GROUNDLINE

POWERCOR DETERMINATION
AUSTRALIAN ENERGY REGULATOR
SUBMISSION ON POLE REPLACEMENT NUMBERS
8/01/2021

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POWERCOR DETERMINATION 2021 - 2026
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Executive Summary

Groundline Engineering Ltd is highly qualified to make this submission on the revised determination of Powercor's pole replacement numbers.

A review of the available data and information undertaken by Groundline Engineering Ltd finds that the revised determination for pole replacement is not credible. It finds further that it is insufficient to meet the minimum requirements for prudence and does not meet the expectations of key stakeholders and communities.

On the data to hand, Groundline Engineering Ltd both corroborates and supports Powercor's original determination of a requirement of approx. 8000 poles to be replaced per annum and is of the view that less than this creates a materially high risk of degradation across the Powercor network.

In arriving at this position Groundline's review of the publicly available data simultaneously calls into question the quality and consistency of the data on which the recommendation is made and highlights the realistic opportunity that with better data the volume of poles requiring replacement to maintain risk levels maybe in the future, be less.

By excluding 'probability of failure' from the revised assessment, the result is more an exercise in "*how much can we reduce expenditure without impacting future performance",* rather than a serious and prudent review of "*what should our asset replacement budget be*" and *"are we reducing our risk year on year as the replacement program is delivered".*

The original inspection process of Sound, Dig and Drill, was originally conceived some 50 years ago, when pole replacements were a matter of course and regularly maintained. In the context of current-day replacement programmes that from budgetary necessity are now significantly more selective (whilst managing the same risks), this method of testing and data collection is in our opinion not fit for purpose and we recommend that an appropriate and scalable alternative be entertained.

Finally, Groundline Engineering Ltd insists that the AER appropriately and correctly considers the real risk of increasing the volume of pole replacements versus not doing so when evaluating whether the threshold of prudence has been properly supported and met.

Federal government to 'throw its weight around' to get better governance of bushfire-causing energy giants[1]

Figure 1 Federal Energy Minister, Angus Taylor at Community Meeting, Terang, VIC 1st March 2019

"Now safety comes first. We need to keep our communities safe. That is our top priority and that every part of the energy sector, the electricity sector needs to remember that every day."

"I take away some very clear messages here and I will be taking some very clear messages back."

"First of all, to energy companies and Powercor in this area you have to do the right thing by the community. That means making sure your inspection and replacement regime for the network infrastructure is done in a timely and effective way to prevent fires like what we saw here last year."

"Secondly to the state government you need to do the right thing. The regulator, the state regulator doesn't have the teeth and doesn't have the focus that it needs to be able to keep communities safe. These are important messages. It is crucial that everyone work together to make sure our communities are safe and the devastation that we saw here last year is not repeated."

"We need to ensure this does not happen again and that means improving, dramatically improving the inspection replacement and investment regime in the distribution network infrastructure. The poles and wires. That has to happen in a way where fires like this don't happen in the future."

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[1] https://www.standard.net.au/story/5932087/federal-minister-vows-to-bring-powercor-and-state-government-to-heel-over-dodgy-power-poles/#slide=0 (transcript of video)

Established in 2004, Groundline is a global consultancy providing transmission and distribution lines engineering services to network operators and service providers.

Over the last 16 years, our business has grown exponentially. We credit our success to one thing – our team.

We have a rock-solid reputation for being great to work with – we build long-term relationships with, and make things as easy as possible for, our customers. We take a practical approach to what we do; looking beyond spreadsheets, software and calculations.

We're not only great at what we do; we're also dedicated to improving our industry and society as a whole. Groundline is a global leader in providing overhead solutions and systems suitable for high wildfire start risk environments.

We invest significantly in ongoing research and development, and our customers benefit from this via our clever innovations in GPS, cloud software, ICT and seismic technologies.

1. Background

Victoria is one of the highest bushfire prone areas in the world. Whilst improvements to communication, notifications, and response have vastly improved since the horror events of the 2009 Black Saturday bushfires, addressing the contribution that powerlines play have yet to be seriously addressed.

Historically while powerline bushfire starts account for approx. 1-2% of all bushfires, powerline-initiated bushfires have accounted for over 80% of deaths associated with bushfires in Australia over the last 50 years.

The 2009 Royal Commission into the Black Saturday bushfires[2], noted with respect to powerlines:

> "Many of these fires are the result of Victoria's aged and failing powerline assets, and relate in particular to the 28,000 km of Single Wire Earth Return (SWER) and 60,000 km of 22kV high voltage electricity cables across the State, which are predominantly bare-wire.
>
> *The need to replace Victoria's ageing electricity infrastructure was identified more than 10 years ago, by the Victori*an Bushfire Royal Commission, 2009:
>
> *"As components of the distribution network age and approach the end of their engineering life, there will probably be an increase in the number of fires resulting from asset failures unless urgent preventive steps are taken…*
>
> *…now is the time to start replacing the ageing electricity infrastructure…The seriousness of the risk and the need to protect human life are imperatives Victorians can't ignore".*

[2] http://royalcommission.vic.gov.au/finaldocuments/volume-2/HR/VBRC_Vol2_Chapter04_HR.pdf

1.1. Documentation of previous AER Failures

The failings of the Energy Regulator (AER), and the ability to provide the required investment were also recorded at the time:

"The Australian Energy Regulator's failure to factor in the costs to human life and property arising from bushfire as part of its cost–benefit equation means that real and substantial costs to the community imposed by bushfire are left out of the price determination process.

