Safety Performance Report
on
Victorian Electricity Distribution
and
Transmission Businesses

2012

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PREFACE

Energy Safe Victoria (ESV) is the independent technical regulator responsible for electricity, gas and pipeline safety in Victoria. ESV oversees the statutory regime that requires Major Electricity Companies (MECs) to submit an Electricity Safety Management Scheme (ESMS) to ESV for review every five years, submit Bushfire Mitigation Plans (BMPs) and Electric Line Clearance Management Plans (ELCMPs) to ESV for review each year and to actively participate in ESV audits to confirm compliance with their safety systems. ESV also provides comment and input on the MECs' safety programs included in their periodic price and revenue proposals submitted to the Australian Economic Regulator (AER).

The primary responsibility for ensuring network safety rests with the MECs. ESV holds the MECs accountable for complying with the ESMS and, in recent years, has recruited experienced staff to comprehensively monitor, analyse and report on MEC safety performance. ESV applied significant effort to acquire the relevant data, including the use of specifically targeted audits, informed by trends and other risk-based assessments to enable an informed view on the MECs' safety performance to be made.

This report provides objective evidence of the efficacy of initiatives adopted by the Victorian Government to meet Recommendation 34 from the 2009 Victorian Bushfires Royal Commission (VBRC), namely to "... 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 ...".

The reliability and safety performance of electricity networks, including their propensity to start fires, is ultimately a function of environmental factors as well as how well the networks are planned, designed, maintained and operated. While network assets are by their nature long-life, some more than 70 years old, they are subject to ongoing refurbishment based on utility and maintenance requirements. The impact of changes to network design, maintenance and operation on the safety performance of electricity networks may not become evident for many years.

This is the third year that ESV has publicly reported on the safety performance of Victoria's MECs: CitiPower, Powercor, Jemena, United Energy, SP AusNet (distribution), SP AusNet (transmission) and Basslink. This report analyses the safety performance of Victoria's electricity distribution and transmission businesses (MECs) by:

- monitoring the safety performance trend of the industry and each business
- reporting on how the industry and each business is performing against targets and initiatives emerging from the VBRC and government's response to the Powerline Bushfire Safety Taskforce recommendations
- identifying potential systemic issues in the industry and each business that need to be addressed; informing stakeholders, community, government and the industry about ESV's activities in performing its regulatory role; and

- assisting stakeholders to hold the network businesses accountable for delivering their primary legal accountability to plan, design, maintain and operate their assets in a manner that minimises safety risk and reduces the likelihood of bushfires, initiated by network assets, to a level that is as low as practicable.

Paul Fearon
Director of Energy Safety
June 2013

Summary

This is ESV's third annual report on the safety performance of Victoria's MECs and covers the second year of the current five-year regulatory price determination period.

The first two reports covered the 2010 and 2011 years and were characterised by a period of mild weather. From the performance data available and published in those first two reports ESV concluded that safety outcomes were acceptable and the MECs' programs were largely tracking to trend.

In this report, ESV notes that the safety performance for some of the networks has deteriorated.

This can be partly attributed to the weather in 2012, which had more Total Fire Ban days and was hotter and drier than the two previous years. The deterioration in safety performance was not only weather dependent but a result of an increased rate of specific in-service asset failures in certain MEC distribution networks, which was possibly a reflection on the increasing average age of the infrastructure.

While the overall management of networks was seen as good, with improvements being made in a number of areas including database systems, other investment and outcome indicators suggest that the performance across the MECs is mixed and a number of concerning trends have emerged.

MEC safety programs, exemptions granted and directions issued by ESV

The five distribution MECs established 62 safety programs, with 11 directions and 18 exemptions. The status of each of these programs is different for each distribution MEC.

For this report ESV has classified safety programs as both the specific safety initiatives proposed by MECs and the projects for the replacement or treatment of assets approved by the AER and identified by them as being primarily safety driven. Where the MEC did not provide a specific forecast for one of these programs in the current regulatory price determination period, ESV has annualised the quantities for illustrative purposes.

CitiPower has eight safety programs being monitored by ESV.

CitiPower had no specific agreed safety programs in the context of its submission to the AER. However, the AER did provide for the treatment and replacement of certain assets on the basis that they were primarily safety driven. CitiPower did not provide annualised targets for these programs.

CitiPower defined eight programs associated with the replacement and treatment of certain electrical infrastructure poles and pole-top structures. At the end of this period the quantities reported against three of these programs were greater and five were less than ESV's annualised projections.

Those programs in excess of projection were crossarm replacement, power pole replacement (staked), and power pole replacement (stayed). Programs currently less than projection include the replacement of high voltage (HV) or low voltage (LV) conductors. Given the small number of conductor failures that occur on the network and the small amount of overhead conductor involved there are no current indicators to suggest any adverse safety implications from these

programs. While other power pole replacement programs are behind ESV's projection these are of less concern at this time because of the small numbers involved.

ESV has granted Citipower three exemptions from current regulatory requirements. It is pleasing to note that the program for overhanging trees has been successfully completed. Programs relating to cyclic vegetation powerline clearing were either in line with, or only marginally behind, ESV's projection for the period.

ESV remains confident that, were the need to arise, all of the safety programs proposed to the AER and agreed with ESV can be achieved in the current funding period.

Notwithstanding the positive investment in replacement programs, ESV notes that there has been an increase in the number of crossarm failures in the period. This is a matter requiring CitiPower's attention.

CitiPower has identified and actioned a problem with a specific type of domestic fuse mount located on domestic meter boards within its network area. These fuse mounts were believed to have been installed by council-owned electricity businesses on domestic meter boards in the Northcote and Thornbury areas. CitiPower reported that they had completed a program of inspecting 21,082 sites and replacing specific fuse mounts at 5042 sites in the period. The replacement of the remaining 160 sites has been scheduled for completion in early 2013 following the resolution of customer access difficulties. ESV is advised that there was limited use of this model of fuse mount in other areas.

Powercor has eight safety programs being monitored by ESV.

Powercor had no specific agreed safety programs in the context of its submission to the AER. However the AER did provide for the treatment and replacement of certain assets on the basis that they were primarily safety driven. Powercor did not provide annualised targets for these programs.

Powercor defined eight programs associated with the replacement and treatment of certain electrical infrastructure poles and pole-top structures. At the end of this period the quantities reported against three of these programs were greater and five were less than ESV's annualised projections.

Those programs in excess of projection were crossarm replacement, power pole replacement (HV), and power pole replacement (stayed). The three other power pole replacement programs are in line with, or marginally behind, ESV's projection.

Programs currently behind projections include the replacement of high voltage (HV) or low voltage (LV) conductors. Given the small number of reported conductor failures that occur on the network and the relatively small amount of overhead conductor involved there are no indicators to suggest any adverse safety implication from these programs at this time. However Powercor will need to significantly increase the installation of HV conductor in the time remaining in this five-year regulatory price determination period for the proposed replacement quantity to be achieved.

Powercor was issued with a number of VBRC-related directions by ESV associated with bushfire mitigation. Directions associated with the survey of spans for conductor separation, the installation of vibration dampers and the installation of armour rods are well behind ESV's projection. Powercor will need to significantly increase the activity on these directions to ensure

that the programs are completed in the time specified. The direction associated with mitigating the fault energy on 179 SWER powerlines in the worst fire consequence areas was completed with the installation of 178 modern technology ACRs.

At the start of the period Powercor had four exemptions from current regulatory requirements. One relating to overhanging trees was successfully completed. Of the three exemptions associated with cyclic vegetation powerline clearing, progress on one program is in line with ESV forecast but progress on the other two programs is well behind ESV projections. Powercor has applied for a further exemption related to powerline vegetation clearing distances and a variation to the existing powerline vegetation cyclic clearing timeframe. ESV is currently considering these requests.

To achieve all of the safety programs and ESV directions Powercor will need to ramp up its activities from the progress reported to date. Progress on these matters will remain the subject of ESV review.

The high number of HV fuse and power pole top failures in both the reporting period, and continuing in early 2013, is of particular concern to ESV and requires Powercor's attention.

United Energy has 22 safety programs being monitored by ESV.

United Energy defined 22 programs in its submission for the current five-year regulatory price determination period, where the AER provided allowances on the basis that these programs were primarily safety driven.

At the end of this period the quantities reported against two of these programs were greater, seven were in line and 13 were less than United Energy's initial projections.

Those programs in excess of United Energy's projection were associated with conductor replacement in hazardous bushfire risk areas (HBRA).

Programs currently in line with projections include power pole staking, power pole replacement, surge diverter replacement, HV fuse replacement, SWER powerline replacement, the removal of public lighting switchwires and the ground fault neutraliser (GFN) program, which is scheduled to commence in 2013.

Programs currently behind projections include power pole top fire mitigation programs (replace crossarms, replacement of insulator sets, inspection / cleaning / tightening of power pole top structures), replacement of crossarms (based on condition), installation of HV ABC / LV ABC in HBRA, installation of backup protection schemes in zone substations, service cable line clearance (overhead requiring undergrounding and overhead requiring relocation), planned replacement of non-preferred service cables (height and condition), overhanging trees in HBRA (underground, powerline relocation, ABC, etc.), overhanging trees in low bushfire risk areas (underground, powerline relocation, ABC, etc.). Of these, the two programs for the planned replacement of non-preferred service cables are marginally behind United Energy's projections.

United Energy's GFN installation program has been delayed pending resolution of issues associated with the initial GFN installed at United Energy's Frankston South zone substation in the previous regulatory price determination period. Accordingly, it is unclear how United Energy will meet its initial forecast for the installation of seven GFNs in the current period.

ESV is currently considering a United Energy proposal to revise a further three programs based on condition assessment and project viability. ESV is also considering the inclusion of other initiatives in United Energy's current safety programs.

ESV is not currently satisfied with proposed revisions to four other safety programs associated with power pole top structures, as power pole top structures and crossarms are a major class of asset failure for older assets. Data indicates that failure of these assets leads to many asset fires and contributes to vegetation fires. ESV is concerned that if these asset replacement or improvement programs are scaled down, network safety may be adversely affected. ESV is currently in discussion with United Energy regarding the slower than expected rate of detection and replacement of power pole top structures. ESV seeks to understand what, if any, new inspection methodologies might be applied to mitigate the high number of failures in this asset class.

United Energy was issued with three VBRC-related directions by ESV associated with bushfire mitigation. It is pleasing to report that progress on all VBRC-related programs is well ahead of United Energy's initial projections.

At the start of the period United Energy had five exemptions from current regulatory requirements and associated programs and these are all on or ahead of United Energy's initial projections.

To achieve all of the safety programs United Energy would need to significantly ramp up its activities from the progress reported to date. United Energy's proposed safety programs are currently being reviewed by ESV.

ESV's principal concern with United Energy's safety performance is the increased number of crossarm failures and the amount of vegetation requiring urgent pruning in LBRA.

Jemena has 14 safety programs being monitored by ESV.

Jemena defined 14 programs in its submission for the current five-year regulatory price determination period, where the AER provided allowances on the basis that these programs were primarily safety driven.

At the end of this period the quantities reported against four of these programs were greater, seven were in line, and one is marginally behind Jemena's initial projections.

Those programs in excess of Jemena's projection were associated with the replacement of non-preferred service cables due to height, power pole replacement due to age and condition, the staking of undersized power poles and power poles that are in poor condition.

Programs currently in line with projection include replacement of overhead conductor, replacement of crossarms due to age and condition, replacement of crossarm and insulators to mitigate power pole top fires, replacement of SWER powerlines and removal of public lighting switchwires.

The program that is marginally behind is associated with the replacement of non-preferred services cables, while the GFN program is not scheduled to commence until 2013.

Programs currently behind projections include planned replacement of service cables and the program for the replacement of undersize power poles.

ESV is currently considering a Jemena proposal to revise the two programs associated with the replacement of non-preferred service cables. Key to this is the consideration of the short-term and long-term safety outcomes of the proposal to manage the vegetation around service cables in lieu of replacing or undergrounding them.

ESV is also considering Jemena's proposal to revise its undersized electrical distribution power pole replacement program to another that involves staking. ESV accepts that in appropriate circumstances power pole staking can be an acceptable asset management solution, delivering a comparable safety outcome to power pole replacement.

Jemena's GFN installation program has been delayed pending resolution of issues associated with GFNs. Jemena will need to ramp up its activity in this program in the current period to ensure that it meets the initial projections.

Jemena was issued with three VBRC-related directions by ESV associated with bushfire mitigation. Progress on these programs is broadly in line with Jemena's initial projections, with the direction relating to the survey of HV spans complete, the fitting of vibration dampers ahead of projection and the fitting of armour rods slightly behind those projections.

Jemena has provided a revised forecast of the volume of vibration dampers and armour rods to be installed based on the results of its inspection program and ESV expects that Jemena will achieve the revised safety program forecasts within the agreed timeframe.

At the start of the period Jemena had three exemptions from current regulatory requirements and associated programs. One of these programs was ahead and two were progressing in line with Jemena's projections.

ESV's principal concern with Jemena's safety performance is the increased number of crossarm failures.

SP AusNet (distribution) has 10 safety programs being monitored by ESV.

SP AusNet defined 10 programs in its submission for the current five-year regulatory price determination period, where the AER provided allowances on the basis that these programs were primarily safety driven.

At the end of this period the quantities reported against all of these programs were either on or ahead of SP AusNet's initial projections

Notable was the replacement or upgrading of 188 modern technology ACRs during the reporting period, compared to the SP AusNet's projection of 63. The SP AusNet projection for the total program is 234.

SP AusNet was issued with three VBRC-related directions by ESV associated with bushfire mitigation. Progress on these programs is broadly in line with SP AusNet's initial projections, with the direction relating to the fitting of vibration dampers and armour rods largely in line with projections and the survey of HV spans scheduled to commence in 2013.

At the start of the period SP AusNet had three exemptions from current regulatory requirements and associated programs. Two of these programs had progressed in line with SP AusNet's projections. The program for the cyclic clearing of bare powerlines in low bushfire risk areas was behind the projection for the period but it is understood to now be on track.

ESV notes that SP AusNet is the only distribution MEC to report a reduction in, and a very low number of, crossarm fires.

ESV is confident that all of the forecasts in the safety programs proposed to the AER in its submission for the current five-year regulatory price determination period will be completed.

ESV's concern with SP AusNet's safety performance is the number of HV fuse failures, power pole top structure failures and the number of outages caused by vegetation in LBRA. ESV notes however that SP AusNet's portfolio of safety programs includes programs to target these areas of concern.

Safety program performance summary

Performance has been mixed across the MECs in relation to their safety programs, exemptions and directions issued by ESV. ESV is in the process of reviewing some programs and is working with the distribution MECs to address the issues associated with the programs that appear to be falling behind ESV or distribution MEC forecast.

The successful progress to completion of United Energy and Jemena programs are subject to ESV's review of the proposed revisions to their safety programs. Progress on the installation of GFNs in the United Energy and Jemena networks remains problematic as a result of the initial GFN installed at United Energy's Frankston South zone substation.

ESV remains confident that all of the distribution MECs will complete acceptable safety program projections agreed with ESV by 2015, with the exception of Powercor.

ESV is also confident that all of the distribution MECs will complete the directions and exemptions issued by ESV, except for the Powercor directions that are significantly behind ESV's projections on progress.

ESV's principal concern across the distribution MECs is the apparent lack of response to the high failure rate of crossarms and HV fuses. Despite the recent investment in safety and asset replacement programs, asset failures remain high and a major cause of asset and vegetation fires. To reduce the failure rate of these assets, and the growing risk to the community and its employees, the industry may need to review its risk-based and condition-based assessment techniques for the replacement of assets that are approaching the end of their useful life.

ESV has specific concerns with the reduction in the number of crossarms and power pole top structures being identified for replacement by United Energy in the light of a significant number of asset failures in that asset class. ESV is also concerned with Powercor's slow progress in executing certain VBRC-related directions by ESV associated with bushfire mitigation.

ESV is of the view that there needs to be a significant increase in the quality of reporting on powerline vegetation clearance compliance and related issues to other responsible persons to ensure the appropriate awareness of the risks are known. ESV will be working with the distribution MECs in the next period in regard to this initiative.

MEC Bushfire Mitigation Plans and Electric Line Clearance Plans

All of the MECs' 2012 annual Bushfire Mitigation Plans and Electric Line Clearance Plans have been reviewed and accepted by ESV. ESV found that these plans were clear, well presented and define the basis of each distribution MECs' bushfire mitigation activities. They were supported by a comprehensive set of mature policies and procedures that were regularly updated.

ESV audited the extent of certain MECs' compliance to these plans and assessed the accuracy of the MECs' databases regarding their assessment of the condition of the assets. This year's audits included a review of the deployment of the safety programs and ESV directions through the businesses, as well as compliance with the Electricity Safety (Electric Line Clearance) Regulations 2010.

MECs audited this year included Powercor, SP AusNet, Jemena and United Energy.

Field audits are conducted on selected feeders with the auditor's attention drawn to assets that have some maintenance feature of which the MEC would be expected to be aware, have recorded in its database and demonstrate the application of sound asset management principles.

Of the 1162 sites audited, the auditor identified 44 defective or missing items not recorded in the respective database, 16 instances of vegetation non-compliant to the Code of Practice for electric line clearance that was the responsibility of a distribution MEC, and 41 instances of non-compliant vegetation that was the responsibility of a municipal council. The auditor found no spans in HBRA with vegetation near powerlines that did not comply with the requirements of the clearance Code, following the pre-summer cut.

The auditor reported an increase in the accuracy of the databases sampled at this year's audit in comparison to that inspected during the 2011 and 2010 audits, with fewer inconsistencies. ESV is pleased to report that the number of database inconsistencies had reduced from 54 per cent in 2010 to 17 per cent in 2011 and to 4 per cent in 2012, which indicated a greater understanding and visibility of these assets.

ESV was pleased with the auditor's report that there was a strong connection between the distribution MECs' safety plans and activities in the field.

ESV concluded that Jemena, Powercor, SP AusNet and United Energy's preparedness, in HBRA, for the coming fire season was in line with their plans, however, asset management and vegetation clearance around powerlines in the LBRA for certain distribution MECs was observed to be of a lesser standard.

An emerging issue for the industry is the community reaction in certain locations to the extent of consultation and the degree of vegetation cutting required to achieve vegetation clearance around powerlines. ESV has raised these concerns directly with the relevant distribution MEC, and expects to see this matter addressed in its 2013 Electric Line Clearance Plans, which were required to be submitted by 31 March 2013. Another issue for the industry is the management by other responsible persons of non-compliant vegetation around powerlines, in particular by municipal councils in areas where they are the responsible person. This matter will be a focus for ESV in 2013.

MEC Electricity Safety Management Schemes

The primary responsibility for ensuring network safety rests with the MEC. The ESMS is one of the mechanisms that enables ESV to hold each MEC accountable for the safety of its network. The *Electricity Safety (Management) Regulations 2009* specify the scheme's content and requirements.

ESV completed compliance audits on Powercor/Citipower (who have one ESMS with separate sections for Powercor and CitiPower), SP AusNet (distribution and transmission), Jemena, United Energy and Basslink. The audits this year focussed on the following regulations, contained in the *Electricity Safety (Management) Regulations 2009:*

- r.22 Internal monitoring, auditing and reviewing
- r.23 Key performance indicators
- r.25 Competence and training and
- r.26 Records.

The field audits observed a high degree of compliance and positive management practices across all MECs. The audit identified two non-conformances and 71 other areas requiring attention, which are all being addressed by the MECs. The findings by MEC were:

- CitiPower/Powercor initiated action to resolve the 21 areas requiring attention by June 2013
- United Energy initiated action to resolve the 13 areas requiring attention by September 2013
- Jemena initiated action to resolve the two non-conformances and 12 areas requiring attention by August 2013
- SP AusNet initiated action to resolve the 21 areas requiring attention by April 2013
- Basslink initiated action to resolve the four areas requiring attention by August 2013.

Remotely Readable Interval Meters

The question of the intrinsic safety of the Remotely Readable Interval Meters (smart meters) and their installation was raised and addressed in ESV's last Safety Performance Report.

During the current period ESV found no further evidence to suggest that the current generation of smart meters poses a greater safety risk than those associated with the older electromechanical meters. The smart meter program has facilitated a safer network with more than 15,000 hazardous defects (faulty supply conductors, connections, switchboards, and installations) detected during their installation. Further initial trials on the smart meters by Jemena and SP AusNet indicate that the technology in these meters has the potential to detect defects in the network. This feature will be a matter of interest explored by ESV during 2013. *Refer to ESV report, Safety of Advanced Metering Infrastructure in Victoria, July 2012.*

Safety indicator - Fires

There was an increase in the number of fires caused by electrical distribution assets in 2012, with 643 incidents recorded compared with 398 in 2011. There were 233 vegetation fires started by the electricity distribution MECs' networks, compared with 99 in 2011. One fire was started by a transmission MEC asset.

In 2012 there were 1674 asset failures compared with 1119 in 2011. This rise is mainly due to an increase in crossarm and HV fuse failures. These failures caused 534 fires (341 in 2011), including 410 asset fires (299 in 2011) and 124 vegetation fires (42 in 2011). Crossarms were responsible for a total of 193 fires and HV fuses were responsible for a total of 123 fires. Contact with trees started 56 vegetation fires.

Due to features that include environmental and weather conditions, service area and proximity to the coast, the networks of Powercor and United Energy and, to a lesser extent SP AusNet, are more likely to experience conditions that give rise to crossarm fires on older designed structures.

The Powercor network initiated 68 per cent of crossarm fires while United Energy initiated 17 per cent.

The industry recognises that little "natural" insulator washing occurs during periods of long, dry weather, which together with light rain or fog may lead to power pole or crossarm fires in aged timber crossarms where there is some looseness of the insulator and/or crossarm. More needs to be done to reduce the number of fires started by power poles and/or crossarms. Designs developed and introduced by the industry, including the use of steel crossarms, have the potential to reduce the number of power pole top fires. MECs also wash insulators in some parts of Victoria where they are susceptible to high levels of pollution to improve the performance of HV powerlines, but this is of limited scale.

As asset failures have the potential to start a fire, ESV believes there needs to be increased emphasis on reducing the number of asset failures.

Vegetation contact with overhead powerlines caused 3352 power outages in LBRA and 129 outages in HBRA in 2012. Urgent pruning was required on 3422 trees in LBRA and 84 trees in HBRA.

Powercor and SP AusNet networks are more exposed to the risk of vegetation fires than the other distribution MECs due to their geographic size and nature (HBRA), environmental conditions, service area and the length of their rural electrical distribution networks. Powercor, which has the most extensive geographic electrical distribution network, initiated the most number of vegetation fires (53 per cent), with SP AusNet initiating a smaller quantity (24 per cent).

In addition to increasing the focus on reducing the number of asset failures, ESV will maintain its focus on vegetation management to reduce the number of fire starts.

Compared with the five-year average for fire starts, the number of fires experienced in 2012 is closer to, but still below, the five-year average. This is supported by the f-factor figures released by the distribution MECs that indicated that there were 638 fire starts in 2012 which was 27 per cent below the five-year average target for fire starts of 870 set by the AER.

As noted previously, the weather in 2012 was hotter and drier than the previous two years, with an above average number of TFB days. Some of the increase in the number of fires in both vegetation and power poles/crossarms can be attributed to the prevailing weather conditions during the 2012 summer. That said, the deterioration in safety performance was not only weather dependent but a result of an increased rate of specific in-service asset failures in certain distribution MEC networks, possibly as a reflection of the increasing average age of the infrastructure.

Safety indicator - Network maintenance

The number of conductor failures increased marginally to 147 in 2012 compared with 126 in 2011. This equates to a failure rate of one conductor failure per 1067km of overhead powerline per annum. Electrical distribution power pole failures also increased marginally to 43 in 2012, in comparison with 25 in 2011. This equates to a failure rate of one power pole failure per 33,750 power poles per annum. As the number of failures is small, these increases are not considered to be indicative of any increasing trend based on three years of data.

Following a review of KPI safety performance reporting, ESV initiated a review in this reporting period of overhead service cable connection failures. This review concluded that most of the failures were due to ageing assets. Failures occurred in the older neutral screened cables (copper and aluminium), PVC twisted pair cables and their connections. Neutral service cable connection failures increased marginally to 346 in 2012 compared with 314 in 2011. This increase is not considered to be significant or indicative of any trend based on the past three years of data. Analysis of additional data provided by the distribution MECs, indicates that service cable connection incidents were trending down as a result of the distribution MECs' inspection, testing and smart meter installation programs.

Electrical infrastructure crossarm failures increased significantly in 2012, with a total of 539 failures compared with 328 in 2011. Most of the crossarm failures occurred on the Powercor, SP AusNet and United Energy networks.

There were also a total of 285 HV fuse failures in 2012. Most of the HV fuse failures occurred on the Powercor and SP AusNet networks.

With the effort that has been put into condition assessment and asset replacement over the past few years, ESV believes that it would be reasonable to expect to see a reduction in the number of asset failures. Despite targeted programs, the number of asset failures has not reduced. This is particularly the case with crossarms and HV fuse failures.

The Bushfire Mitigation Index (BMI) provides stakeholders with an indication of the readiness of each distribution MEC for the upcoming fire danger period. There were 166 days where the Powercor BMI was above the target of zero prior to the declaration of the fire danger period. This was due to access restrictions around a small number of power poles that were isolated by maturing crops and flood waters. ESV is satisfied that this did not pose an increased fire risk.

All the other distribution MECs achieved the desired BMI of zero for their networks, prior to the declaration of the fire danger period.

Electrical incidents

ESV investigated seven serious electrical incidents during 2012.

There were no fatalities during this time but three members of the public sustained serious injuries. This compares with seven serious injuries in 2011 and seven in 2010.

MEC workers sustained four serious electrical injuries in 2012, compared with four in 2011 and two in 2010.

There were also 19 recorded electric shocks from MEC network assets, compared with 24 in 2011 and 23 in 2010. While this reduction is pleasing, the numbers are small and no trend can be identified based on the three years of data.

Access to electricity switchboards, electrical network assets and substations by unauthorised persons has the potential to result in serious injury or death and affect the continuity of electricity supply. There was an increase in the level of unauthorised access in 2012 with 78 incidents reported, compared with 23 in 2011 and 24 in 2010. Most of the unauthorised access appears to involve criminal damage or theft.

The WorkSafe No Go Zone clearance space establishes the minimum approach distance around electrical assets where a person can work safely. In 2012 there were a total of 170 No Go Zone incidents reported to ESV in which the required clearance distance was infringed. This compares with 91 incidents in 2011 and 151 incidents in 2010. Most of the incidents were due to interference with underground assets and the increase is not considered to be significant or indicative of any trend based on three years of data. ESV believes greater awareness is required of the need to report No Go Zone infringements. In reality, ESV suspects that there are many more No Go Zone infringements than are reported. Due to the potential for such incidents to result in serious injury or death, ESV continues to actively promote the Look Up and Live message and the Dial Before You Dig service to alert the community to the dangers.

A reverse polarity incident occurs when the active and neutral electrical cables are interchanged. This can lead to a serious injury or fatality, damage equipment and affect the continuity of electricity supply. In 2012 there were three instances where polarity was reversed. This compares with three instances in 2011 and five in 2010. While each incident is a potentially serious safety matter, the results do not indicate any trend based on three years of data.

High voltage injections occur where a fault causes high voltage to be introduced into customers' low voltage premises. This can be a serious safety matter with the potential to cause electrocution, electric shock or damage to customer installations. In 2012 there were 104 instances of high voltage injection, compared with 61 in 2011 and 70 in 2010. The increase in HV injections is believed to be a result of the increased number of crossarm fires experienced by Powercor and United Energy, as well as an increase in the number of vehicles hitting power poles experienced by United Energy.

Concluding remarks

The observations and commentary in this, ESV's third annual safety performance report, are set against a backdrop of an increasing expectation on MECs to better manage risk, deliver returns to shareholders, as well as provide a more efficient and reliable service to the community. The reduction in electricity consumption in recent years has only heightened the natural tensions and pressure on MECs to deliver balanced outcomes.

