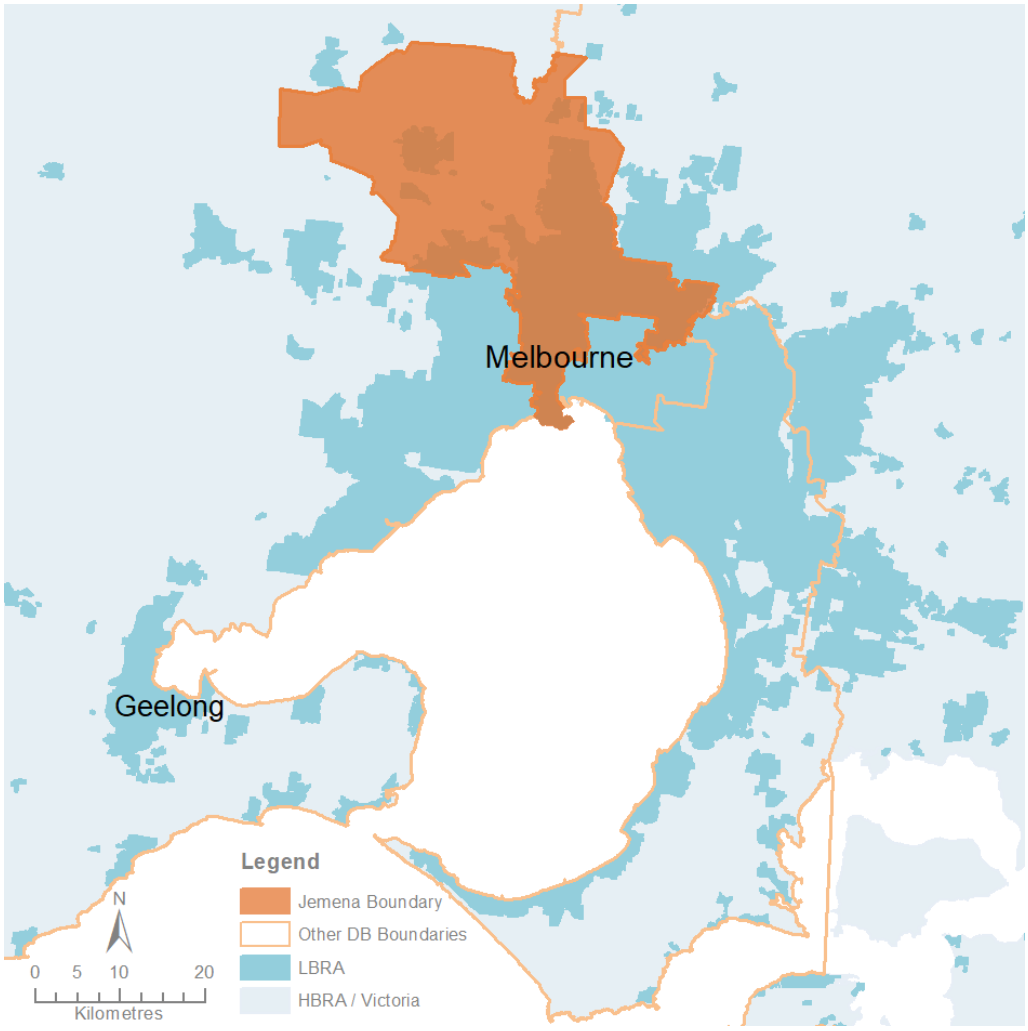
Overview of Jemena's wood pole population

In this section, the characteristics of Jemena's network and wood pole population are presented as context for the findings included in subsequent sections of this report.

Business overview

Jemena distributes electricity within the greater Melbourne area, as shown in the figure below. The overhead electricity network consists of 113,941 poles of which 106,176 are owned by Jemena.[2] The remainder comprise a combination of private overhead power poles and poles owned by other authorities, such as Telstra.

Figure 1: Jemena service area (as shown in orange area)



[2] Energy Safe analysis of Jemena, *JEN POLE EQUIP LIST - TOTAL as at 110722 All*

Wood pole population

The composition of poles by material type and bushfire risk classification by the five Victorian MECs is shown in the tables below.[3]

There are 60,587 wood and 19,919 concrete poles supporting distribution and sub-transmission networks across Jemena's network.[4]

Table 1: Summary of MEC pole materials

MEC	% total poles			Total
	Unreinforced wood	Reinforced wood	concrete	
Powercor	67%	5%	28%	**495,174**
AusNet Services	51%	7%	42%	**318,290**
United Energy	72%	12%	16%	**166,262**
Jemena	56%	19%	25%	**80,506**
CitiPower	77%	13%	10%	**47,332**

Data Sources: s 141AB Information notice submission to Energy Safe by MECs for 2022 and Energy Safe analysis of 'JEN POLE EQUIP LIST - TOTAL as at 110722 All.xlsx'

Collectively, Jemena's wood and concrete power poles make up the second smallest pole population but have the highest percentage of reinforced poles of the Victorian MECs.

Table 2: Summary of MEC wood pole characteristics

MEC	% wood poles			Total
	≥ 45 years	≥ 50 years	≥ 55 years	
Powercor	60%	48%	35%	**355,713**
AusNet Services	51%	37%	24%	**184,294**
United Energy	50%	40%	26%	**139,026**
Jemena	49%	37%	23%	**60,587**
CitiPower	63%	57%	43%	**42,587**

Data Sources: 141AB Information request submission to Energy Safe by MECs for 2022 and Energy Safe analysis of 'JEN POLE EQUIP LIST - TOTAL as at 110722 All.xlsx'

From benchmarking the age and volume of wood poles in the five Victorian MEC networks, Jemena has:

- the highest percentage of reinforced wood poles[5]
- a relatively low percentage of poles older than 45 years.

[3] Steel poles are used to support street lights and are not included within the scope of this report

[4] Energy Safe analysis of Jemena, *JEN POLE EQUIP LIST - TOTAL as at 110722 All*

[5] Concrete poles are not reinforced; wood poles are reinforced as a life extension measure, typically by bracing them with steel stakes attached by bolts and/or steel bands

Table 3: Comparison of MEC wood pole volumes in HBRA and LBRA

MEC (Distribution)	HBRA (%)	LBRA (%)	Total poles
Powercor	58%	42%	**355,713**
AusNet Services	57%	43%	**184,294**
United Energy	9%	91%	**139,026**
Jemena	5%	95%	**60,587**
CitiPower	0%	100%	**42,587**

Data Sources: s 141AB Information notice submission to Energy Safe by MECs for 2022 and Energy Safe analysis of 'JEN POLE EQUIP LIST - TOTAL as at 110722 All.xlsx'

Five per cent (4,343) of Jemena's population of wood and concrete poles are located within hazardous bushfire risk areas (**HBRA**), which is significantly lower than Powercor's and AusNet Services' HBRA wood pole populations.