*The AER, and the Regulations under which it ope*__rates, should acknowledge that Victoria is one of the most bushfire prone places in the world and that major bushfires on the worst days are often caused by the failure of electricity assets.__

Protection of human life must become the priority when evaluating distribution businesses' expenditure proposals.

*The economic regulatory regime must include mechanisms for ensuring that safety-related matters are properly reviewed so as to minimis*__e the risk of bushfire being caused by the failure of electrical assets."__

Earlier this year, the AER in its "issues paper" [3] the AER noted with respect to addressing stakeholder and community concerns as to the proposed (and much needed) lift in pole replacements:

> *We will look closely at CitiPower, Powercor and United Energy's poles repex programs and come to a view on whether a step-change from current asset management practices is prudent and efficient. We will consider the circumstances for each of the businesses when making our draft decision.*

2. Pole Replacement History and Forecast

In 2004 there were 37,000 wood poles 50 years or older in the Powercor Network.[4]

Today, approx. 200,000 wood poles are 50 years or older.

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[3] https://www.aer.gov.au/communication/aer-publishes-joint-issues-paper-for-ausnet-services-citipower-jemena-powercor-and-united-energy

[4] Powercor Australia – 2006 Electricity Distribution Price Review – Submission to the Essential Services Commission (PAL.019.001.1949) at 2021

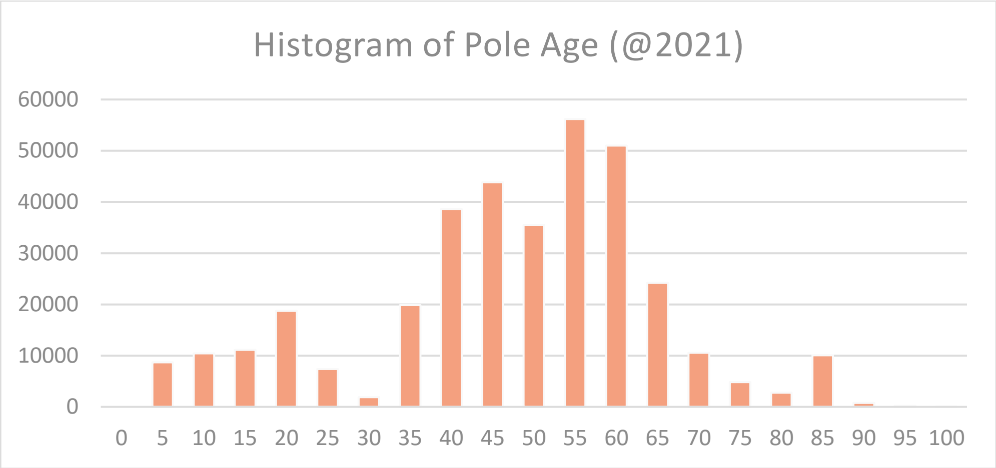

Figure 2 Histogram of Pole Age as at 2021

At the proposed projected pole replacement rates of approx. 3,400 PA (revised determination), a further 30,000 poles will be 50 years or older by the end of the next reset period and if pole replacement rates are maintained until 2031, it is likely over 75% of the pole population will be over 50 years old.

Whilst age alone should not be a justification for replacement, various degradation mechanisms such as termite attack, rot and natural fibre decay erode the strength of the material over time.

We have personally tested and can vouch for solid and durable hardwoods, typically those installed prior to World War 2 are as solid today as the day they went in the ground. Lower durability poles (class 3 & 4, which themselves have a current mean life of 52 years) are already showing signs of distress.

A timber pole network with an average life of over 50 years requires appropriate care and an increased level of vigilance not currently achievable using current traditional methods.

3. Pole Inspection

3.1. Current Pole Inspection Methodology

Present practice in Australia is the use of invasive sound, dig and drilling techniques to assess poles.

Sounding of the pole (having 'an ear' for defect location) inherently means results are generally subjective to the tester, and as a manual process is poorly documented, and inconsistently implemented.

Similarly drilling a pole to 'assess' remaining sound wood, is not a good proxy for future performance as;

- *it damages the pole.*
- *too many holes further weaken the pole.*
- *allows for moisture and destructive wildlife to penetrate the timber.*
- *only assesses the area treated by rods or other treatment systems, providing a false sense of security*
    - *We have personally witnessed the treated area of a pole to remain sound whilst termites hollow out the remainder of the pole.*

- *is not repeatable, reproducible or credible.*
- *the method is slow to conduct, costly and as such does not scale sufficiently to facilitate a holistic perspective of pole condition and risks, or proper prudence across a network*

Repeatable, reproducible and reliable measurements are required if this is to be considered the front-line methodology for future pole inspections. The following images clearly show the futility of achieving this on aged and degraded poles.

