



IN DEPTH EXPLORATION INTO THE STATE OF VICTORIA'S POWER ASSETS

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**STATE
OF CRISIS**



**THE STATE OF
VICTORIA'S
POWER ASSETS**



📷 Rotten LV Cross arm with a literal 'band aid' fix with metal 'Band It Tape' (not an approved method), currently in service. Bayside suburb, 2015.

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Additional evidence in support of testimonials, from independent 3rd party sources are represented in charts and quotes in yellow and grey shaded boxes.

EXECUTIVE SUMMARY

KEY FINDINGS

Results of the consultation and data conclude that:

- ▲ There has been an increase in the number of fires caused by distribution assets in the State of Victoria since privatisation, particularly in the past five years
- ▲ There has been an increase in the number of faults and failures from these assets
- ▲ The current condition of assets is assessed as being poor to fair
- ▲ The condition of assets is declining
- ▲ The level of customer satisfaction from Victorian households is low.

One hundred per cent of those interviewed felt that the risk of fires from distribution assets was very high due to the following factors:

- ▲ Field workers identified that they are working on ageing infrastructure. These assets are further compromised with the pressure on the network from today's digital consumption age. This is leading to an increasing number of supply issues with consumers and rising faults and failures resulting in increased complaints to the ombudsman.
- ▲ Poor maintenance practices and standards including:
 - A focus on reactive maintenance that attends to equipment when it fails rather than preventative planned practice which is consistent, efficient and effective
 - Significant decline of preventative maintenance, with the industry now reacting to problems rather than proactively preventing potential risks
 - Downgrading of priorities, and practices of 'holding back work' and planned maintenance which is causing further deterioration of assets and leading to further risk of fires caused by distribution assets

- 'Band-Aid' fixes being implemented, delivering a 'bare minimum' solution driven by cost-saving practices by distributors. Trained asset workers are discouraged from using their expert judgement on the condition of assets and work required, and are implementing quick fixes as directed by distributors
- Poor quality equipment being installed
- Lack of acceptable, industry-wide standards for maintenance is compromising the quality of materials being used and providing dangerous conditions for asset workers
- Lack of oversight, monitoring and enforcement
- Relaxed response times to rectify a situation.
- ▲ A culture of 'cost-reduction' is being applied by distributors, which is taking precedence over safety and supply in order to deliver increasing profits offshore and reduce maintenance budgets
- ▲ Many have experienced an increase in overseas 'skills shortage' visa workers in the workplace; whilst redundancies are occurring and many out of work trained asset workers want to work. Despite the fact there is no longer a skills shortage for power sector occupations in Victoria, they remain on the 'skills shortage' visa list.

RECOMMENDATIONS

Based on the findings uncovered from the research amongst industry participants and supporting industry data, the following recommendations have been made in order to address the situation.

1. Report tabled to the Victorian Parliament

This report should be tabled to the Victorian Parliament to demonstrate that workers within the electricity industry are seeking immediate action to mitigate health and safety risks to themselves and to the Victorian community.

2. Comprehensive State Government inquiry into the sector

In order to investigate the full extent of the problem, and adequacy of resources to maintain the network and the cost/risk of failing to act, a comprehensive inquiry into the state of the sector by the State Government is recommended immediately. The wide ranging issues that this report has uncovered interplay with the evidence of widespread concern about the sector by Victorian consumers. These critical issues cannot be easily resolved without high level investigation and comprehensive planning, policies and regulatory reform to ensure Victoria has safe, reliable, affordable energy supply into the future.

3. Review the technical quality assurance framework and program for the network assets and operations

The opinions of those interviewed show a need to implement a more robust compliance regime that ensures the quality of all materials, structures, components, systems and processes utilised in the construction and maintenance of distribution assets. In particular, there is a need to monitor performance, including the volume of maintenance jobs, the number of hours spent conducting maintenance and the ratio of maintenance priority jobs. There is a need to track the de-escalating priority maintenance jobs and to ensure maintenance is done properly rather than applying band-aid solutions.

4. State Independent Technical Regulator

The role of a State Independent Technical Regular should be reviewed to ensure that a quality framework is implemented, regulated and audited.

5. Legislating licensing criteria and duty of care obligations for power industry maintenance and asset inspection occupations

This issue was raised consistently by industry participants, who see it as vital to ensure well-trained and qualified asset workers are responsible for maintaining the poles and wires and that quality practices and work are carried out consistently in Victoria.

6. Establishment of a permanent and ongoing high level committee representing a cross section of industry and community stakeholders

In order to provide an ongoing transparent voice of the industry, the establishment of such a committee formed with representatives of the workforce, distributors and safety regulators would be beneficial to ensure the industry remains focused on providing a reliable, safe network and remains accountable.

BACKGROUND

Since privatisation of the electricity industry, field operatives have observed and identified a significant decline in the state of Victoria's electricity assets.

This report, based on qualitative research, has identified that industry field experts consider the state of electrical assets in Victoria to be in substantial decline. They were able in the research to provide multiple examples of ageing equipment, inadequate maintenance routines,

below standard monitoring practices, poor response times and patch up jobs that will increase the risk of fires in Victoria.

Data from independent third party sources confirm the thoughts and feelings of the industry field staff consulted. Recommendations proposed by expert Line Workers and Asset Inspectors in this report provide the Victorian Government with the opportunity to address this situation to ensure that the risks to health and safety to themselves and to Victorian residents is addressed to mitigate the possibility of another 'Black Saturday' disaster. As one participated stated, 'We haven't learnt anything since Black Saturday.'



Evidence of HV asset failure, 2015.

This report was commissioned by the Electrical Trades Union (ETU) to examine the condition and state of Victoria's Electrical Assets and their potential risk to the Victorian community. In particular, this risk is identified as fires caused by distribution assets.

Those qualified in the field with substantial experience are considered by the ETU and industry to be experts. The ETU was therefore keen to consult, identify and document their concerns and views.

The method of research was qualitative, based on the views and opinions of field workers including Line Workers and Asset Inspectors. Desk research and data from third-party sources were undertaken to validate or negate field observations and opinions.

The ETU has encouraged its members to speak out and to identify through the appropriate process the challenges that they face at an operational level. This workforce has grave concerns regarding the ageing equipment, practice and monitoring standards of the assets.

This study therefore has consulted, identified and documented their views and opinions.

Project Aim and Objectives

The aim of the research was to collect and collate the views of industry participants, primarily the members in the industry 'Line Workers and Asset Inspectors' who are experts in their field relating to the state of the Victorian asset network condition.

Specifically objectives were to:

- ▲ Understand how the industry feels about the current state of the network assets
- ▲ Gain their opinion on the cause of the condition of the network assets
- ▲ Identify the risks involved and costs associated with no change
- ▲ Ascertain what industry experts and industry participants believe the industry needs to do in order to address these issues.

Research Methodology

Truth-Serum was commissioned by the Electrical Trades Union to undertake research amongst industry participants who are registered with ESV (Energy Safe Victoria) and members of the ETU in December 2015.

As part of this project, a total of 29 Victorian Registered Asset Line Workers and Asset Line Inspectors were interviewed using a multi-mode qualitative approach to explore members' attitudes, experiences and opinions regarding the state of the Victorian Network assets. The following qualitative methodology was utilised, with fieldwork conducted between 4th February 2016 and 13th February 2016:

1 x Focus group amongst industry participants (Line Workers & Asset Inspectors)	N=7 industry participants per group	75-minute face-to-face focus group held at ETU offices
16 x In-depth phone interviews (30-minute length)	N= 16 industry participants (Mainly Line Workers plus Asset Inspectors)	30-minute phone based interviews
6 Online Interviews self-completion (30-minute length)	N= 6 Industry participants (Line Workers and Asset Inspectors)	30-minute online self-completion interviews

A total sample of 29 industry participants were interviewed during the fieldwork, providing a robust qualitative sample to support the existing quantitative evidence that has been published relating to the State of Victoria's power assets. Recruitment of participants was managed by the ETU amongst their member base. An incentive of a \$50 Coles Myer Voucher was offered to each participant as compensation for time involved.

Third Party Data Collection

Data was collected and analysed from reliable third-party sources including:

- ▲ Australian Bureau of Statistics
- ▲ Australian Energy Market Operator
- ▲ Australian Energy Regulator
- ▲ Bushfire Royal Commission Final Report
- ▲ Energy and Water Ombudsman of Victoria
- ▲ Energy Safe Victoria
- ▲ Essential Services Commission of Victoria
- ▲ Published Retailer Tariffs.

High voltage asset failure caused HV injection into premises. Switchboard fire resulted. All household appliances damaged beyond repair. 2015.



KEY FINDINGS

There is an increase in the number of fires caused by distribution assets

Based on their experience working on Victoria's distribution assets, industry participants in this qualitative study agreed that the number of fires caused by distribution assets has increased during the last five years. Indeed, some thought the actual number of fires had been under-estimated as the statistics reflect reported fires only.

- ✘ **'Falling apart, unsafe, unreliable and decimated. Poles failing and falling of their own accord. High voltage cross-arms fail regularly causing high voltage injection into residences and businesses resulting in appliances being damaged, house fires starting and meter panels being blown out of the wall. (Linesman)**
- ✘ **'Plenty of broken cross arms in high fire risk areas.' (Linesman)**
- ✘ **'I don't think distributors have learnt anything from Black Saturday ... The only maintenance that has**

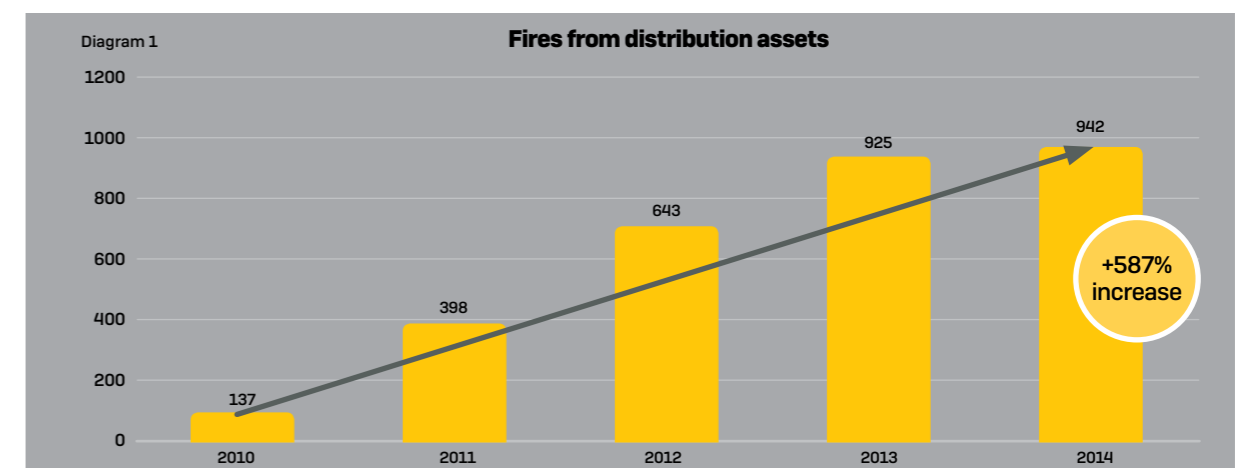
been carried out is not going to prevent further fires as a single measure. Vibration dampeners aren't going to stop rotten cross-arms and poles from falling over or dropping conductors.' (Linesman)

The view that fires had increased due to distribution assets is backed up by data from Energy Safe Victoria as demonstrated in Diagram.

The widely reported view that fires have been under-reported and under-estimated in the statistics is supported by a 2014 Bushfire Mitigation Audit and findings by Energy Safe Victoria, which reported the following in 2015:

Black Saturday Royal Commission Final Report – Summary

'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.'



Data sourced from Energy Safe Victoria indicates the number of fires caused by distribution assets in Victoria has increased by 587% from 2010 to 2014, from 137 fires in 2010 to 942 in 2014.

Source: Energy Safe Victoria Annual 'Safety Performance Report on Victorian Electricity Network' 2012- 2015.



📍 A recent High Voltage Cross Arm Fire in Melbourne bayside suburb.

ESV BUSHFIRE MITIGATION AUDIT – POWERCOR

The desktop audit identified that Powercor's fire start trend showed an increase in the number of vegetation fire starts due to its assets. Powercor stated that the increasing trend was due to more accurate reporting of fire starts. ESV is concerned with this statement for two reasons:

- ▲ if Powercor's position is that fire starts have not been worsening, it implies that Powercor under-reported historic fire levels by a factor of three (or more)
- ▲ if Powercor's position is that it is not performing any worse than the other distribution companies (accounting for different sizes of asset base), it implies that the other businesses continue to significantly under-report fire levels.

The industry's identified increase in fire starts since 2010 was predicted by the Bushfire Royal Commission.

There is an increase in the number of asset faults and failures

Based on their experience in the field, industry participants were seeing more faults and failures, symptomatic of assets which could cause an increase in the number of fires. They were able to readily provide examples of a range of failures and faults. These are reported below and indicate that asset failures are occurring across various pieces of asset infrastructure. Research participants cited the following:

- ▲ Broken conductors:
 - ✘ 'Have been out there for 50 years. Fifty years ago, we didn't have air conditioners.' (Asset Inspector)
 - ✘ 'A lot more cross arm and conductor condition issues due to loading.' (Linesman)
- ▲ Broken cross arms/failed services:
 - ✘ 'Plenty of broken cross arms in high fire risk areas.' (Linesman)
 - ✘ 'Failed services: things are left broken and hanging and might be left there for 2 days with people walking underneath.' (Linesman)
- ▲ Pole failures:
 - ✘ 'Poles falling over in high winds – some have been condemned, but have not been replaced and others haven't been identified as a problem because of increased inspection period.' (Linesman)

KEY FINDINGS

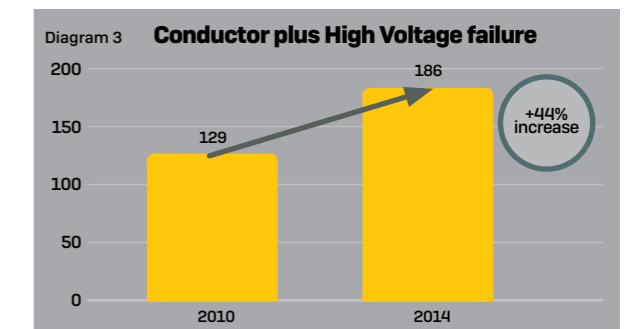
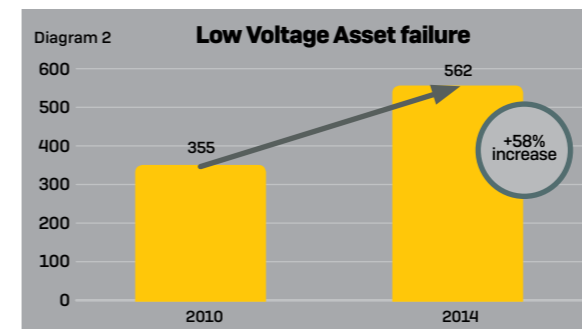
- ▲ Transformers failing/leaking; failing to cope with increased load:
 - ✘ 'Over-stressed and will fail. Often DBs wait until transformer is leaking before replacing them, which is a hazard.' (Linesman)
 - ✘ 'Leaking carcinogenic oil into streets.' (Linesman)
- ▲ Broken and cracked insulators:
 - ✘ 'Brown insulators in particular will fail – they're obsolete, but not getting replaced at an adequate rate – wait for them to fail.' (Linesman)
- ▲ Fluctuating voltage on single wires:
 - ✘ 'Get heaps of complaints about fluctuating power; the system becomes overloaded because it's reliant on one wire.' (Linesman)
- ▲ Pole top assembly deterioration:
 - ✘ 'Old top assemblies should be getting replaced, but they are left to deteriorate to the point of failure.' (Linesman)
- ▲ EDO units breaking and failing
- ▲ Rusty cables that are starting to fail / not doing wire reconductoring:
 - ✘ 'Corrosion of metal assets is a big issue in coastal areas, causing lines to fail and hit the ground.' (Linesman)
 - ✘ 'Ocean areas – a lot of 'cancer' on the steel, but DBs keep pushing out replacing it – keep turning funding tap off. It's inconsistent – one area will get addressed and then funding is stopped and others won't.' (Linesman)
- ▲ Overloaded circuits
- ▲ Service wire failures:
 - ✘ 'At the end of their lifespans and in some cases breaking and hanging live.' (Linesman)



📍 A recent example of a live service wire in suburban Melbourne that failed due to age and deterioration. Reports from residents stated the wire had hung alive opposite a sports ground for 2 days before crews responded.

- ▲ Zone sub stations failures:
 - ✘ 'Failing due to a refusal to upgrade or maintain them to even minimum standards asset owners are bound to.' (Linesman)
- ▲ Failing hardware such as bolts.

There were some comments that the total number of asset failures has been under-reported: 'It's just the tip of the iceberg.' Data from Energy Safe Victoria confirms that there have been an increase to faults and failures as indicated by Diagrams 2 and 3.



'Increases have been evident in 'Asset Failures and Faults' with an increase of 58% in Low Voltage Asset Failures (street poles and wires) and a 44% increase in the more dangerous 'Conductor plus High Voltage tie failures'.

Such failures can also cause HV & LV conductors to come into contact with each other. This can result in HV injections that can cause damage to local electrical equipment and shock members of the public close to such equipment.'

Source: Energy Safe Victoria Annual 'Safety Performance Report on Victorian Electricity Network' 2012- 2015

Current asset condition assessed as being poor to fair

Based on their experience working on Victoria's distribution assets on a daily basis, industry participants were asked for their assessment of the overall condition of the network and to give examples to reflect their opinion.

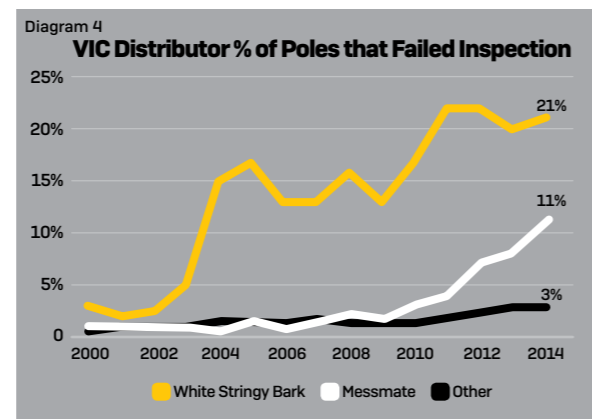
There was general agreement that the condition of assets is variable depending on the area, and that overall, the condition can be described as poor to fair. The network is ageing and not designed for today's energy demands. Industry participants are of the view that many parts of the network are deteriorating and failing and not being replaced. Rather, the emphasis is on patching up existing infrastructure.