Jemena has adopted a policy in HBRA of (i) no longer reinforcing wood poles, (ii) proactively replacing reinforced wood poles with concrete poles, and (iii) replacing non-reinforced wood poles with concrete poles when they are due for replacement. This is a risk reduction strategy that is discussed further in Table 6. In low bushfire risk areas (**LBRA**), Jemena deploys concrete poles sparingly because of their higher material cost compared to wood poles. Consequently, concrete poles are only installed in LBRA to satisfy specific design requirements.[6]

The average age of Jemena's wood poles is 40.2 years,[7] which compares favourably to Jemena's expected serviceable life of a non-reinforced wood pole of 54 years. The expected serviceable life includes the positive impacts of Jemena's wood pole life extension strategies such as using wood preservatives and termite treatment. The average age at which Jemena's wood poles are replaced is 39.7 years,[8] this figure includes only those poles that have been replaced and does not include poles which have been reinforced.

The pole reinforcement techniques used by Jemena can extend the service life by twenty or more years.

While the age of a wood pole is not the sole determinant of its condition or remaining serviceable life, as a pole ages the risk of failure increases due to deteriorating condition and strength. At some point the risk of failure is high enough to justify proactive intervention – either pole reinforcement or replacement. Jemena's assessment of the condition and risk of failure is discussed in Table 9 and its approach to wood pole interventions is discussed in Table 10.

Jemena's wood pole failure rate is a lagging indicator of the success or otherwise of its determination of the risk posed by its wood poles and its intervention decisions (methodology and timing). As discussed further in Table 7, its wood pole performance is good relative to the other Victorian utilities.

However, with 23 per cent (~13,692) of its wood poles over 55 years old, Energy Safe expects that Jemena will need to remain vigilant in the management of poles in order to maintain an acceptably safe pole population. This will require, at a minimum, the level of wood pole intervention that Jemena has been applying to its population. Energy Safe's findings regarding Jemena's wood pole replacement and reinforcement forecasts is discussed further in Table 11.

[6] For example, when the loading on the pole is high (due to either pole-top equipment and/or strain angles)

[7] Based on Energy Safe analysis of 'JEN POLE EQUIP LIST - TOTAL as at 110722 All'

[8] ELE-999-PA-IN-007 Electricity Distribution Asset Class Strategy - section 4.1.2

Current condition assessment of wood poles

In managing its wood poles, Jemena undertakes regular condition assessment of every pole. The inspection process captures information necessary to allow analysis and classification of the pole as Serviceable, Limited Life, or Unserviceable. Table 4 shows the definition of each classification.

Table 4: Jemena's wood pole serviceability classifications definitions

Classification	Definition
Serviceable	Considered safe until the next inspection,[9] no other action required
Limited Life	Pole could become unserviceable before the next inspection; reinspect or reinforce within 12 months
Unserviceable	Replace or reinforce within 12 weeks

Source: Based on Energy Safe Victoria Wood Pole Management Workshop 2022 - Serviceability Criteria – slide 55

Jemena's AIM establishes the serviceability criteria that apply to these classifications. Pole reinforcement is applied to Limited Life and Unserviceable poles, provided certain criteria are satisfied.[10]

Table 5 shows the breakdown of the pole population by serviceability status in July 2022. Jemena had identified 40 Unserviceable wood poles for intervention and 831 Limited Life poles.

Table 5: Jemena's wood poles in each serviceability classification

Classification	Number of wood poles	Percentage of wood pole population
Serviceable	44,240 non-reinforced	73%
	15,476 reinforced	26%
Limited Life	820 non-reinforced	1%
	11 reinforced	<1%
Unserviceable	39 non-reinforced	<1%
	1 reinforced	<1%

Data Source: Energy Safe analysis of Jemena, 'JEN POLE EQUIP LIST - TOTAL as at 110722 All'

Based on Energy Safe's field inspection of a sample of more than 1,000 Jemena wood poles and Jemena's reported condition assessment, Energy Safe concludes that:

- Jemena's reported number of wood poles in each classification is likely to be representative of the condition of the wood pole population
- The number of Unserviceable poles represents a relatively small percentage of Jemena's wood pole population and represents a manageable number of poles to replace within the designated 12 week limit[11]

[9] Four years in LBRA and every three years in HBRA within Jemena's accepted Bushfire Management Plan (BMP). Jemena has implemented a change in inspection interval in LBRA from four yearly to five yearly and submitted a BMP to Energy Safe containing this change. Energy Safe is currently assessing the submitted BMP.

[10] Criteria is based on internal residual wall thickness and external residual diameter at the critical section for given timber durability class, plus consideration of whether reinforcement can be safely attached to the pole

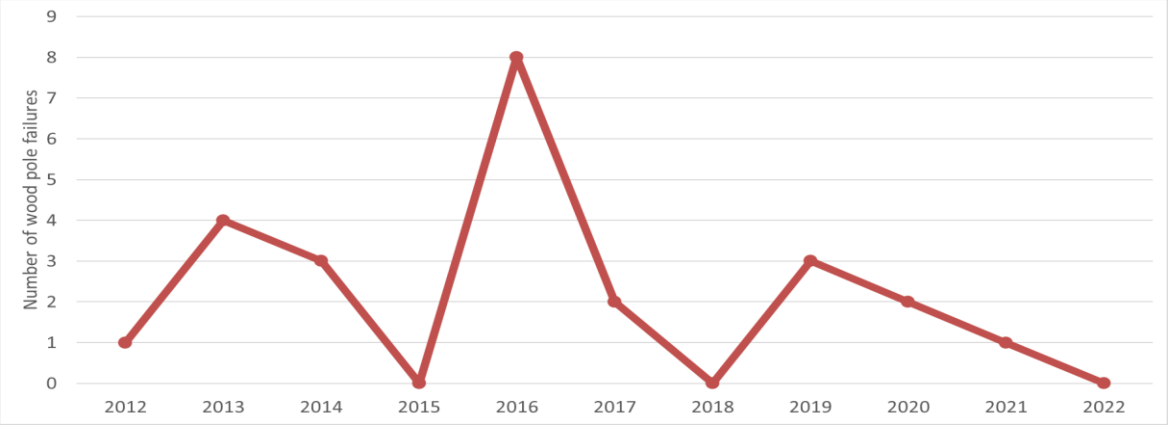
[11] On a rolling basis, as with each inspection more Unserviceable poles will be identified

- Jemena has a relatively large percentage of ageing reinforced poles that will progressively need to be replaced with new poles. This underpins Jemena's increasing pole replacement volume.