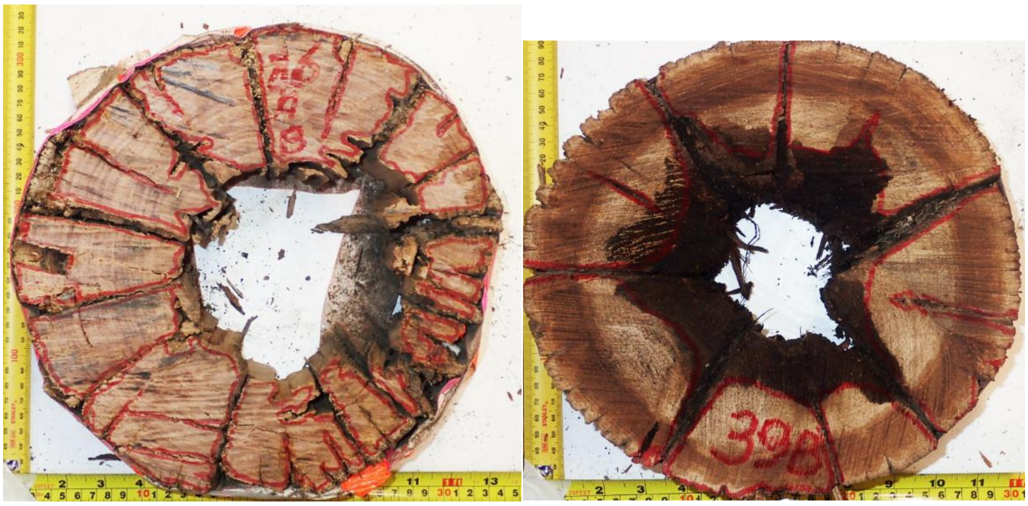

Figure 3 Decayed Pole Cross Section

As can be seen in figure 3, obtaining a “sound wood” measurement on the above poles depends solely on where the drill is applied and could easily vary between 25 – 150mm.

Figure 4 Failed Pole, Otherwise solid, but for drill holes and advanced decay

It's likely that the pole failure shown in Figure 4 was not drilled every few years, the pole would still be standing.

Such a scenario played out in 2018 when a double staked pole failed at the top of the reinforcement to a combination of decay and a lack of accurate assessment. From ESV's technical report into the pole failure at Garvoc, March 2018[5] it was noted that the reported sound wood measurements of failed Pole No 4 over three inspections, as follows:

- *15/05/2015 - full inspection, remaining sound wood measurement 50 millimetres*
- *10/05/2010 - full inspection, remaining sound wood measurement 100 millimetres*
- *11/05/2005 - full inspection, remaining sound wood measurement 70 millimetres*

At the time of inspection, the minimum sound wood criteria was 30mm. The pole failed in high winds on 17th March 2018 with an average measured sound wood measurement (in the lab) of 25mm (varying between 10 and 40mm)

In addition to Sound, Dig and Drill, poles are visually assessed for the following before a preservative treatment is applied:

- *fruiting bodies*
- *large splits or holes*
- *termite infestation*
- *external rot / loss of cross sectional area*
- *excessive or dangerous leaning*

Poles are then classified into[6]:

[5] https://esv.vic.gov.au/pdfs/garvoc-fire-technical-report/

[6] https://esv.vic.gov.au/wp-content/uploads/2020/01/Detailed-technical-report-Powercor-wood-pole-safety-management.pdf (page 75)

Classification	Safety Factor (SF) range	R Factor range	Other
Serviceable	SF ≥ 1.875	R ≥ 1.00	For a Durability Class 1 pole: sound wood thickness of the annulus ≥ 40mm For other durability class poles: sound wood thickness of the annulus ≥ 50mm
AC Serviceable	1.40 ≥ SF < 1.875	0.75 ≥ R < 1.00	For a Durability Class 1 pole: 35mm ≤ sound wood thickness of the annulus < 40mm For other durability class poles: 35mm ≤ sound wood thickness of the annulus < 50mm
Unserviceable Priority 2	1.00 ≥ SF < 1.40	0.53 ≥ R < 0.75	One or more of: • Visual Appearance criterion (between ground level and 2m above ground):[109] – 'see through' splits > 10mm in width – Or >25 per cent of pole cross-section is lost – Or >100mm void or loss of wood • a hardwood pole having an internal measurement between 30 and 16mm • any of the defect causes: fire, vehicle impact, third party or lightning • a defect has been identified below the excavation depth by the deep drill process • poles identified with Dampwood (Glyptotermes) termite infestation • wood poles found with fungal fruiting bodies above 2 metres • pole stable and leaning greater than 5 degrees over a carriageway or greater than 10 degrees elsewhere [1] • leaning and has the potential to cause damage to other assets [1]
Unserviceable Priority 1	SF < 1.000	R < 0.53	Sound wood thickness of the annulus less than 16mm

Figure 5 Pole Classification Criteria 2019

Note classification down to three significant figures (1.875) implying a level of accuracy not credible for the methodology borne out in the efficacy below.

3.2. Efficacy of Current Pole Inspection / Intervention

Current Definition of Pole Failures:

> *Pole failures occur when the loading on the pole exceeds the capacity of the pole to withstand the bending moment from the loads on the pole.*
>
> *A pole failure is classified as an 'unassisted pole failure' when the pole fails despite the loading forces on the pole being within the original design strength capacity of the pole.*
>
> *The primary standard for pole design is AS/NZS 7000:2016 Overhead Line Design which, among other things, specifies how to calculate the load on a pole, including wind pressure.*
>
> *Poles that fail due to excessive loading, typically from vehicle or vegetation impacts and cyclonic winds, are referred to as 'assisted pole failures.' Powercor, as with many other utilities have traditionally held autonomy in classifying pole failures as unassisted or assisted, therefore direct comparisons.*

In response to an ESV information request[7], Powercor provided separate fault investigation analysis information to that reported in its 2019 Asset Class Strategy document.

From the analysis of 115 wood pole failures since 2013, summarised below, 44 per cent of all the failures were of Class 3 durability poles. This is well above the 29 per cent representation of Class 3 poles in the wood pole population.