The saw-toothed pattern of investment persists, where investment is low immediately after a regulatory price determination. This may reflect, in part, the features of the five-year cost-of-service pricing regime and the adequacy of incentives to take a longer term and more consistent view to managing long-life assets, including developing the resource and skills base for capital programs.

For some businesses individual asset classes and components appear to be reaching end of life at a rate faster than the replacement programs. Increasing investment demand and the balance of short-term incentives may make it progressively harder for industry to bridge the resource / skills gaps that might exist and may take many years to reverse or overcome.

ESV also observes that some MECs may be approaching the limit of the risk-based or condition-based management of ageing assets, and recognises the challenge in applying traditional inspection regimes to determine when individual assets reach their end of life. Certain distribution MECs have adopted new inspection techniques to address this matter, including aerial asset inspection. However, the challenge remains and ESV has confirmed that for some distribution MECs this deteriorating performance trend, albeit only three years, continues into the first quarter of 2013.

Finally, ESV makes three observations in relation to the interaction of the economic and safety regimes. First, adequate investment allowances for safety programs have been granted by the AER based on ESV support of the MEC safety programs. Second, the scope of some of these safety programs is difficult to determine realistically for a future period, especially when they are based on asset condition, an approach ESV observes may be reaching the limits of effectiveness. Third, there is historic evidence of underspending against the AER reliability and quality maintained capex project allowances. Whether this is reflected in a growing inherent risk profile being adopted by MECs, or is a reflection of over-forecasting during price determination reviews, ESV believes that the equivalent investment should be made to provide the community with a level of service and safety they have paid for. It is possible that underspending relative to AER allowances also reflects a gap between available skills and resources and the optimum investment requirements of the businesses. Ultimately the primary responsibility for addressing the competing priorities of shareholders, reliability, service and safety lies with the MECs. ESV observes a possible increasing risk being taken in an ageing network and that current approaches may not be sustainable in the longer term.

Structure of the report

The remainder of the report is structured as follows.

Chapter 1: Introduction
Overview of the relevant acts and regulations, the MEC performance reporting regime and an overview of the MEC network characteristics.

Chapter 2: Electricity Safety Management Scheme
Information on the key performance indicators employed by ESV to monitor and audit MEC compliance with safety standards.

Chapter 3: Safety programs
Progress reports and ESV review of the agreed MEC safety programs.

Chapter 4: Directions and exemptions
Progress reports and ESV review of the of the ESV directions and exemptions on the MECs.

Chapter 5: Safety indicators – Network
Reports and ESV review of the fires caused by electricity distribution and transmission assets and the efficacy of overhead powerline maintenance.

Chapter 6: Safety indicators – Community
Reports and ESV review of community safety incidents involving electric shock together with a summary of the serious electrical incidents investigated by ESV.

Chapter 7: Bushfire Mitigation and Electric Line Clearance Audits
Results of bushfire mitigation and electric line clearance audits conducted by ESV on the MECs.

Chapter 8: Electricity Safety Management Scheme audits
Results of ESMS audits conducted by ESV on the MECs.

Chapter 9: ESV investigation into the safety of Advanced Meters

Results of the ESV investigation into the safety of Remotely Readable Interval or smart meters.

1 Introduction

Energy Safe Victoria was established on 10 August 2005 with the passing of the *Energy Safe Victoria Act 2005.* ESV is committed to the safe, efficient supply and use of electricity and gas. ESV has overall responsibility for the safety and technical regulation of electricity, gas and pipelines in Victoria, and reports annually to the Victorian Parliament on the functions and programs that it administers.

This is the third year that ESV has reported on the safety performance of the Victorian distribution MECs and the second year it has reported on safety performance of the Victorian electricity transmission businesses. This report informs stakeholders, the community, government and industry on how well these businesses are meeting their safety obligations.

This report also provides transparency on ESV's role in regulating the safety of electricity supply in Victoria and focuses on the key safety indicators reported by the MECs. This includes:

- progress of critical safety programs
- progress of directions placed on the electrical distribution MECs to meet the recommendations of the 2009 Victorian Bushfires Royal Commission (VBRC) and the Powerline Bushfire Safety Taskforce (PBST)
- operation of the Electricity Safety Management Schemes; and
- results of audits on the MECs, including those to assess the readiness of the distribution MECs for the bushfire season.

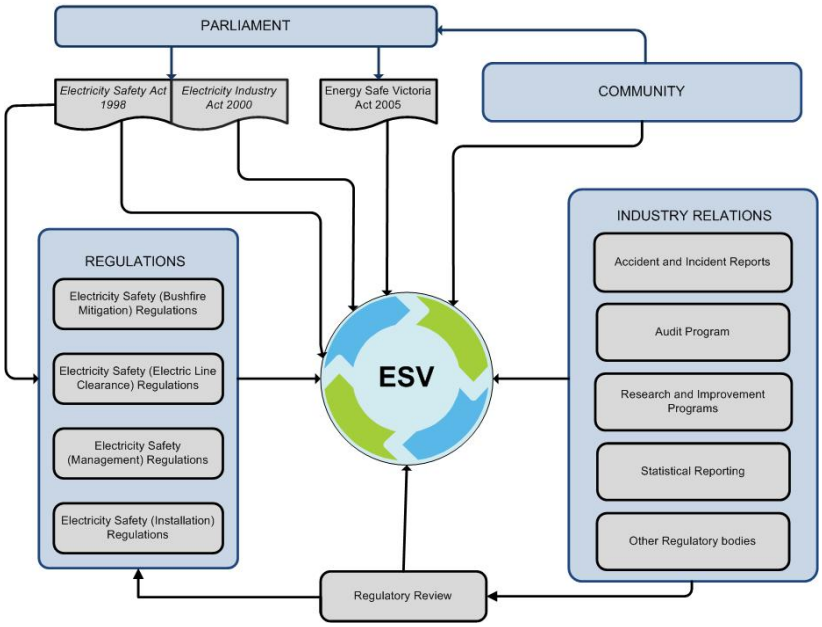
1.1 Network Safety Regulation

Victoria has adopted an outcomes-based regulatory approach for MECs, as distinct to employing a prescriptive regime. This is achieved through legislation that imposes a general duty and requires all MECs to develop, introduce and maintain an electrical safety management scheme accepted by ESV. This outcomes-based regulatory approach accords with the best practice approach undertaken by the Victorian Government in its regulatory reforms.[1]

ESV's regulatory approach to electricity network safety management is depicted in Figure 1, and the key elements are expanded below.

[1] Department of Treasury and Finance, Melbourne, Victorian Guide to Regulation, May 2011

Figure 1: ESV's approach to MEC electricity safety management



The principal electrical safety legislation that applies to Victorian MECs is the *Electricity Safety Act 1998.* This is underpinned by supporting regulations that include;

- *Electricity Safety (Management) Regulations 2009* set out the requirements for an Electricity Safety Management Scheme (ESMS) that is required to be submitted to ESV by all MECs, every five years, for acceptance and is audited by ESV.
- *Electricity Safety (Bushfire Mitigation) Regulations 2003* set out the requirements for a Bushfire Mitigation Plan (BMP) that is required to be submitted to ESV by all MECs, every year, for acceptance and is audited by ESV.
- *Electricity Safety (Electric Lines Clearance) Regulations 2010* set out the requirements for an Electric Line Clearance Management Plan (ELCMP), which is required to be submitted to ESV by all MECs each year for acceptance and is audited by ESV. It is a requirement that all persons responsible for maintaining electric line clearance produce a plan annually. Currently responsible persons other than MECs include certain municipal councils, persons responsible for the management of public land, owners or operators of electric powerlines, and the Roads Corporation. These entities are required to produce an ELCMP plan annually and submit to ESV on request with ESV conducting targeted audits on those plans. MECs' plans generally cover the regional and rural areas, with local council plans applying to specific 'declared' areas, in towns and cities.
- *Electricity Safety (Installation) Regulations 2009* specify the safety requirements relating to electrical installations and electrical work and contain certain specific requirements for electricity suppliers.

1.2 Major Electricity Company Performance Reporting

The Victorian distribution and transmission MECs are collectively referred to in the legislation as major electricity companies (MECs). The electrical distribution MECs were formed from the State Electricity Commission of Victoria and while generally similar in engineering terms have evolved as different engineering solutions have been developed.

The MECs also have different characteristics such as geography, topography, customer base and operating environment, which may influence their safety performance. As such a direct comparison of the performance of the distribution MECs may be misleading.

Powercor and SP AusNet have extensive overhead rural electrical distribution networks, with Powercor having considerably more powerline length than any of the other networks. Jemena and United Energy have predominantly overhead urban electrical distribution networks, while CitiPower services the central business district and the inner-urban areas. Approximately 97 per cent of CitiPower's central business district network is underground while the inner urban network is mainly overhead.

The electrical transmission MECs are managed by SP AusNet and Basslink. SP AusNet was formed from the State Electricity Commission of Victoria and its transmission network covers the whole state of Victoria, including the interconnecting powerlines to NSW and South Australia. The Basslink transmission network was developed post the State Electricity Commission of Victoria and is a comparatively short transmission link to Tasmania. As such due to the differences between these two transmission businesses, direct comparison of their performance may be misleading.

This performance report is not intended to compare the safety performance of the MECs; instead it highlights the outcomes for each individual business and provides commentary on the performance of each business relative to its previous performance.

1.3 Information reported and published

ESV's reporting requirements were expanded with the introduction of the mandated ESMS regime in December 2009 leading to the development of standard data definitions and an improved reporting framework. These requirements are outlined in the ESV *Distribution Business Electrical Safety Performance Reporting Guide*[2] and the *Transmission Electrical Safety Performance Reporting Guide*[3].

This reporting is designed to provide an insight into the effectiveness of the ESMS regime in improving network safety performance, reducing risk due to asset failure and interference while managing the consequence of any asset failure.

As part of the five-year regulatory price determination period, administered by the Australian Energy Regulator (AER), all distribution MECs have implemented agreed safety programs for the five-year period from 2011 to 2015. Distribution MEC safety performance together with the progress in delivering these safety programs is included in this report.

[2, 3] Reporting guides available on ESV website at http://www.esv.vic.gov.au/Electricity-Professionals/Electricity-Safety-Management-Schemes-ESMS.

ESV has developed a five-year audit plan for the MECs (coinciding with the five-year ESMS period) and has commenced the program of targeted audits of the MECs. The results of the 2012 audits are included in this report.

Table 1: Characteristics of the Victorian MEC Networks

Distribution MEC	Approximate number of customers	Approximate area	Approximate powerline length (km)	Approximate number of poles
CitiPower	313,000 85% residential	157 km2 - Melbourne CBD and inner suburbs.	7,400 25% CBD 40% underground	60,000
Jemena	320,000 88% residential	950km2 – City, north-west suburbs and Melbourne International Airport.	6,000 75% urban 26% underground	99,000
Powercor	730,000 85% residential	150,000km2 – Melbourne's Docklands precinct, west from Williamstown to the SA border, north to the Murray and south to the coast.	84,000 92% rural 11% underground	530,000
SP AusNet	658,000 88% residential	80,000km2 – Outer-eastern suburbs, north to the NSW border, south and east to the coast.	48,900 85% rural 10% underground	380,000
United Energy	630,000 90% residential	1500km^2 – South-eastern suburbs and south to the coast.	12,700 25% rural 20% underground	205,000
TOTAL	**2,651,000**		**159,000**	**1,274,000**

Transmission business	Approximate number of customers	Transmission voltages	Approximate powerline length (km)	Approximate number of towers
SP AusNet	-	500kV AC and 220kV AC from Victorian power station switchyards. 330kV AC and 275kV AC interconnections with NSW and SA respectively. 66kV AC sub-transmission across Victoria.	6572	13,000
Basslink	-	500kV AC and 400kV DC (HVDC) link connecting Loy Yang power station in south east Victoria to George Town terminal station in north Tasmania.	67 3.2km of 500kV AC OH line 57.4kM of 400kV DC OH line 6.6kM of 400kV DC UG cable 290km of 400kV DC SM cable	142
TOTAL			**6639**	**13,142**

2 Electricity Safety Management Scheme

The regulation underpinning Electricity Safety Management Schemes (ESMS) is wide-ranging and applies to all of the network operations of the MECs. Through oversight of these schemes, ESV is well placed to test, challenge and expose the safety performance of the MECs whose principal safety objective is to manage the risks associated with the planning, design, construction, maintenance and operation of the electricity network, with special attention to bushfires.

MECs must submit an ESMS to ESV, for review and acceptance, every five years, and this may be revised at any time subject to ESV approval. The MEC has a statutory obligation to comply with the approved ESMS and legislation makes provision for ESV to impose requirements on MECs through the ESMS.

ESMSs include the following requirements for a formal safety assessment;

- the listing of the technical standards adopted by the MEC
- the ability to develop and implement new technology expeditiously
- the ability to change and adapt quickly to changing community expectations
- a mechanism for the safety regulator to closely monitor performance
- provisions for the safety regulator to influence the safety related decision-making of the industry; and
- prescribe penalties for non-compliance.

2.1 Monitoring Compliance with Safety Standards

ESV monitors the performance and compliance of each MEC through a comprehensive reporting regime and program of compliance audits that includes the collection and analysis of incident data and monitoring key performance indicators.

2.2 Auditing Program

An ESV audit program has been developed using the information provided in the approved ESMS, the BMPs and the ELCMPs. ESV has adopted a risk-based approach to these audits by assessing the various network characteristics, asset age, operating environment and prior audit outcomes. ESV has also been informed by data collected since the last audit and the initiatives initiated by the MECs in the management of their electrical assets. ESV has conducted both desktop audits to confirm that approved policies and procedures have been implemented and field audits to demonstrate the deployment of those policies and procedures. The field audits have been, by their nature, a limited sample taken at a point in time and are not designed to inspect all of the individual assets.

Audits of MEC ESMSs are conducted regularly, focussing on different elements of the approved scheme on each occasion. ESV intends to audit all of the fundamental elements of the approved schemes at least once during their five-year life. In 2012, all of the MECs were

subject to compliance audits on four of the requirements of the *Electrical Safety (Management) Regulations 2009:*

- r.22 Internal monitoring, auditing and reviewing
- r.23 Key performance indicators
- r.25 Competence and training and
- r.26 Records.

2.3 Key performance indicators

The ESV *Distribution Business Electrical Safety Performance Reporting Guide* sets out both the serious electrical incidents that are reported to ESV, within an established timeframe, as well as the suite of key performance indicators that are reported to ESV quarterly.

In 2012 ESV also published the *Transmission Electrical Safety Performance Reporting Guide.*

These indicators provide ESV with the capacity to monitor the safety performance and compliance of the MECs with their approved schemes, identify trends and track changes.

Actual safety performance is audited regularly as part of the formal, annual BFM, ELC and ESMS audit program, informally during quarterly ESMS management and performance meetings with each of the MECs, and on an ad hoc basis on matters of interest to ESV.

2.4 Agreed safety programs

The regulatory price determination process requires each distribution MEC to submit a case to the Australian Energy Regulator for funding its operations for a five-year period. During 2010 ESV worked closely with the distribution MECs and the AER to review the five-year works program and support the distribution MECs' programs of performing work to maintain and improve the safety of their networks. Each distribution MEC submitted a plan detailing asset replacement or treatment programs to be completed by 2015. The outcome of the AER's deliberations was an agreed increase in expenditure for asset replacement or treatment programs that the AER identified as being primarily safety driven.ESV monitors the progress of this work to ensure that the agreed and funded safety programs have been delivered.

2.5 Victorian f-factor scheme

Following Black Saturday, the f-factor scheme was introduced to encourage improvements in the management of electricity distribution assets to reduce the number of fires started by these assets and reduce the risk of loss or damage caused by the fires. For the period (2012–15), distribution MECs will be rewarded or penalised for performing better or worse than their respective fire start targets.

The f-factor scheme defined fires as any fire started by an electricity distribution MEC asset:

- that starts in or originates from an electrical distribution system
- is started by a tree, or part of a tree, falling or coming into contact with an electrical distribution system
- is started by a person, bird, reptile, or other animal in or on an electrical distribution system
- is started by lightning striking a distribution system or part of an electrical distribution system;
- is started by any other thing forming part or coming into contact with an electrical distribution system; or
- is otherwise started by an electrical distribution system.

This differs from the ESV threshold for a serious electrical incident; an incident that causes or has the potential to cause death or injury to a person or significant damage to property or a serious risk to public safety;

- any fire damage
- greater than $250,000 damage to property, other than network assets
- damage that has potential for significant public or media interest; or
- damage serious enough to warrant on site action to mitigate risk to the public by Police, Ambulance Service, MFB, CFA, Victorian WorkCover Authority, a statutory body or an emergency service provider.

The f-factor scheme determined the number of fire starts of the distribution MECs over five calendar years 2006–2010, (4281) and established an annual f-factor target (807) based on the historical average of annual fire starts.

The number of reported vegetation, power pole and crossarm fires for the same period (2006–2010) was 2909 or, on average, 581 per annum.

Table 2: F-factor Scheme Fire Start Targets

Distribution business	F-factor target (per annum)	Number of vegetation, pole and crossarm fires (per annum)
CitiPower	30.4	10
Jemena	56.8	51
Powercor	401.8	316
SP AusNet	256.8	131
United Energy	124.2	75
TOTAL	**807**	**581**

Source *Final determinations and explanatory statement F-factor scheme determinations 2012-15 for Victorian electricity distribution network service providers, 22 December 2011.*

3 Safety programs

Over time, the network operating environment, duty cycle and network events contribute to the ageing of assets, requiring maintenance or replacement to reduce and mitigate the probability and rate of asset failure. The rapid rate of electrification of Victoria during the middle of last century means that many assets are nearing the end of their initial design life. To minimise the occurrence and consequence of asset failure, appropriate risk mitigation programs have been implemented. The distribution MECs have continually refined their asset replacement decision-making practices. Asset replacement decisions are now based on a greater degree of asset inspection and condition assessment.

Asset upgrades use new materials that have the potential to reduce the number of asset failures, to reduce the number of outages and fires, and lead to an improvement in the reliability and safety of the electricity network. Despite a targeted condition assessment and asset replacement program to reduce breakdowns, the number of asset failures has not reduced for all asset classes across all MECs, especially crossarms and HV fuses. To reduce the asset failure rate, the industry may need to review its condition assessment techniques and reliability approach to asset replacement. Where the current condition monitoring is problematic a move to a more informed assessment or age-based replacement approach may be warranted to mitigate asset failure.

3.1 The safety programs

The 2010 AER determination on the allowable expenditure for distribution MECs for the five-year period between 2011 and 2015 included expenditure for asset replacement or treatment programs that it identified as being primarily safety driven.

AER's determination contained the written expectation that ESV would continually monitor the volume of work undertaken by the distribution MECs to ensure the programs are delivered to achieve the intended safety outcomes proposed.

For this report ESV has classified both specific safety initiatives proposed by MECs and the projects for the replacement or treatment of assets approved by the AER and identified by them as being primarily safety driven, as safety programs. Where the MEC did not provide a specific forecast for one of these programs in the current regulatory price determination period, ESV has annualised the quantities for illustrative purposes

Since each distribution MEC has a different risk profile, the agreed safety-related works differ for each organisation. However, in general, the agreed safety-related works apply to:

- accelerated rate of replacement of crossarms, power poles, conductor, insulators and high voltage fuses
- accelerated rate of replacement of low voltage overhead neutral screen service cables; and
- installation of new high voltage protection equipment or upgrade of high voltage protection equipment, automatic circuit reclosers (ACRs) and rapid earth fault current limiters (REFCLs) – also known as a ground fault neutralisers (GFN).

The distribution MECs asset replacement programs are currently largely based on the results of asset inspection and condition monitoring programs.

Legend

For the benefit of the reader the following colour coding of the status of the safety programs has been applied:

RED; PROGRAM TOTAL TO DATE < 90 PER CENT OF FORECAST TO DATE
GREEN; PROGRAM TOTAL TO DATE ± 10 PER CENT OF FORECAST TO DATE
BLUE; PROGRAM TOTAL TO DATE > 110 PER CENT OF FORECAST TO DATE

3.2 Safety program status: CitiPower

CitiPower reported on the progress of eight safety programs.

Progress on three of the programs is ahead of the ESV forecast:

- ✓ Crossarm replacement
- ✓ Pole replacement staked
- ✓ Pole replacement stay

Progress on five of the programs is behind the ESV forecast:

- ✓ LV overhead conductor replacement
- ✓ HV conductor replacement
- ✓ Pole replacement LV
- ✓ Pole replacement HV
- ✓ Pole replacement sub transmission

CitiPower did not establish an annual forecast for these safety programs. The forecasts shown in the table are based on the figures supplied to the AER for revenue determination purposes and annualised by ESV for determining progress.

CitiPower reports that information on the progress of two of the programs, LV and HV overhead conductor replacement, is not available as no IT system exists to easily identify the route metres replaced. However, ESV notes that CitiPower's "sister" company, Powercor, provided these figures. CitiPower reports that little conductor (2km of HV) was replaced in 2012. Accordingly ESV has recorded that these programs are behind ESV's forecast. Being on a small base the progress on these programs is of less concern at this time.

CitiPower reports that all power poles and associated structures assessed in 2012 as requiring replacing or reinforcement have been replaced or reinforced.

HV, LV and sub-transmission power pole replacement programs are behind ESV forecast, however, being on a small base the progress on these programs is of less concern at this time. The intended power pole replacement has been offset to some degree by an increase in the number of staked power poles. It is pleasing to see that crossarm and power pole replacement (staked and stay power poles) is well ahead of ESV's forecast.

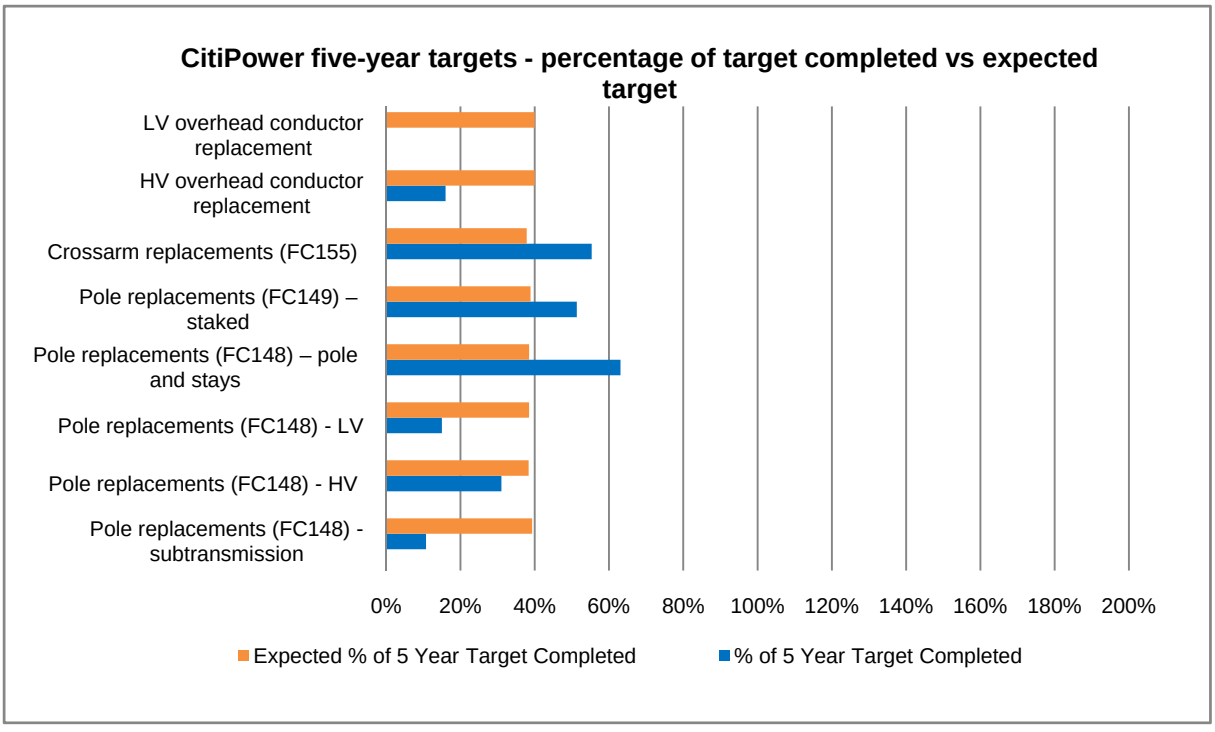
Based on the information provided, and performance to date, ESV remains confident that all of the safety programs proposed to the AER and agreed with ESV can be achieved by CitiPower by the end of 2015.

Table 3: CitiPower: Safety program status

Program	Measure	2012 ESV forecast	2012 Completed to date	Program target	Comments
LV overhead conductor replacement	Route kilometres of HV conductor replaced	1.0	0	2.5	IT upgrade required, CitiPower could not provide any figures on the progress of this program.
HV overhead conductor replacement	Route kilometres of HV conductor replaced	5.0	2	12.5	IT upgrade required, CitiPower could not provide any figures on the progress of this program.
Crossarm replacements	Number of crossarms replaced	1400	2048	3700	Program is 46% ahead of ESV forecast.
Pole replacements - Staked poles	Number of poles staked	515	680	1325	Program is 32% ahead of ESV forecast.
Pole replacements – Stay poles	Number of poles replaced	25	41	65	Program is 64% ahead of ESV forecast.
Pole replacements - LV	Number of poles replaced	221	86	574	Program is 61% behind ESV forecast.
Pole replacements - HV	Number of poles replaced	89	72	232	Program is 19% behind ESV forecast.
Pole replacements - Sub transmission	Number of poles replaced	22	6	56	Program is 72% behind ESV forecast.

#CitiPower did not set annual forecasts. The 2012 ESV forecast is based on the volume of work submitted to the AER for revenue determination purposes.

Figure 2: CitiPower progress of safety-related programs



3.3 Safety program status: Powercor

Powercor reported on the progress of eight safety programs.

Progress on three of the programs is ahead of the ESV forecast:

- ✓ Crossarm replacement
- ✓ Pole replacement stay
- ✓ Pole replacement HV

Progress on one of the programs is in line with the ESV forecast:

- ✓ Pole replacement staked

Progress on four of the programs is behind ESV's forecast:

- ✓ LV overhead conductor replacement
- ✓ HV conductor replacement
- ✓ Pole replacement LV
- ✓ Pole replacement transmission

Powercor did not establish an annual forecast for these safety programs. The forecasts shown in the table are based on the figures supplied to the AER for revenue determination purposes and annualised by ESV for determining progress.

Powercor reports that it replaced less overhead conductor than ESV's forecast in 2012 and advised that the variance was a result of resource constraints resulting from ESV's VBRC directions.

Powercor advised that all power poles and associated structures assessed in 2012 as requiring replacing or reinforcement have been replaced or reinforced.

The HV and LV overhead conductor replacement program is behind ESV's forecast but other programs appear to be in line with ESV's forecast. It is pleasing to see that crossarm and power pole replacement (HV and stay power poles) programs are well ahead of ESV's forecast. Little overhead conductor has been replaced, putting at risk the program target to replace 20km of LV overhead conductor and 2380km of HV overhead conductor.