The following quotes illustrate how field workers describe the condition of assets:

- ✘ 'Fair at best – a lot of condemned staked poles which should be a temporary solution, but seem to be left indefinitely.' (Linesman)
- ✘ 'Fairly poor – we see a lot of damaged conductors and rotting poles and cross arms.' (Linesman)
- ✘ 'Depends a lot on weather or loading as to how it performs – it's fragile. A lot is old and failing because of age and poor condition.' (Linesman)
- ✘ 'Substandard and third world in some cases – see assets in the air that are 60+ years old and don't meet today's safety standards. They're throughout Victoria.' (Asset Inspector)
- ✘ 'It's poor, some areas are 10 times worse than others.' (Asset Inspector)
- ✘ 'Get off major highways and it's poor.' (Linesman)
- ✘ 'Built up areas are fair to good, but a lot of country areas are poor and getting worse.' (Linesman)
- ✘ 'Falling apart, unsafe, unreliable and decimated. Poles are failing and falling of their own accord. High voltage cross arms fail regularly causing high voltage injection into residences and businesses resulting in appliances being damaged, house fires starting and meter panels being blown out of the wall. (Linesman)
- ✘ 'Poor – poor poles and cross arms – trying to make assets last longer than their lifespan.' (Linesman)
- ✘ 'Some areas are better than others – poles, insulators and cross arms are a problem re deterioration. Cables also starting to show their age – cable breaks are starting to happen.' (Linesman)
- ✘ 'Fair at best – every third pole needs attention – needs maintenance within a month which doesn't happen. A lot of conductor damage and fatigue which isn't being addressed.' (Linesman)

*AusNet Electricity Services Pty Ltd Regulatory Proposal, 2016-20. 30 April 2015

- ✘ 'Poor – starting to look like a third world country. Poles aren't straight, hardware is obsolete; things fall down when it gets windy.' (Linesman)
- ✘ 'Too many patch up fixes on the network when it really needs to be rebuilt in some areas.' (Asset Inspector)
- ✘ 'Patchy – a lot of outdated, ageing assets such as small conductors and old style insulators – not updating out-of-date assets that can't cope with today's supply demands.' (Linesman)



Source: AusNet Services 2015.*

AVERAGE AGE OF POLES TO INCREASE

'Despite the forecast increase in pole replacements, the average age of poles will continue to increase over the forecast period.' (2016 – 2020)

AusNet Services, 2015.

Asset condition declining

Industry participants described in detail how the condition of network assets is declining throughout Victoria. Specific comments included:

- ▲ Rotted poles / condemned staked poles that are left in situ indefinitely:
- ✘ 'See a lot of poles out there that are rotted or have stakes in them holding them up. They are condemned, but they are staking rather than replacing them.' (Asset Inspector)
- ✘ 'A lot of deteriorating poles out there. They get termite damage or lightning strikes – getting cracks which might not be picked up from a visual inspection. It's not until you are up the pole that you see the damage.' (Linesman)
- ▲ Cross arm failures/rotting cross arms
- ▲ Pole top assembly failures on poles (a lot of top assemblies originally poorly constructed and have aged):
- ✘ 'Did get reported after Royal Commission, but costing too much to fix, so have scaled back on fixes.' (Linesman)

- ✘ A lot of rust on cables/ageing cables/examples of breaking cables
- ▲ 3/12 steel - poorer quality and deteriorates quickly:
- ✘ 3/12 steel galvanizing is rusting.' (Linesman)
- ▲ Leaking transformers:
- ✘ 'Old, original transformers that are past their use-by date, leaking carcinogenic oils.' (Linesman)
- ▲ Transformers not designed to carry today's loads:
- ✘ 'Might have a transformer designed for 10 households in the 1960s or 70s when there were very few electrical appliances and that same equipment is now servicing 30-40 households full of gadgets.' (Linesman)
- ▲ Deteriorating insulators
- ▲ Damaged conductors
- ▲ Obsolete assets that cannot cope with today's supply demands (e.g. small conductors and old style insulators)
- ▲ Corroding LV krone boxes (corrode quickly in salt air)
- ▲ Corroding 'AM pact' connectors
- ▲ Loose hardware such as bolts that need tightening
- ▲ Tree management has gone backwards – no longer seem to worry about having 10m clearance of cables
- ▲ Sub-stations that need to be upgraded:
- ✘ 'It's not in new build cycle so timing is being pushed out. Creates risk of failure and also fires within the sub-station.' (Asset Inspector)



Horsham Sub Station 2015.

There is fear that fire risk will continue to increase

All industry participants believed that the number of fires caused by distribution assets will continue to increase in the future and there was a consensus view that not enough has been done to prevent another 'Black Saturday' catastrophic fire event.

Whilst a couple of Industry participants did comment that there was a drive to improve maintenance and the quality of assets in bushfire-prone areas after Black Saturday and the Royal Commission, it was reported that this level of activity had now dropped off, hadn't been properly implemented or was insufficient in the first place.

- ✘ 'Pressure is now off, so DBs have fallen back into old way of not doing preventative stuff or pushing out planned stuff and waiting for it to become P1 – a top priority because the asset has broken.' (Linesman)
- ✘ 'I don't think distributors have learnt anything from Black Saturday ... The only maintenance that has been carried out is not going to prevent further fires as a single measure. Vibration dampeners aren't going to stop rotten cross arms and poles from falling over or dropping conductors.' (Linesman)
- ✘ 'Bushfire Royal Commission recommendations either have not been implemented or are being implemented in areas which are at less of a risk in an effort to satisfy minimum amounts of work, without the costs associated with high bushfire threat zones.' (Asset Inspector)
- ✘ 'Did put on a lot of vibration dampeners and armour rods to try to prevent bush fires, but not doing the smaller maintenance jobs which can also result in fires.' (Linesman)
- ✘ 'Reconductoring in the Dandenong Ranges got cancelled because it was going to cost too much; so seems to be more about cost than minimising [risk of] bushfires.' (Linesman)

This belief was due to a number of key issues. Not surprisingly, many of these had already been raised by industry participants as factors that have gone towards the increased number of distribution asset-driven fires. The range of issues is leading to little confidence in Victoria's ability to avoid another 'Black Saturday'.

It was also acknowledged that a trend towards hotter, drier summers and more development and population growth in bushfire-prone areas mean that the risk will continue to grow, requiring more proactive maintenance practices.

There has been an increase in the number of consumer complaints by Victorian residents

Industry participants were asked if customer complaints had risen and what types of complaints they receive from customers.

Participants stated that there was a common theme around complaints, relating to time off and frequency of being 'off supply'.

Complaints on the rise from customers to field staff included:

- ▲ Why is my power off?
- ▲ Why wasn't I notified that my power was going to be off? Why wasn't I told how long it would last?
- ▲ Why is my power off again?
- ▲ Why is it taking so long to get my power restored?
- ▲ Why am I paying so much and getting unreliable supply?

- ▲ Why are you back so often working on the same pole/working in the same street?
- ▲ Why has my equipment been damaged/why is my TV not working properly?
- ▲ Why are you blocking entrance to my business or property?
- ▲ Why is my service fee so high when I'm getting less reliable service?
- ▲ Why has it taken so long to fix that street light?
- ✘ **'Businesses having to close for days on end due to outages are a massive complaint we receive.'** (Linesman)
- ✘ **'Low voltage fluctuations are causing damage to appliances and TVs not to function correctly – getting more of those complaints. Instances of customers receiving electric shocks have also risen.'** (Linesman)
- ✘ **'Getting a lot of voltage complaints. Customers notice it more if they have solar installed as they can monitor supply voltage and pick up fluctuations.'** (Linesman)
- ✘ **'No notification of a planned outage is a common complaint.'** (Linesman)
- ✘ **'Customer complaints around access to houses or businesses being blocked without notification during planned outages for maintenance.'** (Linesman)

Industry participants nominated the following reasons for an increase in supply complaints:

- ✘ **'Increased demand on a network not equipped to deal with today's demands.'** (Asset Inspector)

An ageing network that is suffering from a lack of upgrades and replacement of obsolete equipment. This is resulting in more failures and outages, particularly in hot weather:

- ✘ **'More houses, more appliances, too few new substations.'** (Asset inspector)
- ✘ **'Every summer, there are the same problems because we haven't upgraded.'** (Linesman)
- ✘ **'Increased load pressure on assets, because DBs are not augmenting lines sufficiently which means lines are overloaded and more likely to fail.'** (Linesman)

Multiple outages

Participants commented that customers in some areas are subject to multiple outages within a short timeframe, again because there is a focus on short-term fixes rather than planned network upgrades/replacement.

- ✘ **'One of main feeders dropping out fortnightly due to a fault on the line. It took a long time to rectify**

the problem. It comes back to maintenance work being held back so getting more faults and waiting to fix things once they've failed rather than pre-empting it.' (Linesman)

- ✘ **'Lack of resources, lack of maintenance means people are getting fed up with repeated failures. Some go off weekly and underlying problems are not being fixed. Just do a quick fix to get network up and running temporarily.'** (Linesman)
- ✘ **'Some areas are hard hit by maintenance issues and storm activity, so have a lot of outages.'** (Linesman)

Asset approaching end life

'That electricity assets can be expected to demonstrate rapidly increasing failure rates as they near the end of their service life, while much of the current asset base is approaching this point in its lifecycle.'

Energy Safe Victoria, by Jaguar Consulting 2013.

Lengthy time taken to rectify faults

Customers can be without power for significant periods because:

- ▲ Equipment is often badly deteriorated and takes time to fix
- ▲ Delays in sending crew to fix the problem (after initial response) because of lack of resources in the area or to avoid overtime:
- ✘ **'Taking longer to get power on – first response may be fast, but getting crew to fix problem can take time.'** (Linesman)
- ✘ **'Lack of resources means longer and more frequent outages.'** (Linesman)
- ✘ **'Not doing right level of maintenance, not replacing assets – means people are off power for longer and planned shut downs take longer. We have too few resources to complete quickly. Companies won't pay overtime so problems not looked at until next day.'** (Linesman)
- ✘ **'Definitely taking longer to get people back on and some faults are quite big and can take a while to fix e.g. cross arm breakage takes a lot of people off supply for quite a long time. Goes back to lack of planned maintenance.'** (Linesman)
- ✘ **'Time taken to get supply restored has increased. Now have fewer field crews so takes longer to complete jobs. If only a few households are effected, make them wait until the following day for service. It's due to a resourcing issue – lack of budget means they don't want to pay overtime, so they hold jobs back for the following working day.'** (Linesman).

Customers angry that costs are increasing, but reliability of service is decreasing

A belief that customers are more inclined to complain about supply and voltage issues given the number of failures and faults is increasing and particularly because the service charges have increased significantly over the past few years.

Value of Customer Reliability reduced

Victorian governments have been participating in a largely hidden process to reduce the reliability of electricity to Victorian customers from 2016.

The Victorian government has accepted that Victorian households and businesses no longer value electricity supply reliability as much as they did in the past: based on highly selective and scripted surveys by the Australian Energy Market Operator (AEMO).

The regulators have reduced the 'Value of Customer Reliability' (VCR) in evaluating the capital and operating expenditure proposals by distributors. This means, they are accepting lower levels of maintenance and capacity growth expenditure, in return for lower reliability standards for customers.

AusNet Services, 2015

AusNet Services will defer over \$140 million (\$2014) of capital expenditure as a result of applying the new Value of Customer Reliability in its planning and risk assessments.

Powercor, 2015

'As a result of the significant reduction in the VCR, many projects required to maintain current network performance .. will not proceed.'

As a result, customers will gradually receive a lower level of network reliability performance.'

CitiPower, 2015

'As a result of the reduced VCRs many projects required to maintain reliability will no longer be assessed as net benefit positive; and will not proceed.'

Victorian Department of Economic Development, Jobs, Transport & Resources

'If the AER does not provide expenditure to maintain reliability as a result of the lower VCR, then the (distributors' reliability service incentive) targets should be adjusted accordingly.'

Disconnections

Most of the Industry participants in the study either did not handle disconnections, or did not do many. One observed that disconnections can now be handled remotely if the customer has a smart meter.

Two linesman who did a reasonable number of disconnections thought these had increased due to the increased cost of electricity, relationship break-downs and small businesses doing it tough. They thought that power companies were potentially less forgiving regarding disconnections, giving customers less time to settle the bill before disconnecting power.

Customers becoming more aware of voltage related problems

As the following quotes illustrate:

- ✘ **'Solar power installations can lead to issues re supply and voltage to the house – show up as weak spots, so customers are becoming more aware. Customers are now starting to understand the impact of out of balance loads on transformers.'** (Linesman)
- ✘ **'Cheaper quality appliances don't have tolerances built in, so play up if changes in voltage.'** (Linesman)

Victorian climate impacts

'Elevated temperatures can physically stress distribution network assets. They also encourage people to use air-conditioning more frequently and put extra pressure on these assets.'

'The hotter, drier conditions cause vegetation to dry out, thereby creating ground conditions more conducive to fire ignition. Increased failures or fires on the network combined with adverse ground conditions result in more frequent vegetation fires.'

Energy Safe Victoria 2015

The two worst Victorian heatwaves on record have happened in the past 5 years: January/February 2009 and January 2014. Since 2001, Victoria has seen a five-fold increase in the number of days each year where somewhere in the state tops 45 degrees.

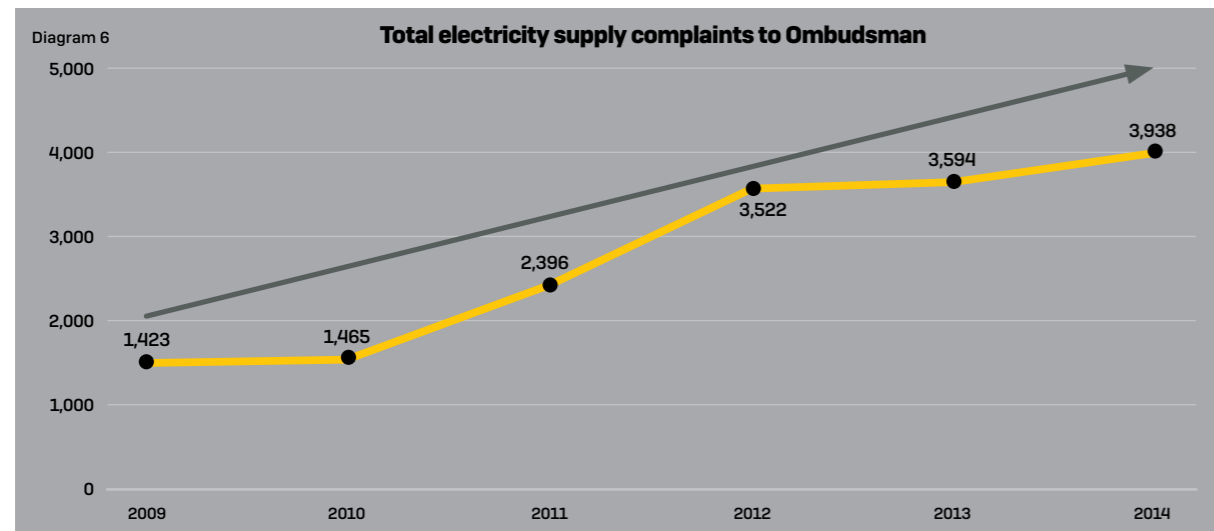
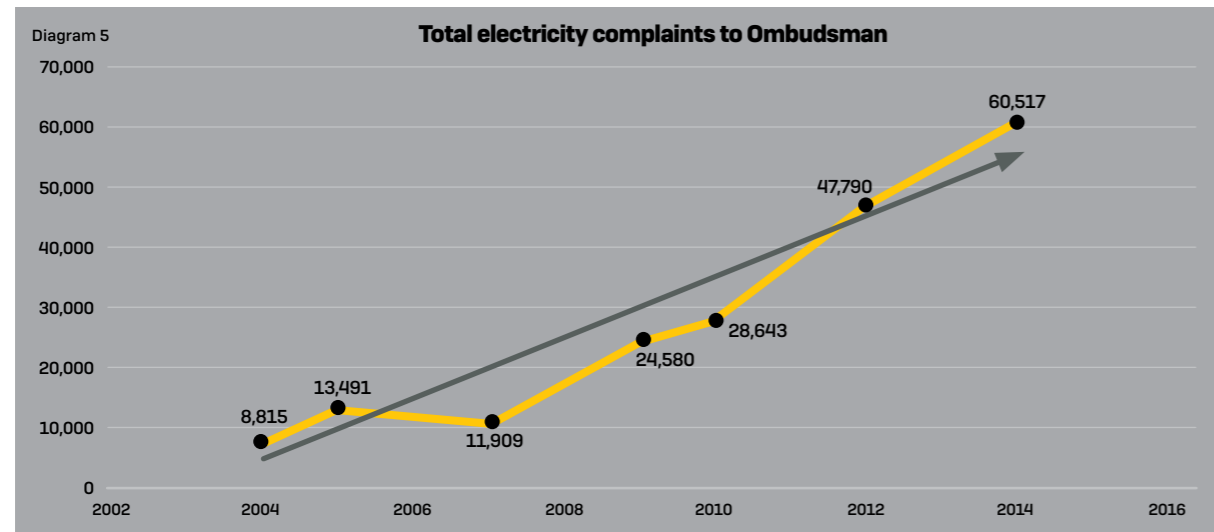
According to the Victoria's Climate Commission and Department of Environment, Land, Water and Planning, Victoria faces a warmer and drier future, resulting in:

- ▲ harsher fire weather and longer fire seasons
- ▲ fewer frosts
- ▲ more frequent and more intense downpours
- ▲ more hot days and warm spells
- ▲ less rainfall.

KEY FINDINGS

Complaints to the Ombudsman Increasing

As demonstrated in Diagram 6 from the Energy and Water Ombudsman of Victoria complaints have increased and substantiates comments made by participants in this survey.



In Victoria, complaints to the Ombudsman about electricity supply issues have escalated in the last 5 years by 177%. Total electricity complaints to the Ombudsman have increased significantly over the last 10 years.

DIAGRAM 5 & 6 Source: Energy and Water Ombudsman of Victoria, Annual Reports 2000 – 2015.



High voltage pole mounted transformer leaked oil into the environment before catching fire in a high bushfire risk area. Summer 2016.

THE REASONS FOR THE DECLINE

Power industry workers identified a number of factors and practices that they believe have impacted on the decline of distribution assets. Many of these factors can be categorised under the broader themes of lack of adequate maintenance, lack of timely replacement of ageing infrastructure, and poor maintenance practices and procedures.

Ageing inadequate Infrastructure

Industry participants reported they are working on ageing infrastructure that is being repaired rather than upgraded or replaced. They acknowledged that the system is being placed under greater pressure in many areas due to an increased population and number of dwellings as well as an increase in the use of energy-hungry appliances, particularly in hot weather.

Additionally, the demand by households today in the digital age is placing increasing pressure on the network and assets. Victoria's distribution network is increasingly prone to failure because it has not been future-proofed in most areas, and cannot cope with the energy demands of today, particularly in hot weather.

A consensus view is that Victoria's distribution assets are not equipped to deal with today's power needs:

- ✘ 'Network is getting bigger and older and there are fewer resources on the ground to do maintenance and upgrades.' [Asset Inspector]
- ✘ 'Existing infrastructure is getting older and older and isn't being replaced even though there is more pressure on it.' [Linesman]

- ✘ 'Playing catch up due to growth on network. Whole network is growing and not putting sufficient resources in to manage this properly, so not removing hazards.' [Asset Inspector]
- ✘ 'Less money going in and less resources on the ground – recipe for disaster.' [Linesman]
- ✘ 'Network is ageing, so maintenance should be increasing and it's gone the other way.' [Asset Inspector]
- ✘ 'The network's so old, and we're so technically advanced it doesn't make sense!' [Linesman]
- ✘ 'Not replacing infrastructure – doing patch ups; waiting until it's at the point of failure (or goes beyond). [Asset Inspector]
- ✘ 'Households use a lot more current, but conductors haven't been upgraded.' [Asset Inspector]
- ✘ 'We're using more power than we ever did in a lot of residential areas, and conductors are the same as they were 60 years ago.' [Linesman]
- ✘ 'The network is so old, but we're so technically advanced these days, with larger homes using more power; more flat screen TVs, computers in every room.' [Linesman]

Black Saturday Royal Commission Final Report

'The Commission considers that now is the time to start replacing the ageing electricity infrastructure and to make major changes to its operation and management.