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[7] https://esv.vic.gov.au/wp-content/uploads/2020/01/Detailed-technical-report-Powercor-wood-pole-safety-management.pdf (page 106)

The figures also show *that:*

• 50 per cent of the failures were caused by wood rot/decay - this is a well understood failure mode for timber poles and is difficult to accurately detect

• 31 per cent of the failures were due to weather – ESV assumes this refers to high wind pressure, but within the limit state design wind pressure on poles specified in AS/NZS 7000

• 17 per cent of failures were due to undetected termite infestation.

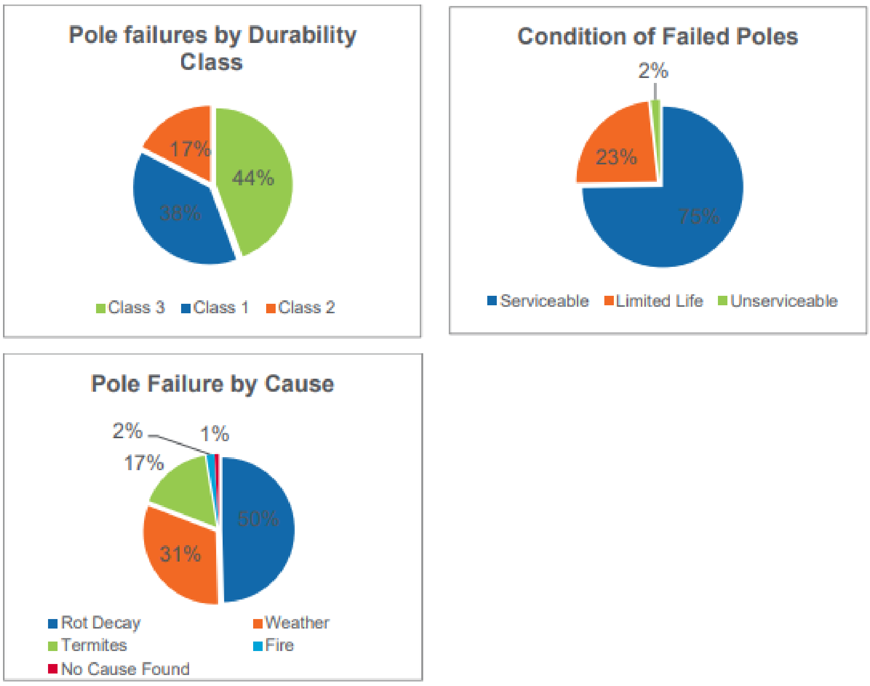

Figure 6 Pole failure performance by durability, condition of pole and cause

Note: 98% of failures occurred in poles identified as serviceable provides for little confidence in the traditional assessment technique.

4. Condition Based Risk Assessment and Review

4.1. Groundline Independent Review of CBRM Model

Using public data from *Powercor - Revised Regulatory Proposal - 2021-26 - MOD 4.16 - CBRM - condition model - December 2020.xlsx*[8] to produce a more granular histogram than what was provided (inset).

[8] https://www.aer.gov.au/system/files/Powercor%20-%20Revised%20Regulatory%20Proposal%20-%202021-26%20-%20MOD%204.15%20-%20Pole%20summary%20-%20December%202020.xlsx

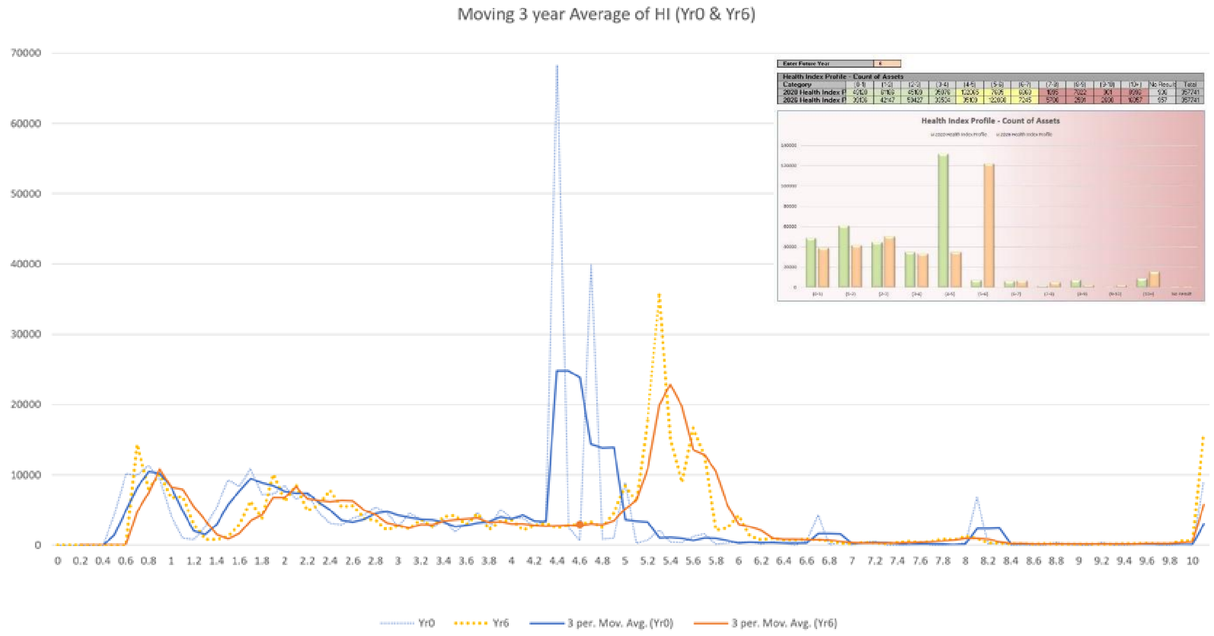

Figure 7 Granular HI Assessment from available data showing distribution of HI

Notes on above histogram and further review of the publicly available data:

- *50% percentile moves from 3.6 to 4.6 over 6 years i.e. a change in HI of 1.0*
- *With End of Life = 7.0 then at proposed replacement rate, 50th percentile moves to 7 in approx. ((7-4.6)*6) 14 years.*
- *Derives 'average' HI deterioration of 1 over 6 year period (0.8 for 5)*
  - *Lower HI poles deteriorate slower than higher HI poles.*
- *There is a 'backlog' (HI>=7.0) of approx. 20,000 poles*
- *It is unclear as to the derivation of consequence, particularly with respect to bushfires (Refer Section 6 Risk Consequence Mapping)*

Forecasting (to the end of the regulatory period and with an eye on the approaching 'bow wave' in 15 years, Pole Replacement rates of 7,600 – 8,000 per annum are required to:

- *maintain the effective HI and Risk*
- *remove the 'backlog' of defective poles*

This number is close to the RBAM model in page 139 of last years ESV technical report[9] – using Powercor's own data:

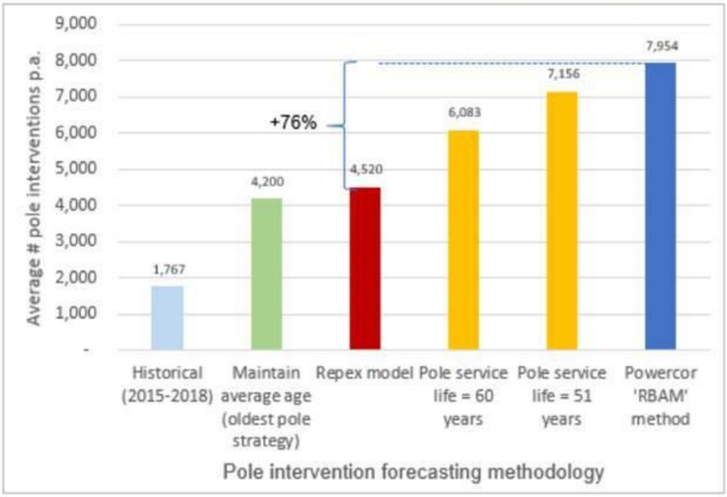

Figure 8 Comparison of pole replacement forecasting approaches

4.2. Groundline Review of Cutler Mertz CBRM Peer Review[10]

- *explicitly excludes probability of failure – despite this being one of the main inputs of any CBRM.*
- *Assumptions on failure rates are not credible.*
  - *Section 5 of the CBRM Review Report assumes a sound inspection and maintenance regime exists.*
  - *relies on traditional sound, dig and drill methodology.*
    - *note poor correlation above with respect to poles identified as failed.*
- *Assumes reinforcement has the similar post-intervention risk as a replacement.*
  - *This is flawed (refer section 5 Use of Pole Reinforcement)*
- *Uses unvalidated F Factor for consequence*
  - *F Factor is an economic incentive, built off a dubious risk model which was developed for reducing intervention of State Government response to royal commission recommendations. (refer Section 6 Risk Consequence Mapping)*
- *Identifies disproportionality factors (as applied to fatalities) are low – actually half to a third of typical values used in other industries.*
  - *poles carry dangerous electricity and very much in the public domain with higher potential for fatalities particularly during extreme bushfire weather events.*
- *Concludes: On the basis that the probability of failure parameter is also appropriate (not reviewed as part of the scope), the model output can be expected to be relied upon for the justification of risk driven pole replacements*

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[9] https://esv.vic.gov.au/wp-content/uploads/2020/01/Detailed-technical-report-Powercor-wood-pole-safety-management.pdf

[10] https://www.aer.gov.au/system/files/Powercor%20-%20Revised%20Regulatory%20Proposal%20-%202021-26%20-%20ATT61%20-%20CutlerMerz%20-%20Pole%20model%20peer%20review%20-%20December%202020.pdf

5. Use of Pole Reinforcement

We are concerned with the level of proposed reinforcement as an alternative to pole replacements.

Whilst offering a short-term fix, the use of reinforcement as a long term solution is not a prudent nor cost effective of resources or funding.

We believe the current system is not appropriate for long term reinforcement of compromised timber poles. Any life extension beyond even a couple of years requires AS/NZS7000 and relevant structural standards.

5.1. Reinforcement utilised beyond two years

In absence of any demonstrated compliance with AS/NZS7000 and related other AS/NZS standards, pole reinforcement should only be used in limited situations (safe for temporary life extension – say waiting on outages etc) and replaced as soon as practicably possible.

Double staking applies even more stress and further complicating structural forces to the already compromised timber pole section. These poles should be removed or assessed with immediate effect

Reinforcement still relies on the integrity of the pole butt for strength and as per the ESV Garvoc Technical Report[11], requires a more complex structural interaction between the timber and steel that is not fully understood by current line inspection processes.

We agree and support the URI Engineering Report into Essential Energy AER 2015 – 2019 Determination Response[12] when they conclude:

"If it is to be used as a cost deferral technique whilst maintaining an acceptable risk profile, a plan needs to be put in place for the management of increased pole replacements in the future."

"Reinforcement only ever delays the pole replacement, pushing the investment back 5-20 years in most cases"

"Pole reinforcement is only just starting to really be understood in terms of how it works structurally."

"Even though reinforcement testing has been done in limited quantities in the past, the methods used included a few well meaning but misguided assumptions and in reality the reinforcement systems do not perform as well as expected."