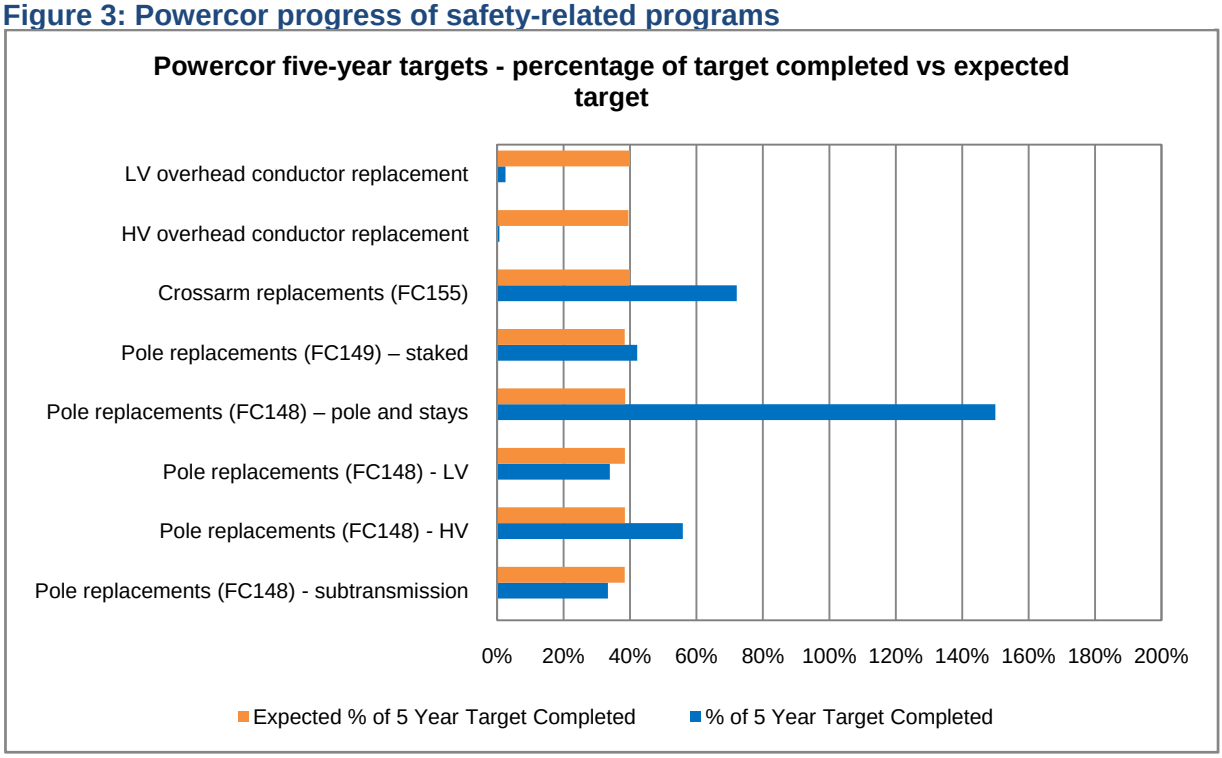
Based on the information provided, and performance to date, for Powercor to achieve all of the safety programs proposed to the AER and agreed with ESV by the end of 2015, it will need to ramp up its activities from the progress reported to date.

Table 4: Powercor: Safety program status

Program	Measure	2012 ESV forecast	2012 Completed to date	Program target	Comments
LV overhead conductor replacement	Route kilometres of HV conductor replaced	8	1	20	Program is 87% behind ESV forecast.
HV overhead conductor replacement	Route kilometres of HV conductor replaced	940	17	2380	Program is 98% behind ESV forecast.
Crossarm replacements	Number of crossarms replaced	6400	11541	16,000	Program is 80% ahead of ESV forecast.
Pole replacements - Staked poles	Number of poles staked	1829	2007	4760	Program is 10% ahead of ESV forecast.
Pole replacements – Stay poles	Number of poles replaced	37	144	96	Program is 289% ahead of ESV forecast.
Pole replacements - LV	Number of poles replaced	406	358	1056	Program is 11% behind ESV forecast.
Pole replacements - HV	Number of poles replaced	1273	1851	3312	Program is 45% ahead of ESV forecast.
Pole replacements - sub transmission	Number of poles replaced	129	112	336	Program is 13% behind ESV forecast.

#Powercor did not set annual forecasts. The 2012 ESV forecast is based on the volume of work submitted to the AER for revenue determination purposes.

Figure 3: Powercor progress of safety-related programs



3.4 Safety program status: United Energy

United Energy reported on the progress of 22 safety programs.

Progress on two of the programs is ahead of UE forecast:

- ✓ Replace other conductors in HBRA
- ✓ Replace overhead steel conductors in HBRA

Progress on seven of the programs is in line with the UE forecast:

- ✓ Stake poles; based on condition
- ✓ Replace poles; based on condition
- ✓ Pole top structure; surge diverter replacement
- ✓ Pole top structure; HV fuse replacement
- ✓ Replace existing SWER lines
- ✓ Removal of public lighting switchwire
- ✓ Install GFN

Progress on 13 of the programs is behind UE forecast:

- ✓ Service line clearance; OH requiring undergrounding
- ✓ Service line clearance; OH services requiring relocation
- ✓ Install backup protection schemes and install LV ABC in HBRA
- ✓ Install HV ABC in HBRA
- ✓ Replace crossarms; based on condition
- ✓ Inspect, clean, tighten; pole top fire mitigation
- ✓ Replace sets of insulators; pole top fire mitigation
- ✓ Replace crossarms; pole top fire mitigation
- ✓ Planned replacement of non-preferred services (height)
- ✓ Planned replacement of non-preferred services
- ✓ Overhanging trees capex (underground, line relocation, ABC, etc.)–HBRA
- ✓ Overhanging trees capex (underground, line relocation, ABC, etc.)– LBRA

United Energy has informed ESV that it reviews its improvement plans regularly to minimise risk and the hazards associated with network operations. As a result of changes in technology, network operations and condition assessment criteria, United Energy has reported that some of its safety programs are tracking lower than originally forecast. Eleven of the safety programs proposed to the AER in early 2010 have been reviewed and reprioritised on a risk management basis, and that other safety programs have been introduced. The revised safety programs are currently being reviewed by ESV.

It is disappointing to see that less power pole top mitigation work has been completed, especially the replacement of fewer crossarms and insulators.

As power pole top structures are a major cause of asset failure and fire, ESV will seek to have United Energy review its position and its condition assessment techniques for these assets.

It is pleasing to see that the HV fuse replacement program is in line with the United Energy forecast as HV fuses are a major asset failure category and cause of fires.

The ground fault neutraliser program is yet to commence. The GFN installed at United Energy's Frankston South zone substation was installed prior to the commencement of this program. Technical difficulties with this installation have delayed deployment of the additional units funded and their installation is unlikely to commence until these technical difficulties have been resolved. Accordingly it appears highly problematic that this program can be completed in the balance of the regulatory funding period.

Planning has commenced on the SWER replacement program. These programs have long lead-times that are reported to have been delayed by issues associated with the current easement corridors. United Energy reports that they have been investigating alternative solutions for this program.

ESV is in the process of reviewing United Energy's revised safety programs and the supporting risk assessment and cost benefit analysis in some detail to confirm that the proposed safety programs deliver a comparable safety outcome. Indications are that the estimated total expenditure on the revised safety programs will be comparable with the planned expenditure on the original safety programs. The revised programs include:

- the inclusion of the replacement of air break switches with the crossarm replacement program to reduce the risk of fires
- replace aged metal, LV service pillars in the Doncaster area to reduce the risk of electric shock (new)
- secure pole caps to mitigate fire risk (new)
- early fault detection on overhead powerlines to mitigate fire risk (new)
- pilot the use of LiDAR technology to complement asset inspection practices (new)
- pilot the Siemens Kaon Fuse Saver to reduce the likelihood of fire starts (new)
- oil containment, noise abatement, asbestos management, SF6 management
- address low distribution transformer mounting height
- address low tramway crossings
- improve zone substation access security
- improve network earthing
- DC system management
- animal and bird proofing
- rectification of potential conductor clashing
- fitting of armour rods
- fitting of vibration dampers.

Based on the information provided and performance to date, for United Energy to achieve all of the original safety programs proposed to the AER and agreed with ESV by the end of 2015, United Energy would need to ramp up its activities from the progress reported to date.

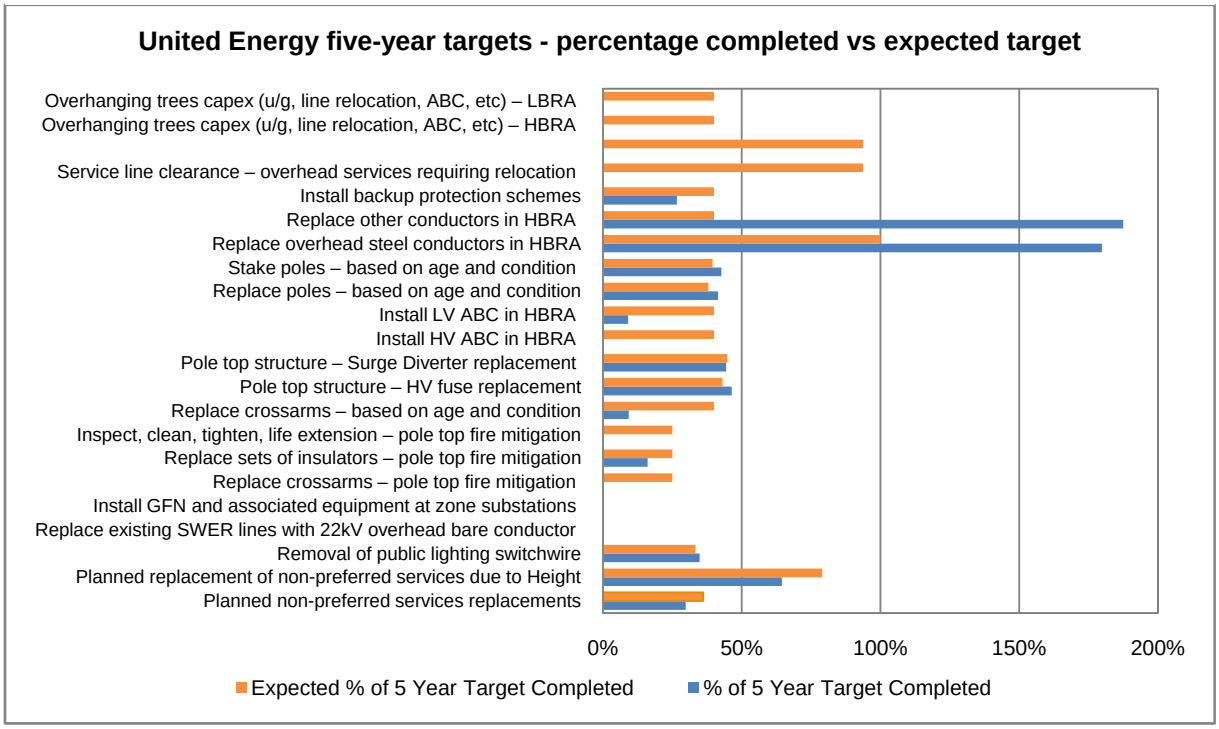
The revised safety programs and forecasts proposed by United Energy are the subject of a current review by ESV.

Table 5: United Energy (UE): Safety program status

Program	Measure	2012 UE forecast	2012 Completed to date	Program target	Comments
Service line clearance – overhead services requiring undergrounding.	Number of services	1660	1	1771	Program is 100% behind UE forecast. UE is unlikely to meet the original UE target.
Service line clearance – overhead services requiring relocation.	Number of services	6636	2	7083	Program is 100% behind UE forecast. UE is unlikely to meet the original UE target.
Install backup protection schemes	Zones substations completed	6	4	15	Program is 30% behind UE forecast. Program will be completed by the end of the current regulatory period
Replace other conductors in HBRA.	Kilometres of conductor replaced	0	3.75	126	Program is ahead of UE forecast.
Replace overhead steel conductors in HBRA.	Kilometres of conductor replaced	23	41	80	Program is 78% ahead of UE forecast.
Stake poles – based on age and condition.	Number replaced	784	847	2098	The program is 8% ahead of UE forecast. All poles identified as being suitable for staking have been staked.
Replace poles – based on age and condition.	Number replaced	1039	1135	2805	Program is 9% ahead of UE forecast. All poles assessed as having reached the end-of-service life have been replaced.
Install LV ABC in HBRA	Metres of LV ABC	5900	1338	14,750	Program is 77% behind UE forecast.
Install HV ABC in HBRA	Metres of HV ABC	9600	0	24,000	Program is 100% behind UE forecast.
Pole top structure – Surge Diverter replacement.	Number replaced	472	468	1054	Program is in line with UE forecast. All surge diverters identified as needing to be replaced have been replaced.
Pole top structure – HV fuse replacement.	Number replaced	348	375	808	Program is in line with UE forecast. All HV fuses identified as needing to be replaced have been replaced.
Replace crossarms – based on age and condition.	Number of crossarms replaced	20,035	4656	50,088	Program is 77% behind UE forecast. All end-of-life crossarms identified to date are said to have been replaced.
Inspect, clean, tighten – pole top fire mitigation.	Poles completed	500	0	3300	Program is 100% behind UE forecast. All end-of-life components identified to date are said have been replaced
Replace sets of insulators – pole top fire mitigation.	Number of insulator sets replaced	400	257	3400	Program is 46% behind UE forecast. All end-of-life components identified to date are said to have been replaced
Replace crossarms – pole top fire mitigation.	Number of crossarms replaced	400	0	3000	Program is 100% behind UE forecast. All end-of-life components identified to date are said to have been replaced

Program	Measure	2012 UE forecast	2012 Completed to date	Program target	Comments
Install GFN	Number of zone substations	0	0	7	Program is on target with the UE forecast. Work will not proceed until technical problems have been resolved.
Replace existing SWER lines.	km of existing SWER removed	0	0	44	Program is in line with UE forecast.
Removal of public lighting switchwire.	Spans removed	2412	2521	7236	Program is in line with UE forecast. Switchwire is removed when the adjacent LV crossarms are replaced.
Planned replacement of non-preferred services due to height.	Number of services	9966	8138	12,618	Program is 18% behind UE forecast. All “low” services identified have been rectified.
Planned non-preferred services replacements.	Number of services	52,000	42,963	144,000	Program is 17% behind UE forecast. All services identified as requiring to be replaced have been replaced.
Overhanging trees capex (u/g, line relocation, ABC, etc.)–HBRA	Spans removed	280	0	700	Program is 100% behind UE forecast. Program has been revised. The program is unlikely to remove the original target
Overhanging trees capex (u/g, line relocation, ABC, etc.)– LBRA	Spans removed	11	0	28	Program is 100% behind UED forecast. Program has been revised. The program is unlikely to remove the original target.

Figure 4: United Energy: Progress of safety-related programs



3.5 Safety program status: Jemena

Jemena reported on the progress of 14 safety programs.

Progress on seven of the programs is in line with Jemena's forecast;

- ✓ Replace overhead conductor, mainly steel
- ✓ Replace crossarms, based on age and condition
- ✓ Replace crossarms/insulator sets – pole top fire mitigation
- ✓ Replace existing SWER lines
- ✓ Removal of public lighting switchwire
- ✓ Service line clearance, overhead services requiring undergrounding
- ✓ Install GFN

Progress on four of the programs is ahead of Jemena's forecast;

- ✓ Stake undersized poles
- ✓ Stake poles – based on age and condition
- ✓ Replace poles; based on age and condition
- ✓ Planned replacement of non-preferred services (height)

Progress on three of the programs is behind Jemena's forecast;

- ✓ Service line clearance; overhead services requiring relocation
- ✓ Replace undersized poles
- ✓ Planned non-preferred services replacements

Jemena proposes to replace more power poles than forecast as a greater number of power poles have been assessed as requiring replacement. Likewise based on condition assessment, more crossarms than forecast have been assessed as requiring replacement.

Jemena's ground fault neutraliser (GFN) installation program has been delayed pending resolution of issues associated with GFNs. Jemena will need to ramp up its activity in this program in the current period to ensure that it meets its initial projections.

It is pleasing to see that the programs to stake power poles and replace service cables due to height are well ahead of forecast.

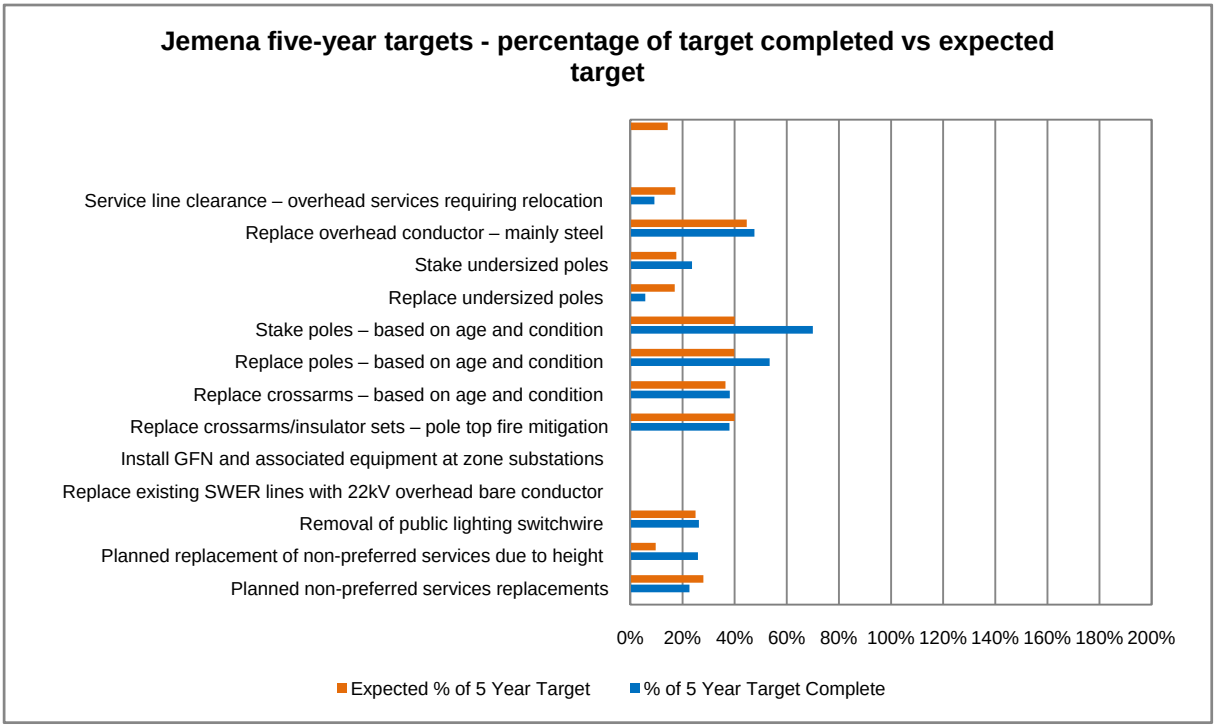
Based on the information provided, and performance to date, for Jemena to achieve all of the original safety programs proposed to the AER and agreed with ESV by the end of 2015, Jemena would need to ramp up its activities in certain programs.

Table 6: Jemena (JEN): Safety program status

Program	Measure	2012 JEN forecast	2012 Completed to date	Program target	Comments
Service line clearance – overhead services requiring undergrounding	Number of services replaced	0	0	672	Program is in line with JEN forecast.
Service line clearance – overhead services requiring relocation	Number of services replaced	30	17	2691	Program is 43% behind JEN forecast.
Replace overhead conductor – mainly steel	km of overhead conductor replaced	50	54	112	Program is in line with JEN forecast.
Stake undersized poles	Number of poles staked	194	261	1100	This program is 34% ahead of JEN forecast. More poles than forecast have been assessed as suitable for staking.
Replace undersized poles	Number of poles replaced	236	82	1385	Program is 65% behind schedule.
Stake poles – based on age and condition	Number of poles staked	446	799	1114	This program is 79% ahead of JEN forecast.
Replace poles – based on age and condition	Number of poles replaced	516	691	1294	This program is 34% ahead of JEN forecast. A larger number of poles than forecast have been assessed as requiring replacement.
Replace crossarms – based on age and condition	Number of crossarms replaced	5146	5386	14,117	This program is in line with JEN forecast. A larger number of crossarms than forecast have been assessed as requiring replacement.
Replace crossarms/insulator sets – pole top fire mitigation	Number of crossarms replaced	1134	1177	2835	Program is in line with JEN forecast.
Install GFN	Number of zone substations	0	0	3	Program is in line with JEN forecast..The program has experienced technical difficulties and it is unlikely that this program will be completed on time.

Program	Measure	2012 JEN forecast	2012 Completed to date	Program target	Comments
Replace existing SWER lines	Km of existing SWER removed	0	0	13	Program is in line with JEN forecast and is planned to start in 2013. Jemena has completed the preparatory work (design and community consultation).
Removal of public lighting switchwire	Spans removed	1274	1339	5100	Program is in line with JEN forecast. Jemena has surveyed its network and identified all of the public lighting switchwire locations.
Planned replacement of non-preferred services due to height	Number of services	387	1034	3987	This program is 167% ahead of JEN forecast.
Planned non-preferred services replacements	Number of services	8400	7394	30,000	Program is 12% behind JEN forecast due to priority being given to the "planned replacement of non-preferred services due to height" program.

Figure 5: Jemena progress of safety-related programs



3.6 Safety program status: SP AusNet Distribution

SP AusNet reported on the progress of 10 safety programs.

Progress on three of the programs is in line with SPA's forecast;

- ✓ Targeted replacement of EDO fuse tubes
- ✓ Pre-emptive replacement of copper conductor

- ✓ Pre-emptive replacement of steel conductor

Progress on seven of the programs is ahead of SPA's forecast:

- ✓ Augment spans (u/g, relocate, ABC) – Overhanging trees in HBRA
- ✓ Replace/upgrade three-phase ACR controllers
- ✓ Replace all SWER OCRs,
- ✓ Targeted bird and animal proofing in HBRA
- ✓ Targeted replacement of EDOs
- ✓ Replace HV pin type insulator sets – pole top fire mitigation
- ✓ Crossarm replacement

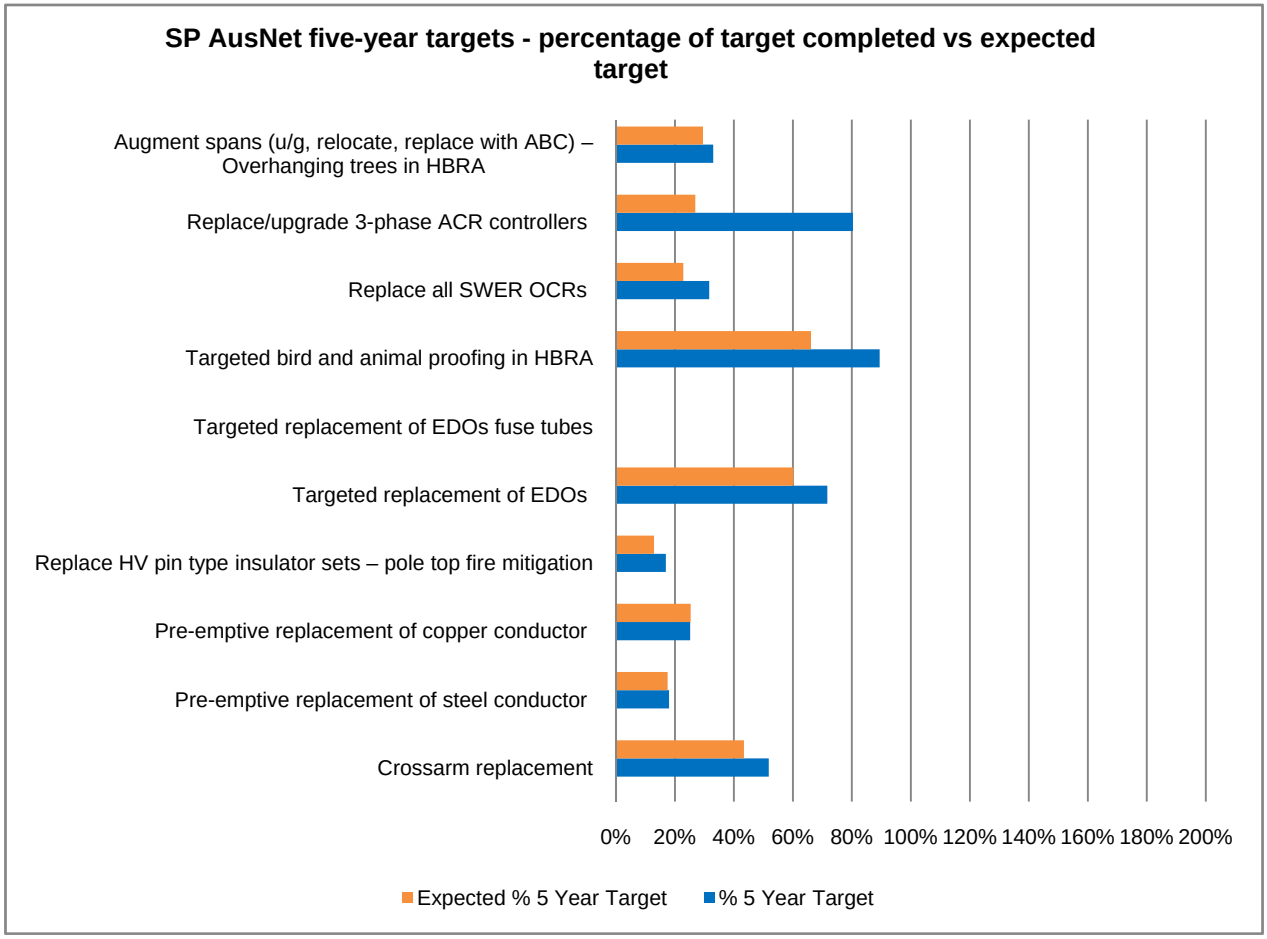
It is pleasing to see that all of the programs are on or ahead of forecast, especially the crossarm and HV fuse replacement programs. The targeted replacement of 11,246 EDO fuse tubes is scheduled to commence in 2013.

Based on the information provided, and performance to date, ESV expects SP AusNet to achieve all of the original safety programs proposed to the AER and agreed with ESV by the end of 2015.

Table 7: SP AusNet Distribution: Safety program status

Program	Measure	2012 SPA forecast	2012 Completed to date	Program target	Comments
Augment spans (u/g, relocate, ABC) – Overhanging trees in HBRA	Number of spans	590	660	2000	Program is 12% ahead of SPA forecast.
Replace/upgrade 3-phase ACR controllers	Number of units upgraded /replaced	56	188	234	Program is 235% ahead of SPA forecast.
Replace all SWER OCRs	Number of OCRs replaced	120	166	525	Program is 38% ahead of SPA forecast.
Targeted bird and animal proofing in HBRA	Number of asset sites fauna proofed	3968	5366	6000	Program is 35% ahead of SPA forecast.
Targeted replacement of EDO fuse tubes	Number of EDO fuse tubes replaced	0	0	11,246	Program is yet to commence.
Targeted replacement of EDOs	Number of EDOs replaced	6515	7761	10,825	Program is 19% ahead of SPA forecast.
Replace HV pin type insulator sets – pole top fire mitigation	Number of insulator sets replaced	730	956	5650	Program is 31% ahead of SPA forecast.
Pre-emptive replacement of copper conductor	Kilometres of conductor	72	72	284	Program is in line with SPA forecast.
Pre-emptive replacement of steel conductor	Kilometres of conductor	310	319	1771	Program is 3% ahead of SPA forecast.
Crossarm replacement	Number of crossarms replaced	20,302	24,253	46,785	Program is 19% ahead of SPA forecast.

Figure 6: SP AusNet Distribution progress of safety-related programs



4 Directions and exemptions

Following the acceptance by government of the recommendations made by the 2009 Victorian Bushfires Royal Commission, ESV issued a number of directions to the distribution MECs to improve the safety of overhead powerlines. These directions, and other changes made following Black Saturday, required the distribution MECs to initiate changes to their asset management programs. Additional changes were also made to Electric Line Clearance Regulations in 2010. As many of the altered regulatory requirements could not be met immediately ESV issued exemptions and approved a transition program designed to ensure that staged compliance could be achieved within the approved timeframe, ranging from three to five years.

The progress of exemption and direction programs is reported to ESV quarterly. It is reviewed and audited regularly as part of the formal, annual BFM, ELC and ESMS audit programs and informally during quarterly ESMS steering committee meetings with each of the MECs.

ESV has granted Citipower three exemptions from current regulatory requirements. It is pleasing to note that the program for overhanging trees has been successfully completed. Programs relating to cyclic vegetation powerline clearing were either in line with, or only marginally behind, ESV's projection for the period.