'In view of the size of Victoria's electricity distribution network, any replacement program will take years to complete even if it begins immediately.

'The Commission considers that Energy Safe Victoria needs to take a more proactive role as the electricity industry safety regulator.'

THE REASONS FOR THE DECLINE

- ✘ 'Under-sized conductors can't cope with modern load requirements and old style insulators get dirty and cause pole fires.' [Asset Inspector]
- ✘ 'Pole fires due to old style insulators definitely increasing. Get outages, particularly in summer because of build-up of dirt; not being replaced quickly enough with larger insulators. [Linesman]
- ✘ 'Get a lot of complaints from customers about voltage problems due to undersized conductors.' [Linesman]
- ✘ 'Greater demand on network due to denser development – same asset has to feed more buildings and means network can't handle supply when there is high demand, so get outages.' [Asset Inspector]
- ✘ 'Now have transformers running at 300+% – the network can't keep up. Only scratching the surface re upgrades and maintenance.' [Linesman]
- ✘ 'Current work is more focused on fixing problems as they occur rather than building a network for today's demands.' [Asset Inspector]

Poor Maintenance Practices

The maintenance practices that field workers believe result in more asset failures are:

- ▲ Reactive maintenance
- ▲ Limited preventative maintenance
- ▲ De-escalating priorities, extending timeframes and 'holding back' jobs
- ▲ Poor quality equipment being installed
- ▲ Use of poor quality materials
- ▲ Compromising standards
- ▲ Extended inspection periods
- ▲ Lack of monitoring by the Regulator
- ▲ Issue identification
- ▲ Response times
- ▲ Reduced expenditure
- ▲ Lack of independent standards.

The common industry view about ageing assets was supported by observations by Energy Safe Victoria as follows:

ESV Safety Performance Report 2015

Assets approaching future

'The approach of not undertaking age-based replacement runs a risk that assets may be operated until they are well within the onset of significant unreliability.

'Distribution networks were built within fairly short timeframes and will have a population of crossarms of similar age that are likely to deteriorate at similar rates, and so approach failure at the same time ... and that the number of assets approaching failure will be large.'

Lack of age transparency

'ESV has no substantive data on the age of the assets of the major electricity companies.

'ESV concern is that aspects of current asset management practice may be placing network reliability at risk in the longer term as assets age and require replacement in substantial numbers in the future.

'ESV currently has almost no visibility of the potential impact of asset management practice on the network of the future, predominantly because of a lack of asset condition and age data provided to ESV.'



📹 In-service aged pole with split through centre 'repaired' with metal straps.

Reactive Maintenance

There was a common belief that maintenance has become more about reacting to equipment failure, or near failure, rather than planned, preventative measures aimed at reducing the risk of bushfires over the long term, due to budget considerations.

Line Workers reported that many of the jobs that they are sent to work on involve working on a single piece of an asset that has failed or is about to fail, even though they often observe that other parts of the asset or surrounding assets are also at risk of failing and have the potential to cause fires. Lack of maintenance in its different forms was mentioned by all field force in the study as a cause of fires.

- ✘ 'From an experienced person's point of view, you might see that you need to do five things at the site to make the asset safe, but you only have the budget to do one, so that's all that gets done.' (Linesman)
- ✘ 'The budget doesn't allow to bring it up to speed – can only do one task. You can see that that's wrong, but we've only been paid to do one thing.' (Linesman)
- ✘ 'Will do the bare minimum (of maintenance); they can mark you off that they have attended the pole and completed the maintenance, but they're not doing it properly!' (Linesman)
- ✘ (Instances of) 'Instead of knocking it out, we'd just assess it as having vertical splits.' (Linesman)
- ✘ 'We only fix a little bit of a pole such as a cross arm, even though it's sitting on a condemned pole ... or only change a fuse unit rather than the arm they are sitting on – it's all about quick and cheap fixes.' (Linesman)
- ✘ 'We'd drive past 3 or 4 cross arms that were in a much worse state than the one we'd been sent to repair.' (Linesman)
- ✘ 'Maintenance is not keeping up with age of assets – more failures equal more fires. Companies are being driven by the bottom line, so do quick fixes rather than fixing the problem. Focus is on minor repairs rather than replacements.' (Asset Inspector)
- ✘ 'They do the bare minimum so it gets ticked off they've attended the pole; that they've done a bit of maintenance.' (Asset Inspector)

This issue was raised by a majority of industry participants, often in the context of a failure to maintain assets to an adequate standard which could increase the risk of fires.

- ✘ 'It's a risk management strategy; rather than being about prevention; it's all about Band-Aids.' (Asset Inspector)

- ✘ 'Making assets last until they break.' (Asset Inspector)
- ✘ 'Doing things on the cheap – will upgrade a sub, but not conductors – only doing half the job.' (Linesman)
- ✘ 'Only think about temporary fixes rather than proper fixes ... might be 8 rotten cross arms in a street, but they'll only replace 2 of them and think that will fix the problem.' (Asset inspector)

Australian Energy Market Commission (AEMC)

'The [regulated] building block amounts do not mandate what distribution businesses must spend on their distribution systems each year. Rather, distribution businesses ultimately control and determine the amount of capital expenditure that they undertake.'

The terms 'Band-Aid' solution or 'patch-ups' were often used to describe maintenance work undertaken. Field workers had concerns about whether the maintenance tasks they were asked to undertake would be sufficient to reduce the risk of fires.

- ✘ 'A lot of jobs we went to were really, really bad cross arms. We are not allowed to replace them; just do a quick fix to try to stop it splitting further. I'd say to my boss: it's just going to make it worse; it's not going to fix the problem; the arm needs replacing. I'm told: you're not allowed to make that decision (to replace) ... You worry that just doing a quick fix might end up making it worse.' (Linesman)
- ✘ 'It's just a Band-Aid, so they can say we sent out a maintenance crew to work on that asset, so they can tick the box ...' (Asset Inspector)
- ✘ 'Finding cheaper solutions – short term, but paperwork will record that the maintenance has been done. However, only a small part of the job is done really – Band-Aid fix is made.' (Asset Inspector)
- ✘ 'Only doing partial upgrades e.g. changing over HV installations – will upgrade 1 phase, but not all three.' (Linesman)
- ✘ 'Faulty HV SEC cables only patched up to get supply restored and rarely replaced. Some bays have 2-3 joints.' (Linesman)

In addition, there is a focus on repairing existing infrastructure rather than upgrading assets; doing patch-ups rather than planned upgrades of ageing and overloaded assets, which Industry participants think adds to fire risk:

- ✘ 'Lack of preventative stuff – fix as fail a lot of the time.' (Linesman)

- ✘ 'Band-Aids on the system which fester into bigger wounds ... should resolve issues rather than gloss over them. Just fixing major problems as they occur, rather than focusing on prevention.' (Linesman)

Indeed, a number of Industry participants stated that this leads to inefficient practices as field workers may have to revisit the same asset multiple times, or a number of assets located next to each other, fixing different problems as they occur, incurring a lot of travel and set up time.

- ✘ 'Only replacing immediate issues rather than doing all upgrades and maintenance in one visit to a site. It's very inefficient. A lot of travel time rather than productive work time, even though the work is right in front of you.' (Linesman)
- ✘ 'It's all about selective maintenance rather than looking at that piece of asset and saying what do we need to do today to keep this running indefinitely?' (Linesman)
- ✘ 'Go to jobs and fix one cross arm, when others are virtually as bad and we know we will be back there.' (Linesman)
- ✘ 'It's all just about getting through P1 jobs. Not doing preventative work. If there isn't budget this year; reassess priorities and don't do planned upgrades. Gets put off until following year. Ends up costing more in the long run as becomes an emergency to be fixed and end up having to pay overtime rates.' (Linesman)
- ✘ 'It's more about quick fixes of things that go wrong than planned maintenance. Just look at one item rather than other poles in the area.' (Linesman)

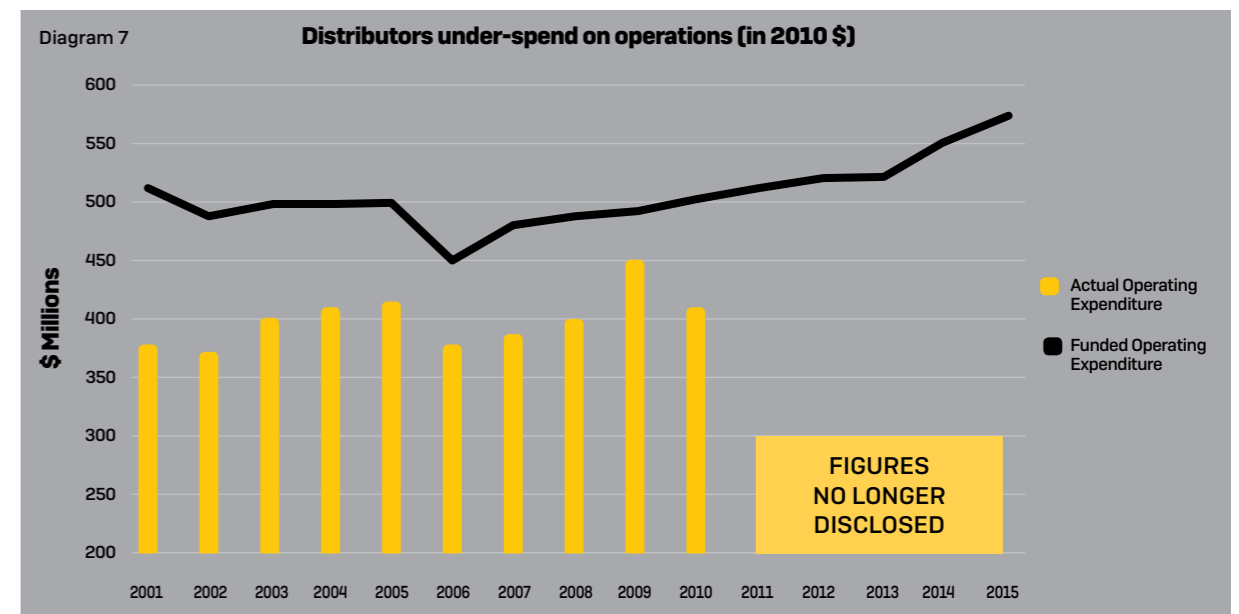
- ✘ 'No longer do long conductor runs or multiple poles. Now typically only fixing one pole that has become high priority and leaving the rest, even though they may be as bad.' (Linesman)

- ✘ 'Spend a lot of time travelling from job to job and going back to same street time after time. It's all about patching things up as needed rather than planning ahead and working on a particular area. May go back to the same pole multiple times or poles within meters of each other multiple times.' (Linesman)

Limited preventative maintenance

There was a consensus belief amongst industry participants that preventative maintenance standards have been relaxed. Industry participants believe that the focus is on reactive, ad hoc 'just in time' maintenance. There is little emphasis on planned and preventative maintenance strategies. Field workers thought that the lack of more proactive maintenance was implicated in the increased number of fires due to distribution assets.

- ✘ 'A lot of assets are 50-60 years old and aren't being updated even though past their use-by date. There are a lot of old, damaged and over-loaded circuits. Pole fires are being caused by dirty circuit insulators which have been left.' (Linesman)
- ✘ 'Lack of preventative maintenance – industry has moved towards using conductors who aren't paid to do preventative work. Previously if saw something that needed fixing, would just do it. That's no longer the case – now just report any issues and distribution company gives it a priority. If it's a lower priority, it doesn't get fixed until it becomes a bigger problem. We're just doing half the job.' (Linesman)



THE REASONS FOR THE DECLINE

Industry participants often grouped planned maintenance and preventative maintenance standards together, as standards dictate the amount of non-urgent maintenance that gets done.

Key observations around this topic include:

- ▲ Current strategy being around risk management; on reactive quick fixes as assets fail rather than on a proactive preventative strategy:
- ✘ 'It's all about fixing assets that are on the point of failure – we don't do preventative work anymore.' [Linesman]
- ✘ 'General consensus is that the asset owners' attitude is one of we'll fix it once it breaks. It is reactive maintenance, rather than preventative.' [Asset Inspector]
- ▲ Timeframe for P2 and P3 fixes has been relaxed, and indeed a belief that a lot of P3 work is not getting done (instead left until it deteriorates further and becomes a more urgent priority):
- ✘ 'Just wait for the problem to become critical before doing a fix and then it's often a patch up. We are not preventing failures, not doing P3 work.' [Linesman]
- ✘ 'General maintenance has been cut right back. Target dates are being pushed back more and more.' [Linesman]
- ✘ 'Servicing is not getting changed unless it is marked down as really bad. Ditto insulators – not spending any extra. Do a re-conductor job and just leave one pole and top structure there. That wouldn't have happened a few years ago.' [Linesman]
- ▲ Extended inspection periods, which means deteriorating assets are not identified:
- ✘ 'Standards have definitely been relaxed as well as inspection schedules being pushed further and further out.' [Asset Inspector]
- ▲ Redefining what constitutes a viable asset. Key example given here is redefining the amount of good wood in a pole before it can be classified as condemned.

The views of industry participants are supported by reports to the regulators by the distributors about reduced maintenance expenditure. Jemena, for example, cited the following in its Regulatory Proposal to the AER in 2015.

Jemena Reported Reduction in Maintenance Expenditure

'We note that as a proportion of our total expenditure, operating expenditure has declined materially—from more than 50% of our total forecast expenditure over 1996 to 2000 to approximately 40% in the 2016 regulatory period.'

Industry participants perceive these practices are likely to continue and will continue to have a deleterious effect on fire risk:

- ✘ 'Not replacing brown insulators quickly enough – lack of preventative maintenance being done.' [Linesman]
- ✘ 'Focus is all on priority 1. Don't want contractors to fix other things they find.' [Linesman]

'Quality of assets declining – leaving poles to rot longer.'
[Linesman]

- ✘ 'Will increase because we're not updating assets – only doing essential work and nothing extra to prevent the types of failure that result in fires. If working on a pole, we are instructed to change a tie, but not to upgrade the insulator to current standard, even though we can see it's deteriorated/substandard. Not allowed to do anything other than what's been given out and those types of things start fires.' [Linesman]
- ✘ 'A lot of tree growth – makes access harder and fire risk greater. Reactive re fixing assets; doing patch-ups rather than proper fixes.' [Linesman]
- ✘ 'A lot of assets in the air on poles that are not being replaced or inspected – transformers may be more than 30 years old and now have to cope with increased load. Recipe for disaster. Not testing equipment e.g. testing oil levels of transformers; not checking gas levels contained in switches – can cause outages and fires.' [Lineman]
- ✘ 'Extended inspection cycle means will get more failures that can cause fires. Seeing a lot of poles and cross arms that require a shutdown to work on because they are in such bad shape.' [Linesman]
- ✘ 'The use of 'fingers crossed' approach across the networks is accepted practice. Holding off maintenance until infrastructure is at the point of failure or does fail. An attitude of: we'll fix it once it fails. Increased load demands are not matched with upgrades. Blown overloaded circuit fuses are replaced with fuses rated higher than the assets they are meant to protect. Assets are weakened over time until they fail or because fire starts.' [Linesman]



Ⓜ HV tracking to LV arm corroded rusted bolts drops ash and sparks in Seaford.

There is a strong belief that the timeframe for P2 and P3 work is being extended, and a lot of P3 work doesn't seem to be getting issued:

- ✘ 'P2 and P3 work isn't happening. They have been identified as an asset risk, but they are not being fixed.' [Linesman]
- ✘ 'Distributors used to have a shut down and fix the whole street; now it's just done in dribs and drabs; fixing one small thing at a time. We are no longer doing re-conductoring or changing poles.' [Linesman]
- ✘ 'Planned maintenance, especially P3 is not getting done and P2 timeframes being pushed out. Often these are P1s that have been reclassified. We inspect every 5 years and 2.5 years in bushfire prone areas, and are reporting same defects over and over (because they haven't been fixed in the interim. They then just re-report it and then it goes back into the system as a new report and given another priority, so nothing gets done.' [Asset Inspector]

Some industry participants believe that an extended inspection cycle exacerbates the lack of planned maintenance (because deteriorating assets are not picked up). Reports of priority projects being de-escalated also go to this issue.

Also there were a couple of reports of contractors struggling to do planned maintenance because of resourcing issues, given redundancies in the industry:

- ✘ 'Getting overwhelmed doing P1s so P2s and P3s aren't getting done – we just don't have the resources. A lot get reassessed and put back into service.' [Linesman]

- ✘ 'P2 and P3 work not being done in timely way because of rostering issues – can't co-ordinate staff and may not have specialised skills or equipment available. Planners may assume availability and it's not the case. A lot of work gets pushed back e.g. re-conductoring, transformer upgrades; pole changes because the right resources aren't there anymore.' [Linesman]

There were also a number of observations that the lack of planned maintenance is evident in the number of redundancies in the industry, due to lack of maintenance work being put off.

De-escalating priorities, extending timeframes and 'holding back' jobs

Industry participants cited the changing and de-escalating of maintenance priorities as another factor that could be increasing the risk of distribution asset fires. This relates to high priority work (P1) and lower priority projects (P2 and P3) being de-escalated in priority and extended timelines appearing to be common practice.

- ✘ 'The Royal Commission said that defects must be rectified – anything P2, but power companies have just downgraded them to P3 and then push timeframe out. Some defects have been there for 5 years so when do 5 year inspection cycle, they are still there ... In bush fire prone areas - 2.5 years later when we check again, defects are still there, so power companies are not rectifying them – just delaying indefinitely.' [Asset Inspector]

THE REASONS FOR THE DECLINE

- ✘ 'Maintenance is being by-passed. An Asset Inspector will do an inspection and find 100 assets/faults – then someone else reassesses and puts 30% back into service.' (Asset Inspector)
- ✘ 'Downgrading priorities – P2s becoming P3 and pushing out time in which fixed – can be years and years. Over-riding P1 decisions – we now have to take photos of every defect raised to be re-assessed and often P1 assessment is over-ridden. Changing timeframes – P1 was 24 hours – can now be weeks. Got rid of a lot of linesmen and those that remain don't seem busy, so I'm not sure who is out there fixing things.' (Asset Inspector)
- ✘ 'May de-escalate priorities – from P1 to P2 or P2 to P3 to try to reduce the amount of work in that budget period.' (Asset Inspector)
- ✘ 'Not doing P3s e.g. loose nuts and bolts or arms not classed as urgent, but which have deteriorated. They're just getting left in place.' (Linesman)
- ✘ 'A couple of reports of DBs holding back P1 jobs until the next day to avoid overtime, even though they posed a high risk of causing a fire.' (Linesman)
- ✘ 'DB will hold reported fault back until the next day rather than pay overtime. Went to one where customer had reported it the previous evening and it wasn't called in until 7.30am the next day. House could have burnt down.' (Linesman)

In addition, some reports of work not being issued until the following quarter or following financial year in order to come in under budget impact work being completed in a timely manner. This means that the timeframe for lower priority work in particular is being pushed out. An asset assessed as a P3 priority could spend many



✉ High voltage cross arm failure, insulator hanging because of rotten cross arm.

years in service before receiving maintenance, posing a potential fire risk:

- ✘ 'Go over target dates, or just not issuing the work. Overtime not happening – jobs held over until the next day even if urgent.' (Linesman)
 - ✘ 'Quality of assets declining – leaving poles to rot longer.' (Linesman)
 - ✘ 'Faults can be left until the next day to fix – deprioritise so don't have to pay overtime rates.' (Linesman)
 - ✘ 'DBs leave things in system that should be fixed to save budget – not issuing jobs till next financial year to come in under budget. Means safety and standards are compromised.' (Linesman)
 - ✘ 'Holding back work even though it is there – everything is budget related. It should be about ensuring a well maintained and functioning network – that should be the priority, rather than starving it of funds.' (Asset Inspector)
- A couple of industry participants believe that maintenance and upgrades are worse in non-metro areas, with lower funding because there is a smaller population. Consequently, these areas are more subject to asset failures and longer outages:
- ✘ 'If it's a rural area, and only one or two customers affected, they'll have to wait until the next day.' (Linesman)

The issue of lack of testing of new equipment before installation was also raised as a concern amongst industry participants:

- ✘ 'When put new equipment onto the system; used to spend years and years testing it (prior). Now they see something that is cheap ... put it in without testing. Two years on, starts blowing up.' (Linesman)
- ✘ 'The SEC would make sure that it worked and had a good history behind it; often involved in manufacture and development of it. Now just getting cheap stuff from overseas.' (Linesman)

ESV concern about expenditure deferral

'ESV also needs to secure confidence from the major electricity companies that future network performance is not being compromised by the deferral of expenditure.'