Failure performance of wood poles

It is common industry practice to consider the cause of a wood pole failure as either 'assisted' or 'unassisted'. The former is where the pole fails due to applied forces beyond those reasonably foreseeable and for which each pole should be designed to withstand. Causes of assisted pole failures include impacts from cars or fallen trees, and wind forces beyond design.[12] By contrast, unassisted pole failures result from events or issues that are within the control of Jemena and/or are within the design parameters for normal service. Jemena's unassisted pole failure performance is shown in the figure below.

Figure 2: Jemena's number of unassisted wood pole failures



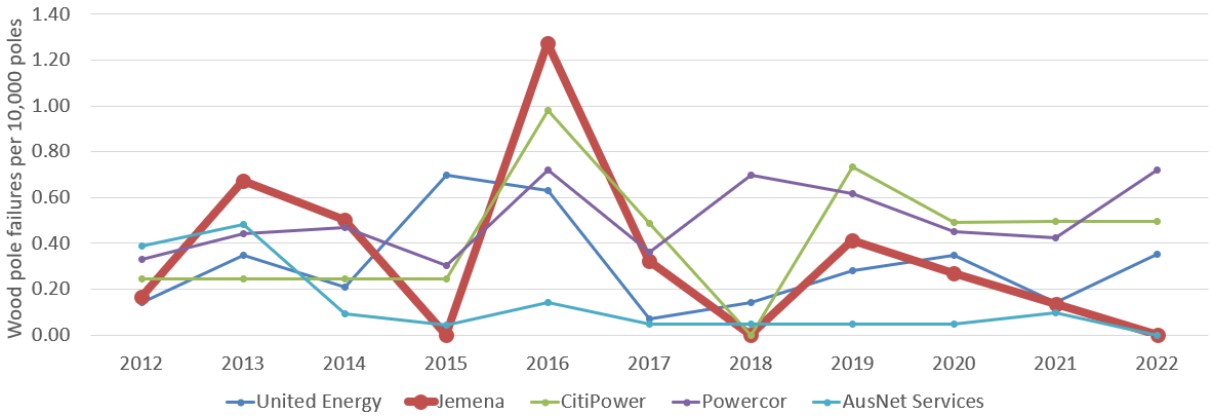
Source: MEC quarterly reported asset failure data to Energy Safe

Jemena has achieved a generally declining number of pole failures since 2016. The spike in unassisted failures in 2016 was common to a number of Victorian MECs with the weather pattern in that year considered to be a significant contributing factor. The figure below shows that Jemena's recent wood pole failure rate (measured in failures per 10,000 poles)[13] compares very well with other Victorian MECs.

[12] Poles are required to withstand wind forces that the line is designed to meet

[13] Normalising the poles failure rate by dividing by 10,000 is the common industry approach for reporting this statistic

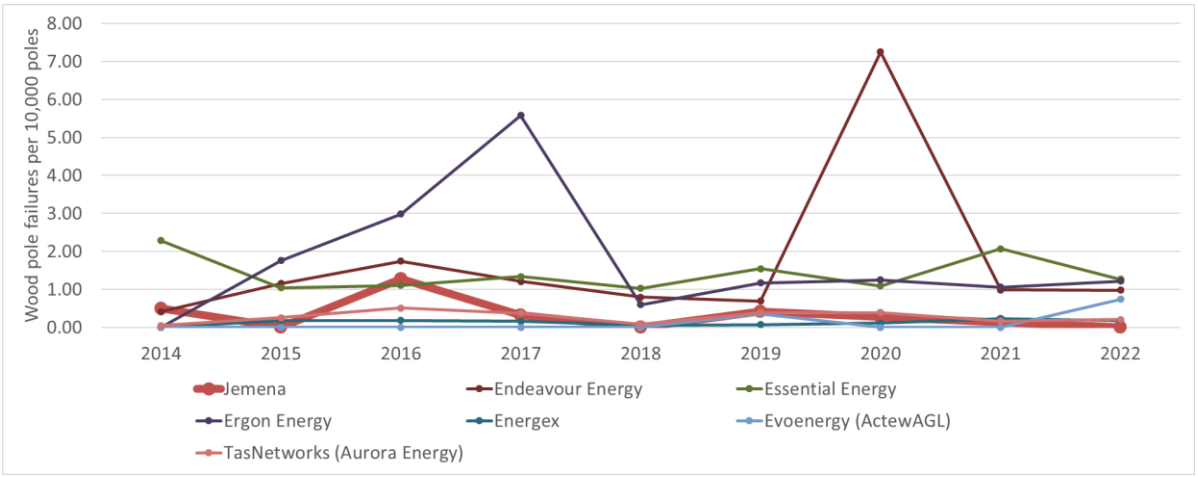
Figure 3: Comparison of unassisted wood pole failure rate by Victorian MEC



Source: Serious and other serious electrical incidents reports submitted to Energy Safe by MECs from 2012 to 2022

Jemena's wood pole failure rate also compares favourably with that of the other distribution utilities in the National Electricity Market (**NEM**), as shown in the diagram below. The average NEM distribution utility unassisted wood pole failure rate over the last five years is 0.98 poles per 10,000. Jemena's average unassisted wood pole failure rate over the same period is 0.16 poles per 10,000.

Figure 4: Comparison of unassisted wood pole failure rate – other Australian DNSPs



Source: Energy Safe analysis of Regulatory Information Notices and Energy Safe quarterly reports[14]

[14] Energy Safe AER RIN data from businesses with comparable failure definitions. Jemena data was obtained from Energy Safe quarterly reports.

Approach to assessment of Jemena's wood pole management

This section describes Energy Safe's approach to the assessment of Jemena's wood pole management systems and practices.

For the purpose of this review, a sustainable approach to wood pole management is defined as one that consistently minimises bushfire danger and risks to the safety of any person or property arising from the supply network, as far as practicable, pursuant to section 98 of the *Electricity Safety Act 1998* (Vic) (**Act**).

Approach to the assessment

Similar to previous reviews,[15] a two-stage approach was undertaken consisting of:

- Stage one - A high level review of Jemena's wood pole management with the aim of informing the planning and launch of stage two; and
- Stage two - Detailed review of Jemena's wood pole management systems and practices.