Based on the information provided to date, for CitiPower to achieve these exemption targets agreed with ESV CitiPower will need to ramp up its activities from the progress reported to date.

Powercor was issued with a number of VBRC-related directions by ESV associated with bushfire mitigation. One direction was completed, however progress on three of the directions was behind target.

At the start of the period Powercor had four exemptions from current regulatory requirements. One has been successfully completed, one was on target and two programs were well behind ESV projections.

Based on the information provided to date, for Powercor to achieve all of the agreed ESV exemption and direction targets Powercor will need to ramp up its activities from the progress reported to date.

In August 2012, CitiPower and Powercor notified ESV that they had delayed their line clearance programs and in December 2012, applied for an amendment to the exemption that had been granted by ESV. The progress of their cyclic clearing programs to December 2012 was found to be consistent with the revised completion percentages contained in the application, and it became apparent that both CitiPower and Powercor would not achieve the original targets for these exemptions.

United Energy was issued with three VBRC-related directions by ESV associated with bushfire mitigation. It is pleasing to report that progress on all VBRC-related programs is well ahead of United Energy's initial projections.

At the start of the period United Energy had five exemptions from current regulatory requirements and associated programs and these are all on or ahead of United Energy's initial projections.

Based on the information provided to date, ESV expects United Energy to achieve all of the agreed ESV exemption and direction targets.

Jemena was issued with three VBRC-related directions by ESV associated with bushfire mitigation. Progress on these programs is broadly line with Jemena's initial projections, with the direction relating to the survey of HV spans complete, the fitting of vibration dampers ahead of projection and the fitting of armour rods slightly behind those projections.

Jemena has provided a revised forecast of the volume of vibration dampers and armour rods to be installed based on the results of its inspection program and ESV expects that Jemena will achieve the revised safety program forecasts within the agreed timeframe.

At the start of the period Jemena had three exemptions from current regulatory requirements and associated programs. One of these programs was ahead and two were progressing in line with Jemena's projections.

Based on the information provided to date, ESV expects Jemena to achieve all of the agreed ESV exemption and direction targets.

SP AusNet was issued with three VBRC-related directions by ESV associated with bushfire mitigation. Progress on these programs is broadly in line with SP AusNet's initial projections, with the direction relating to the fitting of vibration dampers and armour rods largely in line with projections and the survey of HV spans scheduled to commence in 2013.

At the start of the period SP AusNet had three exemptions from current regulatory requirements and associated programs. Two of these programs were progressed in line with the SP AusNet projections. The program for the cyclic clearing of bare powerlines in low bushfire risk areas was behind the projection for the period, but it is understood to now be on track.

Based on the information provided to date, ESV expects SP AusNet to achieve all of the agreed ESV exemption and direction targets.

4.1 Directions and Exemptions: CitiPower

CitiPower currently has no areas of its network classified by the CFA as High Bushfire Risk. Consequently ESV did not undertake a bushfire mitigation audit on CitiPower in 2012.

CitiPower notified ESV that it had delayed its line clearance program and in December 2012 applied for an amendment to the exemption granted, seeking to extend the completion date by one year.

The progress of cyclic clearing to December 2012 was found to be consistent with the revised completion percentages contained in the application. CitiPower reported on the progress of three exemptions.

Progress on one of the exemptions is behind target:

- ✓ Cyclic clearing – ABC or insulated cable

Progress on one of the exemptions is on target:

- ✓ Cyclic clearing – Powerlines

Progress on one exemption is complete:

- ✓ Overhanging trees (cut) – completed in 2011

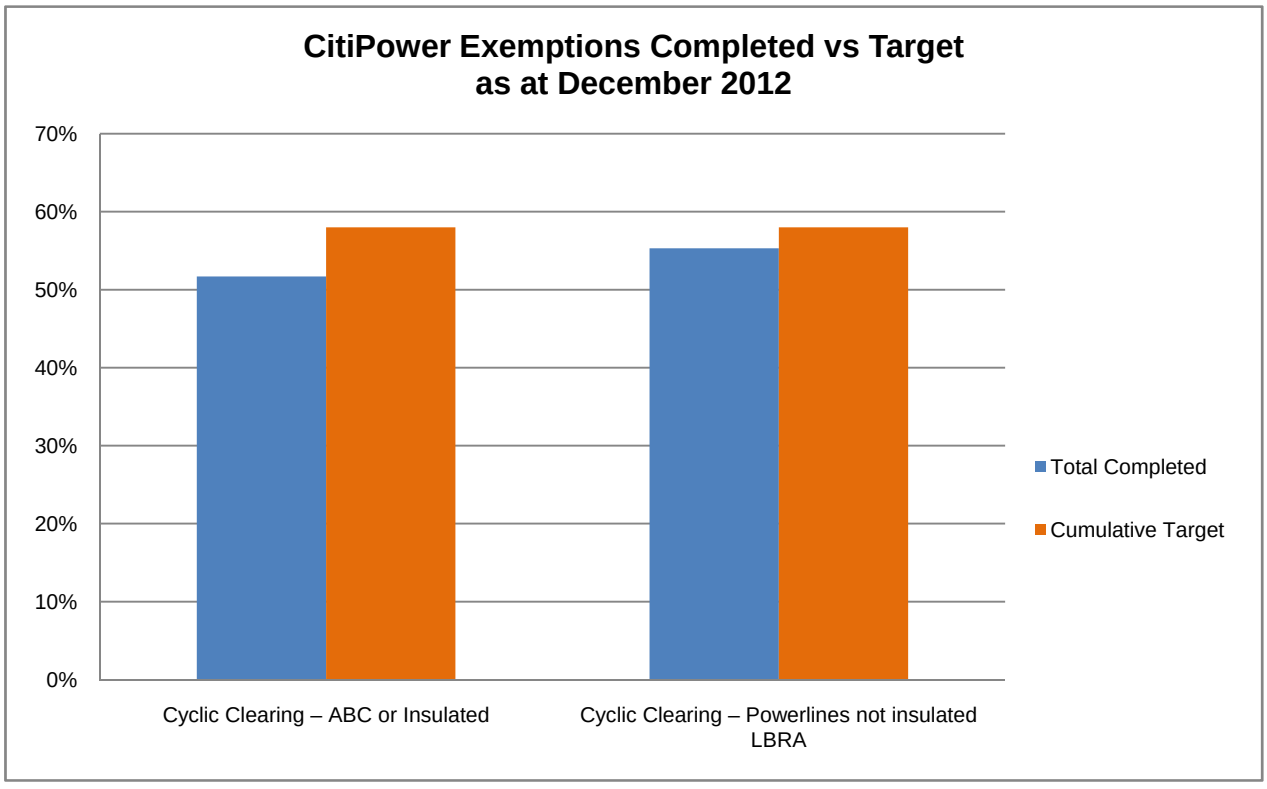
While the cyclic clearing program, ABC or insulated cable is marginally behind schedule. ESV is satisfied that this does not result in an increased safety risk.

Based on the information provided, and performance to date, ESV expects that CitiPower will meet the targets agreed with ESV.

Table 8: CitiPower: Exemptions status

Program	Measure	2012 Target to date	2012 Completed to date	Program Target	Comments
Cyclic clearing – ABC or insulated cable	Per cent of spans	58%	52%	100%	Program is 11% behind schedule.
Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)	Per cent of spans	58%	55%	100%	Program is 5% behind schedule.
Overhanging trees (cut)	Per cent of spans	100%	100%	100%	Program was completed in 2011. Not included in graph.

Figure 7: CitiPower: Progress of exemptions



4.1 Directions and exemptions: Powercor

The 2012 bushfire mitigation audit concluded that Powercor:

- had amended its design standards to include the installation of armour rods and vibration dampers as directed
- is currently ahead of its targets for site inspections
- installation of armour rods and vibration dampers is currently behind target, however, Powercor advise that a tender is being let for this work; and
- personnel at the depots were aware of the process for rolling out the programs to achieve directions and exemptions.

Powercor reported on the progress of three directions and four exemptions.

Progress on two exemptions is behind target and one has been completed:

- ✓ Cyclic clearing – ABC or insulated cable (all areas)
- ✓ Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)
- ✓ Overhanging trees (cut) – completed in 2011

Progress on one exemption is on target:

- ✓ Cyclic clearing – Powerlines other than ABC or insulated cable (HBRA)

Progress on three of the directions is behind target:

- ✓ Survey of HV spans (clearances) – HBRA
- ✓ Vibration dampers – HBRA
- ✓ Armour rods – HBRA

Powercor notified ESV that it had delayed its powerline clearance program and in December 2012 applied for an amendment to the exemption granted, seeking to extend the completion date by one year. The progress of cyclic clearing to December 2012 was found to be consistent with the revised completion percentages contained in the application.

Powercor's directions program commenced with inspection and assessment of each HV span in HBRAs. The installation targets were set prior to the detailed development of the project and were based on an estimate using a small sample. Information received from Powercor indicates that they may have overestimated the number of vibration dampers and armour rods to be installed. Powercor confirmed that armour rods and vibration dampers will be fitted at all locations as required. Were this to be the case then progress currently measured as behind target may not translate to the direction being completed in the time specified. ESV is mindful that if the funded quantities of armour rods and vibration dampers are accurate then the direction may not be completed as required.

ESV notes that Powercor is behind schedule on the direction relating to the space between HV and HV circuits. It is ESV's view that the failure to complete this program as forecast may have adverse safety implications.

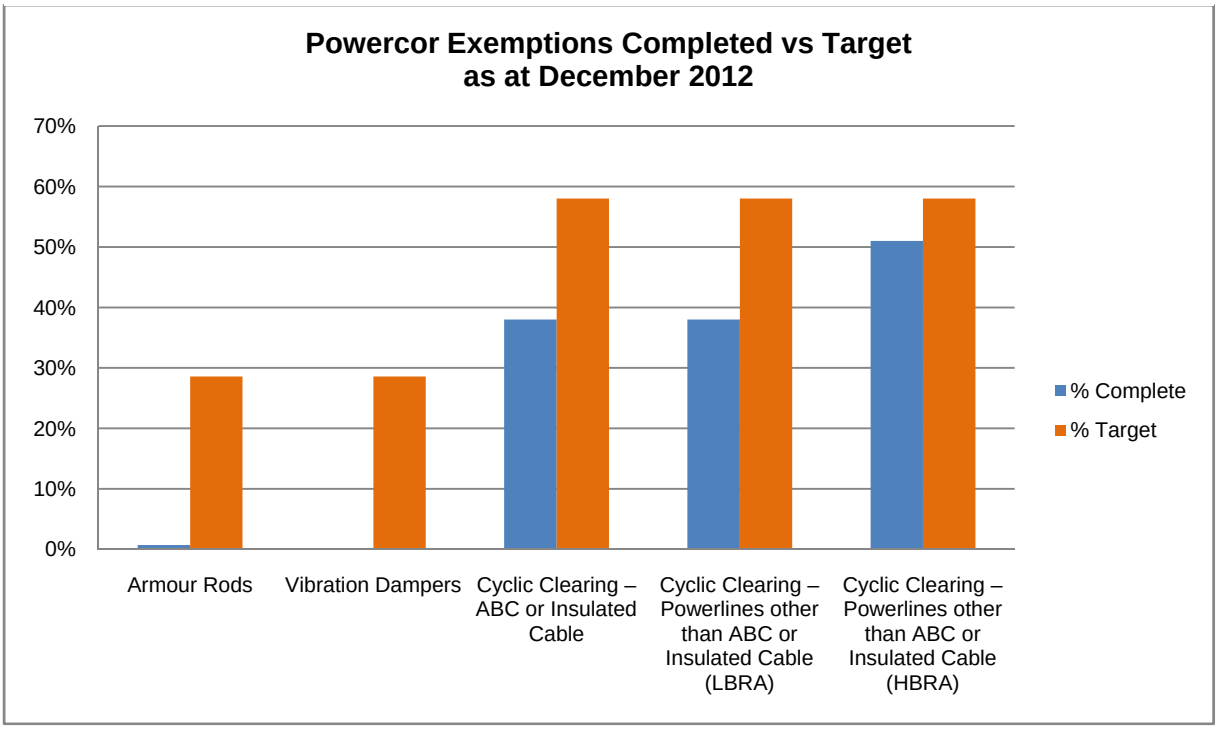
In April 2012, ESV directed Powercor to install sufficient SWER ACRs to eliminate the need to attend and manually suppress the automatic reclose function on any SWER powerline in the worst fire consequence areas of its network. Powercor complied and installed 178 new electronic SWER ACRs controlling the 179 SWER lines in the highest risk areas.

Based on the information provided, and performance to date, for Powercor to achieve all of the agreed ESV exemption and direction targets Powercor will need to ramp up its activities from the progress reported to date.

Table 9: Powercor: Directions and exemptions status

Program	Measure	2012 Target to date	2012 Completed to date	Program target	Comments
Survey of HV spans (clearances) - HBRA	Spans surveyed	0	0	No information provided	Program is 100% behind schedule. PAL did not provide a progress report.
Vibration dampers - HBRA	Number of spans	56,200	48	196,700	Program is 100% behind schedule. PAL did not provide a progress report.
Armour rods - HBRA	Number of spans	5,800	60	20,300	Program is 100% behind schedule. PAL did not provide a progress report.
Cyclic clearing – ABC or insulated cable (all areas)	Per cent of spans	58%	36%	100%	Program is 35% behind schedule. PAL has requested an extension of time to complete its program and the request is being reviewed by ESV.
Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)	Per cent of spans	58%	38%	100%	Program is 35% behind schedule. PAL has requested an extension of time to complete its program and the request is being reviewed by ESV.
Cyclic clearing – Powerlines other than ABC or insulated cable (HBRA)	Per cent of spans	58%	51%	100%	Program is on schedule. PAL has requested an extension of time to complete its program and the request is being reviewed by ESV.
Overhanging trees (cut)	Per cent of spans	100	100	100	Program was completed in 2011. Not included in graph.

Figure 8: Powercor progress of directions and exemptions



4.2 Directions and exemptions: United Energy

The 2012 Bushfire Mitigation Audit concluded that:

- UE's design standards include the installation of armour rods and vibration dampers as directed
- UE issued instructions to the field, bulletin in June 2012, regarding the installation of armour rods and vibration dampers
- line workers were aware of the project and the requirements for the installation of armour rods and vibration dampers on all overhead steel spans greater than 300m, and
- programs for the installation of armour rods and vibration dampers were on schedule.

United Energy reported on the progress of three directions and five exemptions.

Progress on one exemption is on target:

- ✓ Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)

Progress on three directions and four exemptions is ahead of target:

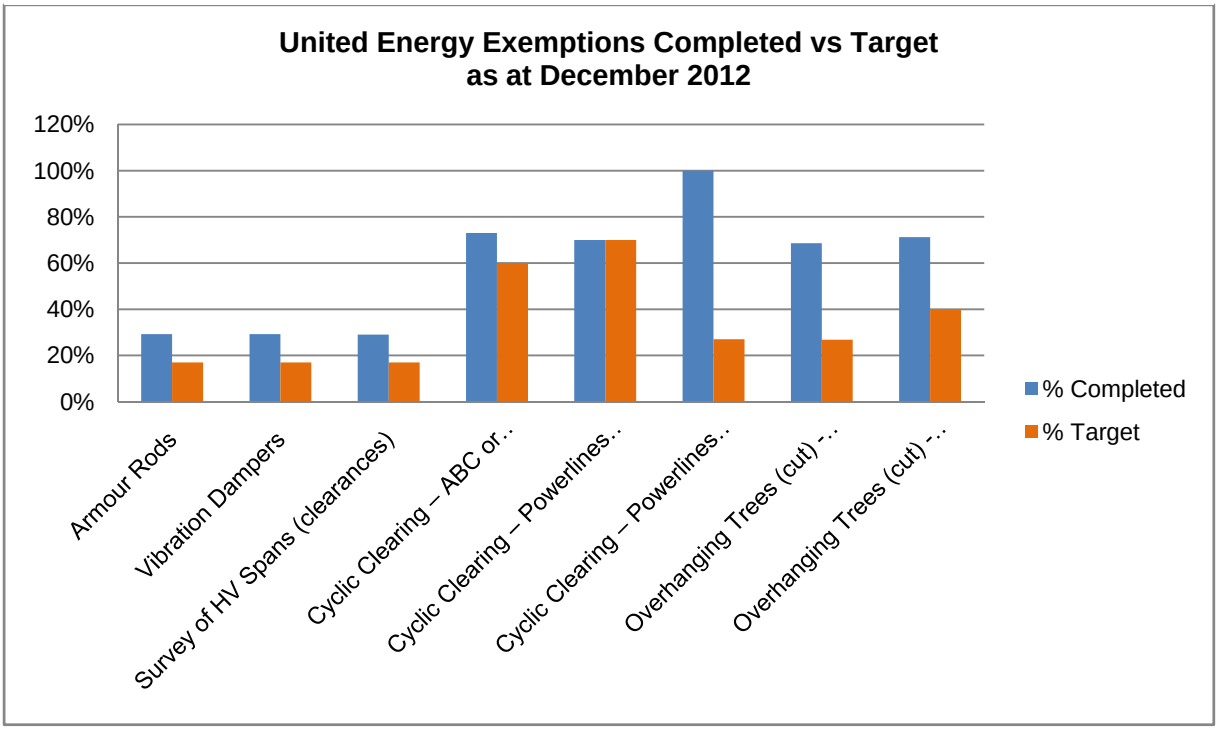
- ✓ Survey of HV Spans
- ✓ Fitting of vibration dampers (HBRA)
- ✓ Fitting of armour rods (HBRA)
- ✓ Cyclic clearing – ABC or insulated cable (all areas)
- ✓ Cyclic clearing – Powerlines other than ABC or insulated cable (HBRA)
- ✓ Overhanging Trees (cut) - Powerlines other than ABC and insulated cables (LBRA)
- ✓ Overhanging Trees (cut) - Powerlines other than ABC and insulated cables (HBRA)

Based on the information provided to date, ESV expects United Energy to achieve all of the targets agreed with ESV.

Table 10: United Energy: Directions and Exemptions Status

Program	Measure	2012 Target to date	2012 Completed to date	Program Target	Comments
Fitting of vibration dampers (HBRA)	Number of spans surveyed	3332	5737	19,602	Program is 72% ahead of schedule.
Fitting of armour rods (HBRA)	Number of spans surveyed	3332	5737	19,602	Program is 72% ahead of schedule.
Survey of HV spans (clearances)	Number of spans surveyed	3332	5737	19,602	Program is 72% ahead of schedule.
Cyclic clearing – ABC or insulated cable (all areas)	Per cent of spans	60%	73%	100%	Program is 22% ahead of schedule.
Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)	Per cent of spans	70%	70%	100%	Program is on schedule
Cyclic clearing – Powerlines other than ABC or insulated cable (HBRA)	Per cent of spans	27%	100%	100%	Program is 270% ahead of schedule
Overhanging Trees (cut) - Powerlines other than ABC and insulated cables (LBRA)	Number of spans	88	225	328	Program is ahead of schedule. This program is not graphed.
Overhanging Trees (cut) - Powerlines other than ABC and insulated cables (HBRA)	Number of spans	1120	1995	2800	Program is ahead of schedule. This program is not graphed.

Figure 9: United Energy Progress of Directions and Exemptions



4.3 Directions and exemptions: Jemena

The 2012 bushfire mitigation audit concluded that:

- Jemena's line construction manual includes the installation of armour rods and vibration dampers;
- Jemena's line workers understand the policy and procedures covering the installation of armour rods and vibration dampers on all overhead steel spans greater than 300m; and
- the program for the installation of armour rods and vibration dampers is on schedule

Jemena reported on the progress of two directions and three exemptions.

Progress on two directions is on target:

- ✓ Fitting of armour rods (HBRA)
- ✓ Fitting of vibration dampers (HBRA)

Progress on two of the exemptions is on target:

- ✓ Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)
- ✓ Cyclic clearing – Powerlines other than ABC or insulated cable (HBRA)

Progress on one of the exemptions is ahead of target:

- ✓ Cyclic clearing – ABC or insulated cable (all areas)

Jemena also had an annual program to confirm that all of the required spacers were in place and functional prior to 1 November. Progress on this program was not reported to ESV.

The program to fit armour rods was found to be on target despite fewer armour rods being fitted than forecast. Asset inspection identified that fewer armour rods were required and Jemena had over-estimated the number of spans that required remediation. Were this to be the case then progress currently measured as behind target may not translate to the direction being completed in the time specified. ESV is however mindful that if the initially funded quantities of

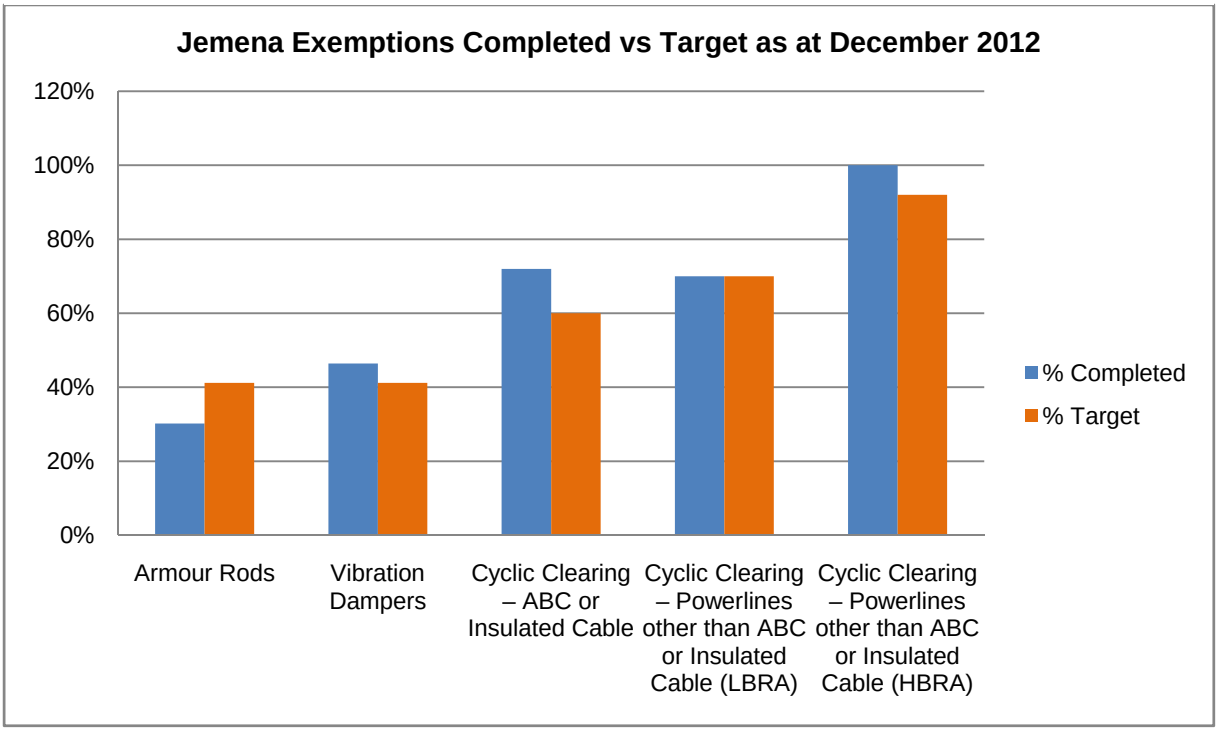
armour rods and vibration dampers were accurate that with the current progress being behind schedule the direction may not be completed as required.

Based on the information provided to date, ESV expects Jemena to achieve all of the targets agreed with ESV.

Table 6: Jemena: Directions and exemptions status

Program	Measure	2012 Target to date	2012 Completed to date	Program target	Comments
Fitting of armour rods (HBRA)	Number of spans	2100	1539	5100	Program is on schedule. Jemena over-estimated the number of spans that required armour rods, the forecast number of amour rods may not be achieved.
Fitting of vibration dampers (HBRA)	Number of spans	2100	2367	5100	Program is on schedule
Cyclic clearing – ABC or insulated cable (all areas)	Per cent of spans	60%	72%	100%	Program is 20% ahead of schedule
Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)	Per cent of spans	70%	70%	100%	Program is on schedule
Cyclic clearing – Powerlines other than ABC or insulated cable (HBRA)	Per cent of spans	92%	100%	100%	Program is 8% ahead of schedule

Figure 10: Jemena progress of directions and exemptions



4.4 Directions and exemptions: SP AusNet

The 2012 Bushfire Mitigation Audit concluded that:

- SP AusNet's design standard include the installation of armour rods and vibration dampers, as directed by ESV
- SP AusNet issued an instruction to field staff, bulletin in June 2012, regarding the installation of armour rods and vibration dampers
- line workers were aware of the project and the requirements for the installation of armour rods and vibration dampers on all overhead steel spans greater than 300m; and
- the program for the installation of armour rods and vibration dampers was on schedule.

SP AusNet reported on the progress of three directions and three exemptions.

Progress on the three directions is on target

- ✓ Fitting of armour rods (HBRA)
- ✓ Fitting of dampers (HBRA)
- ✓ Fitting of HV spacers (HBRA)

Progress on two of the exemptions is on target:

- ✓ Cyclic clearing – ABC or insulated cable (all areas)
- ✓ Cyclic clearing – Powerlines other than ABC or insulated cable (HBRA)

Progress on one of the exemptions was behind target at the end of 2012, but is now back on target:

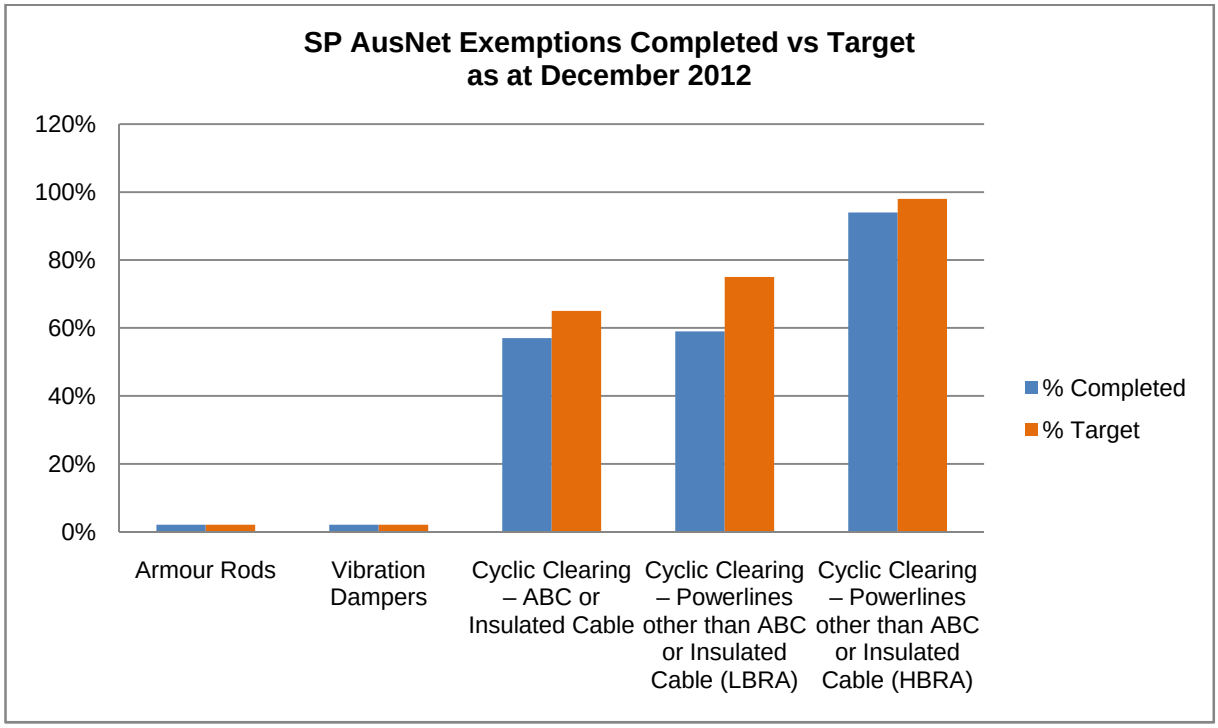
- ✓ Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)

Based on the information provided to date, ESV expects SP AusNet to achieve all of the targets agreed with ESV.