Energy Safe Victoria, 2015.



✉ High voltage cross arm snapped due to deterioration. Note: Installation of vibration dampers was recently completed on the failing assets.

Poor quality equipment being installed which isn't up to the job

This issue was mentioned by a number of industry participants:

- ✘ 'Having to repair cheap equipment only put in 2 years ago 'High voltage insulators were \$30 instead of \$80 and they were breaking within 2 years.' (Linesman)
- ✘ 'The life span of high voltage aerial bundled cable or ABC was severely over-estimated and has been failing daily causing fire starts, outages of whole communities for multiple days at a time in the same area over and over.' (Linesman)
- ✘ 'Vibration dampeners – DBs have gone the cheapest option possible; put them up, but in the wrong places – just put them up in easy areas; not high risk areas, to satisfy numbers. Cheap product is now causing the very issue that it's meant to stop (i.e. fires).' (Linesman)
- ✘ 'There's a lack of regulation in the industry in relation to the quality of materials used.' (Linesman)

A number of industry participants raised poor quality materials and assets that wear quickly and fail well before their predicted use-by date as an issue that could contribute to the risk of fires. Note that other participants raised this issue in later discussions around asset condition and the reason for failures and faults.

- ✘ 'Using inferior materials that fail quickly.' (Linesman)
- ✘ 'Cheap products are now causing the very issue that they're meant to stop.' (Linesman)

A couple of reports indicated that some of the newer infrastructure is of poor quality, and likely to fail sooner than anticipated, increasing the risk of fires:

- ✘ 'In Redhill, high voltage assets aren't lasting half the expected lifespan, blowing up.' (Linesman)

- ✘ 'In Redhill, high voltage area bundle cables keep failing. Meant to replace 20 kilometres, but only done 2-3 – could easily result in a major fire; progress is so slow.' (Linesman)
- ✘ 'Vibration dampeners used, they've gone the cheapest option possible, put them up, but in the wrong places. Cheap products are now causing the very issue that it's meant to stop.' (Linesman)

Lack of Standards

This was raised mainly in the context of the amount of good wood required for a pole to be deemed sound, which has been reduced to 30mm from 50mm; the practice of staking poles rather than replacing them.

There were concerns that these measures could lead to more pole/asset failures which could result in more fires:

- ✘ 'Leaving poles to rot for longer – reduced standards re quality of pole – good wood requirement now 30 mm; not changing poles over.' (Linesman)
- ✘ 'Pole top assemblies – using a strap on brown insulators as a running repair rather than replacing obsolete insulators that have been linked to bushfires. Not replacing pole top assemblies – standards have definitely dropped.' (Linesman)
- ✘ 'In the last 3 years we've had at least 5 poles that have fallen down when we were climbing them.' (Linesman)
- ✘ 'Making poles last longer- changing standards to strength of poles to remain in service so don't have to change them over. Quality control is an issue, especially pole strength.' (Linesman)

Undersized Pole Replacement Program

'Jemena's program to replace undersize poles had been commenced but was 74 % behind target.'

Energy Safe Victoria, 2015.

Lack of oversight, monitoring and enforcement

There is a strong belief amongst these field workers that there is no real oversight, monitoring or enforcement of distributor activity around maintenance and this is evidenced by the many examples of sub-standard assets that can be found on the network:

- ✘ 'Not seeing any evidence of oversight by Regulator or government. Distributors do their own and they're motivated by saving as much as they can rather than having reliable and safe electricity supply.' (Linesman)
- ✘ 'Asset Inspectors are undermined and over-ruled – no one is doing any enforcement to ensure standards are maintained.' (Asset Inspector)
- ✘ 'Asset owners and distributors are left to their own devices re maintaining a safe network and their main objective is around profit and not safety or reliability. That makes no sense.' (Linesman)
- ✘ 'Distributors shouldn't be able to reclassify defect ratings P1, P2 and P3 to ensure work doesn't get done – if there was monitoring and enforcement, that wouldn't be allowed, and it's happening all the time.' (Asset Inspector)
- ✘ 'There is no enforcement. Power companies do their own oversight which is a huge mistake and why assets are in the mess they are in.' (Linesman)

- ✘ 'Not enforcing maintenance – getting away with lax standards and too little maintenance.' (Linesman)
- ✘ 'No one is ensuring quality work gets done. It's all about smashing out as much work as possible in as little time as possible because contractors have had to undercut to get the work because they are being squeezed. Auditing isn't being done properly and standards are not being adhered to – only have internal auditors.' (Linesman)
- ✘ 'Lack of independent and resourced regulator to police what has effectively become a cartel industry.' (Linesman)
- ✘ 'DBs don't seem to answer to anyone – they get money off government and are not being held accountable.' (Linesman)
- ✘ 'There doesn't seem to be monitoring/oversight when it comes to planned maintenance which means just doing bare minimum to keep network running.' (Asset Inspector)
- ✘ 'Need to bring compliance to standards back up via an independent regulator rather than self-appointed monitoring.' (Linesman)



The belief of the field workers is due to the absence of any independent technical regulator or standards in Victoria.

According to their own Safety Reports, ESV undertake a very small number of audits and even where evidence of non-compliance is material and found year after year, ESV routinely request the distributors investigate themselves. Examples from the ESV 2015 Safety Report are as follows.

ESV 2015 Bushfire Mitigation & Safety Programs

Jemena

Ten findings from the field audit were randomly selected and were compared with the records in Jemena's works management system.

Five of the 10 did not have matching notifications created in the system. Therefore, for this small sample size, 50% of the defects were found to not be recorded for actioning.

AusNet

ESV found sites with LV-only poles being recorded as having had armour rods and vibration dampers installed, but where rods and dampers had not been installed.

ESV also found several sites where poles with HV ABC were recorded as having rods and dampers installed but no installation was observed on site.

Healesville on Feeder WYK24 on the Maroondah Highway – it was reported that new cross arms, armour rods and vibration dampers had been installed on many poles. On inspection it was discovered armour rods had not been installed on any of the poles

As part of the armour rod and vibration dampers direction (following the Black Saturday Bushfire Recommendations), 926 assets of AusNet Services were audited and 76 issues were identified for a variance of 8.2 %.

United Energy

United Energy reports to ESV on a range of safety programs, namely:

- ▲ 22 programs arising from the AER 2010 determination

- ▲ 13 additional safety programs from 2012/13 review, including one from an ESV direction.

Of the original 22 programs, four did not start by the end 2014 based on data provided by UE.

Of the additional 13 programs, five had not yet started by the end of 2014.

ESV raised non-compliances on two of the original safety programs and one of the additional programs:

For the pole-top surge diverter replacement, works at 12 of the 70 sites reported as finished had not been completed. A variance of 17.1 %

In relation to the ESV direction, ESV found 16 out of 140 locations where the vibration dampers had not been installed as recorded, but United Energy reported the works as complete. A variance of 11 %.

Progress on six programs is behind ESV's forecast for 2014:

1. LV overhead conductor replacement
37% behind target
2. HV conductor replacement
28% behind target
3. Pole replacement LV
52% behind target
4. Pole replacement HV
CitiPower not reported
5. Pole replacement sub-transmission
CitiPower not reported

CitiPower not reported

ESV's Safety Report identified variations in safety work reported as complete, compared to actually completed work. In each case reported above, ESV's response is as follows.

'ESV recommended that 'DISTRIBUTOR NAME' conduct an internal audit of the safety programs to review consistency between the reported volumes and works actually completed, take corrective action based on the findings and report the outcomes to ESV.'

No penalties have ever been applied for material non-compliance.

Extended inspection timeframes

A few industry participants raised the 5-year inspection cycle i.e. as a factor that could have contributed to an increased risk of fire from distribution assets. Particularly, as they felt a lot of assets are being patched up rather than replaced (and hence may not prove to be robust) and also given lower priority maintenance can be deferred for a number of years (sometimes from one inspection period to the next).

- ✘ 'Before privatisation, assets were tested every 3 years; now it's every 5 years. Maintenance work is being delayed and put off.' (Asset Inspector)
- ✘ 'P3 cross arms – just sent out to inspect them and 2 – 3 years later, when they should have been replaced; they're still deteriorating, but get put back in as another P3 in the next inspection, so timeframe starts over. That can't keep going on [indefinitely]. Could be in service for several more years, deteriorating.' (Asset Inspector).

- ✘ 'Pole inspectors aren't picking up fatigue and damaged equipment – too long between inspection dates.' (Lineman)
- ✘ 'A lot of rusty conductors in rural areas – that's what started Black Saturday bush fires. Assets are not inspected often enough, given a lot of them are already in not very good condition. Need annual inspections in coastal areas where they get a lot of salt damage.' (Linesman)
- ✘ 'Things get missed, not picked up – rotten poles are not getting fixed when they need to be; getting more storm activity.' (Linesman)
- ✘ 'There's a lot of ageing wooden assets out there – poles and cross arm breakage. P2s were meant to be fixed in 15 weeks, may now have been downgraded to a P3 and not fixed after several years. Power companies are able to restart the timeframe from the latest inspection – get Asset Inspectors to inspect them again as part of 5 year cycle and then restart priority based on that, so they can go on with a P3 for many years.' (Asset Inspector)
- ✘ 'Definitely too little maintenance in the hills – focus is on costing saving, not on a safe network.' (Linesman)
- ✘ 'Still a lot of poles out there that should be replaced and won't be, because inspection cycle has been pushed out.' (Linesman)

Victorian Bushfire Commission on Inspection Frequency

The Commission cited a 1997 study of the Powercor network which found that a reduction in the inspection interval from 5 years to 3 years would be expected to result in:

- ▲ a 70 % reduction of in-service failures.
- ▲ In-service failures each year would have reduced from 500 to 84.



High voltage tracking caused pole fire. HV cross arms was replaced but severely damaged pole was not.

Insufficient monitoring by the Regulator

A consensus view is that there has been insufficient monitoring by the Regulator of asset conditions. Indeed, many have seen no evidence in the field of the Regulator monitoring or auditing assets.

The belief that the Regulator is not monitoring asset conditions is evidenced by:

- ▲ The poor condition of existing assets in many areas, where deteriorating assets remain in service indefinitely or until they fail:
- ✘ 'Seeing insulators leaning over on cross arms – not getting inspected... State of the network indicates insufficient inspections are happening.' (Linesman)
- ✘ 'Regulator never checks on jobs, never on site as far as I know. Can tell sufficient monitoring doesn't get done because we are getting construction calls about poles falling over. That shouldn't happen if network is properly maintained and monitored.' (Linesman)
- ▲ Asset Inspectors' decisions re Priority 1 jobs being over-ruled by the DB, which some felt would not occur if DBs knew the work would be audited
- ▲ More generally, de-escalation of priorities and increase in timelines to completion, which suggests to front line workers that this is not being monitored by the Regulator
- ▲ Changes to standards which are believed to have been driven by distributors e.g. pole staking; reduction in good wood allowance before a pole is condemned etc.
- ▲ A failure to see evidence of the Regulator in the field, auditing activities
- ▲ One participant said he had reported what he believed to be urgent asset problems to the Regulator and they had not been fixed.

Indeed some Industry participants are of the view that the Regulator does no direct monitoring, instead leaving monitoring in the hands of distributors.

- ✘ 'Relies on DBs to do their own monitoring, so regulator doesn't have a realistic understanding of asset conditions.' (Linesman)
- ✘ 'Haven't heard of, or experienced the current regulator engaging in auditing of the industry at all: Let alone scrutinizing distribution businesses or enforcing minimum standards and regulations.' (Asset Inspector)
- ✘ 'Never hear from regulator regarding audits – never seen in the field.' (Linesman)
- ✘ 'If they did (monitor), they would put more pressure on distributors to do more maintenance. It's easy to see there is a problem if you look.' (Linesman)

Bushfire Royal Commission on Energy Safe Victoria

Recommendation 34
The state amend the regulatory framework for electricity safety to strengthen Energy Safe Victoria's mandate in relation to the prevention and mitigation of electricity caused bushfires and to require it to fulfil that mandate.

'The Commission is strongly of the view that a strengthening of ESV's regulatory powers is needed, including the ability to apply sanctions in relation to non-performance, so that it can take a more active role in monitoring and regulating the electricity distribution industry in Victoria.'

Specifically, the Commission found ESV needed the regulatory powers and resources to make judgements

about the need for distributors to adopt methodologies such as:

- ▲ Age-based replacement programs
- ▲ Inspection programs

'This would enable ESV to determine whether the bushfire mitigation plans put forward by the distribution businesses minimise fire risk to the greatest extent practicable.'

Energy Safe Victoria's Director, then and recently reappointed, Mr Fearon, told the Commission he did not believe 'ESV would ever be able to retain the sort of expertise necessary to undertake such assessments.'

In 2016, ESV continues to simply observe distributors moving to exclusively condition-based (inspection-based) replacement of ageing assets and extended inspection cycles.

Self-Regulated Technical Standards

There are no independent technical standards in Victoria for electrical distribution powerline equipment or practices. The Distribution Businesses develop the technical and operating standards themselves (Victorian Electricity Supply Industry) while Victoria's regulations refer to them meeting their own standards.

This notwithstanding, Energy Safe Victoria annually reports systemic need to improve work practices against their own standards on issues including:

- ✘ appropriate earthing and adherence to priority earthing requirements
- ✘ calculation and documentation of temporary loads/tensions
- ✘ electrical access permit procedures, including permit issue processes.

Line Workers disempowered to identify issues

A number of Industry participants say that front line workers feel disempowered and have little say in ensuring urgent problems they find on the network are addressed, even though they are well placed to identify issues. Whilst Line Workers can report problems 'up the line', they have little confidence they will be addressed in a timely manner:

- ✘ 'Under the old SEC – if we found something unsafe, we were able to fix it. Now we are only allowed to do stuff that has been authorised. A lot of stuff is not getting picked up because of 5-yearly cycle – too long, getting left till it is unsafe because no longer allowed to fix stuff when we find it.' (Linesman)
- ✘ 'Asset inspectors are doing it from the ground to the best of their ability. They can't see hairline cracks. As linesmen we often climb that pole; we're right in front of it. In a better place to assess it;

to know what's right, what's not right. We are not allowed to make decision to do necessary fixes. Now all they want you to do is what they've asked you to do'. (Linesman)

In addition there was also a feeling that Line Workers are not encouraged to report problems or to take a proactive stance:

- ✘ 'It is left to pole inspectors to pick up unsafe assets; we're no longer allowed to fix stuff when we find it. If find a broken insulator, it's hard to get approval to fix it. Get asked 101 questions. Gets too hard.' (Linesman)
- ✘ 'Asset workers just do what's on the paper in the report. If you do anything more or say that more maintenance is required, you get a cross against your name.' (Linesman)
- ✘ 'Asset linesmen are experienced tradesmen; but we're not allowed to make decisions about repair and maintenance required on site. We have to do what we're told to do and nothing more.' (Linesman)

Response times are increasing due to a range of factors

Most Industry participants are of the view that response times have increased in a range of areas due to a number of reasons that include:

- ✘ 'Reduced number of workers in the field/difficulties resourcing.' (Linesman)
- ✘ 'Crew is spread out very thin – may only have one guy in an area and others are working out of the area so limits ability to respond to problems.' (Linesman)
- ✘ 'Contractors undercut each other and then want to minimise resource costs. Distributors just drip feed

Necessity for Licensing

Unlike other licensed electrical occupations which have a high duty of care to protect the public as a consequence of the dangers inherent in their occupation, lineworkers are not licensed. Licensed occupations have a higher regulatory duty of care to protect the public, than they do to their employer or their own profit or convenience.

Licensing is central to safety outcomes because of the related regulatory requirements to adhere to certain conduct standards, identified as safer to the public. The failure of a licensed worker to meet licensing requirements can result in disciplinary action, including loss of their license and ability to work in the occupation they have been trained for.

Licensing requirements usually include the requirement to report unsafe practices or incidents to the relevant authority or regulator. This legal requirement is insurance for workers from repercussions from their employer or client, for raising public safety issues that could incur a cost.

A regulator relies on these reports to monitor, address and develop policies and standards to ensure protection of the public.

Currently in Victoria, the only regulator of electrical safety, i.e. ESV, relies on the corporate reporting of incidents and safety practices, despite the strong conflict of interest of those corporations to maximize profit at the expense of investing in public safety. ESV has repeatedly noted the non-compliance and variation of reported work performed in the interest of public safety. Yet it has not developed 'licensing' for lineworkers which would overcome the conflict of interest of the reporting party.

A major compounding issue impacting on lineworkers' ability to do work up to a standard that is safe in Victoria for the public, is that all the companies themselves provide the technical standards to be adhered to.

📷 Bushfire area Band aid – Aged leaning HV+LV Pole with new cross arm. Trees growing into low voltage lines.

work through which makes resourcing difficult – it's hard to have adequate crews when they're needed.' (Linesman)

- ✘ 'It's taking longer to get big faults repaired quickly because we have lost resources and expertise.' (Linesman)
- ✘ 'Jobs not being put out or delayed.' (Linesman)
- ✘ 'P2 times are getting blown out and P3s don't seem to get done at all.' (Linesman)
- ✘ 'P1s should be fixed in 24 hours, but not happening.' (Asset Inspector)

Employer tries to avoid paying overtime and hence delays work:

- ✘ 'First responders have to argue with control room to get people out to fix a fault – they want to leave it until next day. Leaking transformers are left overnight.' (Linesman)

Change in response timeframes and re-prioritisation, such that response timeframes have been extended:

- ✘ 'P1 should be fixed in 24 hours but know that a lot of these jobs get pushed out or re-prioritised as when go back to check on job, a lot haven't been done. It's a real worry with P1s because there's a strong risk of imminent failure which could cause fires or risk to public.' (Asset Inspector)

A feeling that DBs don't seem to be as concerned about response times:

- ✘ 'Used to be that resources had to be within a few minutes of fault location – don't seem to worry about that now – may live 30-45 minutes away and it seems to be acceptable.' (Linesman)

One comment about new fault allocation app on Ipad leading to response delays:

- ✘ 'Terrible since new fault app – that's how they now issue faults to subbies. Gets accessed from office and gets delayed – results in emergency jobs not being put out when they should be.' (Linesman)

Response to major events compromised due to lack of resources

A number of Industry participants commented that response times are slower when there are major events such as storms or hot days due to a lack of resources:

- ✘ 'In peak periods such as 40+ degree days, it is always last minute to find out who can roster on – very reactive.' (Linesman)
- ✘ 'Not for events such as storms or bush fires – don't have resources because contractors have downsized. People often off power for days.' (Linesman)
- ✘ 'Fine for day to day, but get a storm and it falls over – too few feet on the ground to cover it.' (Linesman)

Essential Services Victoria assessment and explanation for sustained outages, December 2015

'The majority of customers experience fewer than 6 sustained interruptions per year, but there is a long tail of customers experiencing significantly more sustained interruptions. The existence of a 'long tail' would indicate that there continue to be areas where it is not economically efficient to reduce the number of sustained interruptions.'