[11] https://esv.vic.gov.au/pdfs/garvoc-fire-technical-report/

[12] https://www.aer.gov.au/system/files/Essential%20Energy%20-%20Attachment%206.6%20-%20Response%20to%20AER%20Draft%20Decision%20of%20Replacement%20Expenditure%20-%20January%202015.pdf (from page 113)

“In particular, there have been unconservative uses of plastic design theories to determine the design capacity, and assumptions that the timber and steel will work as one (composite action) to resist the design loads.”

“In reality, these assumptions are not supported by sound structural theories, nor by experiences with failures in the field or during realistic testing. In short, the timber takes almost all the load up until the point that it begins to fail because the timber section has a higher EI (“stiffness”) than the steel, and the connection between the two has too much play before transferring shear loads. Once the timber fails the steel has to take over. By the time the steel takes over, the lean on the pole is significant and the weight of the pole together with the lean and the external loads will almost always buckle the steel reinforcement and the pole will fall to the ground.”

“In other cases the timber will actually fail at the top of the reinforcement through one of a number of mechanisms and definitely fall to the ground. The number of instances where the timber fails and the steel continues to hold the pole off the ground and out of immediate danger is considered very rare. Understanding this should significantly alter perceptions of risk reduction offered by reinforcement.”

“In short, increasing reinforcements to Ausgrid levels is unlikely to significantly reduce the number of replacements required, it will just add to the overall cost of a responsible Repex program by requiring more poles to be reinforced in addition to the replacements. We are not sure of the justification behind Ausgrids reinforcement strategy, but from the information available to us it is not considered responsible.”

“We have been witness to pole failures at the top of reinforcement in Ausgrids network that we know were not recorded as a pole failure, let alone a reinforced pole failure, so we would question the use of Ausgrids data regarding reinforced pole failures in making any assumptions about performance of reinforced poles, regardless of the fact that the timber itself is unlikely to fail.”

“In our experience, reinforcement should only be an option as a risk reduction technique until a more permanent replacement can be arranged. If it is to be used as a cost deferral technique whilst maintaining an acceptable risk profile, a plan needs to be put in place for the management of increased pole replacements in the future.”

“A reinforced pole does not automatically have a lower risk of failure or consequence of failure compared with an unreinforced pole because it does not reinforce the entire length of the pole and does not support significant compressive loads.”

5.2. Remaining Life of Existing Reinforcement

The average age of a reinforced pole being 55 years and with over 26,000 reinforced poles in service begs the question of *“What is the remaining life of a pole which has been previously assessed as compromised due to a valid reason”?*

6. Risk Consequence Mapping

Calling into question the assumptions potentially utilised to ascertain the consequence of a pole failure. Based of available public information, consequence is based off DELWP Phoenix modelling.

6.1. DELWP Phoenix Mapping[13]

Fire risk maps utilised in the risk model are presently enshrined in legislation and align with what the f-factor consequence modelling has also been built upon.

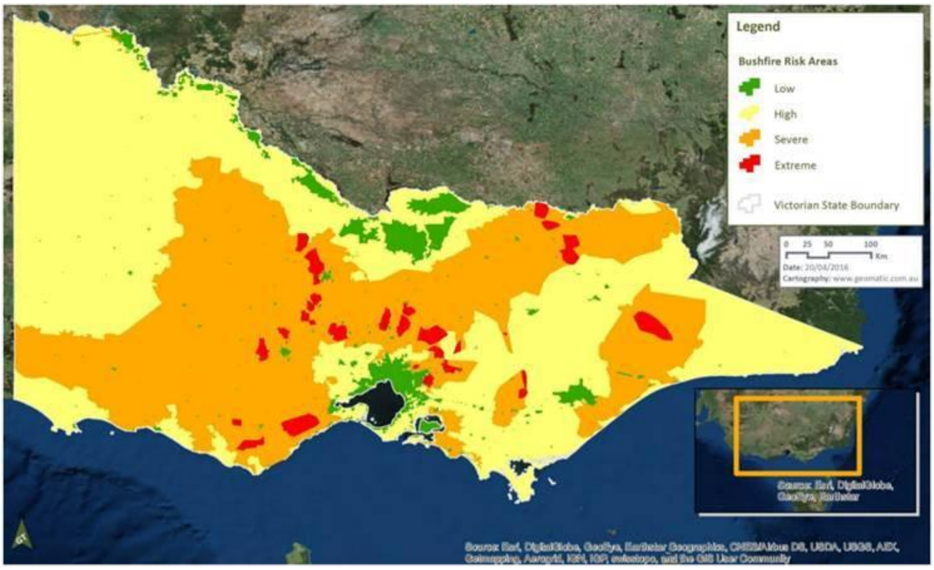

Figure 9 DELWP Phoenix Rapidfire Mapping - with BFRA

The fire risk mapping above was built on limited information and was constructed for the purpose of prioritising powerline replacement works and funding, not a for a comprehensive asset management function.