Table 7: SP AusNet: Directions and exemptions status

Program	Measure	2012 Target to date	2012 Completed to date	Program target	Comments
Fitting of armour rods (HBRA)	Number of spans	1300	1264	59,645	Program is on schedule.
Fitting of vibration dampers (HBRA)	Number of spans	1300	1264	59,645	Program is on schedule.
Fitting of HV spacers (HBRA)	Number of spans	0	0	50	Program is on schedule to commence in 2013. Survey of 10,242 spans has forecast that 50 spans need to be addressed.
Cyclic clearing – ABC or insulated cable (all areas)	Per cent of spans	65%	57%	100%	Program is 8% behind schedule.
Cyclic clearing – Powerlines other than ABC or insulated cable (LBRA)	Per cent of spans	75%	59%	100%	This program is 16% behind schedule due to priority being given to cyclic clearing in HBRA. Schedule was recovered by February 2013.
Cyclic clearing – Powerlines other than ABC or insulated cable (HBRA)	Per cent of spans	98%	100%	100%	Program is 2% ahead of schedule.

Figure 11: SP AusNet progress of directions and exemptions

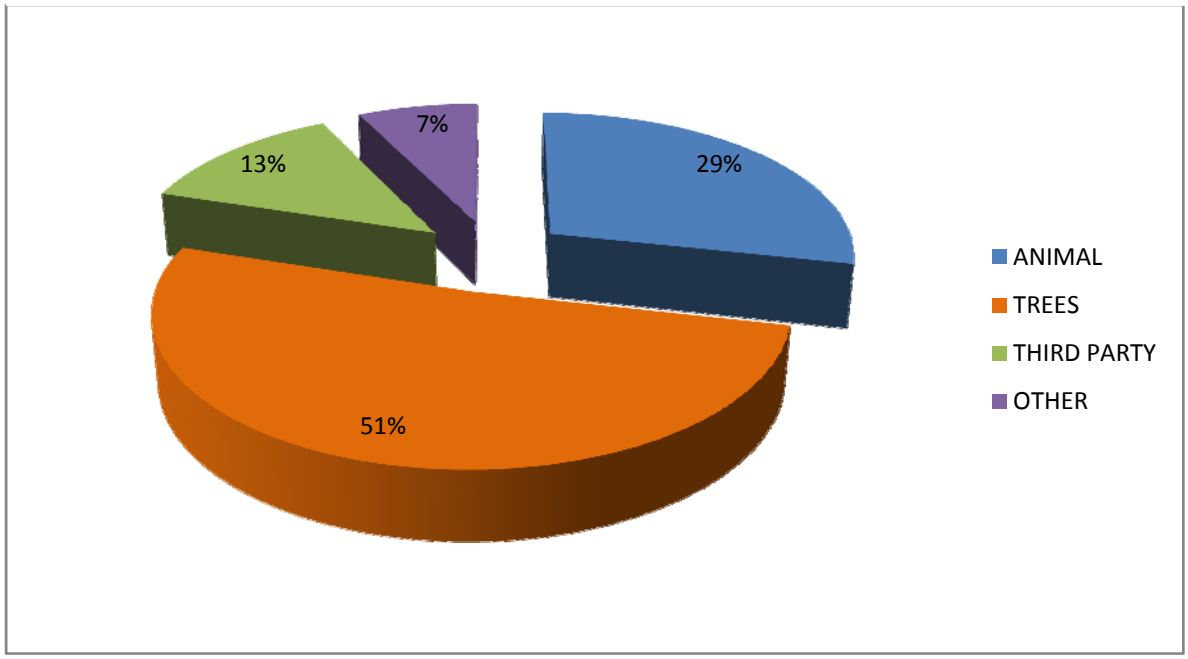


4.5 Trees

An emerging issue for the industry is the community reaction in certain localities to the extent of consultation and the degree of tree cutting required to achieve vegetation clearance around powerlines. ESV has raised these concerns directly with the relevant distribution MECs, and expects to see them addressed in the 2013 Electric Line Clearance Plans, currently being reviewed by ESV. Another issue for the industry is the management by other responsible persons of non-compliant trees around powerlines, in particular by municipal councils in areas where they are the responsible person.

In 2012, contact with network assets initiated a total of 109 fires in vegetation with 56 (50 per cent) of these due to contact with trees.

Figure 12: Vegetation fires started by contact with network assets



Information provided by the distribution MECs indicates that a high number of trees caused outages in the SP AusNet region and a high number of trees require pruning in the United Energy region. Information provided to ESV indicates that in some areas these figures may not be complete and there may be many more trees in close proximity to powerlines that go unreported to ESV.

Table 8: Tree contact with powerlines

Item	Total	CitiPower	Powercor	Jemena	United Energy	SP AusNet
Trees caused outage	3481	17	84	67	650	2663
Trees requiring urgent pruning	3506	3	21	0	2129	378

ESV has initiated a program to improve the reporting of electric line clearance by distribution MECs and other responsible persons, across the state to test, challenge, expose and improve the safety of electric lines near “vegetation”.

5 Safety indicators: Network

ESV reports on data that provides an indication of the safety performance of the Victorian electricity industry.

Lead indicators:

- progress of the distribution MECs' safety programs
- progress of directions placed on the distribution MECs
- management of exemptions granted to the distribution MECs; and
- degree of MEC compliance (ESMS, BFM, ELC) identified by ESV audits.

Lag indicators:

- number of fires started by the MEC assets, particularly in HBRAs
- effectiveness of MEC powerline maintenance programs in preventing asset failures and fires, particularly in HBRAs
- extent to which community safety was impacted by persons infringing the No Go Zone limits or gaining unauthorised access to the MEC assets; and
- number and severity of electrical incidents attributable to MEC assets.

5.1 Fires caused by network assets

The operation or failure of electrical distribution network assets have the potential to initiate fires. The probability and consequence of the fire initiation is a function of the physical location of the fire source, the surrounding vegetation and the prevailing weather conditions; wind speed, wind direction, humidity and temperature.

The MECs reported that in 2012:

1. A total of 233 fires were started in vegetation due to electricity distribution asset failures or contact with electricity distribution assets, and one fire was started by transmission assets. Of these, 122 fires were started in HBRA. This is an increase on the 72 vegetation fires started in the HBRA in 2010 and 59 fires started in the HBRA in 2011.

2. A total of 124 asset failures resulted in vegetation fires, 25 fires were started by electrical distribution power pole and crossarm failures and 19 fires were started by HV fuse failures. This is an increase on the 42 vegetation fires started by asset failures in 2011.

3. Tree contact with powerlines resulted in 56 vegetation fires.

4. A further 410 asset failures resulted in an asset fire, 168 fires were started by electrical distribution power pole and crossarm failures and 104 fires were started by HV fuse failures. This is an increase on the 299 fires started by asset failures in 2011.

5. There were a further 1140 asset failures that did not result in a fire, 382 were due to electrical distribution power pole and crossarm failures and 162 were due to HV fuse failures. This is an increase on the 778 asset failures in 2011.

6. Vegetation contact with overhead powerlines caused 3352 outages in LBRA and 129 outages in HBRA. This data was not collected in previous years, so no comparison is available.

7. Urgent pruning was required on 3422 trees in LBRA and 84 trees in HBRA. This data was not collected in previous years, so no comparison is available.

Table 9: Distribution business asset failures and fires

Item	Total	CitiPower	Powercor	Jemena	United Energy	SP AusNet
Asset failure, no fire	1140	62	404	115	205	354
Asset failure, asset fire, no vegetation fire	410	27	186	23	52	122
Asset failure, vegetation fire	124	3	73	2	20	26
Vegetation fires from contact with assets	109	5	50	12	12	30

Table 10: Transmission business fires

Item	Total	SP AusNet	Basslink
Grass/vegetation fires	1	1	0

Early indications are that this trend has continued into the first quarter of 2013.

5.2 Overhead powerline maintenance

MECs have established powerline maintenance programs to reduce the probability of powerline assets creating a safety hazard or starting fires. These programs address:

- conductor failure, complete or partial separation of electric wires
- pole failure, leaning or fallen conductor support structure to the point where the live conductors have become a hazard
- neutral service cable connection failure, complete or partial separation of electric wires or an increase in the impedance of the service cable connection
- crossarm failure, complete or partial deterioration of the crossarm wood to the point where the live conductors have become a hazard
- HV fuse failure, complete or partial failure of any of the components of the fuse assembly; and
- Bushfire mitigation (Bushfire Mitigation Index), status of the components most commonly associated with fire ignition.

With all the effort that has been put into condition assessment and asset replacement over the past few years, ESV would expect to see a reduction in the number of asset failures. Despite targeted programs, the number of asset failures has not reduced, especially power pole top and

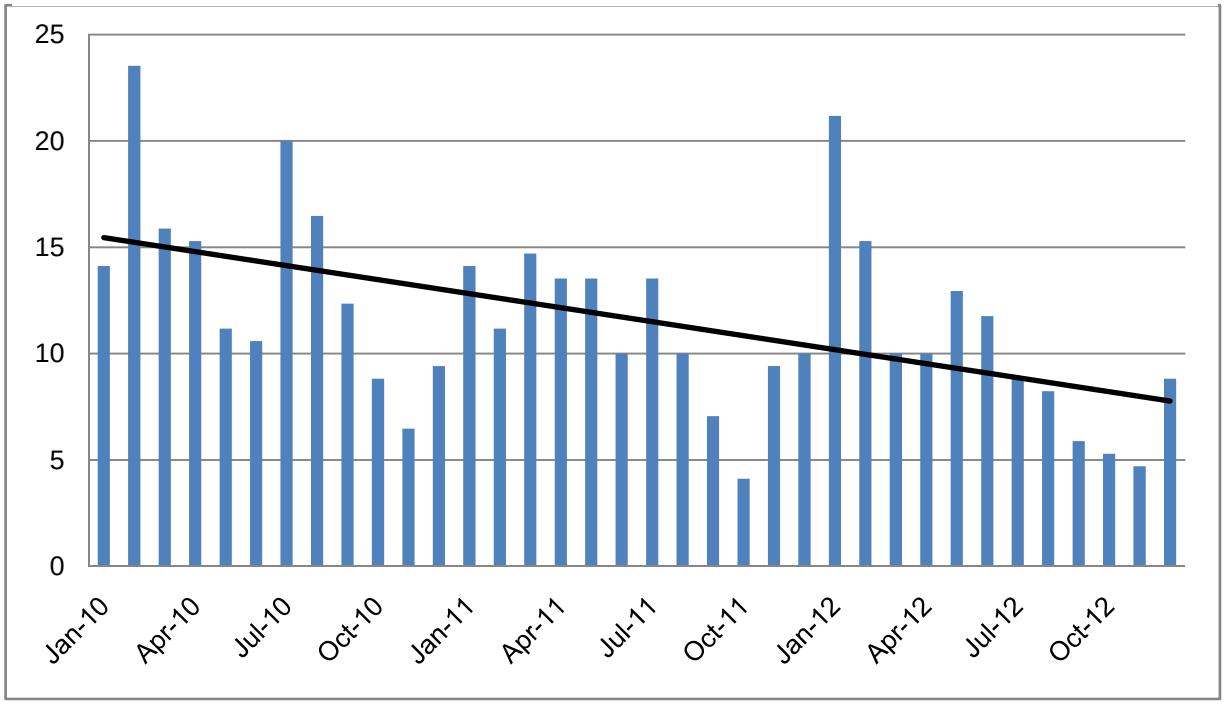
HV fuse assets that remain high and a major cause of asset and vegetation fires. To reduce the failure rate of these assets, and the continuing risk to the community and its employees, the industry may need to review its risk-based and condition-based assessment techniques for the replacement of assets that are approaching the end of their useful life.

There were 147 conductor failures in 2012, a failure rate of one conductor failure per 1067km of overhead powerline per annum, compared with 126 conductor failures in 2011 and 129 conductor failures in 2010. Due to the comparative length of overhead powerlines, most of the conductor failures occurred on the Powercor network (48) and SP AusNet network (57), noting that the Powercor network is 70 per cent longer than the SP AusNet network. The increase is not considered to be significant or an increasing trend based on three years of data.

There were 36 power pole failures in 2012, a failure rate of one power pole failure per 33,750 power poles per annum compared with 17 power pole failures in 2011 and 24 power pole failures in 2010. Due to the comparative length of overhead powerlines, most of the power pole failures occurred on the Powercor network (18) and SP AusNet network (13). This appears to be consistent with the Powercor network having 40 per cent more power poles than the SP AusNet network. The increase is not considered to be significant or an increasing trend based on three years of data.

Neutral service cable connection failures increased marginally to 346 in 2012, compared with 314 in 2011 and 355 in 2010. Generally only the neutral connection failures that involve electric shock are brought to ESV's attention. There are probably many more neutral connection incidents that are not reported to ESV. This increase is not considered to be significant or indicating any trend based on the past three years of data. Analysis of additional data provided by the distribution MECs indicates that service cable connection incidents are in fact trending downwards as a result of the distribution MECs' inspection, testing and smart meter installation programs.

Figure 13: Service connection incidents



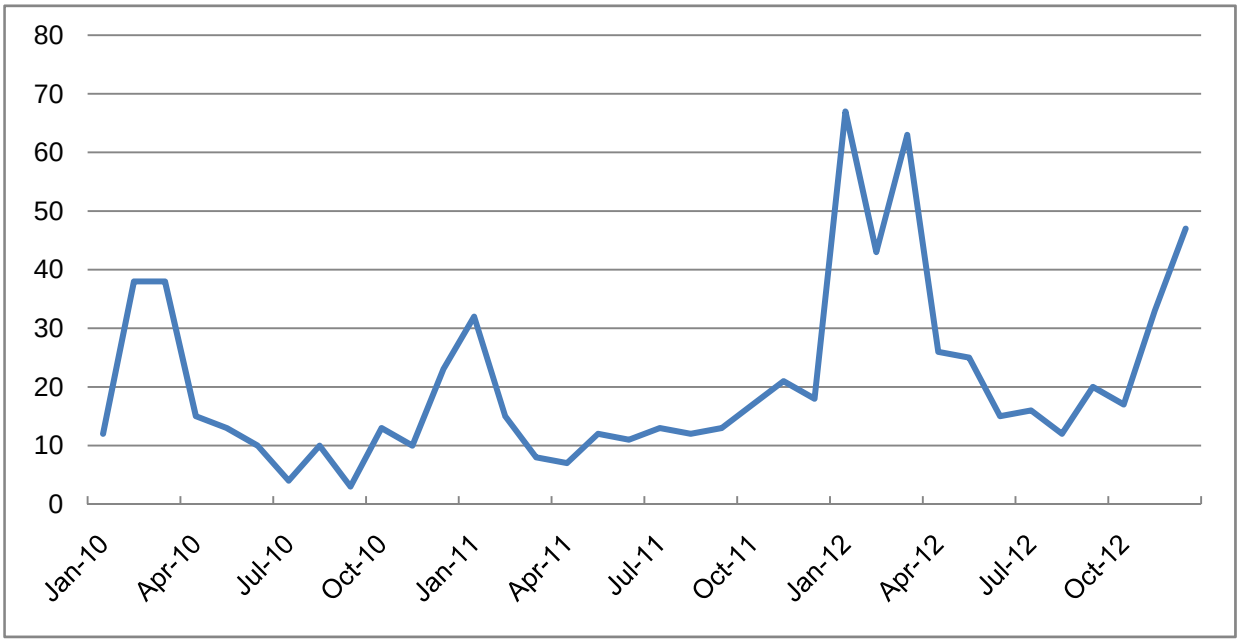
There were a total of 539 crossarm failures in 2012 compared with 328 in 2011. Due to the comparative length of overhead powerlines, most of the crossarm failures occurred on the Powercor (232), SP AusNet (107) and United Energy (115) networks. The numbers of crossarm failures for United Energy appears proportionately high for the number of power poles in their network.

Despite all of the recent effort being put into the crossarm replacement program, crossarm failures do not appear to be reducing. This trend has also continued into the first quarter of 2013. The industry need to review its risk-based and condition-based assessment techniques for the replacement of crossarms.

There were 285 HV fuse failures in 2012. HV fuse failure statistics were not collected separately in previous years so a comparison of performance cannot be made. Most of the HV fuse failures occurred on the Powercor (167) and the SP AusNet (104) networks. This appears to be consistent with the Powercor network being 70 per cent longer than the SP AusNet network. Despite all of the effort being put into the HV fuse program recently, the number of HV fuse failures remains high. This trend has continued into the first quarter of 2013. One distribution MEC has moved from its previous condition-based replacement regime to a complete asset type replacement and ESV is of the view that the industry as a whole needs to review its risk-based and condition-based assessment techniques for the replacement of HV fuses.

Analysis of asset failures over the past three years indicates that HV fuse, crossarm and power pole failures increase over the summer period. The figure below shows the increase in these failures for the past three years.

Figure 14: Asset failure: HV fuses, crossarms and poles



ESV notes that SP AusNet is the only electrical distribution MEC to report a reduction in the number of crossarm failures and a very low number of crossarm fires.

The bushfire mitigation index (BMI) provides stakeholders with a simple indication of the readiness of each distribution MEC for the upcoming fire season. Each distribution MEC has its own method for calculating the BMI, which is expected to be zero for the entire summer fire season. There were a total of 166 days where the Powercor BMI was above zero while all other distribution MECs achieved the zero target. Powercor reports that the result reflects the fact that maintenance could not be completed on a small number of power poles isolated by maturing crops and flood waters. At the end of 2012 the Powercor BMI was approximately 0.4 and ESV is satisfied that this did not result in an increased fire risk.

Table 11: Powerline Maintenance by Distribution MEC

Item	Total	CitiPower	Powercor	Jemena	United Energy	SP AusNet
Pole top failure	539	37	232	31	115	107
Conductor failure	147	6	48	17	19	57
Pole failure	36	2	18	0	3	13
HV fuse failure	285	4	167	0	9	104
Neutral service cable connection failure	346	14	62	57	79	134
Number of days BMI > 0	166	0	166	0	0	0
Average BMI over bushfire season (166 days)	0	0	1.9	0	0	0

Table 12: Powerline maintenance by transmission business

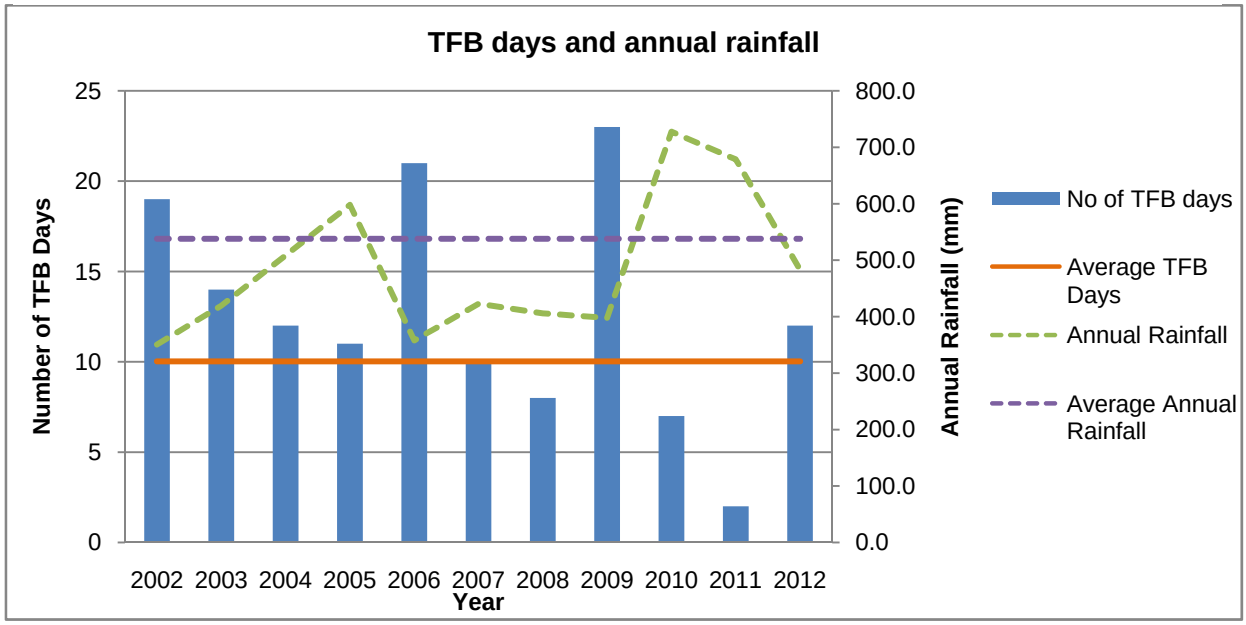
Item	Total	SP AusNet	Basslink
Conductor failure	0	0	0
Tower failure	0	0	0

Of the 233 fires started in vegetation, a total of 123 fires (53 per cent) occurred in the Powercor region and 56 fires (24 per cent) occurred in the SP AusNet region. Powercor and SP AusNet's networks are more exposed to fire risk than the other distribution MEC due to the prevailing geography (HBRAs), environmental conditions, service area and length of rural electrical distribution networks.

Of the total of 186 fires on electrical distribution power poles or crossarms, 126 fires (68 per cent) occurred in the Powercor region and 31 fires (17 per cent) occurred in the United Energy region. Powercor and United Energy's networks are more exposed to power pole top fires than the other distribution MECs due to the proximity of assets to the coast, environmental conditions, and weather conditions.

In addition to network performance, weather conditions influence the number of fires that may be initiated. The weather in 2012 was hotter and drier than the previous two years, with more TFB days. Some of the increase in the number of fires in both vegetation and power poles/crossarms can be attributed to the prevailing weather conditions over the 2012 summer increasing the probability of fire ignition.

Figure 15: Number of TFB Days declared by CFA and annual rainfall data



[Melbourne Airport; recent data from the Bureau of Meteorology; annual rainfall, the number of TFB days declared by the CFA (used as a proxy to indicate dry conditions) and the long-term (40-year) averages.]

Compared with the five-year average figure for fire starts, the number of fires experienced in 2010 and 2011 was low. The number of fires reported in 2012 is closer to, but still below, the five-year average.

This is supported by the f-factor figures released by the distribution MECs indicating that the number of fire starts in 2012 was 20 per cent below the five-year average target of 807 set by the AER.

While it is recognised that weather conditions influenced the number of fires that were initiated in 2012, asset failures were a major contributor. Asset failures all have the potential to initiate a fire, depending on the prevailing conditions. More emphasis needs to be placed on reducing the number of asset failures. In 2012 there were 1674 asset failures that led to 124 vegetation fires and 410 asset fires.

Figure 16: Asset failures: Total for 2012 = 1674

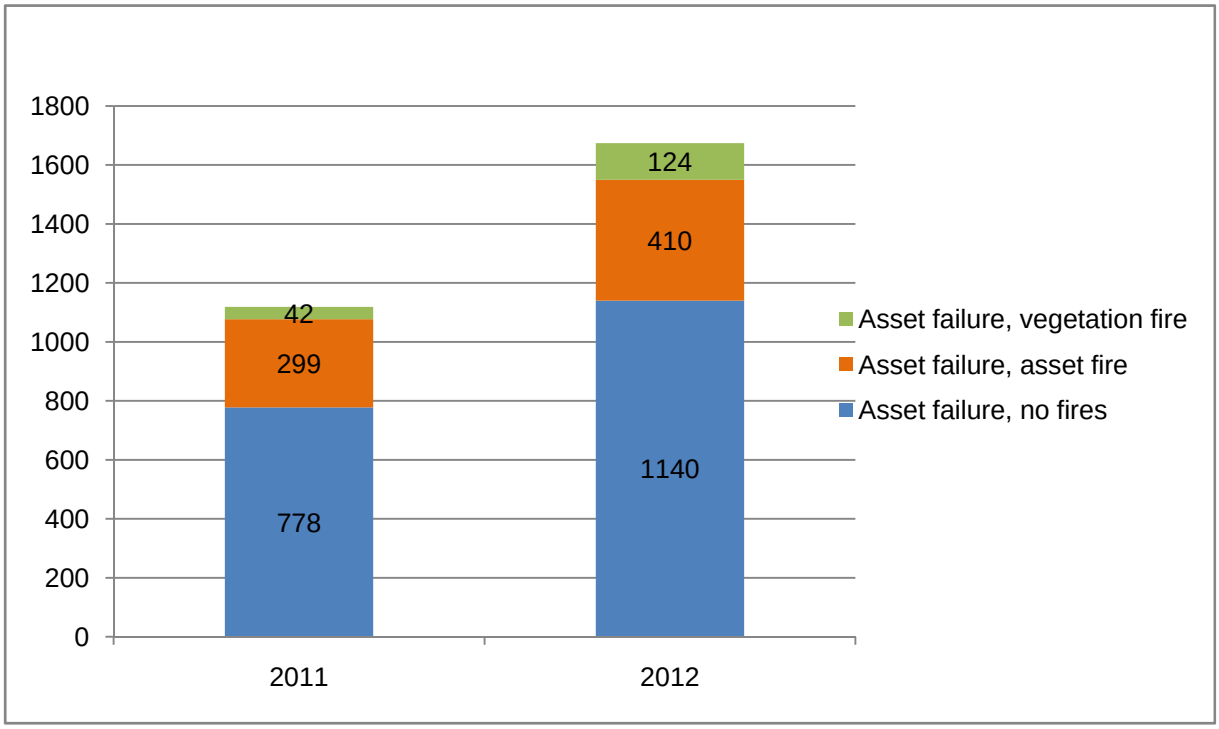


Figure 17: Asset fires due to asset failure (no vegetation fire) total for 2012 = 410