Rectification response times have increased due to lack of resources and budget

Some Industry participants commented that whilst initial response times are relatively good in their area, fault rectification after the initial response time has increased substantially, often because there is a lack of resources or because the employer doesn't want to pay overtime. This can mean customers being without power for a number of days.

- ✘ 'Rectification of the fault has increased. Initial response is okay; will make it safe, but then leave. Doesn't mean the power is back on. Contractors will save money by putting off that work until during the day so they're not paying overtime. Just working with a skeleton crew.' (Linesman)
- ✘ 'Companies fudge the stats – they class response time as when they send first responder out, but single person can't do fix until second person or crew gets out there. So stats show response is in required time; not when problem is fixed.' (Linesman)
- ✘ 'Not enough done to monitor response times and more specifically what gets done within response time. A lot of problems/faults are left for a few days when they could have been rectified during the initial response.' (Linesman)
- ✘ 'The power distribution system is falling apart and overloaded. Causing minutes off supply to escalate and response times to increase. In the past, areas were covered by 2-man first response fault crews who easily made it to priority faults and fires in a timely manner. This is no longer the case. Fault crews can have multiple jobs at once and have to travel up to 100km between jobs. Unfortunately the job loads are causing incidents and customers to have to wait hours and hours for a fault crew to arrive. And where a fault crew in the past may have rectified the issue there and then, they are now just making the site safe and leaving again to attend the next emergency. Leaving the rectification works to be done the next day.' (Linesman)
- ✘ 'It's taking longer to get big faults repaired quickly because we have lost resources and expertise.' (Linesman)

Planned priority maintenance response times have blown out substantially

As discussed in earlier sections of the report, a strong belief exists that response times for planned priority maintenance have increased substantially.

Field workers believe a lot of this work is not being allocated or that it is being re-prioritised and that acceptable response times for this type of maintenance have also extended:

- ✘ 'Work is not being put through, even though we know there is plenty out there.' (Linesman)
- ✘ 'Not allocating work....holding the jobs off, pushing out until the next quarter, until the next budget period. Saving money has taken precedence.' (Asset Inspector)
- ✘ 'Any work that isn't done, the DBs can justify asking for more money to deal with back log.' (Linesman)
- ✘ 'Planned maintenance – now have 365 days to respond; used to be a 180 days maximum. Seeing a lot of things that should have been picked up and fixed as part of planned maintenance and it's not happening. Standards are dropping.' (Linesman)
- ✘ 'P3 stuff, will wait for a year or more to fix. P1s are blowing out all over the place because jobs are difficult and take a long time to fix or resources are not being put on the job.' (Linesman)
- ✘ 'Only allowed to do P1s; not P3 on the same pole

even though we know we'll have to come back to do it.' (Linesman)

Reduced expenditure

There is a belief amongst industry participants that the network is being inadequately funded, in terms of both general maintenance and replacements/ upgrades that impact on the availability of resources and, ultimately, on the reliability of the network. Budget cuts and constraints were seen to underlie a lot of the substandard maintenance practices outlined and field workers think lack of expenditure means the network is not being upgraded and replaced at a rate that will minimise failures:

- ✘ 'Not putting enough money in – lack of funding for maintenance and not replacing equipment. Less resources to do the work because budgets have been cut and staff have been laid off.' (Linesman)
- ✘ 'Not replacing or repairing assets in a timely manner because it's a cost to the business that they're looking to minimise to keep shareholders happy.' (Asset Inspector)
- ✘ 'Saving money is taking precedence over safety.' (Asset Inspector)
- ✘ 'Profits and revenue used to come back in through maintenance of poles and wires, so went back into the assets to get repaired. Now profits go offshore.' (Linesman)

Distributor Profit from Maintenance Under-expenditure

AusNet Services reported the following additional profit of more than \$110 million over 8 years, by reducing operating expenditure by 8%.

Total opex (operating expenditure) from 2006 to 2014 of \$1,373 million was around 8% lower than total allowances of \$1,483 million (real 2015).

AusNet Services also substantially underspent against its approved allowance for capital expenditure on augmentation of the network to meet rising customer and customer demand. The diagram below illustrates the total underspend on network between 2011 – 2015 is estimated by AusNet Services to be a remarkable 58%.

AusNet Services, 2015.

Also, budget and cost issues mean that the industry is not always investing in high quality replacement assets as outlined.

Some industry participants also talked about funding being stopped and started as power companies looked to shift expenditure from quarter to quarter and year to year. This means that the roll out of maintenance/ upgrades can be sporadic and patchy in terms of coverage.

Field workers have experienced reductions in maintenance spending

Many fieldworkers don't necessarily know it, that there is underspending to budget, but they do know there is less being spent on maintenance and that a lot of maintenance practices are aimed at saving costs, which are having a deleterious effect on the condition of assets. They do strongly believe that not enough is being spent to maintain the network:

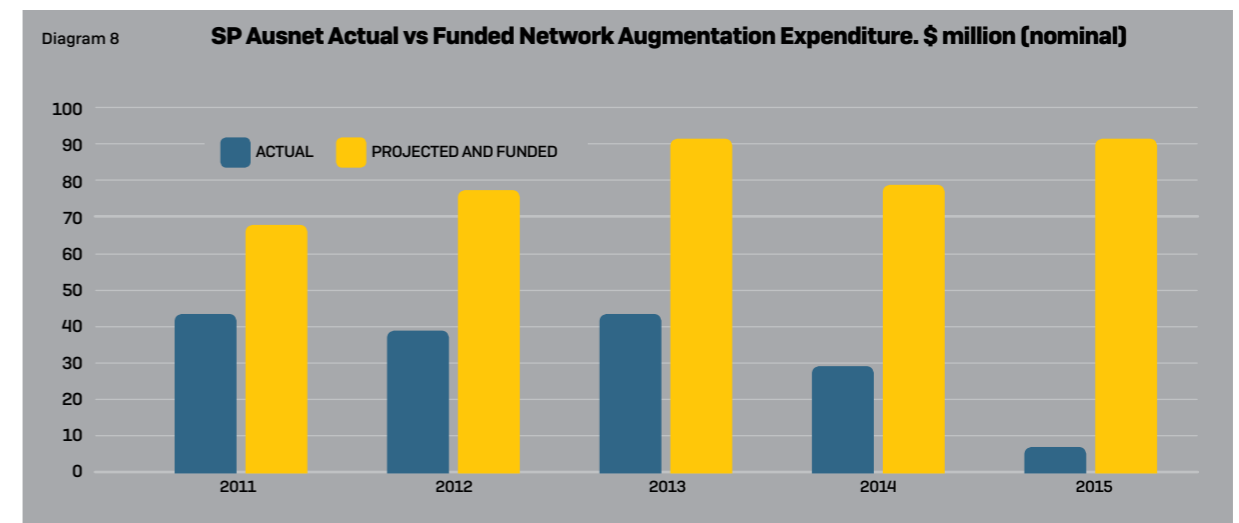
- ✘ 'Definitely spending too little and focusing on patching up the network as it fails rather than on

planned and preventative maintenance which creates inefficiencies and also a more unreliable network, given demand is growing in a lot of areas due to population growth.' (Linesman)

Industry participants have all seen a reduction in maintenance spending. Indeed this was a common theme in discussions around the reasons for increased fires and distribution asset failures, with many of the causal factors attributed to reduced expenditure and a resulting lack of maintenance and sub-optimal maintenance practices.

Industry participants provided a range of examples of reduced expenditure on maintenance that they have experienced in the field. These include a range of examples around:

- ▲ Doing single fixes of one component of an asset rather than fixing multiple problems at the same time
- ▲ Patching up, rather than replacing existing assets
- ▲ A focus on minor ad hoc repairs rather than planned maintenance or preventative measures
- ▲ Not fixing assets until they fail or are on the point of failure
- ▲ De-escalating priorities and putting assets back into service:
- ✘ **Less general maintenance jobs being put out (not getting P2/3 work; it's mainly about managing P1s): 'Work is not being put through.'** (Linesman)
 - ▲ Extended inspection cycle; such that defects are often left unchecked until reported by a linesman or the general public
 - ▲ An increase in asset inspection tolerances e.g. tolerance for structurally sound wood in poles
 - ▲ Using sub-standard equipment as replacements
 - ▲ Line Workers no longer having an input into maintenance decisions (i.e. can only fix what they're told to rather than urgent problems they encounter)





ⓐ Cross arm deteriorated, old Jbox hanging and has no lid, all need replacing but band aid fix to hold cross arm together.

In addition, a number of participants commented that a lot of contractors have made field force redundancies due to the lack of maintenance work being issued by distributors.

Specific examples of reduced maintenance spending included:

- ▲ Poles, cross arms and transformers not being fixed or replaced as required to maintain a safe and reliable network
- ▲ No longer upgrading transformers when change sub-station poles if it is still in service:
- ✘ **'Will keep the same transformer even if it is an obsolete model.'** (Linesman)
- ▲ Pole staking instead of replacement
- ▲ Rotting, condemned poles remaining in service:
- ✘ **'Having to change over a cross arm on a knackered pole, but not allowed to replace it.'** (Linesman)
- ▲ Increased tolerance re structurally sound poles:
- ✘ **'Used to have to be 70mm of good wood for pole to be viable, now its 30mm before will put a cross on it. Means having to climb poles that are unsafe.'** (Linesman)
- ▲ Conductors in poor condition, remaining in service
- ▲ Over-riding Asset Inspector assessments and putting assets back into service
- ▲ Steel conductors rusting and not being changed out.
- ▲ Not doing any re-conducting work at all
- ▲ Less urgency around preparing for bushfire season in past year or two due to reduced budgets:
- ✘ **'There used to be a push to get maintenance finished before the fire season started. The urgency hasn't been there in the past couple of years – don't want to use resources and spend the money.'** (Linesman)
- ▲ We are seeing more equipment failure e.g. underground sections with old cable heads that blow up

- ▲ We seem to see less inspectors on the ground/ inspection cycle has been pushed out so deteriorating assets are not picked up:
- ✘ **'The cycle for inspection of assets has extended, so we are seeing a lot more rotten assets.'** (Linesman)
- ▲ Cables upgraded with sub-standard materials:
- ✘ **'Doing cheap and nasty cabling; single earth return – can cause grass fires.'** (Linesman)
- ▲ Indefinite delays re P3 work/not doing P3 jobs at all
- ▲ Inefficient practices: Often going back to the same pole multiple times to do single fixes rather than replacing a number of elements at the same time:
- ✘ **'Will replace a cross arm, but not the pole even though it's condemned. Adds to costs because have to have a crane to work on condemned poles.'** (Linesman)
- ✘ **'Used to change a whole street. Now do one arm or installation in that street and leave the rest.'** (Linesman)
- ✘ **'Have to drive past P2s and P3s in same street because they are not being done – only doing P1s ... Can switch out the same areas several times on same assets to do different priority jobs on the same pole.'** (Linesman)

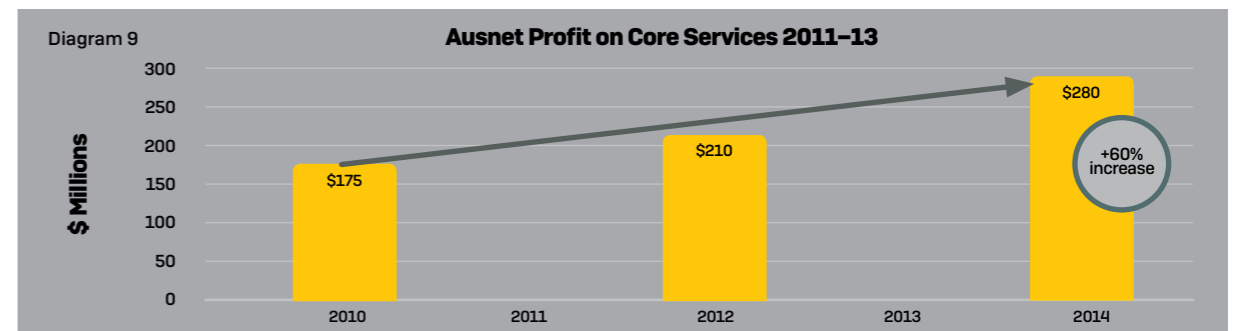
As part of the discussion around reduced maintenance expenditure, a couple of industry participants commented that funds that are spent are not always spent effectively:

- ✘ **'Put a whole heap of dampeners on a line that's been decommissioned and has no power going through it.'** (Linesman)
- ✘ **'Putting dampeners on unused poles, just to tick the boxes that it has been done.'** (Linesman)

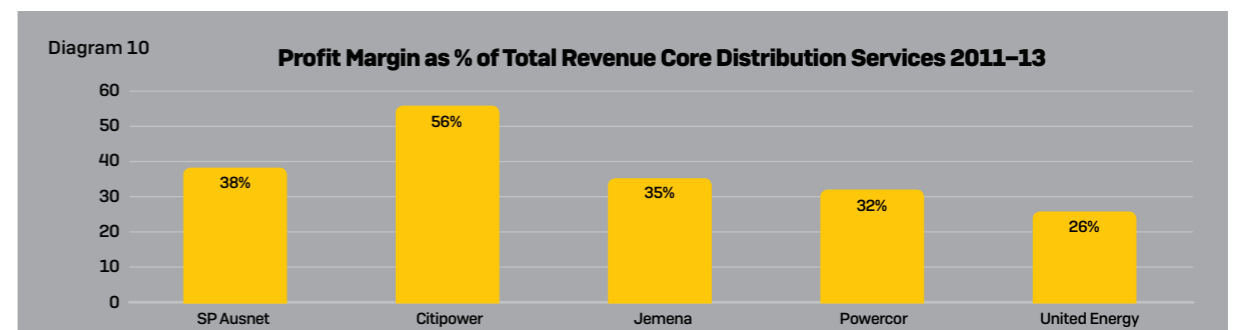
Industry participants perceived that distributors are spending less on maintenance to maximise profits and because they aren't being monitored.



ⓐ Pole in service - completely rotten on ground.



Industry participants' views are supported by evidence with reported profits indicating strong profit margins as a % of total revenue is evident in Victoria. Strong increases in profit are particularly seen through AusNet with a 60% reported increase.



Source: AER Electricity Distributors Comparative Performance Report 2011 – 2013. Published June 2015.

Industry participants were asked why they think distributors are spending less on maintenance. Given the network is seen to require more, rather than less maintenance, the main reason is seen to be DBs maximising profits and their share price:

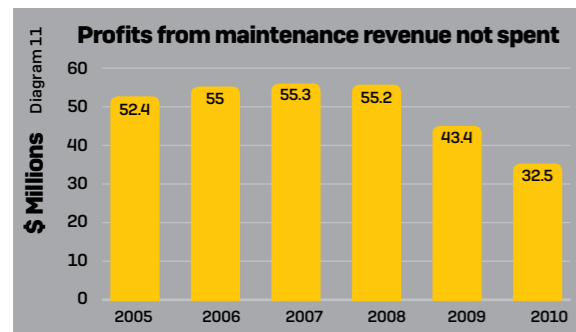
- ✘ 'They don't really care about customers or the state of the asset. It's all about the bottom line.' (Linesman)
- ✘ 'The distribution businesses won't spend money unless they have to, and not being told by anyone that they've got to.' (Linesman)
- ✘ 'The DBs want to keep more of the allocated funds themselves. Rather than investing in the assets, they are running them into the ground.' (Asset Inspector)
- ✘ 'They're answerable to shareholders, not customers. Profits are the priority; see

maintenance as a cost item that they don't get a return on, so spend as little as possible.' (Asset Inspector)

Allowed to set own standards:

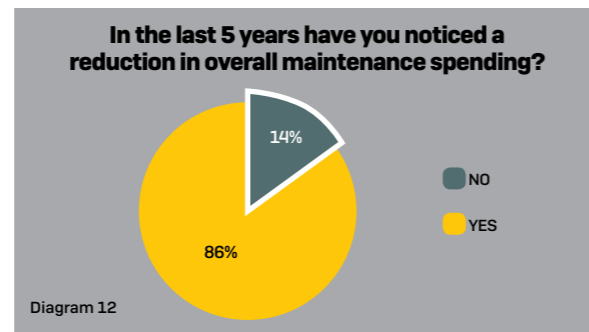
A second factor was raised around distributors being allowed to set and change standards and timelines to reduce maintenance requirements and hence spend less:

- ✘ '10 years ago, there were acceptable standards for maintenance; now it's different.' (Asset Inspector)
- ✘ 'Acceptable limit was 100mm of good wood, now its 30mm before a pole is condemned and then no one is checking that it has been taken out of service.' (Linesman)
- ✘ 'Can change priorities; over-ride Inspector.' (Asset Inspector)



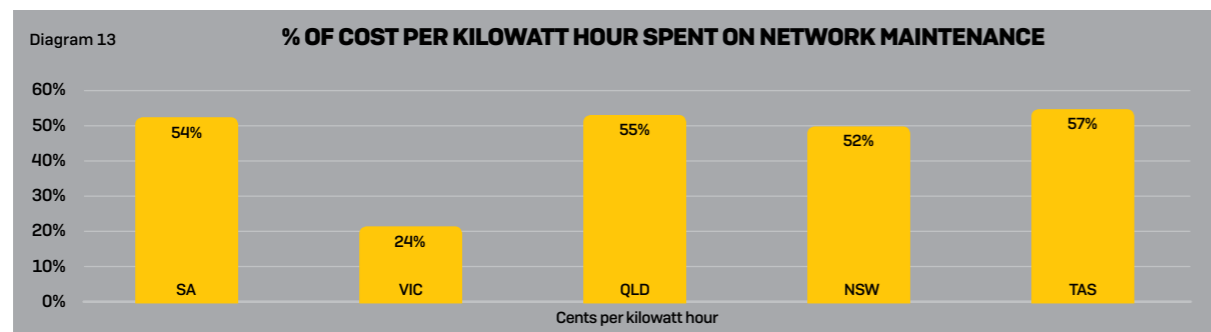
It is reported that distributors are funnelling revenue into profits that consumers pay in their bill for maintenance, rather than spending it on maintenance. In 2010, \$32.5m was not spent on maintenance and funneled into profits (data not available since 2010).

Source: Australian Energy Regulator (AER) Victorian electricity distribution businesses - comparative performance reports - 2009-2010.



86% of powerline maintenance workers and asset inspectors registered with Energy Safe Victoria surveyed in 2015 had noticed a reduction in overall maintenance spending in the last 5 years.