Issues documented from a recent Victorian Auditor General Office report into reducing bushfire risk highlighted the following limitations with this modelling:

- *The modelling tool does not consider the likelihood of fires starting in different areas, which is not equal across the state.*
- *All fires start five kilometres apart:*
    - *The tool may underestimate risk because this distance between fires is too widely spaced in some parts of the state to be relevant and,*
    - *Where houses are interspersed with pockets of forest, such assumption reduces risk.*
- *The modelling tool uses address points (based on Vicmap's address dataset) as proxies for house locations.*
    - *Some localities in the map with multiple properties and no houses have been assigned an extreme consequence (despite the absence of houses / people) whilst,*
    - *Some address points contain multiple homes and may be scored too low.*

[13] https://www.energy.vic.gov.au/safety-and-emergencies/powerline-bushfire-safety-program/electrical-safety-bushfire-mitigation-further-amendment-regulations-2016/electric-line-declared-energy-maps

6.2. CSIRO Spark Powerline Bushfire Mapping

Below is a slide from a presentation by the CSIRO[14] as to fire risk on the Powercor area which was delivered during a Californian Public Utility Commission Wildfire Summit held in Sacremento, CA in 2019)

The mapping undertaken by the CSIRO was undertaken by the same people as commissioned the legislated risk map, yet we've two completely different outcomes.

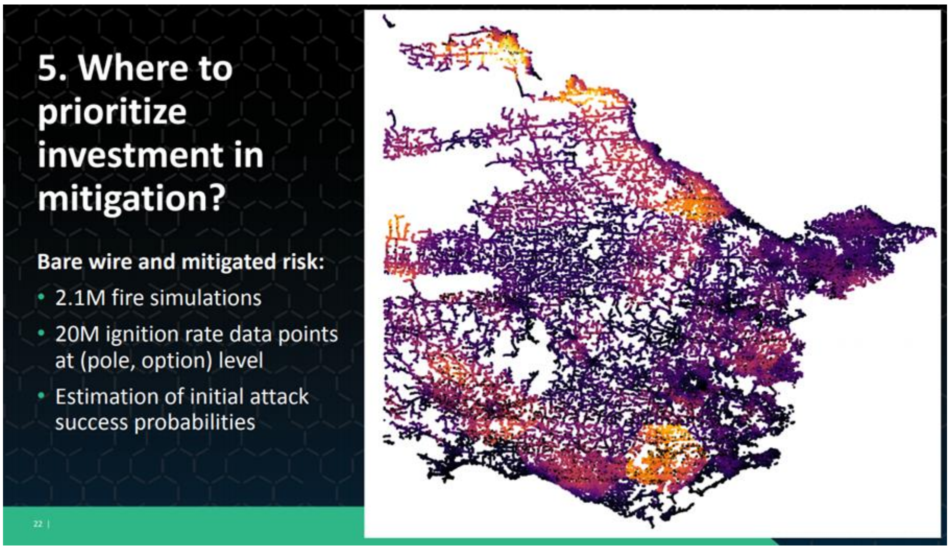

Figure 10 CSIRO Spark Consequence Mapping

Overlaying the two maps (between the legislated DELWP Pheonix and CSIROs Spark), we can clearly see the difference in the Powercor Network area.

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[14] https://www.youtube.com/watch?v=Q92TYLz4g6M&list=PLsgixh8pRZUBuk0O7MeqpyfD1zhvjutCc&index=5

two minutes of Simon Dunstalls (CSIRO) presentation which starts at 54 minutes into the video link.

Most relevant is a few minutes from 1.12.00 – 1.14.00 where Simon talks of

> *"a giant spreadsheet in the middle of this process where some Electrical Engineers made fantastic guesses……………………………"*

He goes on:

> *"…………those guesses are really important as different electrical protection can see different types of those, but you can't observe it in the real world and so you bringing some crusty old electrical engineers and see what you can do so what we can do is come up with some guesses estimates depending on which way you look at them of different mitigations like putting power lines underground or putting this REFCL stuff on them or putting covered conductors or automatic circuit reclosers, what risk reduction do you get………..."*

He gives the game away at 1.13.40 by saying:

> *"The much bigger question in away is OK we know this but where do we invest something like half a billion dollars when the total bill of what the Royal commissioner told you had to do put everything underground will cost you between 40 and 60 billion dollars to do"*