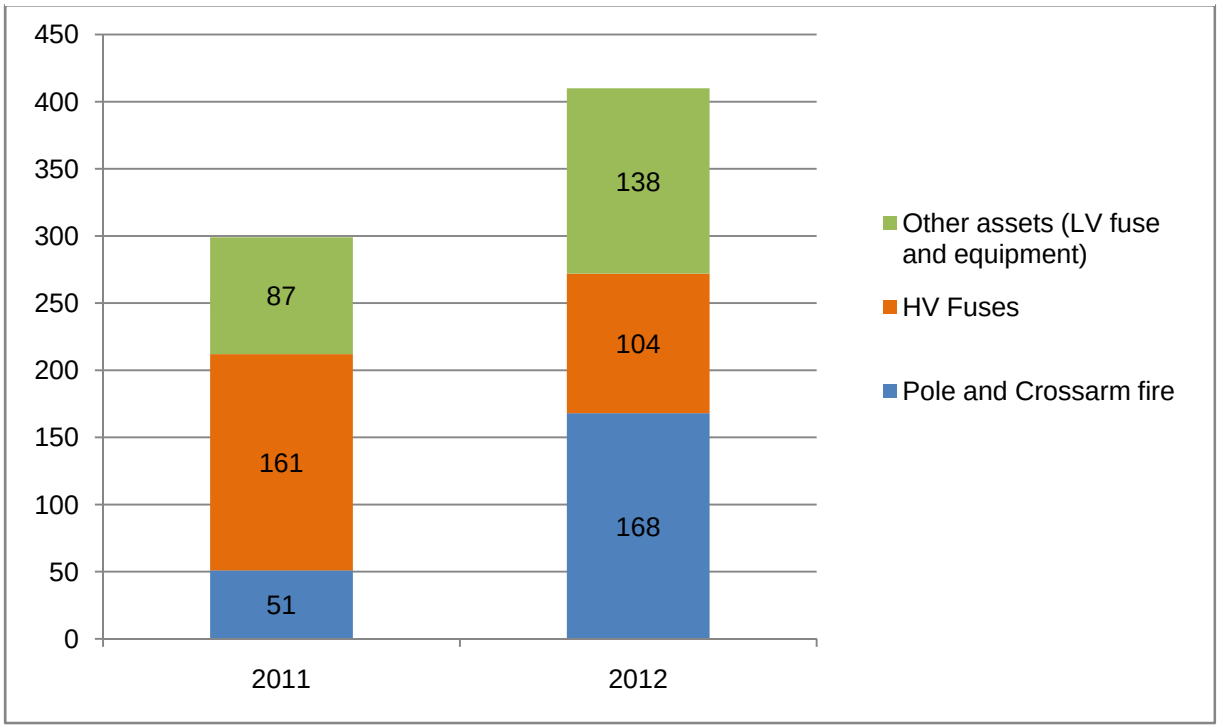


Figure 18: Vegetation fires due to asset failure total for 2012 = 124

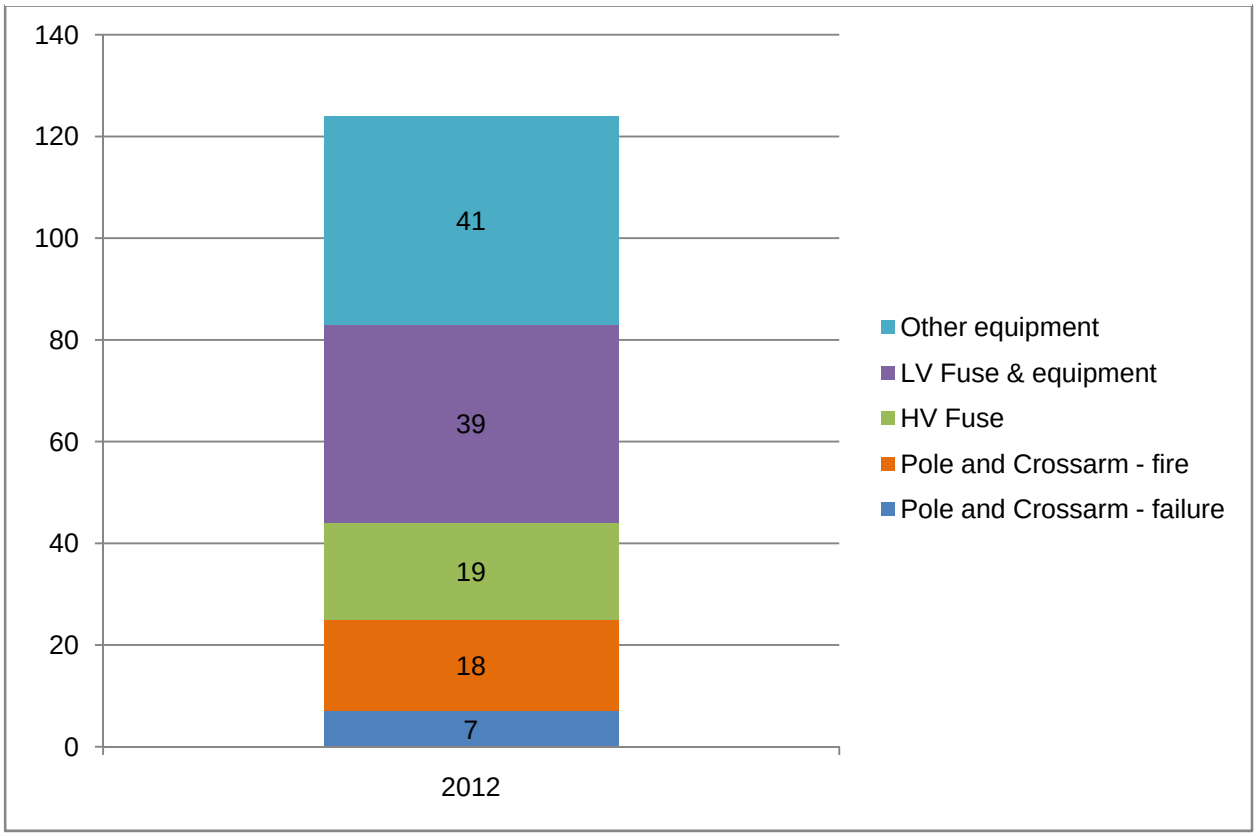
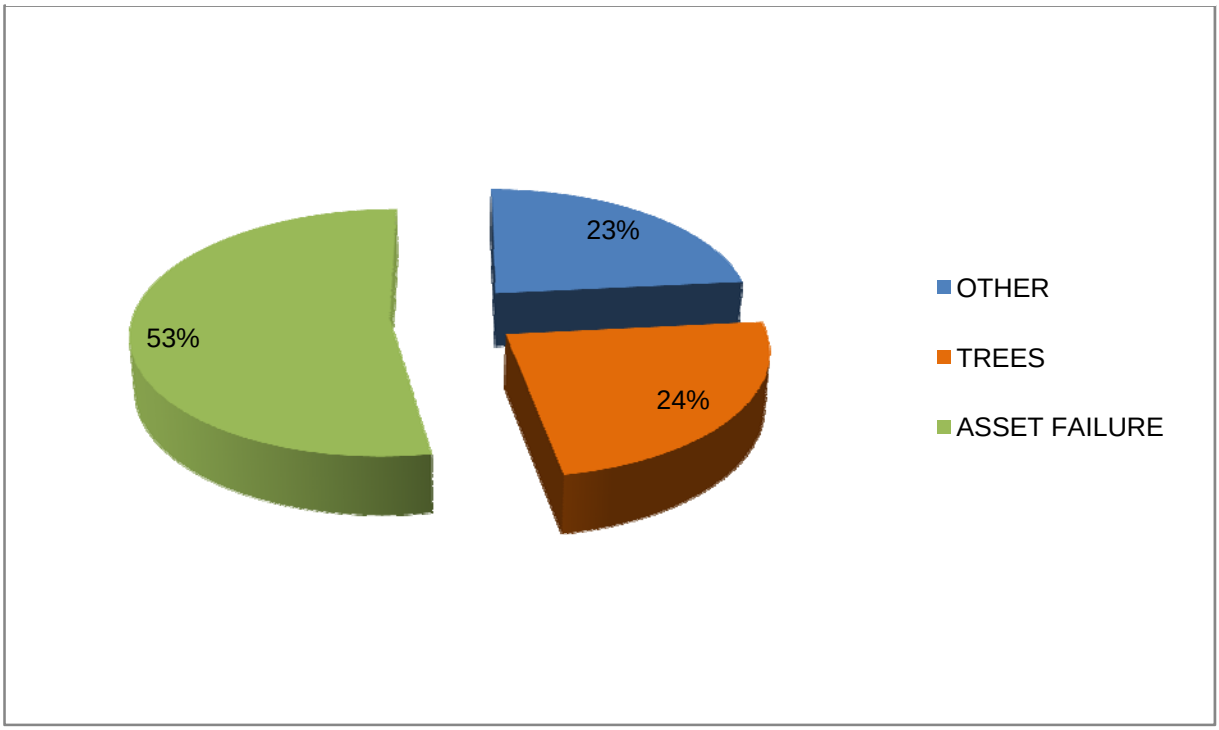
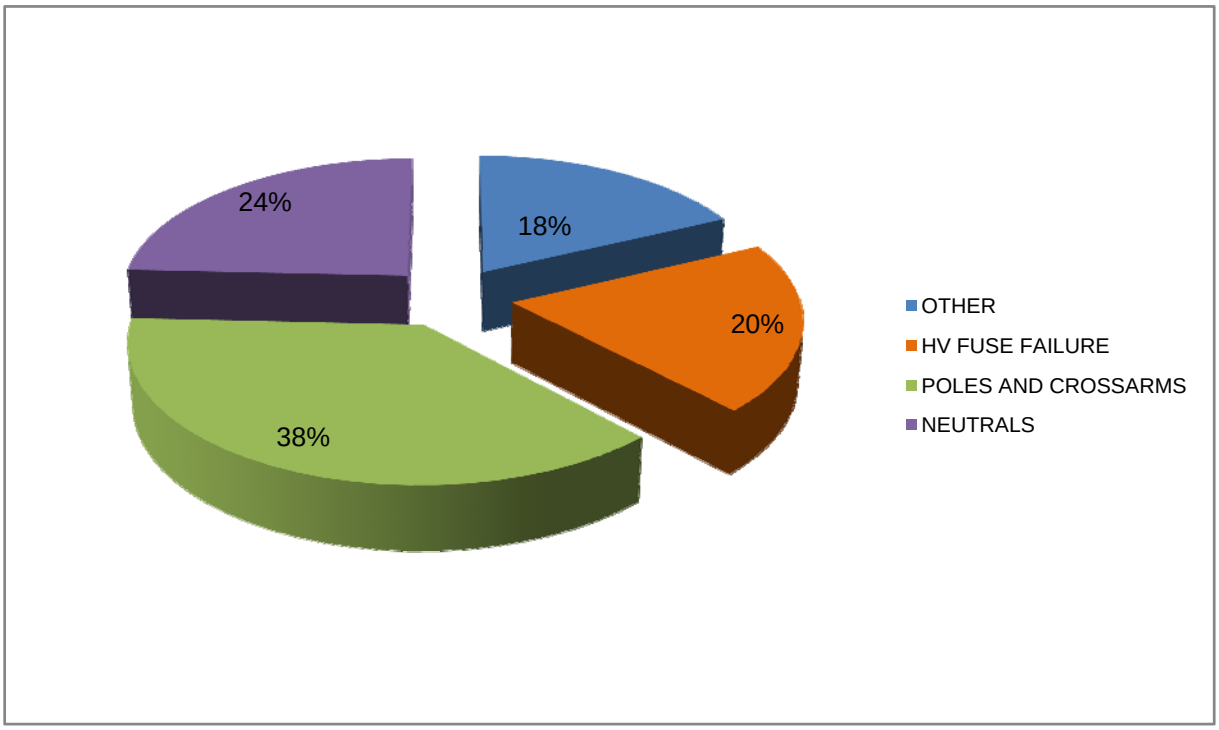


Figure 19: Fires starts by category



Asset failures started more fires in vegetation than tree contact; 124 fires compared with 56 respectively.

Figure 20: Fires started by asset failure



Power pole, crossarm and HV fuse failures started 44 vegetation fires.

The issues associated with HV fuses and crossarms need to be addressed to reduce the number of asset failures, a major cause of fire, especially in Powercor and SP AusNet's regions. While HV fuses and crossarms fail in SP AusNet's region, few of these asset failures lead to vegetation ignition, possibly due to the condition of the vegetation. Many crossarms fail in United Energy's region but few of these failures lead to a fire.

To reduce the number of asset failures, each one a potential fire ignition, the industry needs to review the effectiveness of current condition assessment techniques and replacement programs.

The industry recognises that little "natural" insulator washing occurs during long periods of dry weather, which together with light rain or fog can lead to tracking and cause power pole top fires. The washing of insulators undertaken in some areas of Victoria to improve the pollution performance of HV powerlines could be considered elsewhere.

Figure 22: All distribution businesses powerline failure/maintenance

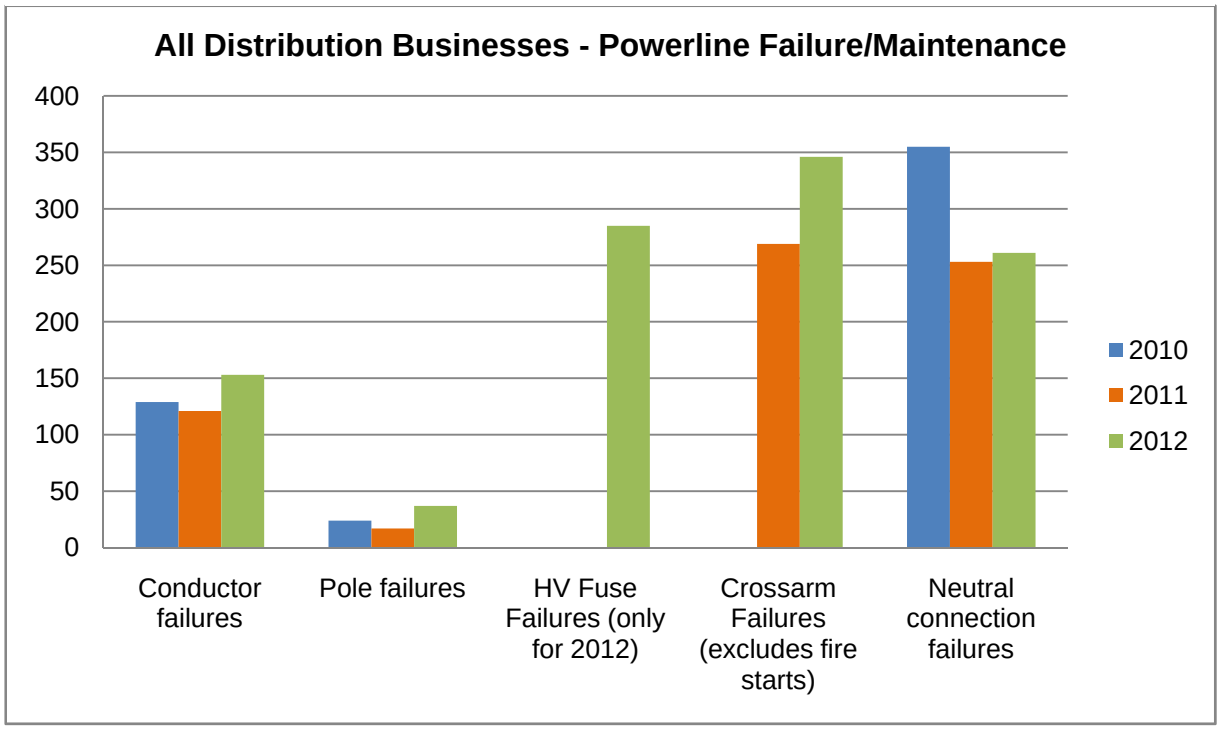


Figure 21: United Energy powerline failure/maintenance

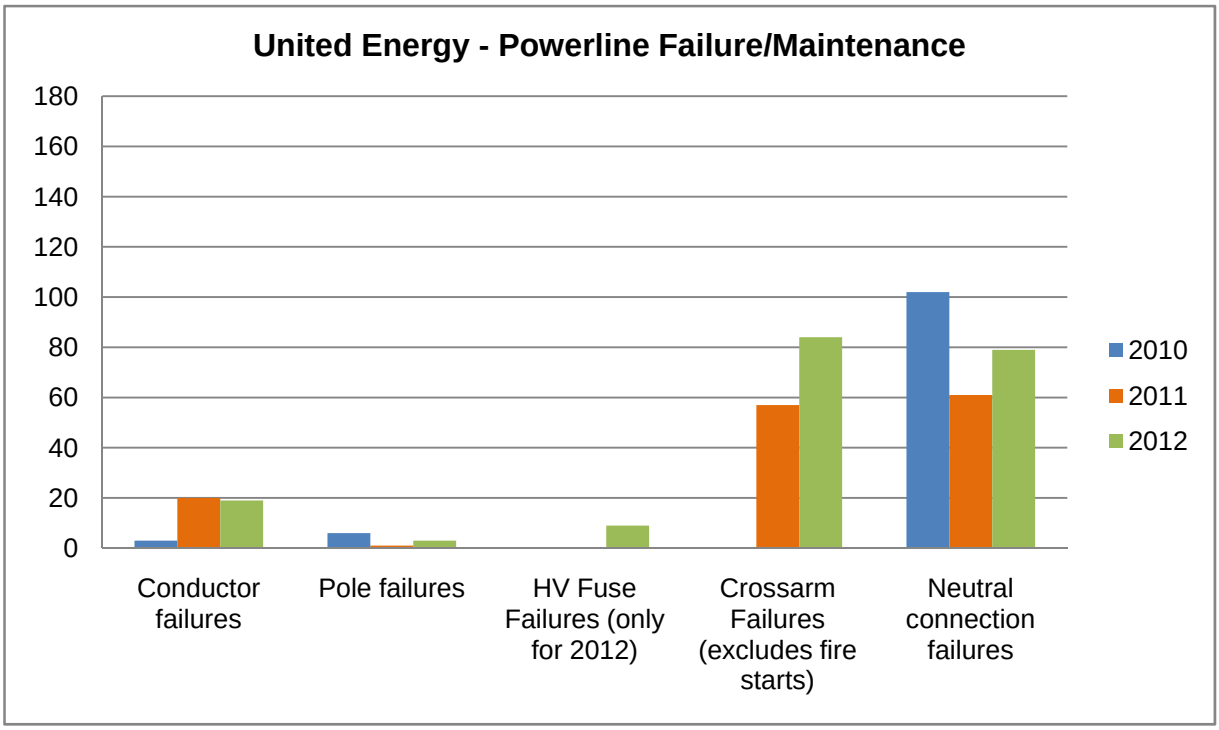


Figure 24: Jemena Powerline failure/maintenance

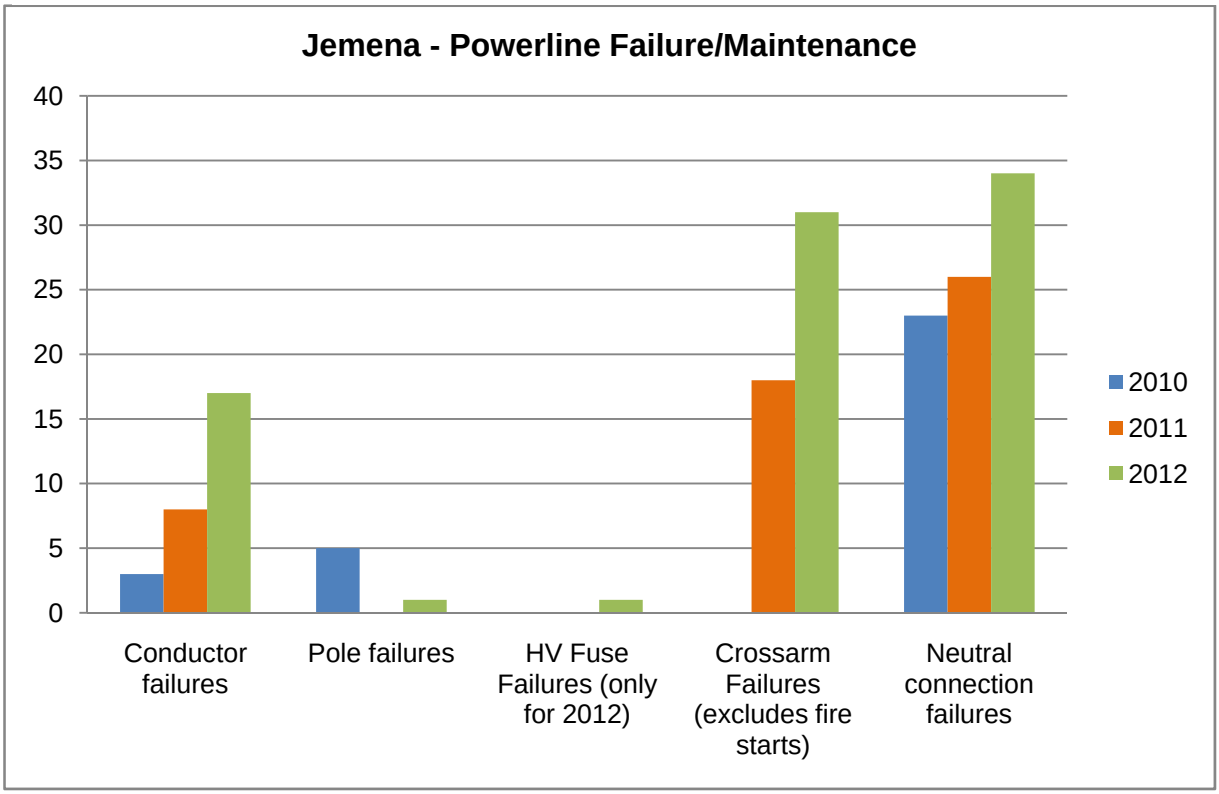


Figure 23: SP AusNet powerline failure/maintenance

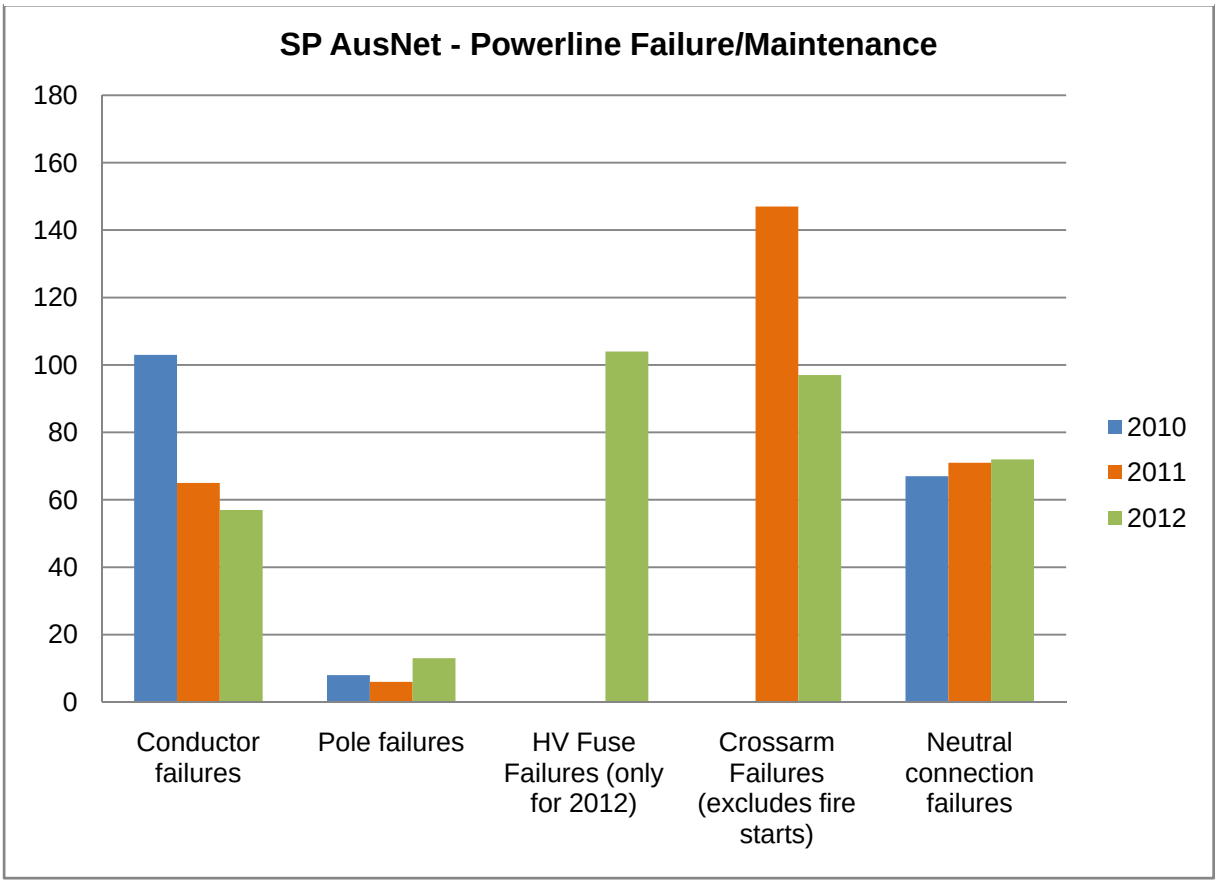


Figure 26: Powercor Powerline failure/maintenance

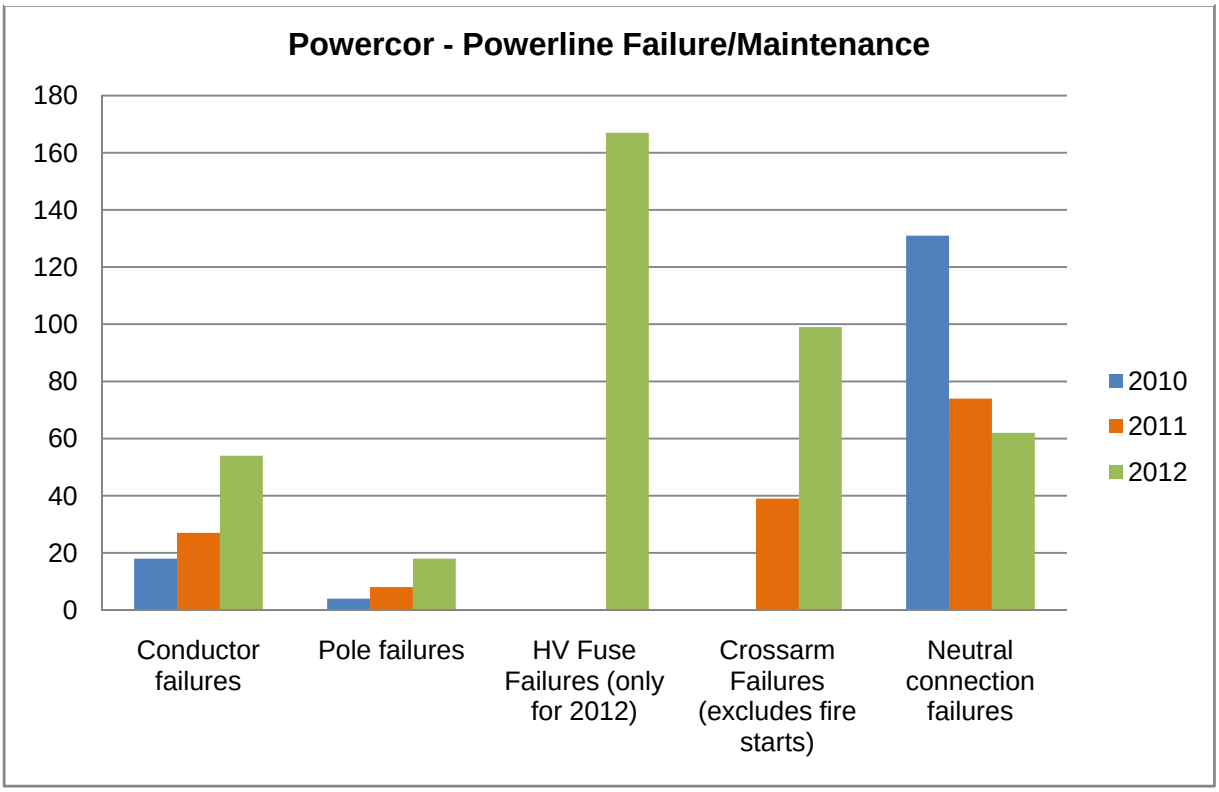
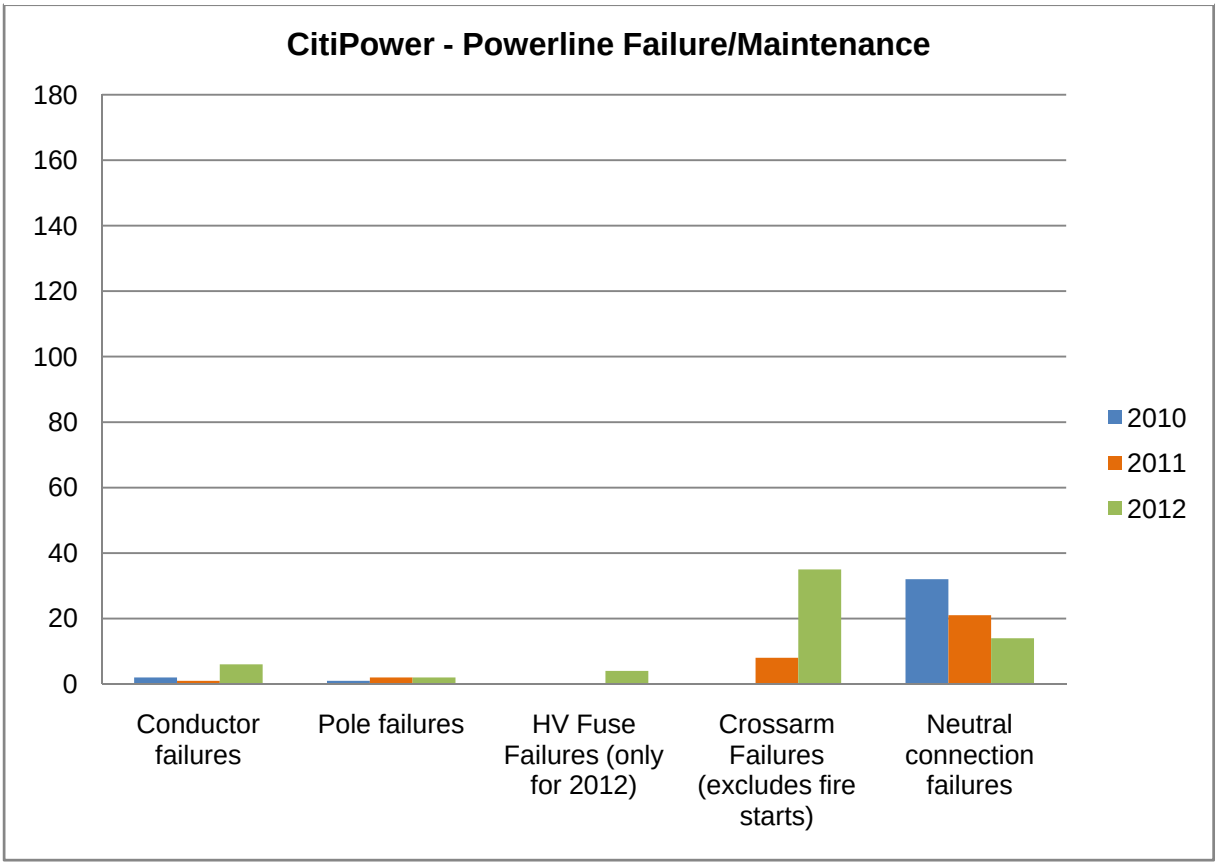


Figure 25: CitiPower powerline failure/maintenance



6 Safety indicators: Community

6.1 No Go Zone infringements

Access to electricity switchboards and substations by unauthorised persons may result in serious injury or death and affect the continuity of electricity supply. MECs go to considerable lengths to prevent unauthorised access and ensure that assets are secure. There was a large increase in the level of unauthorised access in 2012, a total of 78 occasions, compared with 23 unauthorised access incidents in 2011 and 24 unauthorised access incidents in 2010. Most of the unauthorised access appears to involve criminal damage or theft.