As part of the detailed review, Energy Safe undertook discussions, workshops, and field visits with representatives of Jemena and its key service providers. Energy Safe reviewed Jemena's strategies, documents, work practices, data, pole performance, and forecast modelling to support the findings in this report.

Energy Safe issued an Information notice to acquire Jemena's documents, data and information (including Jemena's own analysis and independent reports) to support its review.

Jemena and Energy Safe held an initial workshop in September 2022. The purpose of the workshop was to provide Jemena with an opportunity to inform and confirm Energy Safe's understanding of Jemena's approach to managing its wood pole assets.

We held a series of follow-up discussions and workshops with Jemena staff.

Jemena was provided with a copy of the draft report to enable it to comment on any factual errors in April 2023. Jemena's feedback identified no factual errors and no corrections were made to the draft report.

Consideration given to reported performance

Each MEC is required to report serious electrical incidents and the progress of safety initiatives in accordance with the reporting guidelines published by Energy Safe. This includes wood pole failures.

When reviewing wood pole failure performance, it is important to note that failure rates are 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 need to be high and/or increasing. If the required intervention volume is not

[15] That is, of Powercor's, AusNet Services', and United Energy's wood pole management

undertaken, the network safety risk posed by wood poles will rise, and the resulting rate and number of pole failures will inevitably increase some time thereafter.

Energy Safe has considered both the current and historical pole failure rates in its review of wood poles and importantly, whether Jemena's current wood pole management practices are likely to affect the failure rates and safety outcomes for its wood pole population over the medium to long-term.

Requirements to demonstrate level of safety

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

In determining what is practicable, the Act requires an MEC to have regard to the severity of the hazard or risk, the state of knowledge about the hazard or risk, the availability and suitability of ways of removing or mitigating the hazard or risk, and the cost of doing so.

A summary of the regulatory framework that applies to MECs is provided in Appendix B.

The Act also requires that all MECs that operate electricity supply networks have an accepted Electricity Safety Management Scheme (**ESMS**). An ESMS functions as a performance-based, outcome-focused part of the regulatory framework that enables the industry to determine its own performance measures and demonstrate that the measures proposed meets legislated safety requirements.

Energy Safe has published its *Energy Infrastructure Safety Management Policy* and the supporting *Electricity Safety Case (ESMS) Preparation and Submission Guideline for MECs* to improve MEC awareness of how Energy Safe interprets and applies the safety management regime, and how Energy Safe expects compliance with statutory and regulatory requirements to be achieved.

In addition, all MECs are required to have an accepted Bushfire Mitigation Plan (**BMP**) that complies with the *Electricity Safety (Bushfire Mitigation) Regulations 2023* (Vic).

The ESMS:[16]

(i) specifies safety and risk management systems, policies and practices, including the AFAP decision-making methodology

(ii) describes a Formal Safety Assessment (**FSA**) that identifies and assesses hazards and risks arising from the supply network

(iii) specifies the outcomes of risk control decisions made by the MEC in relation to safety risks identified in the FSA.

The BMP:

(i) specifies the preventative strategies and programs in place to mitigate network-caused bushfire danger

(ii) specifies the management systems, processes and procedures in place to meet the prescriptive regulatory requirements to mitigate the risk of fire.

In legislative terms, the BMP forms part of an ESMS and is a specific, prescriptive document designed to address bushfire risk. It outlines in practical terms, the key controls that the MEC will implement to minimise bushfire danger arising from its supply network AFAP.

[16] Energy Infrastructure Safety Management Policy page 11

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

In this review, Energy Safe has referred to these overarching requirements, and where required, referred to the obligations of the Act in making findings regarding Jemena's wood pole management.

Findings and recommendations

Jemena's wood pole management practices have resulted in an improving unassisted wood pole failure rate, which compares favourably with other Victorian MECs and other peer utilities in the National Electricity Market.

However, Energy Safe has identified improvement opportunities that, when fully implemented, will help Jemena sustain good wood pole performance.

This section presents the key findings arising from the detailed review.

Overview

The findings are grouped into six key assessment areas:

- Strategy and management plan
- Pole characteristics and performance
- Inspection method and practices
- Assessment of pole condition and risk
- Wood pole intervention options
- Wood pole management forecast and delivery.

Strategy and management plan

This section focuses on our findings and recommendations from reviewing Jemena's overarching strategy for the management of its wood pole population, including how Jemena ensures sustainable safety outcomes are delivered to the communities in its service area.

Key strategy and management plan findings

The key findings are summarised in the table below.

Table 6: Summary of key findings regarding Jemena's strategy and management plan

Finding	Elaboration
Jemena's certification to the ISO 55000 international standard on asset management leads its peer utilities in Victoria and is consistent with its policy and objective to deploy best asset management practices.	Jemena is the only Victorian distribution MEC that has achieved and maintained the ISO 55000 certification.[17] Consistent with an asset management system accredited to ISO 55000, Jemena's wood pole management strategy is informed by historical asset performance and risk. Evidence of this is the review and analysis of historical asset performance that led Jemena to adopt several wood pole failure risk reduction programs including: • Use of concrete poles in HBRA Jemena is progressively replacing all reinforced wood poles with concrete poles in HBRA and replaces Unserviceable or Limited Life poles with concrete poles[18]

[17] Based on information available up to February 2023

[18] That is instead of reinforcing Limited Life wood poles in HBRA, Jemena replaces the wood pole with a concrete pole

	• Replacing LV poles with HV raiser brackets A safety risk was identified when using steel HV raiser brackets and crossarms to add HV lines to exiting LV poles. The raiser bracket could be energised at HV only centimetres from the LV conductors. These poles are now replaced with standard HV poles. • Undersized poles program An investigation into a number of pole failures after a severe storm in 2008 identified that a subset of failed poles were undersized. These poles were installed by previous network authorities and it was decided that all undersized poles would be either staked or replaced. • Inspection criteria for Class 3 timber poles Leading up to 2017 there was an increase in failures of Class 3 wood poles.[19] Consequently, Jemena modified the sound wood measurement component of its serviceability criteria for Class 3 poles with the aim of ensuring that the mean time to failure of this pole type exceeded the inspection period.
Jemena's documented corporate, electricity network, and asset objectives, while broadly aligned, are inconsistently stated across its suite of asset management documentation.	Jemena states its asset objectives in a number of corporate documents, including its Network Strategy and its Asset Business Strategy. The inconsistently stated objectives can lead to confusion about investment priorities (i.e. decision-making, resource allocation, and KPIs) and undermines the confidence of Energy Safe that strategic decisions will be made consistently and in order to achieve their objectives.
The safety-related objective in Jemena's Asset Business Strategy is to:[20] *-Invest to maintain safety, reliability and availability of services.* An objective to maintain safety does not ensure Jemena meets its obligations to minimise risk AFAP.	The objective to 'maintain safety' is potentially inconsistent with Jemena's requirements under the Act to minimise safety risk AFAP. It is also inconsistent with other areas of Jemena's risk management documentation in which appropriate statements regarding minimising safety risk AFAP are denoted. While the Asset Business Strategy document includes several alternative objectives to 'Meet compliance requirements and expectations of Energy Safe', it does not explicitly recognise the requirement of the Act for Jemena to design, construct, operate, maintain and decommission its supply network to minimise hazards and risks AFAP.
Jemena has an established AFAP procedure that, if applied appropriately, should result in risks being reduced as far as practicable.	Jemena has in place an AFAP review procedure that outlines the steps required to quantify network risk for an AFAP assessment. Under Jemena's approach, AFAP is achieved when all practicable controls are implemented and any controls omitted are justifiably so because they have been