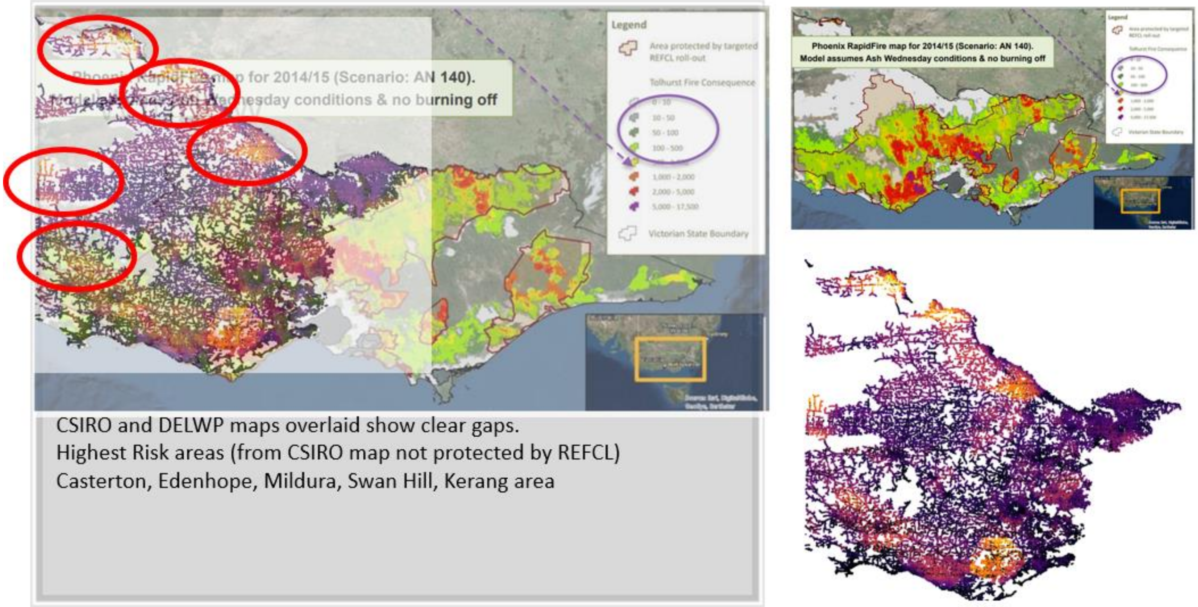

Figure 11 Comparision between Legislated (HBRA) and Consequence Mapping

The effectiveness of REFCLs and ACRs are also under question as to their real world applicability to the prevention of fire starts, beyond single phase to ground or single phase vegetation faults – ie faults which involve a pole failure with multiple phases.

In absence of potentially further information to the contrary, we question the merit of utilising legislated and mandated risk mapping utilised for alternate purposes, against good practice, resulting in considerably different consequences.

7. National Electricity Rules - Prudence is non-negotiable

7.1. Prudent Operator

A prudent operator would be expected to consider both the relative risk of asset failure and the consequences if such a failure were to occur.

'Prudent' is defined in the dictionary in the following ways:

1. wise, judicious, or wisely cautious in practical affairs, as a person; sagacious or judicious; discreet or circumspect.
2. careful of one's own interests; provident, or careful *in providing for the future*
3. characterised by or proceeding from prudence, as conduct, action, etc

(The Pocket Macquarie Dictionary, Macquarie Library 1981)

1. (or a person or conduct) *careful to avoid undesired consequences*;
2. circumspect
3. discreet

(The Australian Concise Oxford Dictionary, Fourth Edition, 1987)

1. discrete or cautious in managing ones activities, circumspect
2. *practical or careful in providing for the future*
3. *exercising good judgment or common sense*

(Collins Dictionary 5th Australian Edition 2003)

1. having good sense: having good sense in dealing with practical matters
2. carefully considering consequences: *using good judgment to consider likely consequences and act accordingly*
3. careful in managing resources: *careful in managing resources so as to provide for the future*

Encarta[15]

7.2. AER Issues Paper (June 2020) Victorian Electricity Determination[16]

The AER note:

> *We will look closely at CitiPower, Powercor and United Energy's poles repex programs and come to a view on whether a step-change from current asset management practices is prudent and efficient.*
>
> *We will consider the circumstances for each of the businesses when making our draft decision.*

With the footer further clarifying:

> *This is consistent with the requirement for us to provide an expenditure allowance to meet the capital expenditure objectives for maintaining network performance, rather than improving it. See NER, cll. 6.5.7(a)(3)–(4) and 6.5.7(c)–(d)*

We are concerned that the outcome of this price determination review is potentially an exercise in "*how much can we reduce expenditure without impacting future performance",* rather than a serious and prudent review of "*what should our asset replacement budget be*" and *"are we reducing our risk year on year as the replacement program is delivered".*

Any determination must eventually take into account the ever-increasing backlog of deteriorating poles and seek to avoid the previous failures of the regulatory regime to deal with replacement practices.

We support Powercor to lift planned pole replacement numbers in line with good asset management practice, sustainable replacement volumes, community expectations and the reality of the extreme bushfire prone environment which we live in.

8. THOR Poletest™- Pole Insights

Thor Poletest™ is a comprehensive testing and insights system that has transformed the way that prudent energy and telecommunications networks understand actionable risks and opportunities associated with the management of their timber pole assets.

The system produces repeatable, reproducible and reliable measurement of the condition of timber poles. It is non-invasive, scalable over an entire network and cost effective. It is objective rather than subjective and can give confidence to the communities that the network serves and that decisions are being made using engineering judgement that utilises the best possible underlying data.

At a macro level Thor Poletest™ provides an independent, transparent and holistic view of asset condition that allows network executives to properly and prudently produce budgets for pole maintenance and replacement for years into the future.

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[15] http://encarta.msn.com/dictionary_/prudent.html

[16] https://www.aer.gov.au/system/files/AER%20-%20Issues%20paper%20-%20Victorian%20Electricity%20Determination%202021-26%20%E2%80%93%20Amendment%20to%20paper-%20June%202020._1.pdf (page 44)

Operationally it makes targeted pole replacement possible. This ensures that replacement programmes are optimised and effective, consistently targeting the highest risk poles and areas of the network.

From the perspective of good financial and budgetary governance, Thor Poletest™ supports the network in its prudence and capacity to reduce wastage of resources that may otherwise be deployed to replace poles that are lower priority than others, or that do not materially reduce risk to life or the community.

9. Conclusions and Further Works

In the absence of specific work on aged poles and a proper pole census incorporating probability of failure, we support with Powercors earlier RBAM work to replace approx. 8,000 poles per annum as reported in

There is potential to reduce pole replacements. This will require further insights utilising:

- Non destructive assessment of pole health
  - Using a process that is repeatable, reproducible
  - Rapid – Can be deployed and scaled to provide an effective audit within 12 months
  - Uses sound engineering judgement to derive:
    - Residual Strength Values
    - Embedment Depth and
    - The distance to and size of defects outside of traditional inspection area

- Mapping of degradation factors for timber poles (for example)
  - Termite location and type
  - Soil type
  - Wind (Synoptic and Downdraught)

Dedicated to improving our industry and society.

Groundline is a global leader in providing overhead solutions and systems suitable for high wildfire start risk environments.

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