Source: ETU Victoria Member Survey 2015, Sample size n=400 - See Appendix C for results.



When looking at the cost of the network by state and the percentage per kilowatt hour that is spent on network maintenance, Victoria's spending on maintenance is significantly lower than other states, supporting the opinions of industry participants.

Data Sources: Published Retailer Tariffs and Australian Bureau of Statistics (ABS); Australian Social Trends September 2012; Household energy use and costs, Canberra.

Lack of transparency:

Industry participants have a perception that distributors are not open about maintenance practices and can change the standards and can 'fudge' the stats:

- ✘ 'There is lack of transparency of where money is being spent, or that it's being spent in the right areas.' (AI)
- ✘ 'That's the problem with DBs being able to make up the rules. They are telling us what they want us to inspect; what priorities they want allocated. Power companies should be told when it should be inspected and what the priorities should be, rather than making the rules up to suit themselves. We'll get an instruction ... if we find too many of them, within 2 months, we'll get another instruction saying to ignore the last one.' (Asset Inspector)

Lack of monitoring:

A third reason for distributors reducing expenditure relates to a perception that DBs are not sufficiently monitored or audited. Hence, a feeling they are allowed to get away with sub-optimal asset maintenance because the Regulator doesn't understand the true condition of assets:

- ✘ 'The focus is on saving money rather than providing a safe network and they're allowed to police themselves - no independent regulator is checking what they're doing.' (Asset Inspector)

- ✘ 'There should be an independent body auditing, with the power to ensure defects get rectified when they need to.' (Linesman)
- ✘ 'There's nobody to hold DBs to account ... the regulator isn't out in the field to know what's going on.' (Asset Inspector)

Lack of enforcement:

A fourth reason cited relates to a perceived lack of enforcement around maintenance expenditure and standards, which means distributors can spend less on maintenance than is warranted.

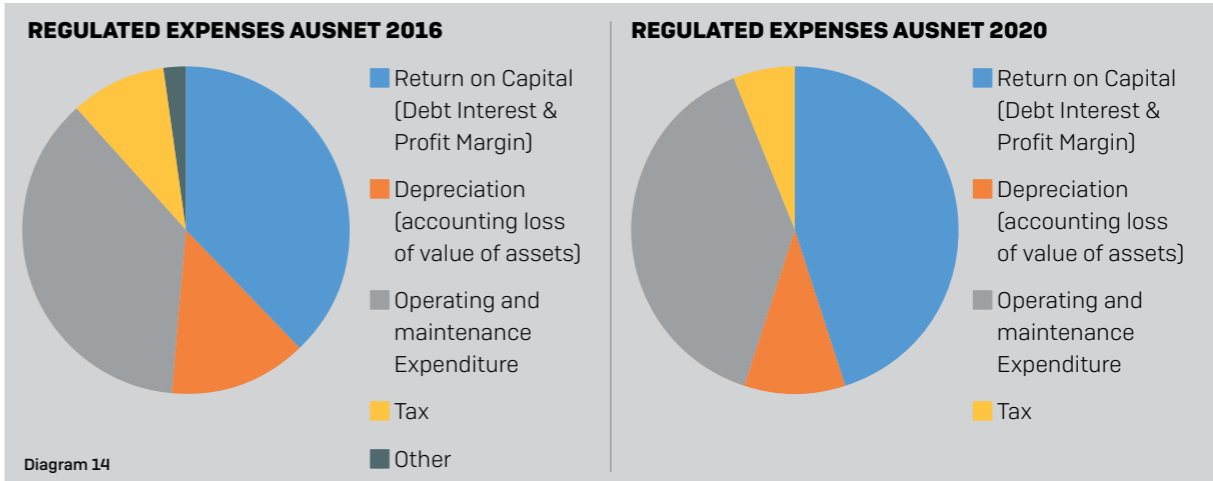
- ✘ 'Lack of effective monitoring and enforcement - auditing is not being done by independent body.' (Asset Inspector)
- ✘ 'They don't seem to worry about penalties around minutes off supply any more - that seems to have been relaxed.' (Linesman)

Operating Expenditure of Distributors

Most consumers are not aware of how little of the revenue that customers pay to distributors is spent on operating and maintenance.

Based on AusNet's current projected costs, expenditure on operating and maintenance is 35%, expected to rise to 39% by 2020. By 2020, however, SP AusNet expects its Return on Capital to rise to 45% of its costs.

In short, Victorians are paying as much, or more, on the interest expense of the debt distributors keep over the assets, than on operating and maintenance expenditure.





IMPACTS

Industry participants have a number of concerns around the impact of reduced maintenance work, expenditure and resources. These include:

General Public Safety

Because of risk of fires due to distribution assets or assets that fail:

- ✘ 'Profit and productivity are being put ahead of human life. The businesses may seem more efficient, but they're not focusing on doing the right things or the right thing by customers and workers.' (Linesman)
- ✘ 'We will see another catastrophic fire and areas being without power on high risk fire days. Losing reliability of supply as well as increasing the risks.' (Linesman)
- ✘ 'Fatalities and injuries to tradesmen and the public will be inevitable as the system becomes extremely unpredictable and run down.' (Linesman)
- ✘ 'Will get more big outages and risk to public safety e.g. conductors dropping on roads.' (Linesman)

Worker Safety

Concerns raised around working on unsafe assets:

- ✘ 'Drilling a hole in a cross arm that needs to be replaced is so much more dangerous ... putting ourselves and our crew at risk.' (Linesman)
- ✘ 'We may be climbing unsafe poles with only 30mm of good wood. We put up with a lot of rot in this state which wouldn't be tolerated in other states.' (Linesman)
- ✘ 'If you're working on one asset and working live, you have to think about what's on either side of you. It's a worry.' (Linesman)

Heatwaves, planned and failure-related outages

Across Australia, heatwaves are responsible for more deaths each year than any other natural disaster. Lower socio-economic groups are particularly vulnerable.

The heatwave that preceded the Black Saturday bushfires killed 374 people - more than double the fires themselves. There was a 46% increase in emergency cases at hospitals across the state.

Direct health impacts include heat stroke, exhaustion, exacerbation of cardiac conditions and respiratory illnesses, falls due to dehydration, and even gastroenteritis as a result of poor food handling.

There is also some evidence of psychological effect: more violent behaviour and an increase in self-harm and suicides during heatwaves.

Environment Victoria, 2015.

Network Reliability

A belief that assets will become less reliable with more outages and lengthier outages:

- ✘ 'Problems will escalate - will get more failures from bottom and top of pole.' (Asset Inspector)
- ✘ 'Assets failing so getting more faults and failures with people off supply for extended periods.' (Linesman).

Employment for Victorians

Reports of recent mass redundancies in the industry may continue given that less maintenance work is being allocated. Contractors are also uncertain about future workflow as budget allocations can be deferred.

There was a consensus view that field staff numbers have been reduced substantially in the past couple of years, with a lack of job security moving forward. In addition, many Industry participants said their employer was not taking on apprentices this year and that apprenticeship numbers had declined significantly in

the past few years. There was a concern that this would lead to a skills shortage down the track.

The cause of redundancies and a lack of investment in apprenticeship training is seen to be due to a range of factors, including:

- ▲ Budget cuts, resulting in less maintenance and replacement work being allocated
- ▲ Lack of certainty re budget allocations, with reports of budgets being held over in a quarter or until the new financial year, making the workload unpredictable and also difficult to plan and utilise resources effectively
- ▲ Contractors having to undercut to win contacts/ DBs not paying a fair price, resulting in contractors cutting expensive staff costs
- ▲ Regulator cutting budgets and/or not allowing distributors to increase pricing. This was raised by a couple of participants
- ▲ Short-term thinking by distributors; focused on short-term fixes rather than a long-term investment in assets and resources
- ▲ A belief that distributors prefer to use cheaper 457 visa workers to reduce costs.

Quotes to illustrate these points appear below:

- ✳ **'There's been a huge reduction in workforce and have had to take forced leave. Wages and machinery are a big cost; have been cuts to budgets. Regulator has cut budget as DBs, now trying to do more with less.'** (Linesman)
- ✳ **'Have been reductions in staff and no new apprentices for the next 3 years.'** (Linesman)
- ✳ **'Massive reduction because of cutting back budgets and cutting back on work. Hardly any apprentices are being put on because contractors can't guarantee work is going to be there to give them a job down the track.'** (Linesman)

- ✳ **'No spending means no maintenance, means no jobs. There's been approximately 500 redundancies in the past 18 months and very minimal apprenticeship intake in 2016.'** (Asset Inspector)
- ✳ **'The industry has remained in the federal 457 visa scheme in spite of the fact that 30% of power industry workers have been made redundant in the past 12 months. Cut backs and a willingness to accept a sub-standard system have also resulted in existing apprentices being made redundant and no apprentices being hired at all for the coming year across the state. All due to essential maintenance being ignored.'** (Linesman)
- ✳ **'Not getting apprentices; not investing and not releasing work. No transparency to contractors so no guarantees of work being there; contractors letting staff go and not training apprentices.'** (Linesman)

Maintenance reports erroneous

'Discussions with CitiPower throughout the five-year period have identified that its reported volumes may not accurately align with works completed.

'CitiPower may have a high number of crossarms in a condition where they may fail; however, the inaccuracies in its records may have led CitiPower to assume works had already been undertaken and its network was safer than it really was.'

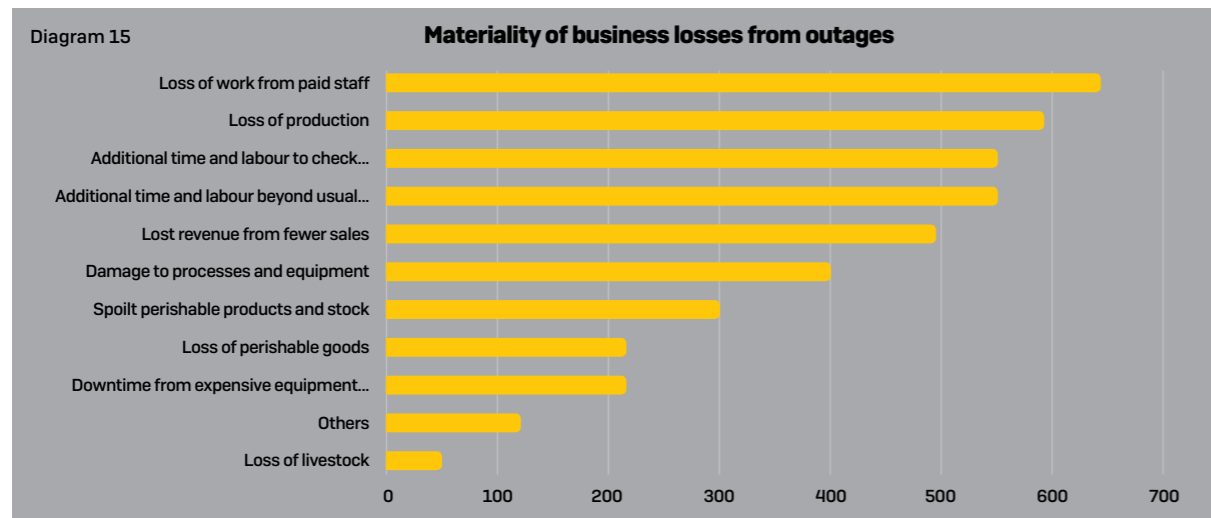
Energy Safe Victoria, 2015

Systemic failures in accurate reporting

'Another failing in the system AusNet Services uses to record activity that is based on the intent rather than the action.'

...the method of reporting used by AusNet Services can result in assets remaining in service when they should have been replaced or upgraded.'

Energy Safe Victoria, 2015.



Asset Condition – Lack of transparency

This was also deemed to be a major issue which impacts the condition of assets. There is a strong feeling amongst field workers that the Regulator and government have no understanding of asset condition or the resources required to maintain the network. There is also a belief that distributors are not transparent about this.

- ✳ **'It's a massive issue – there is nobody holding distributors to account.'** (Asset Inspector)
- ✳ **'A real lack of transparency where money is being spent, how much and whether it's being spent in the right areas.'** (Linesman)
- ✳ **'Think government and Regulator are being lied to by distributors about the condition of assets and resources required to maintain network to an adequate standard.'** (Linesman)
- ✳ **'Very good at getting all the boxes ticked, but there's no substance behind it. The paperwork looks good, but it masks what's really going on.'** (Asset Inspector)
- ✳ **'Regulator/government can't be aware of condition of assets or they would make distributors do more about it.'** (Linesman)
- ✳ **'Lack of transparency is a big issue. A lot of faults are being missed because distributors are not doing preventative work or audits and Regulator seems to be unaware of this.'** (Linesman)
- ✳ **'Power companies know how bad it is [condition of network], but they aren't transparent with government/Regulator about it so they don't have to redress it.'** (Linesman)
- ✳ **'Nobody knows what conditions are really like except people working on assets and they have no say in what gets fixed.'** (Linesman)

Lack of confidence

Industry participants were asked that given government and customers contribute to maintenance expenditure, how we know that the money will be spent on maintenance and how this can be enforced.

Participants believe a key issue is that we don't currently know funds will be spent on maintenance and their experience shows that an adequate amount is not being spent currently and the industry is not being adequately regulated. They foresee this situation is likely to continue:

- ✳ **'The Victorian public don't find out for 2 or 3 years how much of that money has gone into profit rather than maintenance.'** (Asset Inspector)

- ✳ **'Reduce maintenance expenditure towards the end of the (5 year Regulatory price setting) period so the DBs can ask the regulator for more money [because have backlog of work]. Stuff comes out of the schedule until the new period starts, so timelines get pushed out.'** (Linesman)
- ✳ **'Nobody is monitoring resources or thinking about impact of lack of resources.'** (Asset inspector)

There was a strong belief amongst Industry participants that the only way to ensure there is adequate expenditure on maintenance is via independent monitoring of expenditure and maintenance activities and strict enforcement (with significant penalties) for non-compliance. This would be via a well-resourced independent regulator actively involved in determining and auditing maintenance, and with enforcement powers as well as greater government involvement and oversight.

- ✳ **'Need an independent body to oversee spending and outcomes. Can't rely on subcontractors and DBs to be transparent in their reporting and monitoring. They are both motivated to keep costs down as much as possible which isn't in the best interest of assets. Victorians have to rely on people in the industry speaking up right now, and they are frightened to do so, because they are frightened of losing their jobs.'** (Linesman)
- ✳ **'Regulator has to take more responsibility. Otherwise a lot of the maintenance budget will go into profits and distributors will only fix problems as or after they occur.'** (Linesman)
- ✳ **'We need spending to be independently controlled.'** (Linesman)
- ✳ **'The State government has to step in – understand the situation and do something about it: Should oversee where funds go; make DBs accountable and check that work has been done and to standard, rather than last minute quick fixes. It's crazy they get millions and there is no real oversight of how it's spent.'** (Asset Inspector)
- ✳ **'Need an independent body that regulates maintenance and standards in the industry. The money will go elsewhere unless an independent and well-resourced regulator is appointed. Ensuring money is allocated to maintenance is utilised and minimum maintenance levels adhered to, will go a long way to rectifying the problem.'** (Asset Inspector)
- ✳ **'Asset inspectors should be completely independent of DBs – currently DBs are telling them what to inspect. Inspectors should report back to regulator.'** (Asset Inspector)

IMPACTS

- ✘ 'Currently power companies tell the Regulator what they need, with lack of oversight. They can cook the books and put the money into profit. Distributors aren't being held accountable if assets fail; so need more accountability with big fines.' (Linesman)
- ✘ 'Need auditing by people who know what they are looking at to ensure what they tell you is correct. Management have 'fudge figures' to satisfy the person above them for as long as I've been here. I've watched presentations from management telling us what a great job we're doing, and I've said: You've got to be kidding me if you think that's good. Someone's lying to someone!' (Linesman)
- ✘ 'Should enforce a schedule of deadlines for replacements/upgrades of assets.' (Linesman)
- ✘ 'Has to be regulation with teeth.' (Asset Inspector)

Why distributors are not doing more to improve the situation for customers

Given complaints to the Ombudsman have increased, and retail electricity prices have increased significantly in Victoria, participants were asked why they thought distributors are not doing more to improve the situation for customers. Key reasons put forward by Industry participants echo a lot of those given in earlier discussions around fire risk, failures and the reason for complaints and include:

- ▲ Power companies are profit focused rather than customer focused, so more interested in minimising maintenance/resource costs than on running a reliable network
- ▲ Lack of transparency – a belief that DBs can mask the true condition of assets and hence are able to spend less than required on maintenance and network upgrades:
- ✘ 'Can blame it on ageing infrastructure rather than lack of adequate maintenance.' (Linesman)
- ▲ Power companies allowed to set rules/standards (which are more about cost minimisation than a safe and reliable network).
- ✘ 'Profits come before anything else and the industry is self-regulated.' (Asset Inspector)
- ▲ Lack of accountability and oversight, so problems are not being identified:
- ✘ 'Don't want to know about problems because don't want to go to expense of fixing them. Not accountable - only tip of iceberg reported re complaints.' (Linesman)

- ✘ 'No one is holding them to account. Don't have to justify themselves, can create the rules and standards that suit them to maximise profits and minimise maintenance or upgrade spends. Need bigger crews to cover areas – should ensure an adequate number per area and it doesn't happen.' (Linesman)
- ✘ 'Regulator should force distributors to spend adequate money on assets and it isn't happening.' (Asset Inspector)
- ▲ Lack of enforcement and penalties – power companies allowed to get away with offering poor service, so no incentive to improve the situation for customers:
- ✘ 'They are not being penalised for increasing complaints.' (Asset Inspector)
- ✘ 'Ombudsman is toothless; no one is checking on network. Did used to have minutes off supply as a measure, but don't seem to worry about that anymore. DBs can get away with doing the bare minimum because they are not being held to account.' (Linesman)
- ✘ 'Financial penalties don't seem to apply, so can get away with it.' (Linesman)
- ✘ 'No penalties if they mess up. So they think about the bottom line rather than customers and there's no incentive to invest in assets and keep them well maintained. No incentive to be proactive, just react to failures as they occur and patch them up and they're allowed to get away with it, so why would they behave any differently?' (Linesman)

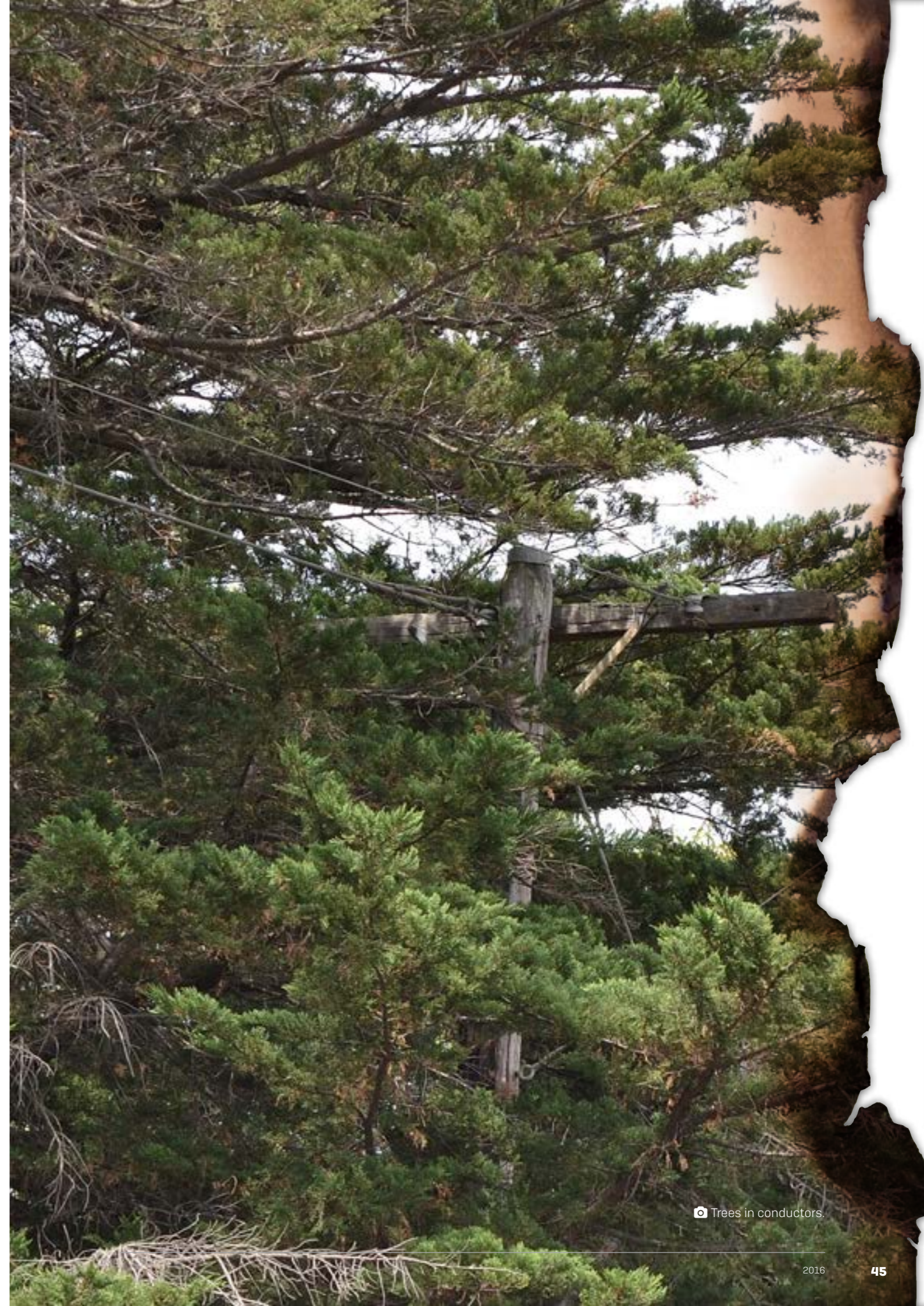
Victorian Essential Services Commission

The consequences of imposed blackouts raise a problem that has received little consideration.