[19] The durability of poles is classified from Classes 1-4, with Class 1 (comprising hardwoods) the highest durability classification and Class 4 the lowest durability. The durability rating of a species is based on the natural ability of the heartwood of that species to resist decay and insect pests (including termites).

[20] Jemena Electricity Network Asset Business Strategy 2020-2029 ELE PL 0019 page 60

	demonstrated to be impractical (e.g. due to the cost of the control being grossly disproportionate to the risk reduction achieved). Jemena has combined its electricity network AFAP procedure and gas network ALARP procedure. The clarity of the document can be improved, particularly when AFAP and ALARP have, at times, been used interchangeably.
In assessing an extension to its wood pole inspection regime for poles in LBRA from four to five years, Jemena has not demonstrated that an appropriate risk assessment and its AFAP process were applied.	Jemena's assessment report titled *WO.16 – 5-year inspection cycle in LBRA*, failed to consider the general duty under the Act, which states: *A major electricity company must design, construct, operate, maintain and decommission its supply network to minimise as far as practicable (AFAP) a range of risks and hazards (including bushfire danger).* The report only considered the requirement of the *Electricity Safety (Bushfire Mitigation) Regulations 2023*, to inspect the LBRA network within a maximum interval of 61 months. In Energy Safe's opinion, Jemena did not provide sufficient evidence that it applied its AFAP procedure appropriately in making its decision to extend its inspection cycle. Jemena's change to its inspection regime is being considered from a regulatory perspective by Energy Safe as part of our assessment of a BMP submitted by Jemena containing this change.

Recommendations

This information has been used to inform the assessment and recommendations of other parts of this report.

Pole characteristics and performance

Energy Safe reviewed the characteristics of Jemena's wood pole population and performance of the fleet of wood poles by referring to its wood pole performance measures and, where appropriate, industry benchmarks for comparison. As Energy Safe is primarily interested in key safety measures, Energy Safe has not considered other outcome measures, such as the financial incentives and penalties pertaining to the Service Target Performance Incentive Scheme (**STPIS**) measure within the national electricity rules (**NER**).

Key pole characteristics and performance findings

The key findings relating to this section are summarised in the table below.

Table 7: Summary of key findings regarding Jemena's pole characteristics and performance

Finding	Elaboration
A fire area boundary review undertaken in 2021 resulted in almost half of Jemena's HBRA pole population being reclassified as LBRA.	Jemena is the second smallest of the Victorian distribution networks and has the lowest proportion of pole population located in HBRA of the four Victorian MECs with HBRA.[21] The result of the fire area boundary review demonstrates that while 59% of Jemena's geographical area is HBRA, a significant proportion of Jemena's assets in HBRA were located in areas subject to development and urban expansion. As a result, these fringe-areas of HBRA were reclassified as LBRA.
Jemena's pole failure performance is good compared to its Victorian MEC peers.	Over the last five years, Jemena's average annual wood pole failure rate is the second lowest of the five Victorian distribution MEC's. Jemena has reported six unassisted pole failures in the last five years – an average of 1.2 failures per annum. According to the information submitted by Jemena none of its reinforced wood poles nor any wood poles located in HBRA have failed in the last ten years.

Recommendations

No recommendations have been included for this section.

Inspection method and practices

Energy Safe reviewed the inspection method, training, and other practices applied by Jemena and its inspection service provider to collect information regarding the strength and other characteristics of each wood pole.

The objective of Jemena's wood pole inspection practice is to provide sufficient information to reliably establish the condition of individual poles. Like most MECs, Jemena uses a combination of visual inspection techniques and the 'dig, sound, and drill' technique to determine the presence and impact of internal rot, termite attack, and other causes of wood pole strength reduction which, if not addressed, lead to pole failure.

[21] CitiPower does not have any HBRA in its service area

Key inspection method and practices findings

The key findings relating to this section are summarised in the table below.

Table 8: Summary of key findings regarding Jemena's inspection method and practices

Finding	Elaboration
Jemena's pole inspection methods and practices (as described in its AIM) are consistent with those of other Victorian MECs with the exception of the application of Non-Destructive Inspection (NDI) technology.	According to Jemena's AIM, a ground-based pole inspection and condition assessment is undertaken at each wood pole inspection. Jemena's ground-based inspection method utilises visual assessment and dig, sound and drill (DSD) techniques.[22] This method and the inherent practices described in its AIM are generally consistent with the methods and practices of other Victorian MECs. The exception is that, unlike other Victorian MECs, Jemena does not utilise an NDI to augment its inspection practices. A proven NDI technology can provide supplementary objective and repeatable information to help improve the accuracy of wood pole condition assessment. Jemena has advised that it is participating in industry-wide NDI trials.
The processes specified in the Asset Inspection Manual and the application of them in the field fall short of good industry practice.	Energy Safe's review of the AIM and observation of the work practices for inspection and audit of inspection has identified the following: • The instructions for the sound test are inadequate, correcting this would help to ensure a consistent approach is achieved at each inspection • The process for inspection of poles where access is restricted[23] is not clear and therefore the inspection may not always be undertaken in accordance with the documented practice – this could lead to failure to identify a high risk pole • The hole score[24] and original pole girth/diameter[25] are measures used to determine pole serviceability. They are not required to be recorded in the inspection process – this could lead to failure to identify a high risk pole • The AIM is inconsistent in stating what is required of Asset Inspectors for treated and untreated poles in relation to: – measuring and recording residual girth

[22] DSD is a widely recognised 'destructive inspection technology' because it involves drilling an increasing number of test holes in the wood pole over successive inspection cycles cumulatively reducing the poles strength; if poles have too many holes they are classified as Unserviceable