The WorkSafe No Go Zone clearance space establishes the minimum approach distance around electrical assets (including an allowance for what a person may be holding and the machinery the person may be operating) where a person can work with safety.

In 2012 there were a total of 170 No Go Zone incidents reported to ESV compared with 91 in 2011 and 151 in 2010. Most of the incidents were the result of interference with underground assets and the increase is not considered to be significant or to reflect an increasing trend based on three years of data. It is attributed to greater awareness about the need to report infringements. These numbers only include faults and incidents of contact with assets reported to the distribution MECs or ESV.

Lead indicators such as near misses and breaches of the clearance zone are rarely reported to the distribution MECs and not included in the statistics.

Due to the potential for such incidents to result in serious injury or death, ESV actively promotes the Look Up and Live message and the Dial Before You Dig service. All MECs offer advice and issue permits for work near powerlines where required.

A reverse polarity, when the active and neutral cables are interchanged, can lead to a serious injury or fatality. In 2012 there were a total of three instances where polarity was reversed compared with three instances in 2011 and five instances in 2010. The decrease is not considered to be significant or a decreasing trend based on three years of data.

High voltage injections are generally caused by a lightning strike on or near the electricity network or when a high voltage powerline contacts the low voltage supply as a result of vegetation contact, a failure of a network asset, or when a vehicle hits a power pole. A high voltage injection into the low voltage supply may cause significant damage to a customer's premises and appliances or result in very serious injury or death. In 2012 there were at total of 104 instances of high voltage injection compared with 61 instances of high voltage injection in 2011 and 70 instances of high voltage injection in 2010. The increase in high voltage injections is largely due to the increased number of power pole top fires experienced by Powercor and United Energy and vehicle hits power pole incidents experienced by United Energy.

Table 13: Safety incidents involving the public by distribution MEC

Item	Total	CitiPower	Powercor	Jemena	United Energy	SP AusNet
No Go Zone infringements	170	37	76	13	16	28
Unauthorised access	78	16	39	12	8	3
Reverse polarity	3	0	0	0	0	3
High voltage injections	104	4	21	6	50	23

Table 14: Safety incidents involving the public by transmission MEC

Item	Total	SP AusNet	Basslink
No Go Zone infringements	0	0	0
Unauthorised access	9	9	0

Figure 27: Safety incidents involving the public by business

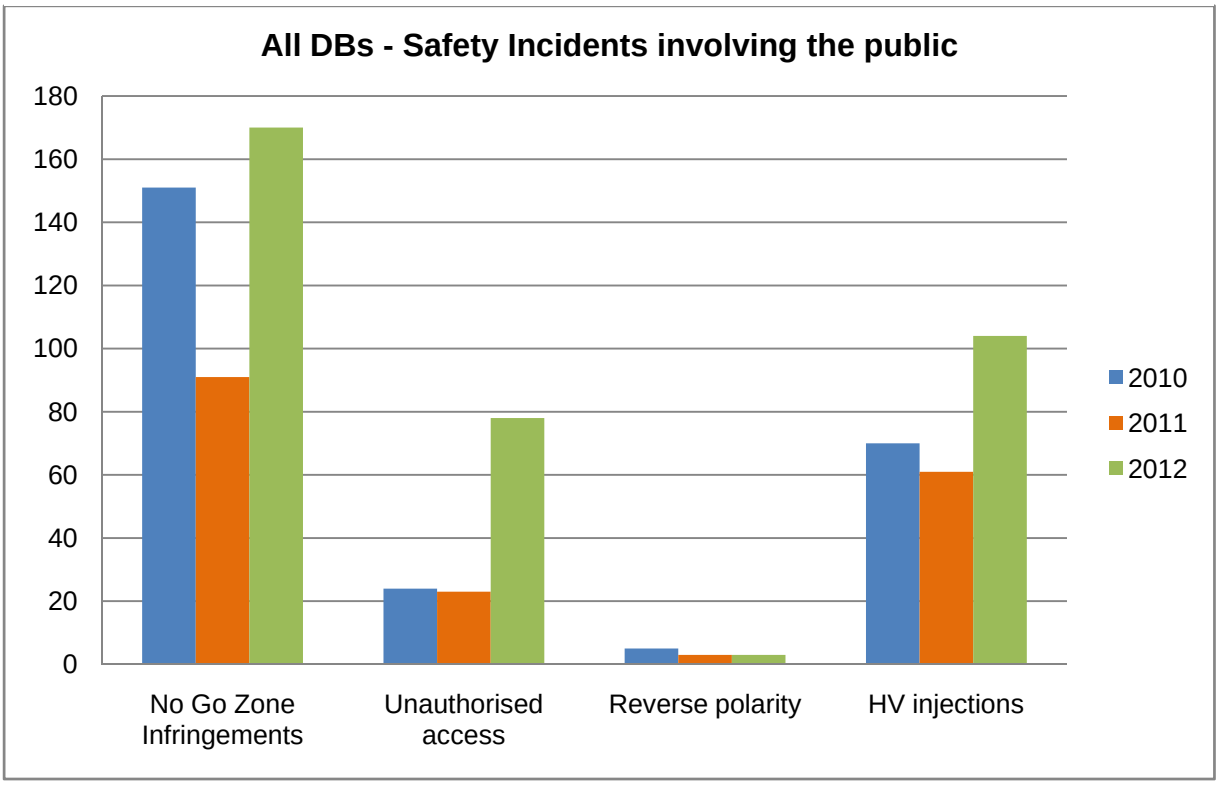


Figure 28: CitiPower safety incidents involving the public

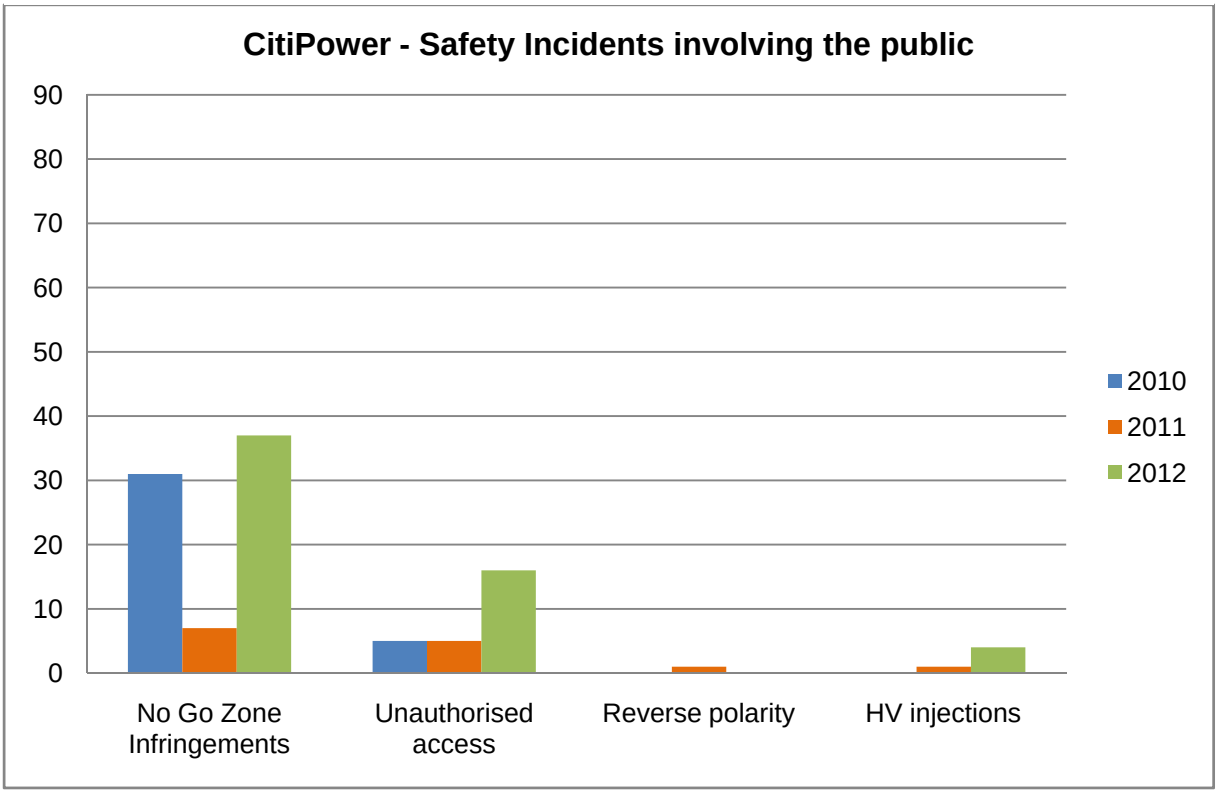


Figure 30: Powercor safety incidents involving the public

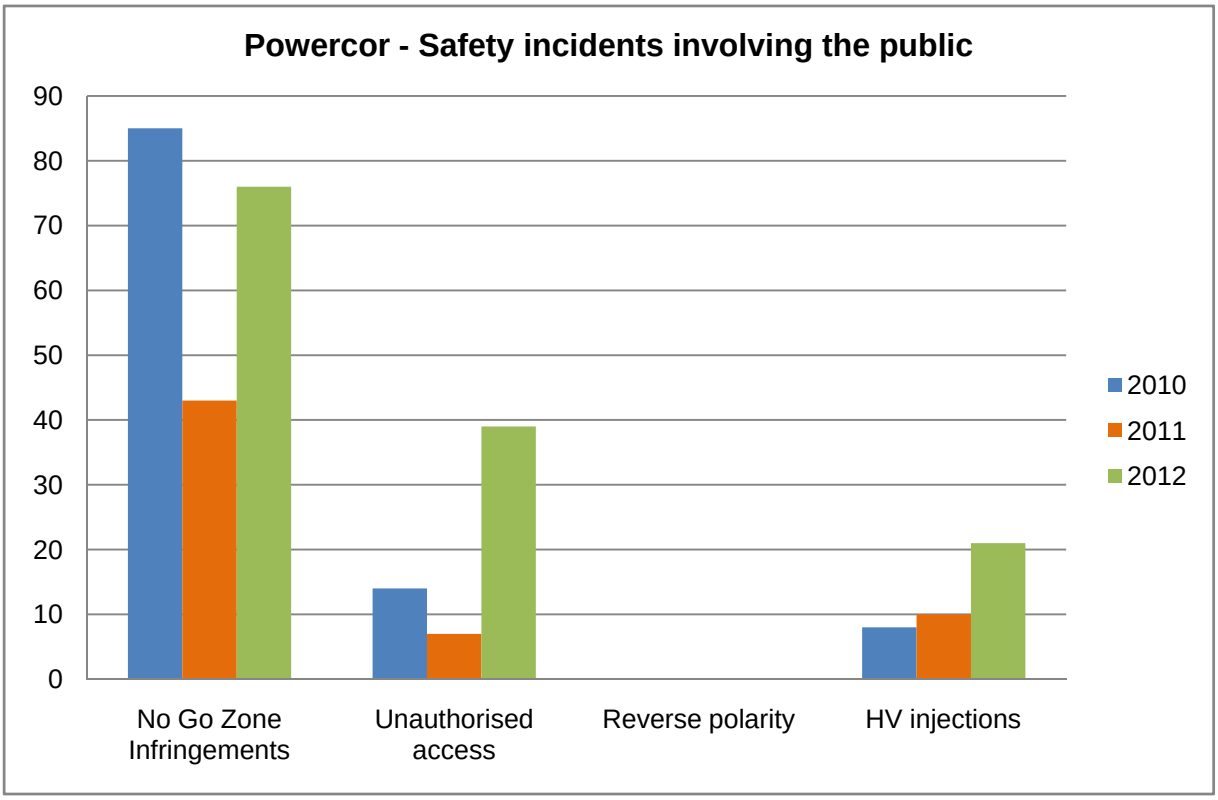


Figure 29: Jemena safety incidents involving the public

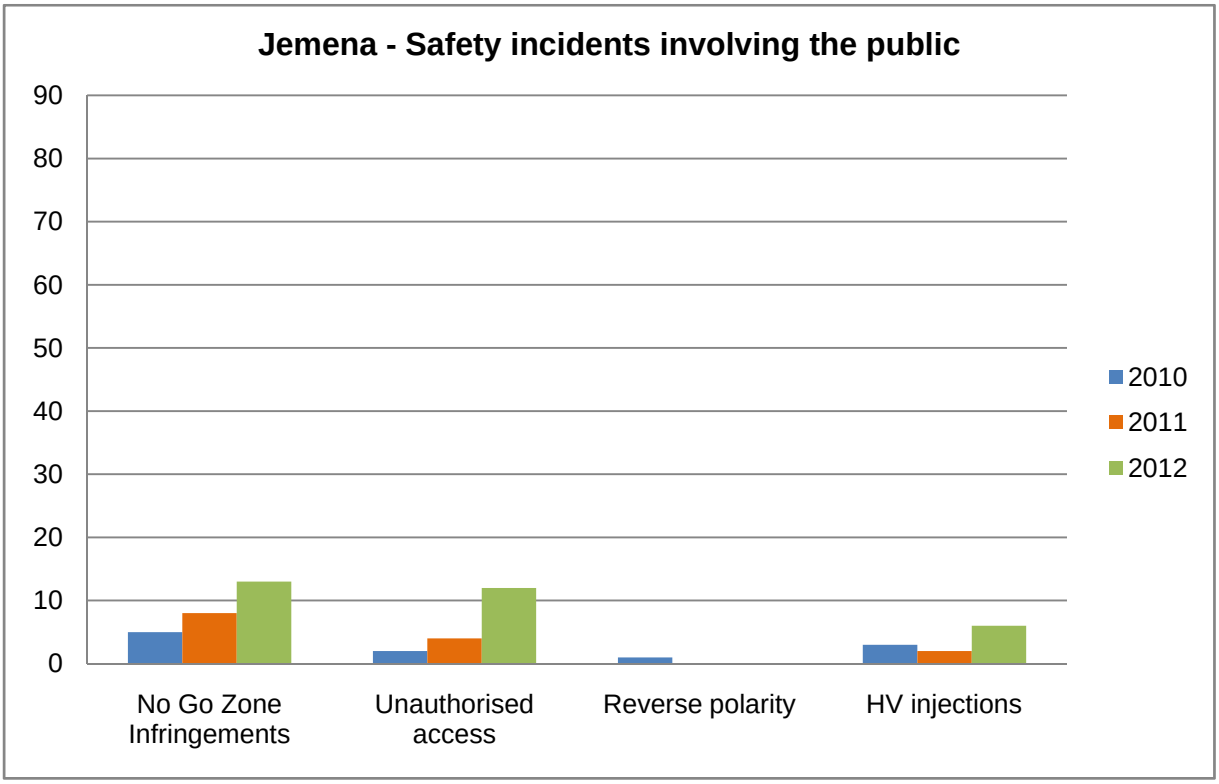


Figure 32: United Energy safety incidents involving the public

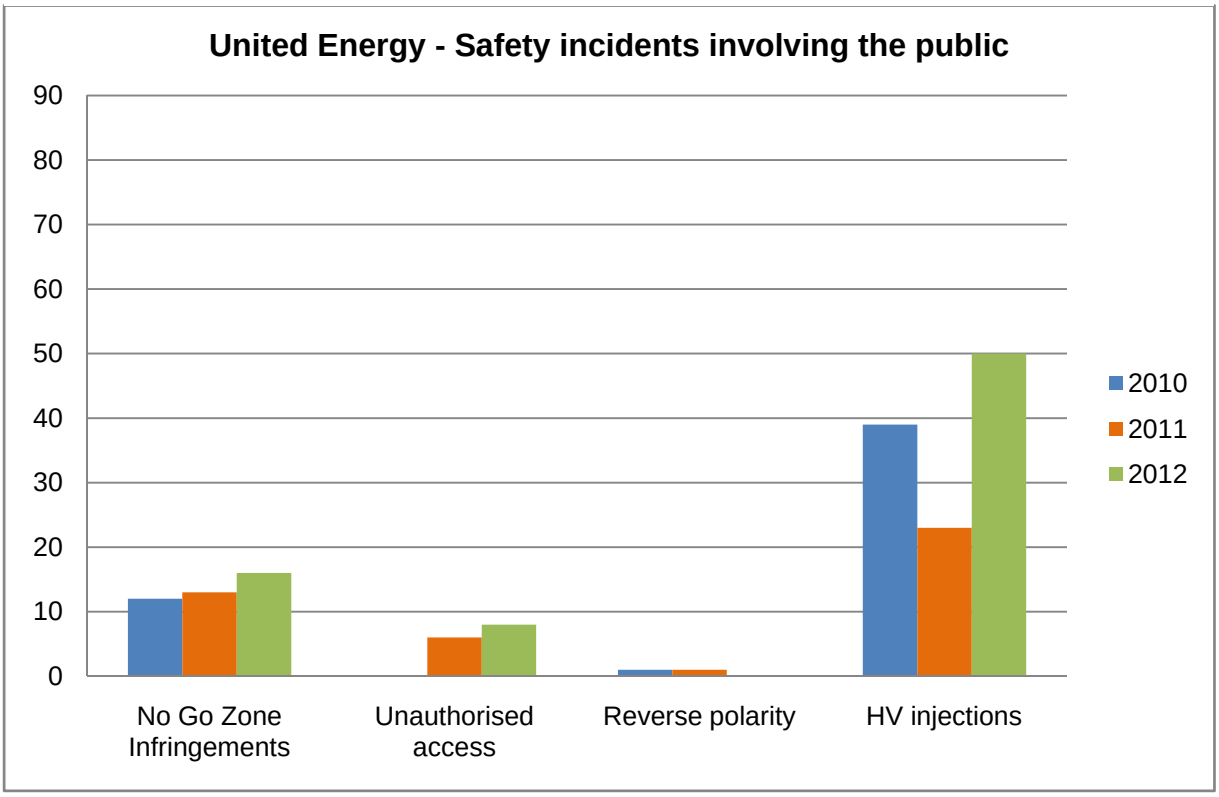
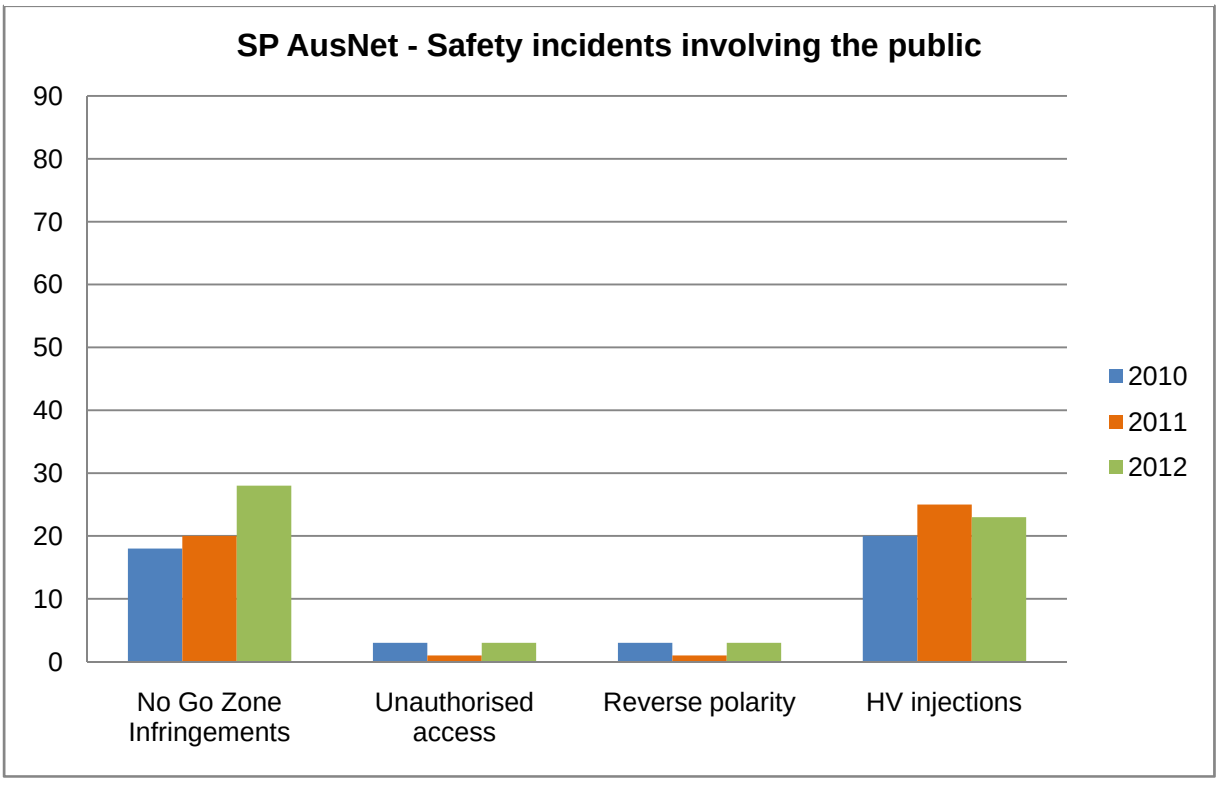


Figure 31: SP AusNet safety incidents involving the public



6.2 Incidents involving electric shock

The safety of the public, the workforce, all workers and contractors to the MECs is the highest priority for ESV. Electric shock incidents, including those resulting in serious injury or a fatality, is a key performance indicator for electrical safety.

It is pleasing to report that in 2012 there were no reported fatalities to the public or MEC workers. However, there was one incident that resulted in serious injury to two MEC workers.

In 2012 there were three serious injuries from electrical causes to the public compared with seven fatal or serious injuries from electrical causes in 2011 and seven fatal or serious injuries from electrical causes in 2010.

There were four serious injuries from electrical causes to MEC workers in 2012 compared with four serious injuries from electrical causes in 2011 and two fatal or serious injuries from electrical causes in 2010.

In 2012 there were 19 electric shocks from MEC assets compared with 24 electric shocks from MEC assets in 2011 and 23 electric shocks from MEC assets in 2010.

Table 19 details the electric shock incidents resulting from electricity distribution assets, and includes electric shock incidents resulting from No Go Zone breaches and accidents involving employees or contractors to the distribution MECs. ESV conducts an investigation into incidents involving serious electric shock, and assists other agencies such as WorkSafe in its investigations. In addition to those issued by the MECs, ESV regularly issues Safety Alerts to industry and the community to highlight dangerous situations.

The reduction in shocks is pleasing, however, it is difficult to identify any trend based on three years of data.