During days of extreme bushfire danger, the associated high temperature presents a substantial public health risk.

Heatwaves are a significant cause of death and with climate change it is predicted that this rate will rise sharply. People affected by severe heat stress during power outages could possibly follow prolonged blackouts designed to avoid bushfires. Without care, a difficult situation could spiral out of control.

Professor David Bowman. Environmental Change Biology, University of Tasmania.



📷 Trees in conductors.

RECOMMENDATIONS

Industry members were asked what they would like to see from the State Government and regulators to improve the situation with regard to Victoria's power assets.

A number of common themes emerged around remedial measures to strengthen the reliability and safety of Victoria's assets and to improve supply to customers. These included:

1. State Independent Technical Regulator - the role of a State Independent Technical Regular should be reviewed to ensure that a quality framework is implemented, regulated and audited.
2. Legislating qualifications and licensing for power industry maintenance and asset inspection occupations – this issue was raised consistently by industry participants who see it as vital to ensure well-trained and qualified asset workers are responsible for maintaining the poles and wires, which ensures that quality practices and work is carried out consistently in Victoria.
3. Establishment of a permanent and ongoing high level committee representing a cross section of industry stakeholders to provide an ongoing transparent voice of the industry. The establishment of such a committee formed with representatives of the workforce, distributors and safety regulators would be beneficial to ensuring the industry remains focused on providing a reliable, safe network and remains accountable.

Strong support for a Government inquiry into the Sector

This was described as: A Government inquiry into the Sector to investigate the extent of the problem, adequacy of resources to maintain the network and the cost/risk of failing to act.

Industry participants believe the Victorian government does not currently understand the current situation with regard to Victoria's power assets and the extent of the problem. An Inquiry offers the potential to increase awareness amongst the general community and is seen as an important first step and foundation for change:

- ✦ 'Great idea – government has to know what is going on, and clearly doesn't right now, given current practices and state of network.' [Linesman]
- ✦ 'Good first step – pretty sure government and regulator have no idea of extent of problem.' [Linesman]
- ✦ 'Very useful – a way to expose current bad practices. Distribution businesses govern themselves currently and write their own rule book. No one is doing enforcement.' [Asset Inspector]
- ✦ 'Would raise awareness in the community of the extent of problem and what is happening. People have no idea; paying more for a less reliable service. People would be outraged if they understood how the network is being run down.' [Linesman]
- ✦ 'Would be a great start – would learn a lot and expose a lot of poor practices which might result in change.' [Asset Inspector]

A few industry participants are a little cynical about government inquiries. It is important that they are not 'talkfests' that don't go anywhere and/or are only undertaken to be seen as doing something about an issue (with little intention of then taking action).

More effective and efficient maintenance practices and quality assurance

As discussed, a number of industry members believe current maintenance practices are inefficient as they often work on the same asset or adjourning assets multiple times doing urgent patch ups, rather than taking a more planned approach in maintaining and upgrading infrastructure. This means a lot of time is wasted travelling between small jobs.

Also, industry participants reported that maintenance budgets are often cut/held over, which makes effective resourcing difficult, as anticipated work may disappear and contractors don't know if it will be reinstated.

More efficient practices would occur if standards are set independently; maintenance activity becomes more transparent and power companies are made more accountable for the type of maintenance work they do. Again, this relates to the role and responsibilities of an independent body.

- ✦ 'There needs to be an independent regulator who understands what is going on, based here in Victoria, who can enforce standards and good maintenance practices and ensure the network is adequately resourced and maintained and that it's done efficiently.' [Linesman]
- ✦ 'Better workload management is needed so contractors can resource more effectively. It's too volatile now – jobs get pulled so may have little work in a quarter and then a heap more the following quarter.' [Linesman]

A need to audit and enforce

To ensure that the right type of maintenance/upgrades take place in the right areas in the right timeframe with penalties for non-compliance sufficient to encourage power companies to 'do the right thing'. Also as discussed, there is a belief that this should be part of the role of an independent State-based regulator.

- ✦ 'Full independent audits of all aspects of the industry.' [Asset Inspector]
- ✦ 'Audit age and condition of assets.' [Linesman]
- ✦ 'Penalties for failures have to be large enough to hurt so companies do the right thing and put money into assets.' [Asset Inspector]
- ✦ 'Asset Inspectors must be independent of distributors – shouldn't be allowed to do own inspections or gauge quality of asset – has to be independent.' [Linesman]
- ✦ 'Shouldn't allow people to be off supply for 3 days – need to enforce minutes off supply with big penalties if they exceed the limit.' [Asset Inspector]

Consider the appointment of an independent State-based regulator

It was raised that there is a need for an independent and well-resourced State-based regulator, run by the Victorian government, that can set standards and expenditure requirements (and ensure budgets are spent appropriately), monitor and audit and enforce/apply penalties for non-compliance.

- ✦ 'Need to set the standards and have asset inspectors who are independent – report to the regulator.' [Asset Inspector]

- ✦ 'Ensure that a standard percentage of revenue is put into maintenance – it's about 7% in Victoria and much higher in other states. In Queensland where it's government run, 40% of your bill goes on maintenance. Shows how inadequate the funding is here.' [Linesman]
- ✦ 'Power companies should be told when it should be inspected; maintained and what the priorities should be. Not the DBs making the rules up to suit themselves.' [Linesman]
- ✦ 'Needs to be untouchable and to mandate DBs put X amount back into maintenance.' [Asset Inspector]
- ✦ 'Has to be regulation with teeth' (i.e. able to enforce and penalise). [Asset Inspector]

Legislating qualifications and licensing power industry workers

This was described as: Legislating required qualifications and standards and licensing of maintenance workers and asset inspectors.

This was raised spontaneously by many industry participants who see it as vital for reasons that have already been discussed. The following quotes illustrate some of the key points made:

- ✦ 'Essential – every other trade is licensed and this is a high risk industry. It would increase safety across the State, for workers and for the public. Would know that everyone working on the network is up to Australian standards.' [Linesman]
- ✦ 'Definitely agree linesmen should be licensed. Electricians have to be and linesmen are working with thousands of volts of electricity running into households. Licensing means they can be regulated and held accountable. Also would limit companies bringing in cheaper workers from overseas who just have to do a basic induction course to start work even though their training is to completely different standards. Work is high risk for workers and potentially also for the community if mistakes are made.' [Linesman]
- ✦ 'Licensing would make tradesmen and businesses accountable for their work standards and practices. Licensing would reduce injuries and fatalities. Would ensure that consumers and the public are kept safe and that once again, faith can be restored in the system.' [Asset Inspector]

Given the power industry is a high-risk industry, and given other trades are licensed, industry participants perceive a strong need to license and regulate qualifications to ensure adequate skills and training of workers:

- ✦ 'We would all prefer to be licensed. It's in the interests of safety to the public and for workers, Plumbers and electricians have to be licensed ... Linesmen don't have to or other power workers even

though we work with high voltages. Don't have to work to certain standards; don't have to have certain level of qualifications. Didn't used to matter when it was all the SEC, but now have individual companies, there is no way to keep tabs on who is who and where, and no set of standards have to confirm to or get to maintain a licence. Working with up to 33,000 volts of electricity unlicensed. If there is an incident on-site it could cause pole fire to start, fatalities at houses; traffic accidents, etc. A licence would make worker accountable for what they are doing as well as the business.' (Asset Inspector)

- ✘ 'Ensure skills are upgraded and maintained. It's hard to get extra training because contractors don't want to take field staff offline. Don't have electrical inspectors so linesmen have to do the testing, but not trained or qualified to work above 100 amps – need a specialised qualification.' (Linesman)

There was criticism of 457 visa workers who were described as often having poor English and math skills, being unfamiliar with Australian electricity infrastructure and who have only undertaken a 2-year apprenticeship (rather than Australians' 4 years):

- ✘ 'Companies not spending money on training apprentices – cheaper to go overseas and bring in 457 visa holders; not regulated and they are not trained to our standards. Their skill level isn't adequate ... workmanship is feeble. Why would you have people not adequately trained and skilled in such a high-risk industry?' (Linesman)
- ✘ 'No longer a skills shortage given all the redundancies in the industry. Need to re-look at the visa workers and change this. There are unskilled people which puts safety at risk.' (Linesman)

In addition, some called for regulation to ensure there is investment in apprentices and the next generation of skilled workers. As reported, industry participants say that very few apprentices are being taken on currently.

Also, a couple of industry participants see a need for regulation around minimum crews/resources required to cover areas to ensure adequate coverage:

- ✘ 'Should order minimum crews and resources to cover an area. Need to ensure adequate numbers which isn't happening. We are always a crew member short and don't have the resources when major weather events hit. Should mandate minimums so all contractors have level playing field during tenders.' (Linesman)

Energy Safe Victoria

There is a feeling amongst industry participants that Energy Safe Victoria is not being as effective as it could be:

- ✘ 'ESV is useless – no enforcement happens. ESV can audit work carried out, but there is no enforcement or ramifications if problems aren't fixed.' (Linesman)
- ✘ 'ESV doesn't understand the industry or how it works.' (Linesman)
- ✘ 'ESV perceived to be a toothless tiger. The Victorian Electrical Supply Industry (VESI) tell ESV to jump, and they say: how high? An independent non-biased regulator is required.' (Linesman)
- ✘ 'They're a joke. Not serious about anything. Never see them in field. Zero credibility.' (Linesman)

A reasonable proportion think ESV could, or should, take a more active role around auditing and enforcement (although others remain cynical about whether it can adapt sufficiently to be effective in this role):

- ✘ 'ESV should be working with DBs and stakeholders rather than just taking on a policing role. ESV should look at the big picture re auditing and enforcement which it doesn't do right now.' (Linesman)
- ✘ 'ESV should be doing this – not doing it effectively now.' (Asset Inspector)
- ✘ 'Never see ESV on a job, they should have a bigger input, but would need a major overhaul.' (Linesman)
- ✘ 'ESV not that effective currently. Would be good if they could be more effective. They need to be more transparent and don't seem to have any powers to enforce.' (Linesman)
- ✘ 'They are hopeless. I've reported stuff to them and if no one was killed, they don't want to hear about it, so what's the point of them being there? They are a toothless tiger – keep them out of this because nothing will happen.' (Linesman)
- ✘ 'ESV should be disbanded rather than overhauled.' (Asset Inspector)

Establishment of a permanent ongoing high level 'committee'

This was described as: Establishment of a permanent ongoing high level 'committee' of representatives of all industry stakeholders – consumers, workforce, distributors, safety Regulators – to monitor developments in the industry and advise government on policy. This is also seen as a good idea as, unlike a government inquiry which would have an end date, it would provide a continuous 'finger on the pulse' with regard to what is happening with Victoria's power assets as well as being an ongoing conduit into government to ensure that the Victorian government 'stays in the loop' and remains informed of developments. This should

help ensure the industry remains focused on providing a reliable network and remains accountable.

Industry stakeholders also welcome the idea of the involvement of multiple stakeholders that each have different perspectives on the industry. The inclusion of the workforce is particularly welcome as industry participants feel they do not currently have a voice when it comes to influencing maintenance decisions or helping to inform Government about the state of Victoria's power assets:

- ✘ 'Would be great – need that input and feedback from different people involved in the industry, including the workforce. Later has no say currently even though we are closer to what is going on and a lot are afraid to speak out because scared of losing their jobs or a contract.' (Linesman)
- ✘ 'Need ongoing finger on the pulse so things don't fall back into bad old ways.' (Asset Inspector)

- ✘ 'Good idea – right now it's the DBs running the show – have to be held to account and scrutinized and this could do that.' (Asset Inspector)
- ✘ 'Beneficial – need greater inclusion of all stakeholders, including those at the coal face – workers and customers. Understand where the industry is and where it's going. Have the ear of government, who doesn't know what is going on right now.' (Linesman)
- ✘ 'All stakeholders in the industry should be brought together to ensure the lessons learnt from the decimation of what were once reliable and safe Australian-owned assets are not forgotten and this is not allowed to happen again. Continual improvement and reliability is an obligation that needs to be maintained.' (Linesman)

Black Saturday Royal Commission – Summary

Victoria's electricity assets are ageing, and the age of the assets contributed to three of the electricity-caused fires on 7 February 2009 which took 119 of the 173 lives lost – the Kilmore East, Coleraine and Horsham fires.

▲ **Origin and cause – Kilmore East Fire** p 75

The Kilmore East fire started after a conductor between poles failed and the live conductor came into contact with a cable stay supporting pole. This contact caused arcing that ignited vegetation near the base of the pole.

The conductor was probably 43 years old.

A line inspection carried out in February 2008 had failed to identify the incorrectly seated helical fitting that contributed to conductor failure.

▲ **Origin and cause – Coleraine Fire** p 111

The Coleraine fire started after the tie wire that held the conductor in place on the top of pole 3 broke, allowing the conductor to fall from the pole.

The tie wire could have been the original, installed in 1961 or 1962. It appears to have broken as a result of fatigue and corrosion and had already had one break in it before 7 February.

That break probably occurred after Powercor, the operator of the line, had last inspected the line, in September 2004.

▲ **Origin and cause – Horsham Fire** p 99

The Horsham fire was caused by a single-earth return electricity line constructed in 1963 or 1964, when the first of the three coach screws that held the pole cap in place on top of a pole came out.

The fire was started by a conductor that fell when the remaining two coach screws came loose as a result of wind-induced vibration enabling the pole cap to become detached

The failure of the pole cap to secure the conductor on the pole might have been avoided had there been a shorter inspection cycle: The pole had not been inspected for about four-and-a-half years.

Black Saturday Royal Commission Final Report 2009.

Source: www.royalcommission.vic.gov.au/Finaldocuments/volume-1/PF/VBRC_Vol1_Chapter06_PF.pdf

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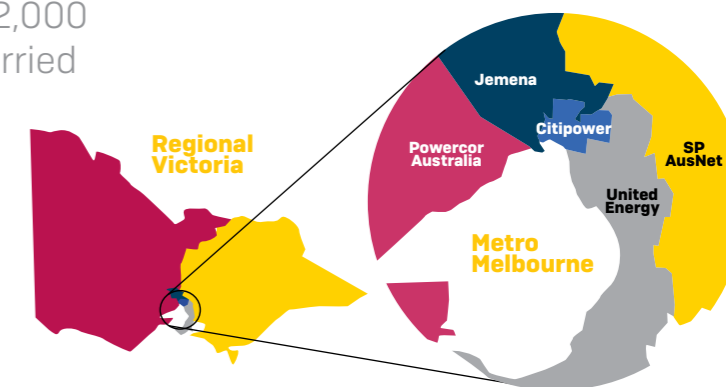
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APPENDIX A

VICTORIAN DISTRIBUTION BUSINESSES

The distribution businesses own and maintain more than 142,000 kilometres of power lines carried on 1,253,680 poles.



AER, STATE OF THE ENERGY MARKET 2015

Distribution Business	Customer Numbers	Line Length Km	Asset Value	Majority Ownership
Powercor	765,241	74,181	\$3.1 billion	Cheung Kong Infrastructure/Power Assets 51% & Spark Infrastructure 49%
AusNet Services Formerly SP Ausnet	685,194	44,842	\$3.1 billion	Singapore Power 31% China State Grid Corporation 20%
Citipower	325,917	4,481	\$1.9 billion	Cheung Kong Infrastructure/Power Assets 51% Spark Infrastructure 49%
United Energy	658,453	12,842	\$1.7 billion	Duet Group 66% & Jemena 34%
Jemena	318,429	6,161	\$1.1 billion	Singapore Power 60% China State Grid Corporation 40%

Four of the five distribution businesses in Victoria are majority owned by foreign entities.

- ▲ AusNet Services & Jemena are 51% owned by governments entities of Singapore and China.
- ▲ Citipower and Powercor are majority owned by the Hong Kong listed energy conglomerate CKI and billionaire Li Ka-shing.
- ▲ United Energy is majority listed on the the Australian Stock Exchange with only 34% owned by Singapore and China government' owned entities.

Distribution Maintenance Contractors Ownership

The Chinese and Singapore government-owned entities also own the major electrical contractors which supply the industry with maintenance and asset inspection services:

- ▲ Zinfra – State Grid International Development 60% and Singapore Power International 40%
- ▲ ZNX – State Grid International Development 60% and Singapore Power International, 40% - contracts to United Energy
- ▲ Select Solutions – 51% owned by government entities of of Singapore and China.