[23] The primary concern is where a significant portion of the wood pole surface area within 1-2 metres of the ground line is obscured – typically by reinforcement stakes and/or banding or by cables (which are required to transition supply from overhead to underground)

[24] The strength loss caused by a drilled hole in a pole depends on its location in relation to the direction of loading; Jemena, like other utilities with wood poles, applies scores to each drill hole which, in aggregate can lead to the maximum score being exceeded and the pole is classified as Unserviceable regardless of the amount of sound wood remaining in the pole

[25] Or an equivalent measure to allow for determination of the loss of external girth/diameter

Finding	Elaboration
	– assessing residual strength against look-up tables and determining serviceability – measuring external rot for treated poles and determining serviceability • The AIM specifies that only creosote-treated poles should be bored to confirm any defects other than checks.[26] In Energy Safe's experience wood pole sounding can identify internal hollows that should be tested (bored) in all hardwood utility poles.
Jemena is not delivering annual refresher training on the content of the AIM.	Jemena's AIM specifies that annual refresher training is to be provided to all personnel who conduct asset inspections. However, Jemena does not ensure that Asset Inspectors undertake formal refresher training annually on all technical tasks in the AIM. Instead, annual training provided to Asset Inspectors is typically limited to new processes, updates to processes, and follow-up to audit findings only. This potentially comprises the quality of field inspections and therefore presents an increased risk that unserviceable poles are not identified.
The quality of the audit program applied to the Asset Inspectors can be improved.	Jemena specifies in its BMP that the competence of Asset Inspectors assigned to assess the condition of overhead electrical assets on the Jemena network is monitored through its audit program. The external auditor engaged by the service provider has inspection experience across a number of MECs, but was observed by Energy Safe to be less familiar with the contents of Jemena's AIM than Jemena's Asset Inspectors which casts some doubt about the quality of the auditing. Examples of shortcomings in the audit quality include: • estimation of the drill angle applied where objective measurement is practicable • errors in the inspection of reinforced poles • failure to adequately audit the HSE component of the inspection process.
The audit program applied to the Asset Inspectors is not independent (as stated by Jemena).	Whilst the BMP states that the quality audit program is to be undertaken independently, Jemena's external service provider for field asset inspection directly engages a single auditor (a sub-contractor) to undertake the inspector audits. The service provider also engages the same sub-contractor to undertake both the inspection/pole condition assessment and the audits of the inspectors under a separate service delivery contract. The auditor is therefore not independent, which casts some doubt about the quality and rigour of the auditing.

[26] A check in a wood pole is also referred to as a crack or split – the more severe the check the more likely the pole is Unserviceable

Recommendations

The recommendations specific to this section are summarised below.

Recommendation 1
Jemena is to update its asset inspection practices and documentation to be consistent and compliant with its ESMS and BMP. In responding to this recommendation Jemena should demonstrate to Energy Safe the independence of its auditor and refresher training on the content of its Asset Inspection Manual (AIM) is periodically undertaken.
Recommendation 2
Jemena is to revise its asset inspection audit process to improve the quality and consistency of inspections and to ensure the competence of Asset Inspectors assigned to assess the condition of overhead electrical assets (including wood poles).
Recommendation 3
Jemena is to submit its training course information to Energy Safe for review for compliance with the requirements of regulation 7(1)(p) of the *Electricity Safety (Bushfire Mitigation) Regulations 2023*

Assessment of pole condition and risk

Energy Safe reviewed the methods applied by Jemena to ascertain the condition of each wood pole, and the pole's ability to continue to meet the requirements of service (or not) as an input to the development of its wood pole management plan.

The serviceability assessment is a field-based test that the pole should be able to withstand the loading forces applied to it, up to thresholds intended to cater for the pole's design limit. The serviceability is established from a combination of (i) the information collected in the field during inspections, (ii) standing data (such as the pole age, pole height, and initial certified design strength), and (iii) loading assumptions, including wind loading and other forces acting upon it.

A wood pole's strength and therefore its ability to withstand these forces decline over time. If a pole's remaining strength is assessed as unlikely to withstand the loading forces likely to act on it (at least until the next inspection/serviceability assessment), then some form of action is required to mitigate the pole failure risk.

Key assessment of pole condition and risk findings

The key findings relating to this section are summarised in the table below.

Table 9: Summary of key findings regarding assessment of Jemena's pole condition and risk

Finding	Elaboration
There is conflicting and inconsistent serviceability criteria listed throughout the Jemena AIM that may lead to the incorrect application of the serviceability criteria.	A number of inconsistencies relating to serviceability criteria have been observed within Jemena's AIM, including: • Inconsistent serviceability criteria for re-inspection of Limited Life poles • Incomplete or conflicting criteria for treated and untreated poles across the serviceability classifications • A combination of measurements and thresholds for characterising internal and external rot that is inconsistent across the serviceability classifications. Each of these issues could give rise to incorrect wood pole serviceability assessment. Energy Safe also observed a small volume of inconsistent records in data fields that contribute to serviceability determination. This issue is relatively minor and is unlikely to materially increase the risk posed by Jemena's wood pole population.
Despite being identified as an issue in 2008, undersized wood poles remain in Jemena's network.	Jemena identified a number of undersized poles following an investigation instigated after a cluster of failures in 2008. Jemena also reviewed the residual girth thresholds for wood pole serviceability in 2016 and identified poles for which the residual girth threshold had to be increased. Jemena is progressing a program to rectify undersized poles with more than 70% expected to be staked and the remainder to be replaced. The population of identified undersized un-staked poles has been reduced to three percent of the total wood pole population as a result of its rectification program, which will continue into the 2021-2026 regulatory period. Energy Safe is concerned that with a history of undersized poles in its network, Jemena has not adequately demonstrated that all undersized poles have been identified. For example, Jemena does not establish the loading on individual poles, nor does it explicitly account for fibre strength deterioration over time in wood poles.
Jemena's failure investigation process can be improved.	Jemena's failure investigation process has driven improvements via changes to inspection criteria and practices identified from investigation findings. However, further improvements should be pursued. For example, Jemena should: • Introduce rigorous root cause analysis, including undertaking pole loading assessments • Trend the findings from failure investigations to identify common causes and/or to identify whether the actions

Finding	Elaboration
	taken in response to previous findings have been effective.

Recommendations

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

Recommendation 4
Jemena is to continue to identify and implement improvements in wood pole management practices in the areas of asset inspection (including NDI of wood poles) and failure investigation.

Wood pole interventions

Energy Safe reviewed the methods applied by Jemena to replace or reinforce wood poles when the combination of the inspection data and serviceability criteria determine that intervention is necessary. The focus of the review was the wood pole treatment (replacement/reinforcement) practices deployed by Jemena and how and when it deploys them.

Key wood pole intervention management findings

The key findings relating to this section are summarised in the table below.

Table 10: Summary of key findings regarding Jemena's wood pole interventions

Finding	Elaboration
Jemena's reinforcement of identified undersized poles may not fully address the risk of failure.	As of the end of 2018, 8% of wood poles were identified as undersized in Jemena's network. Undersized poles have a history of failure[27] due to insufficient girth (across the pole length). In order to manage the issue of undersized poles, more than 70% are expected to be staked and the remainder are to be replaced.[28] By reinforcing the pole from below ground to 1m above ground, the critical section of the pole is no longer the ground line but raised to the upper section of the reinforcement and the line immediately above the top of the reinforcement (i.e. at 1m). However, the fundamental issue of inadequate pole girth (and therefore pole strength) for the design load has not been demonstrated by Jemena as having been resolved by reinforcement. Minimum girth is a limitation in suitability for application of reinforcement. Jemena's Asset Class Strategy (**ACS**) for poles stated that poles with a girth of less than 720mm at 1m above ground are unsuitable for staking[29] regardless of whether they are classed as undersized. However, this requirement is not

[27] ELE-999-PA-IN-007 Electricity Distribution Asset Class Strategy - section 4.1.4

[28] ELE-999-PA-IN-007 Electricity Distribution Asset Class Strategy – Table 4-11

[29] ELE-999-PA-IN-007 Electricity Distribution Asset Class Strategy - section 4.1.5

Finding	Elaboration
	captured in the relevant section of the AIM where intervention options are specified. Where the minimum girth was not assured at the time of application, good practice is to use the girth as a factor in serviceability assessment for classifying poles as Limited Life or Unserviceable. However, data provided by Jemena shows that about 60% of its staked poles have no recorded girth measurements.[30] Further, there are more than 600[31] (4%) of staked poles with girth less than 720mm, which is inconsistent with the reinforcement suitability criterion stated in Jemena's ACS for poles. Furthermore, for reinforced poles with recorded girth measurements, it is unclear from the records where (which location on the pole) the girth measurement was taken. The implication is that girth measurements do not form part of Jemena's serviceability criteria for reinforced wood poles, which in turn may mean there are reinforced poles with inadequate strength that are assumed to be serviceable by Jemena.
One of Jemena's reinforcement systems was not demonstrated to be compliant with AS/NZS 7000:2016[32].	Two types of reinforcement systems are currently used by Jemena, RFD (93% of reinforced poles) and Osmose (6%). HS2 and Power-beam stakes (collectively applied to 1% of the reinforced pole population)[33] are legacy reinforcement systems that still exist in Jemena's network. Jemena currently relies on the engineering design methods in place since privatization, which among other things, relies upon WSM[34] and FOS[35] methods for assessing the suitability of a pole for reinforcement. Jemena refers to a series of VESI-commissioned reports to demonstrate equivalent or better safety performance of the current approach when compared to a limit state method. These reports do not sufficiently cover the practice of pole reinforcement. One of Jemena's current reinforcement system service providers claims to have the functionality in its assessment of the suitability of a pole for reinforcement to incorporate checks against AS/NZS 7000 parameters/ requirements.[36] However, in

[30] Energy Safe analysis of 'POLE Inspection Measurements 010112 to 300622' as at July 2022

[31] No correlation is sort between the 4% staked poles with girth less than 720mm and 3% undersized poles remaining on the Jemena network as the latter is yet to be intervened

[32] Australian and New Zealand Standard (2016) for overhead line design. It specifies the requirements for the design and construction of new overhead lines to ensure that the line is suitable for its intended purpose, provides acceptable levels of safety, and satisfies environmental criteria

[33] Energy Safe analysis of Jemena, 'JEN POLE EQUIP LIST - TOTAL as at 110722 All'

[34] Working Stress Method - assumes that the structural material behaves in a linear elastic manner and that adequate safety can be ensured by suitably restricting the stresses in the material induced by the expected working load

[35] Factor of Safety (FOS) is the ratio of pole's residual strength over the maximum allowable design load for a given pole size

[36] FAQ Sheet - RFD Pole Reinstatement System – Page 4 of 7

Finding	Elaboration
	Energy Safe's opinion, compliance with the standard has not been adequately demonstrated. Information provided by Jemena's second pole reinforcement system service provider has demonstrated its reinforcement systems are consistent with AS/NZS 7000:2016.

Recommendations

The recommendation specific to this section is summarised below.

Recommendation 5
Jemena is to demonstrate to Energy Safe how the management of undersized poles will not lead to future performance issues and the practice of reinforcing poles is compliant with current standards.

Wood pole management forecast and delivery

Energy Safe reviewed the methods applied by Jemena to 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 it serves.

Key wood pole management forecast and delivery findings

The key findings and observations relating to this section are summarised in the table below.

Table 11: Summary of key findings regarding assessment of forecasting and delivery

Finding	Elaboration
Jemena's pole forecasting methodology is adequate.	Condition based risk management (**CBRM**) is a recognised asset management technique for forecasting asset intervention volumes. Jemena's application of CBRM to forecast wood pole volumes is adequate: • Jemena has refined its CBRM model for wood poles over several cycles • The forecast is primarily used for predicting maintenance volumes and for EDPR submissions and so has a relatively short time horizon[37] • The CBRM model result calibrates well against the Australian Energy Regulator's (**AER**) Repex Model (threshold) forecast • The model provides a prediction of when poles will reach Limited Life and Unserviceable classification. Jemena's CBRM-derived forecast is supplemented by the expected volume of replacements and reinforcements due

[37] Jemena's CBRM model is capable of 15 year forecasts but no more than 7 years appears to be used and only then once every five or so years for the purposes of Jemena's EDPR submission to the AER

Finding	Elaboration
	to other drivers (such as its targeted risk-reduction programs and car vs pole incidents). Jemena applies a 'target risk level' forecasting strategy (i.e. seeking to maintain the risk at current levels), noting that it replaces/reinforces poles as determined from its inspection and serviceability assessment for individual poles. From 2009 to 2021, Jemena has, on average, replaced more poles than it forecast.[38]
It is unlikely a significant delivery risk will arise within the next five years.	A large proportion of Jemena's field work (pole inspection, replacement and reinforcement) is currently outsourced. This strategy has been in place for some time and is a common industry strategy. Jemena has recently added a second pole inspection/ replacement/reinforcement contractor to supplement its established service provider. This diversity reduces Jemena's delivery risk. With the relatively low number of poles, relatively young wood pole population and relatively low replacement/reinforcement numbers, it is unlikely that a significant delivery constraint to the wood pole interventions will affect Jemena over the next five years. The main risk to this conclusion is that the collective demand from other utilities with larger pole populations, both within Victoria and other NEM jurisdictions, may put pressure on services to Jemena.