APPENDIX B

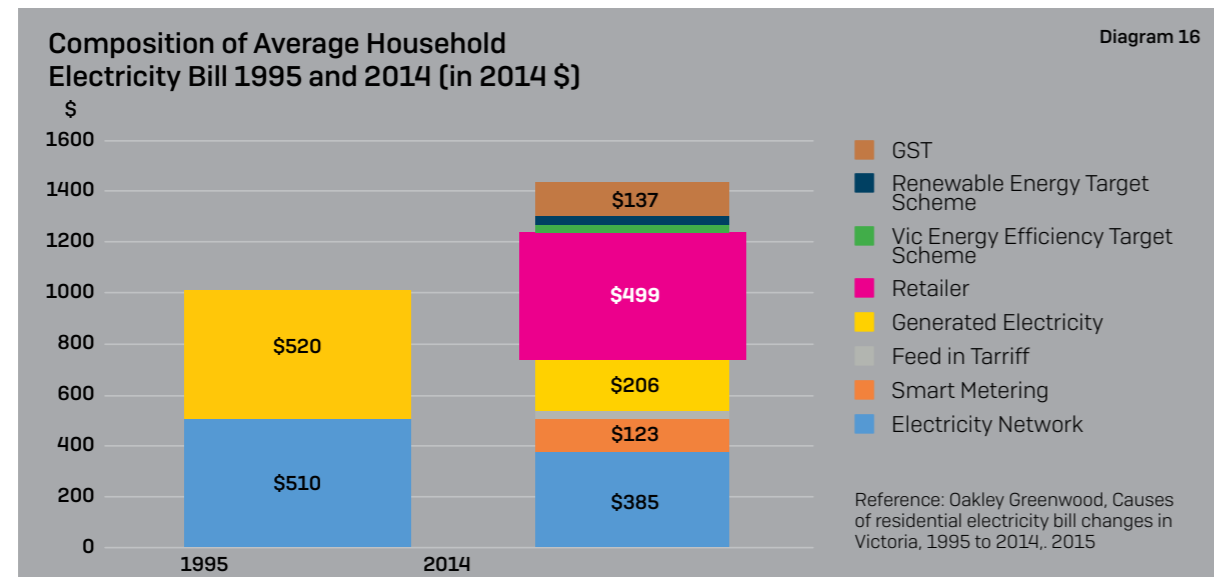
WHERE DOES A HOUSEHOLD'S ELECTRICITY BILL MONEY GO?

In 2009 Victoria removed any cap on the electricity retail prices companies can charge customers

Analysis by Carbon and Energy Markets in 2015 showed there has been a massive jump in electricity bills in Victoria, with retailers charging more than triple what they were six years ago.

Prior to the introduction of 'market regulation reforms' of the electricity sector in Victoria, the retail function of profiting from buying wholesale and selling retail did not exist.

Retail costs have gone from 0% of bill in 1995 to 40% or around \$499 a year.



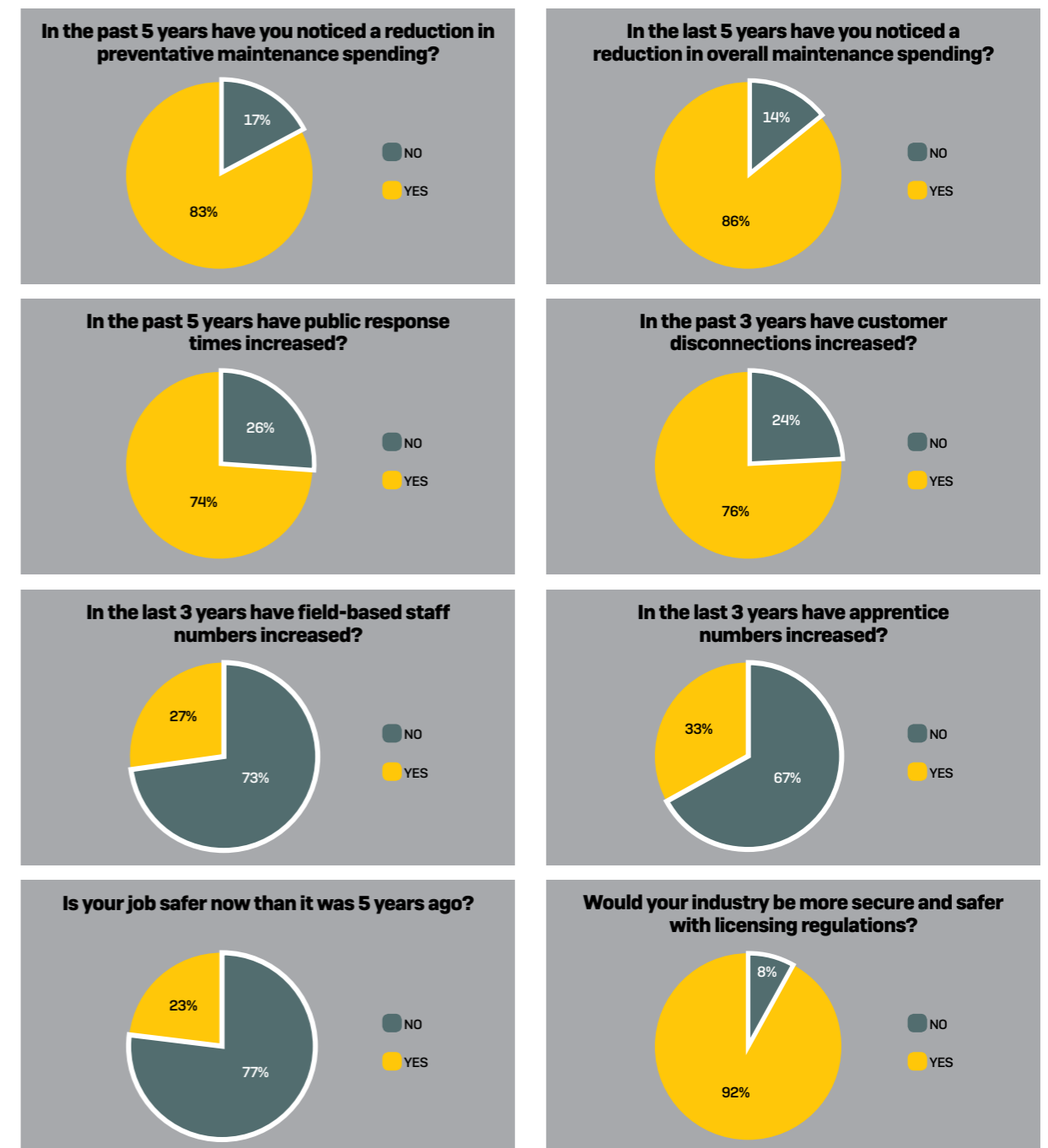
Retail price regulation remains a state government responsibility.

APPENDIX C

The Electrical Trades Union, Victorian Branch mailed a survey with the following questions to members who are registered Linesmen or Asset Inspectors currently employed in Victoria in the final quarter of 2015.

The identities of the 400 survey respondents were anonymous, due to concerns about workers being 'blacklisted' from future employment in the sector in Victoria for raising or responding to issues about the condition of the assets and public safety concerns.

It is notable that some of the variations in responses reflect the variability in some localised practices by distributors and/or contractors.



GLOSSARY

Armor Rod: An outer metal layer applied to a cable for mechanical protection.

Conductor: A wire or wires that conduct electricity, usually copper or aluminium.

Cross Arm: An arm or bracket which crosses a pole: used on poles to carry wires and equipment to keep them separated.

Distribution Business (DB): One of the 5 businesses established by 'regulatory separation and privatisation of grid of the former State Electricity Commission of Victoria (SEC). See Appendix A

Distribution Network: The total length of Victoria's electricity distribution lines is around 200,000 km.

Grid: Generic term that refers to the interconnected system of wires and other equipment that moves electricity from generators to consumers. Also called the network or 'poles and wires'.

High Voltage or HV – A nominal voltage exceeding 1000 volts AC or exceeding 1500 volts DC on the distribution or transmission grids.

Insulator: A device that is used to electrically isolate a conductor or electrical device from ground or a different electrical potential.

Line: Refers to the conductor in an overhead or underground distribution or transmission line.

Low voltage or LV – Nominal voltage exceeding 50V AC or 120V DC but not exceeding 1000 V AC or 1500 V DC

Load shedding: is the deliberate shutdown of electric power in a part or parts of a distribution network, generally to prevent the failure of the entire system when the demand strains the capacity of the system.

P1 Priority 1: Classification of time within which faults and failures need to be rectified 'immediately' ie. within 24 hours.*

P2 Priority 2: Classification of time within which faults need to be rectified 'in the near future' to address an identified fault becoming a failure ie. within 3–6 months.*

P3 Priority 3: Classification of time within which faults need to be rectified to prevent an identified fault becoming a failure 6 months – 2 years.*

* Approximate time periods, subject to variations by individual distributors.

Power line: is a structure used in electric power transmission and distribution to transmit electrical energy along large distances. It consists of one or more conductors (commonly multiples of three) suspended by towers or poles.

Transmission network: Very high voltage (> 66kV) network of power lines that link generators to the lower voltage distribution network. Regulated by the AEMO

Transformer: An electro-magnetic device used to change the voltage in an alternating current electrical circuit.

Tie Wire: A wire device that connects a conductor to an insulator.

Wire: A strand or group of strands of electrically conductive material, normally copper or aluminium.

Vibration Dampers: Attachment to conductors to reduce fatigue from wind induced vibration.

ACRONYMS

AEMC Australian Energy Markets Commission

AEMO Australian Energy Market Operator

AER Australian Energy Regulator

DB Distribution Business

CFA Country Fire Authority

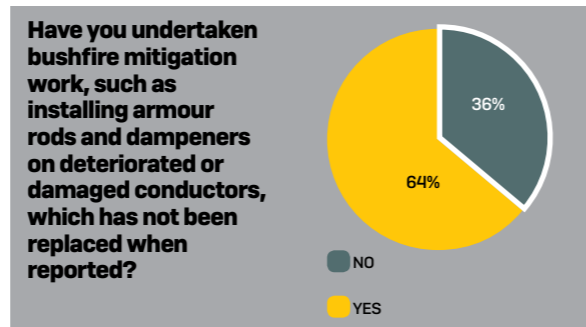
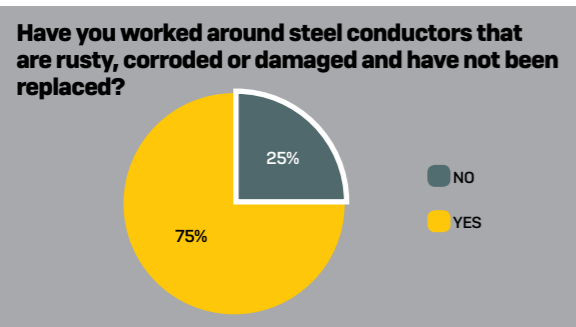
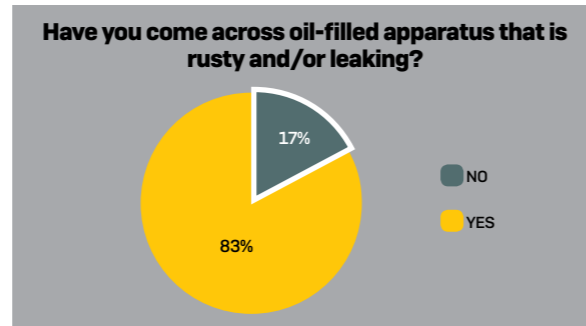
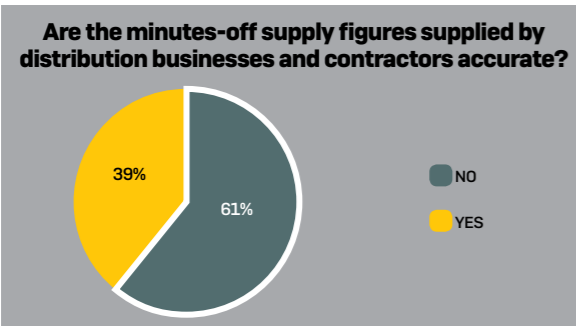
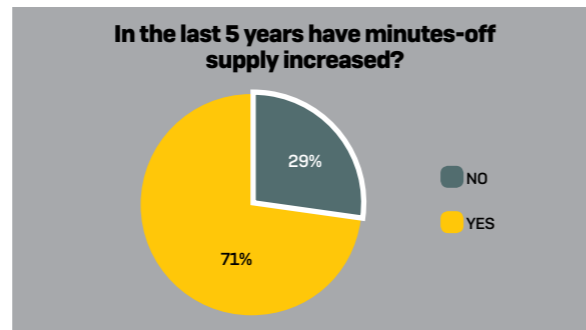
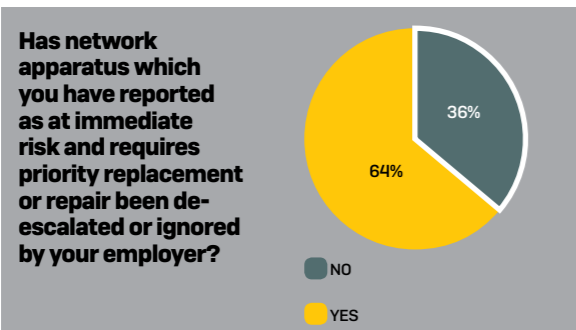
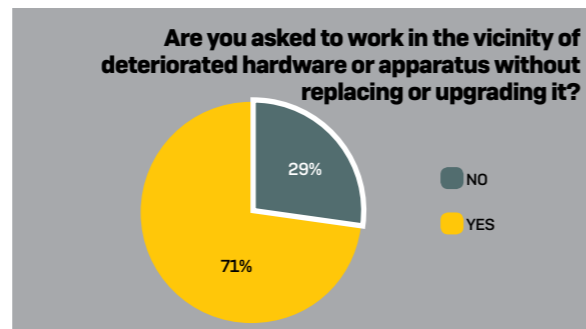
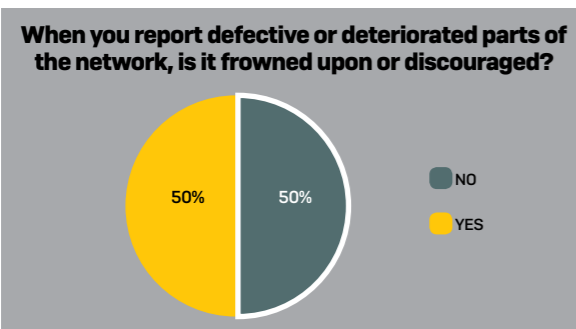
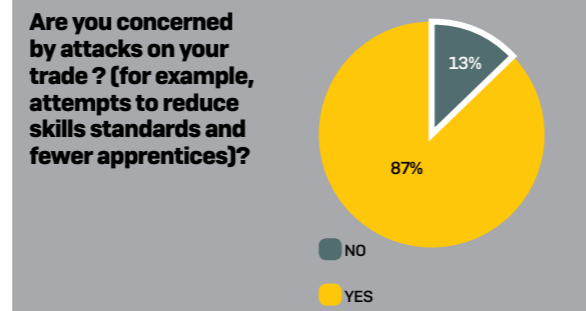
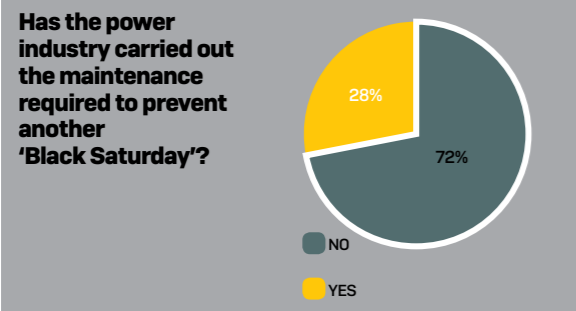
ESC Essential Services Commission (of Victoria)

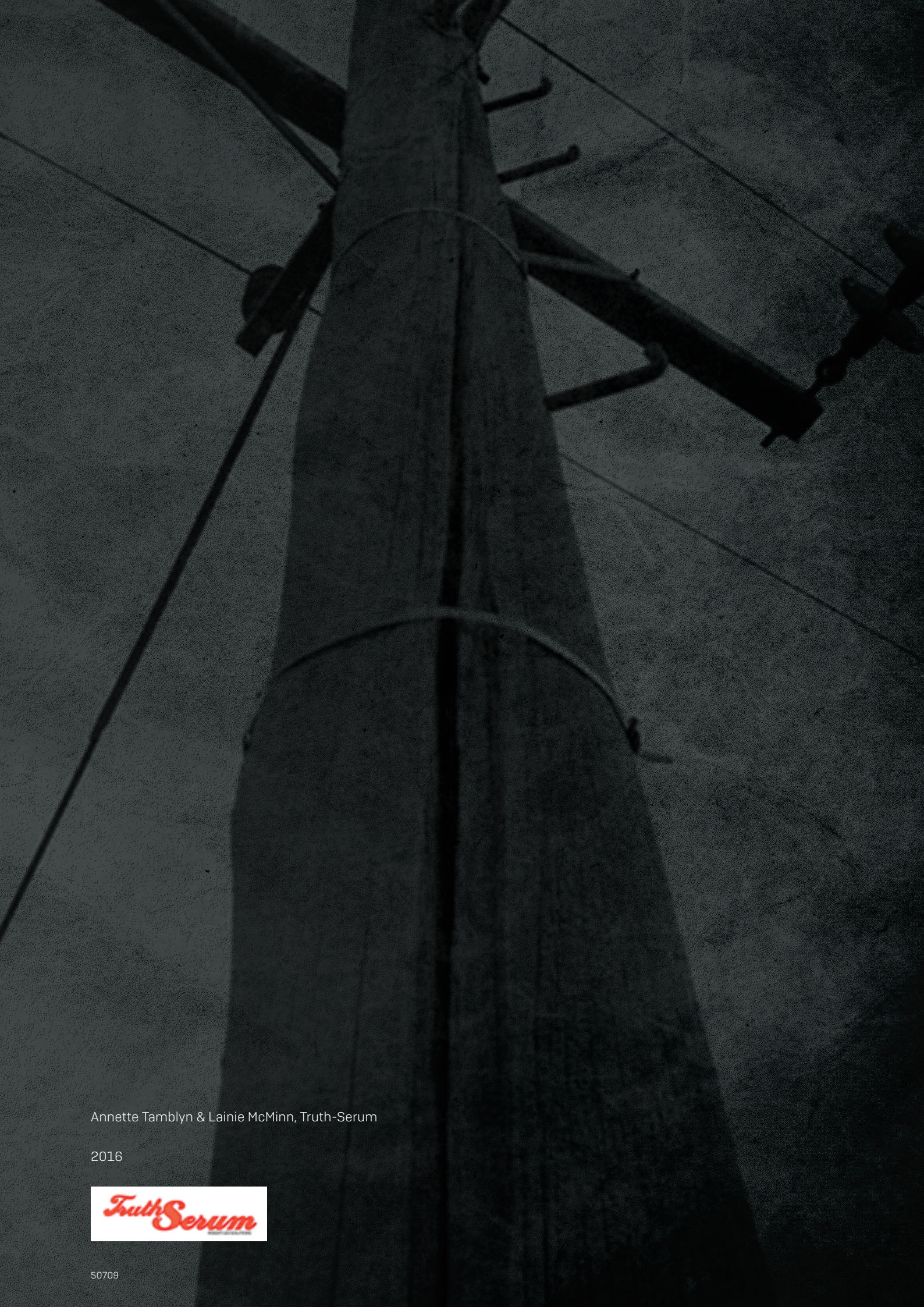
ESV Energy Safe Victoria

LIVE *Energised* or subject to hazardous induced or capacitive voltages

SEC State Electricity Commission of Victoria

VESI Victorian Electrical Supply Industry
Victorian Distribution Businesses Industry
Association





Annette Tamblyn & Lainie McMinn, Truth-Serum

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