Recommendations

No additional recommendations have been included for this section.

[38] Energy Safe analysis of data in Jemena's *Replacement volumes (20 year view) – Nov 2019* and *Energy Safe Wood Pole Management Presentation* slides 51-51

Concluding remarks

Energy Safe will continue to monitor the improvements to the wood pole management system to be undertaken by Jemena, including undertaking further reviews as necessary to ensure that Jemena meets its obligations to provide a safe electricity network.

In this section, Energy Safe provides concluding remarks and identifies implications for further regulatory activities arising from this review.

Concluding remarks

In summary, Energy Safe concludes from the review undertaken, that:

1	**Jemena's pole management practices have resulted in improved wood pole performance over the last few years.**
2	**While Jemena has applied its AFAP procedure to justify bushfire risk reducing initiatives such as a program to remove all reinforced wood poles from its HBRA, Jemena has not demonstrated that all elements of its pole management strategy minimise safety risks as far as practicable.**
3	**Energy Safe has identified several improvement opportunities for Jemena by drawing from desk-top and in-field reviews of Jemena's methodologies and the application of them in practice.**

Opportunities for improvement in Jemena's pole management strategy

Wood pole failure performance data is a lagging indicator and cannot be solely relied upon to predict future performance.

Energy Safe's findings throughout this review have identified areas for improvement in Jemena's wood pole management strategy and practices across its supply network to ensure that it is effectively minimising hazards and risks to safety arising from wood pole failure risk as far as practicable.

Several findings support this overall conclusion:

- In extending its wood pole inspection regime for poles in LBRA from four to five years, Jemena has not demonstrated that an appropriate risk assessment, nor its AFAP process were applied.
- Energy Safe identified inconsistent documentation relating to asset inspection in relation to inspection practices and serviceability criteria.
- Jemena's program of field asset inspection audits is not independent and does not adequately ensure the competence of asset inspectors, nor the effectiveness of the inspections undertaken.

- Jemena has not adequately demonstrated that there are not unidentified undersized poles in its network.
- Jemena's reinforcement of identified undersized poles may not fully address the risk of failure.

Until these issues are addressed, Energy Safe remains concerned that inherent risks within Jemena's wood pole population may not be adequately recognised and treated over the next 20 years.

This report presents the findings of our review into Jemena's wood pole management practices and provides recommendations to ensure all findings are addressed. Jemena is to develop a wood pole management improvement plan to address all recommendations and findings in the review.

Energy Safe will monitor Jemena's pole management improvement plan to ensure all findings are addressed to minimise risks to the safety of people, property damage and bushfire danger as far as practicable. Energy Safe may also consider regulatory action such as requiring Jemena to address each of our recommendations through revisions to its BMP and/or ESMS or issuing directions to address our concerns.

Appendix A: Abbreviations

Term	Definition
Act	Electricity Safety Act 1998
ACCC	Australian Competition and Consumer Commission
ACS	Asset Class Strategy
AER	Australian Energy Regulator
AFAP	As Far As Practicable
ALARP	As Low As Reasonably Practicable
AS/NZS	Australian and New Zealand Standard
AIM	Asset Inspection Manual
AusNet	AusNet Electricity Services Pty Ltd (Distribution)
BMP	Bushfire Mitigation Plan
CBRM	Condition-based risk management
CitiPower	CitiPower Pty Ltd
DNSP	Distribution Network Service Provider
DSD	Dig, Sound and Drill
EDPR	Electricity Distribution Price Review
ESMS	Electricity Safety Management Scheme
Energy Safe	Energy Safe Victoria
FOS	Factor of safety
FSA	Formal Safety Assessment
HBRA	Hazardous Bushfire Risk Area
HSE	Health, Safety and Environment
HS2	A type of wood pole reinforcement
HV	High Voltage
ISO	International Organization for Standardization
KPI	Key Performance Indicator
LBRA	Low Bushfire Risk Area
LV	Low Voltage
MEC	Major Electricity Company
NDI	Non-Destructive Inspection technology
NEM	National Electricity Market
NER	National Electricity Rules
Powercor	Powercor Australia Ltd

Term	Definition
RFD	UAM proprietary Pole Reinstatement System
SECV	State Electricity Commission of Victoria
STPIS	Service Target Performance Incentive Scheme
UAM	Utility Asset Management Pty Ltd
United Energy	United Energy Distribution Pty Ltd
VESI	Victorian Electricity Supply Industry
VIC	Victoria
WSM	Working Stress Method (also referred to as Working Stress Design)

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 cannot be compared directly with each other.

Jemena 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 regime administered by Energy Safe to which this report relates.

Energy Safe is the independent safety regulator for electricity, gas and pipelines in Victoria. Energy Safe oversees a statutory regime that requires MECs to develop, submit and comply with an ESMS, five-yearly BMP and electric line clearance management plan[39], to the satisfaction of Energy Safe. MECs must also actively participate in Energy Safe 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 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.

How network safety is regulated

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

- *Electricity Safety (Management) Regulations 2019*, referencing the Australian standard for an ESMS (AS5577) which set out the requirements for an ESMS that must be submitted by all MECs for acceptance and audit by Energy Safe
- *Electricity Safety (Bushfire Mitigation) Regulations 2023*, which set out the requirements for a BMP that must be submitted by all MECs for acceptance and audit by Energy Safe
- *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 Energy Safe
- *Electricity Safety (General) Regulations 2019*, which specify the safety requirements relating to electrical installations and electrical work and certain requirements for electricity suppliers.

The electricity infrastructure safety management regime (inclusive of ESMS) utilises principle, performance and outcome based regulatory approaches in addition to 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.

[39] Under the current regulations, MECs must have electric line clearance management plans relating to compliance with the Code of Practice for Electric Line Clearance for the period from 1 July 2021 to 30 June 2026.

Who is responsible for safety outcomes?

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

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

How is this responsibility discharged?

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

In determining what is practicable the Act requires a MEC to have regard to the severity of the hazard or risk, and the state of knowledge, availability, suitability, and cost of removing or mitigating the hazard or risk.

Energy Safe 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, as articulated in each MEC's ESMS and BMP.