Table 15: Electric shock from electrical distribution assets

Item	Total	Citipower	Powercor	Jemena	United Energy	SP AusNet
Electric shock – Fatal or serious Injury (Public – excludes vehicle accident)	3	0	3	0	0	0
Electric Shock – fatal or serious injury (MEC workers)[4]	4	0	1	0	1	2
Electric Shock – Non-serious injury	19	4	5	1	2	7

4

Figure 34: All DBs electric shock from distribution assets

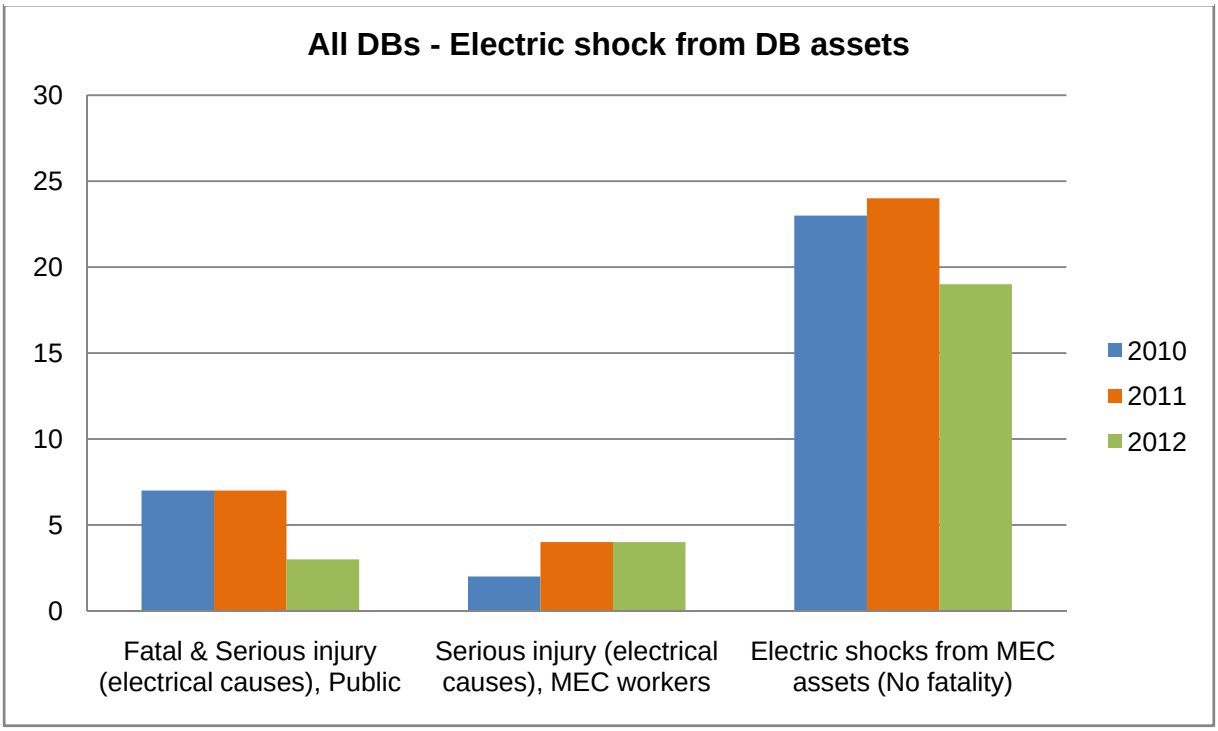


Figure 33: SP AusNet electric shock from distribution assets

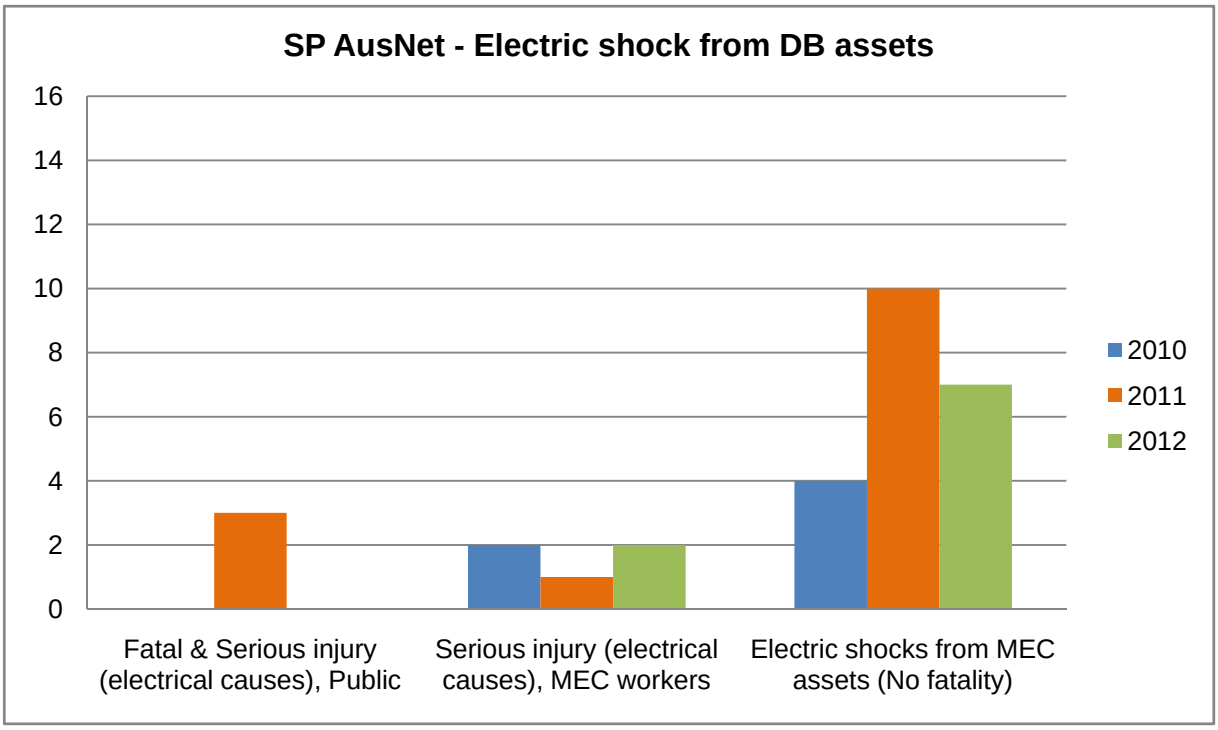


Figure 36: United Energy electric shock from distribution assets

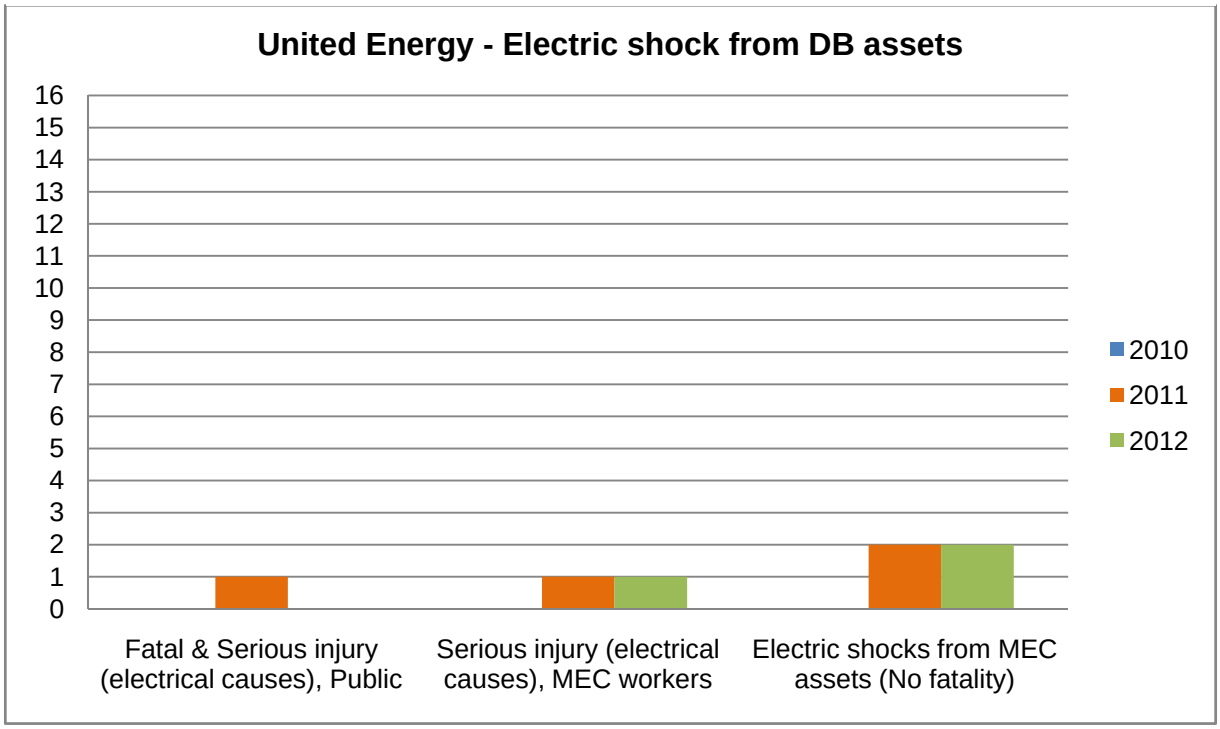


Figure 35: Jemena electric shock from distribution assets

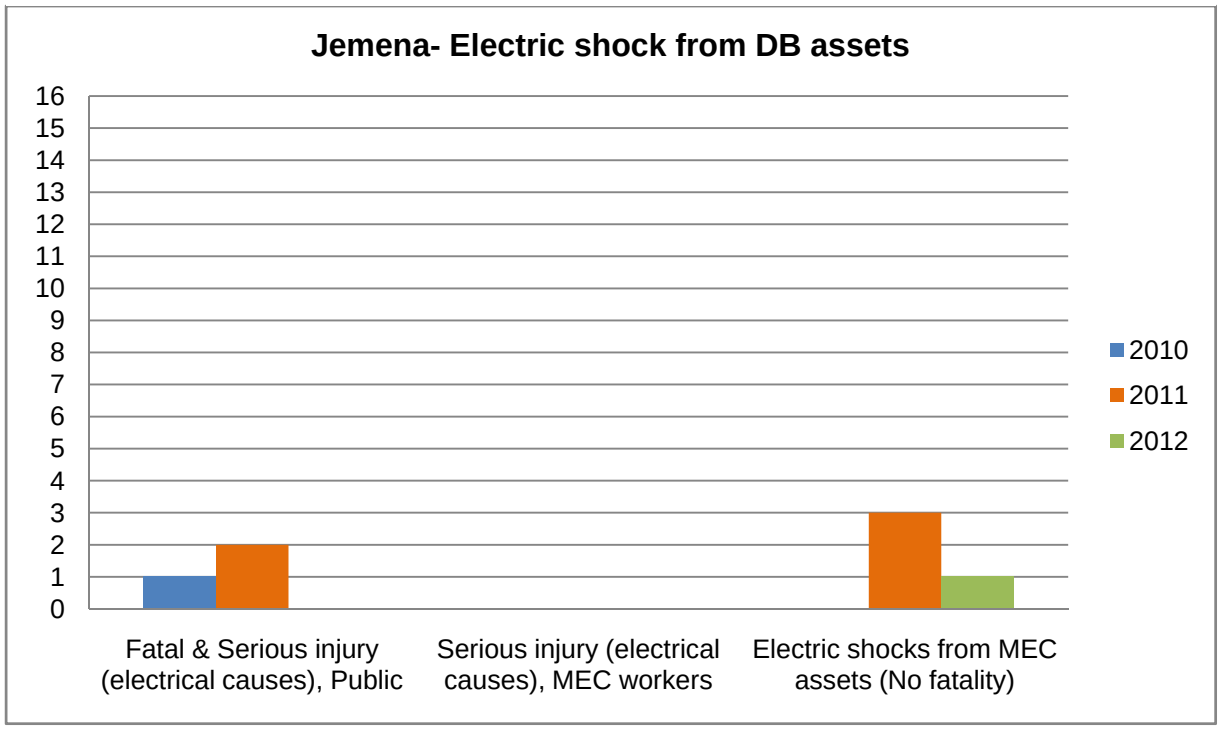


Figure 37: Powercor electric shock from distribution assets

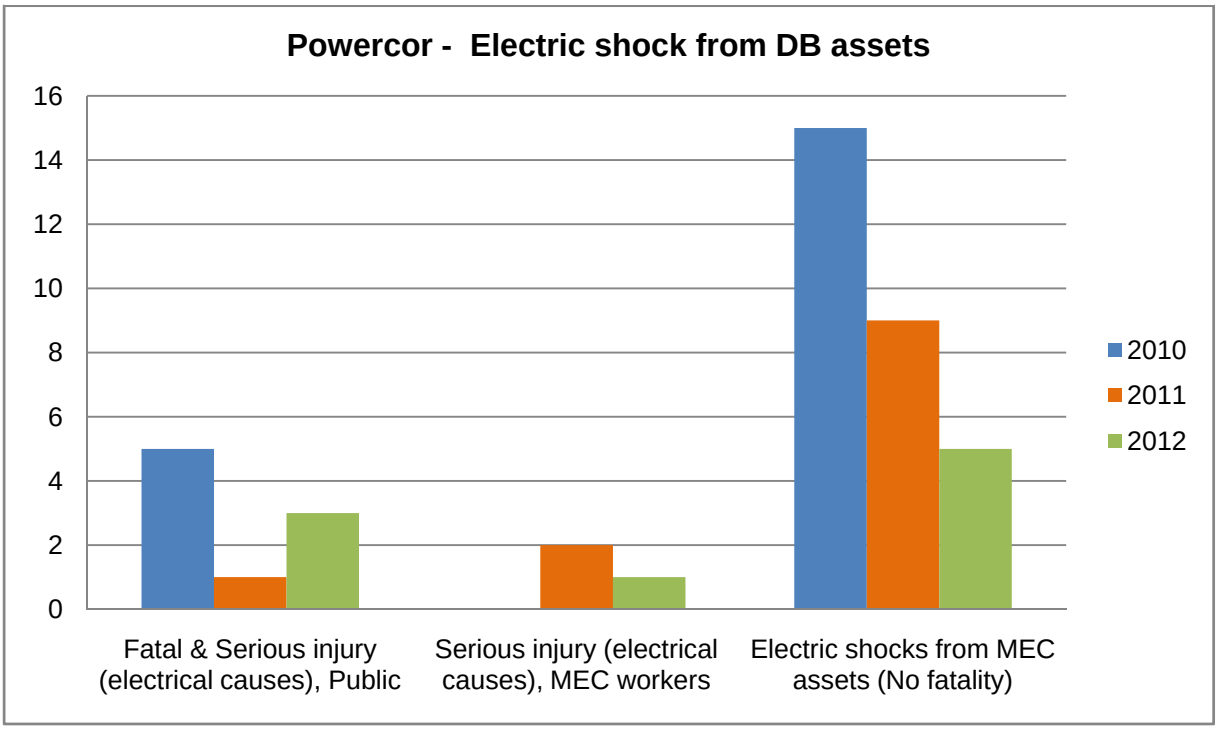
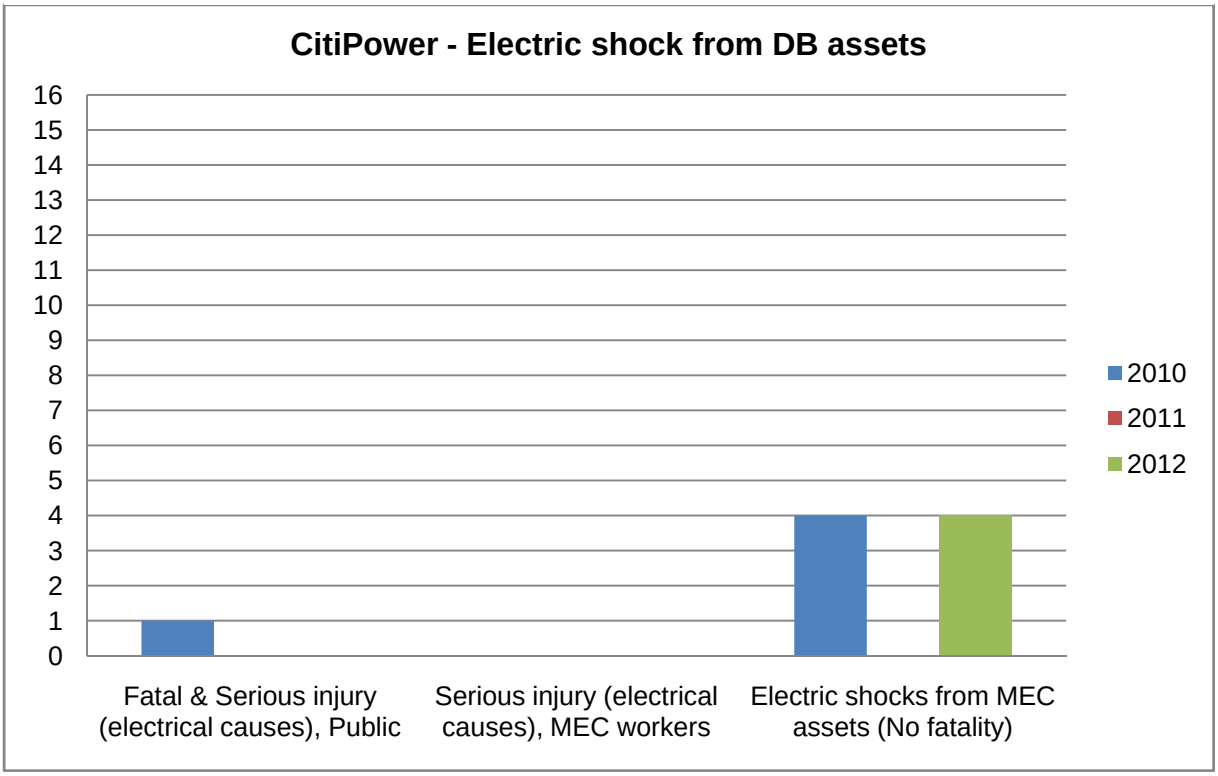


Figure 38: CitiPower electric shock from distribution assets



6.3 Investigations: Serious electrical incidents

ESV investigated seven serious electrical incidents during 2012. These were:

1. 18 March, Hampton: Contract line worker, using ratchet cutters, received an electrical shock and burns to his left hand during the installation of LVABC distribution cable.

2. 22 March, Frankston: A painter received burns to his hand while painting the fascia of a house, near the service cable point of attachment.

3. 26 March, Cheltenham: A painter received burns to his hand while painting the fascia of a house, near the service cable point of attachment.

4. 18 June: A tip truck driver received burns to his hands and feet when the tip truck body was lifted into a HV powerline while the driver was repairing the hydraulic mechanism of the truck.

5. 19 October, Wodonga: Two line workers were injured after coming into contact with a 22kV powerline while changing a HV fuse mount.

6. 22 October, Torquay: A tree clearing contractor sustained electrical burns when he infringed the safe approach distance.

7. 29 October: One person was killed and two persons injured when a light aircraft struck a 22kV single phase powerline. The aircraft crashed and started a fire.

6.4 Blue Book

To facilitate the maintenance of safety standards for the design, construction, operation and maintenance of electrical installations and electricity supply networks, ESV has established the Electrical Safety Committee, formed under the provisions of Section 8 of the *Energy Safety Act 2005*, to develop and maintain a *Code of practice for work on or near high voltage electrical apparatus (The Blue Book).*

The Electrical Safety Committee was reconvened in 2011 to revise the Blue Book as a result of changes to the *Electricity Safety (Installations) Regulations* and the revocation of the *Electricity Safety (Network Assets) Regulations*.

The Committee addressed ambiguities noted by the industry and aligned the Blue Book with international standards. A new provision was developed to provide guidance for tree clearing work being performed by non-utility workers in the vicinity of overhead electric lines in accordance with the *Electricity Safety (Installations) Regulations 2009*.

During 2012 a draft version of the Blue Book was published on the ESV website for comment prior to finalisation.

The committee members are commended for their work in this revision of the Blue Book.

7 Bushfire mitigation and electric line clearance audits

While trees close to powerlines present a safety risk, a greater risk is that of fire ignition. The revised *Electricity Safety (Electric Line Clearance) Regulations 2010* came into operation on 29 June 2010. These regulations clarified the minimum clearance space between trees and powerlines and reinforced the need for all Responsible Persons to assess vegetation and act to remove vegetation to reduce the hazard.

ESV requires all MECs to comply with these minimum clearances and submit their electric line clearance plans and bushfire mitigation plans to ESV:

- by 30 March each year, an electric line clearance plan for ESV, evaluation and approval before the start of the declared fire season
- by 30 June each year, a bushfire mitigation plan.

In 2012 all MECs complied with these requirements and ESV reviewed and accepted their plans.

ESV completed the annual audit of Powercor, SP AusNet, Jemena and United Energy prior to the 2012 summer period with an emphasis on the policies, procedures and practices employed to mitigate fire ignition as described in their bushfire mitigation plans and electric line clearance plans.

ESV concluded the plans were clear, well presented and formed the basis of each distribution MEC bushfire mitigation activities. They were supported by a comprehensive set of mature policies and procedures that were regularly updated.

The audits this year included a discussion with depot field personnel and management to determine their understanding of the bushfire mitigation programs and the methods used to disseminate information relating to changes to company policies and procedures.

ESV concluded that Jemena, Powercor, SP AusNet and United Energy's preparedness, in HBRA, for the coming fire season was in line with their plans. Asset management and vegetation clearance in the LBRA were not to the same high standard for all MECs.

All of the personnel involved in the audits were well prepared and cooperative. They provided information that demonstrated their bushfire mitigation preparedness for the coming fire danger period.

Table 16: 2012 Audit results

	Powercor	United Energy	Jemena	SP AusNet	CitiPower*
Sites audited	305	170	213	474	N/A
Defective / missing asset items	13	9	6	16	N/A
Vegetation non-compliant, distribution MEC responsibility	1	7	6	2	N/A
Vegetation non-compliant, Council responsibility	1	3	5	32	N/A
Vegetation spans non-compliant with Regulations – Following pre-summer HBRA cut	0	0	0	0	N/A

* Bushfire mitigation and electric line clearance audits were not carried out in CitiPower's area in 2012 as there is no HBRA.

The issues reported did not imply imminent asset failure, nor should they be extrapolated across all of the MECs' assets. The principal purpose of the audit was to assess the efficacy of an MEC's system. Specific areas were targeted where ESV had not undertaken previous bushfire mitigation audits.

The distribution MECs' 2012 databases were found to be a more accurate representation of the electrical distribution assets than the 2011 and 2010 databases, with fewer inconsistencies. Comparison between the information in the database and the assets in the field showed that inconsistencies had reduced from 54 per cent in 2010 to 17 per cent in 2011 to 4 per cent in 2012. ESV will continue to audit the accuracy of the distribution MEC asset databases.

7.1 Jemena Electricity Networks (JEN)

Jemena's preparedness for the coming fire season was found to be in line with its Bushfire Mitigation and Electric Line Clearance Plans in the HBRA. This opinion was supported from observations in the field of the company's assets and vegetation line clearances in the HBRA. Asset maintenance and vegetation clearances on mains and service cable conductors in HBRA were, as expected, maintained to a higher standard than in the LBRA.

The depot audits demonstrated that Jemena disseminated its policies, procedures and maintenance programs to its employees and contractors and they had a good understanding of the Bushfire Mitigation program targets and timeframes to be achieved. Both Jemena and the service providers were found to have processes in place to confirm their understanding of the company's obligations to meet agreed timeframes and targets.

Eight Bushfire Mitigation Project scopes of work were chosen at random from the company's August work schedule. Of the eight chosen one was found to be incomplete however the work that had been carried out matched the company's policies, procedures and construction manuals. Jemena responded that the project was not complete as the conductor was to be replaced in October.

7.2 Powercor Australia Ltd

In the HBRA the assets were found to be in good condition and well placed to enter the 2012/2013 fire danger period. In the LBRA, Powercor operates a five-year inspection cycle. A number of sites were identified that needed to be addressed by the company to complete its pre-summer work.

The depot audits demonstrated that Powercor had disseminated its policies, procedures and maintenance programs to its employees and contractors, and that they had a good understanding of the Bushfire Mitigation program targets and timeframes that must be achieved. Both Powercor and its contractors had processes in place to confirm their understanding of the company's obligations, agreed timeframes and targets.

Ten Bushfire Mitigation projects were chosen at random from the company's August work schedule. One project was found to be incomplete however the segment of work had been made safe and the construction project leader was yet to sign off on the work. All other work had been completed in line with the project plan and to the required standard laid down in the construction manual, policies and procedures.

7.3 United Energy

In the auditor's opinion UE's preparedness for the forthcoming fire season was in line with its Fire Prevention and Vegetation Management Plans in the HBRA. This opinion was supported by observations in the field of the company's assets and vegetation powerline clearance in the HBRA. Asset maintenance and vegetation clearance on powerlines and service cables in the LBRA was not to the same standard.

The depot audits showed that United Energy had disseminated its policy, procedures and maintenance programs to its employees and contractors. United Energy staff and service providers had processes in place to confirm their understanding of the company's obligations to meet agreed timeframes and targets.

Five sites chosen at random from the company's work schedule were visited and found to have been completed in accordance with the company's policies, procedures, and construction manuals.

7.4 SP AusNet (distribution)

Following an audit of SP AusNet's programs and a check of the condition of assets in the field, it was ESV's opinion that SP AusNet was in a position to achieve bushfire preparedness in line with its Bushfire Mitigation and Vegetation Management Plans.

The field audit highlighted that the company's assets and vegetation powerline clearances in the HBRA were in good condition, however, asset maintenance and vegetation clearance on service cables in the LBRA was not to the same standard.

The depot audits showed that SP AusNet had disseminated its policies, procedures and maintenance programs to its employees and contractors and that they had an understanding of the targets and timeframes that must be achieved. The company had processes in place to confirm understanding and monitor the company's obligations to meet agreed timeframes and targets.

Ten bushfire mitigation fire scopes of work were chosen at random from the company's September/October work schedule. All work had been completed in line with the scope of works and to the required standard in the construction manual, policies and procedures. While not part of the audit, there were a number of sites across the business where access was still an issue.

8 Electricity Safety Management Scheme audits

The *Electrical Safety (Management) Regulations* were amended in 2009 to require all MECs within Victoria to operate within the scope of an accepted Electrical Safety Management Scheme (ESMS). All of the Victorian MECs have prepared an ESMS that has been reviewed and approved by ESV. ESV audits the compliance with the ESMS on a regular basis. In 2012, all of the MECs were subject to compliance audits on four of the requirements of the *Electrical Safety (Management) Regulations 2009*;

- **r.**22 Internal monitoring, auditing and reviewing
- **r.**23 Key performance indicators
- **r.**25 Competence and training and
- **r.**26 Records

Compliance and positive management practices were common themes across the MECs and all personnel involved in the ESMS audit process responded readily to ESV requests for information and provided assistance to ensure that the audits ran smoothly.

The system for rating issues identified during the audits was revised during the year to include a rating of “Area Requiring Attention”:

- Conformance (C), evidence confirming compliance with the process or procedure and the process or procedure is in line with statutory or business requirements
- Non-conformance (NC), evidence confirming non-compliance with the process or procedure or the process or procedure is not in line with statutory or business requirements and the non-compliance is considered to be systemic
- Opportunity For Improvement (OFI), evidence confirming general compliance with the process or procedure and the process or procedure is in line with statutory or business requirements and the audit identified an area where the process or procedure could be improved
- Area Requiring Attention (ARA), evidence confirming non-compliance of a minor or a “once off” nature that does not pose a safety risk or a major deviation from the process or procedure but requires a formal review and corrective action response.

The degree of conformance identified, as a result of the four audits, on the MECs was high: two non-conformances and 71 areas requiring attention were identified.

- CitiPower/Powercor has initiated action to resolve the 21 areas requiring attention by June 2013.
- United Energy has initiated action to resolve the 13 areas requiring attention by September 2013.
- Jemena has initiated action to resolve the two non-conformances and 12 areas requiring attention by August 2013.

- SP AusNet has initiated action to resolve the 21 areas requiring attention by April 2013.
- Basslink has initiated action to resolve the four areas requiring attention by August 2013.

8.1 Distribution MECs

r.22 Internal monitoring, auditing and reviewing

All of the distribution MECs had systems in place for monitoring, auditing and regularly reviewing the implementation and adequacy of their safety policies and procedures and for making improvements where deficiencies were identified.

The audit found a large degree of compliance with only two non-conformances identified, relating to the monitoring and auditing in respect to OH&S of two contractors employed by Jemena. Jemena is reviewing its contractor management framework to address these two findings.

A total of 35 Areas Requiring Attention were identified across the distribution MEC relating to processes and procedures for the training of personnel carrying out audits and for the grading of audits. Examples of ARAs were:

- Procedures are not specific to the actual level of competency required
- Department not aware of the requirement to enter audits into IMS system

r.23 Key performance indicators

All of the distribution MECs had established key performance indicators to determine their level of compliance with the electricity safety management scheme, the relevant provisions of the Act and the regulations made under the act. Processes were in place to analyse performance and initiate appropriate action as required to ensure compliance.

The audit found a large degree of compliance with no non-conformances identified.

A total of five areas requiring attention were identified across CitiPower/Powercor associated with terminology, reviewing risk profiles and risk management plans.

r.25 Competence and training

All of the distribution MECs have processes and procedures in place around competence and training that were detailed and easy to understand.

The audit found a large degree of compliance with no non-conformances identified, however the audit identified 16 areas requiring attention across all of the distribution MECs. These related to processes and procedures for deeming competency, ensuring that service providers had processes in place when selecting trainers, the implementation of the Certificate II in EIS Vegetation, and the need to confirm competence in the field.

Examples of ARAs were:

- Better documentation on selecting training providers
- Including check lists on audit forms

r.26 Records

All of the distribution MECs have a system in place for maintaining the required records associated with their ESMS and they keep the records at the appropriate locations.

The audit found a large degree of compliance with no non-conformances identified, however the audit identified three areas requiring attention across CitiPower/Powercor and Jemena. These were unique to each distribution MEC and there was no common trend.

Examples of ARAs were:

- ESMS does not specify the location of archived documents.
- ESMS Update Index to include ESV direction section.

Table 17: ESMS audit: Areas requiring attention and non-conformance

Regulation	Grading	CitiPower/ Powercor	Jemena	United Energy	SP AusNet
r.22 Internal monitoring, auditing and reviewing	NC	0	2	0	0
	ARA	12	7	7	12
r.23 Key performance indicators	NC	0	0	0	0
	ARA	5	0	0	0
r.25 Competence and training	NC	0	0	0	0
	ARA	3	3	5	4
r.26 Records	NC	0	0	0	0
	ARA	1	2	0	0
Total	NC	0	2	0	0
	ARA	21	12	12	16

8.2 Transmission MECs

All of the audits found a large degree of compliance with no non-conformances identified, however the audits identified a total of nine areas requiring attention across SP AusNet Transmission and Basslink.

r22. Internal monitoring and reviewing

Four areas requiring attention were identified, three in SP AusNet Transmission and one in Basslink, relating to the processes for monitoring audits and grading the findings.

r23. Key performance indicators

Three Areas Requiring Attention were identified in Basslink relating to the definitions and targets for the KPIs.

r25. Competence and training

Two areas requiring attention were identified in SP AusNet Transmission relating to the process for ensuring training is current and for deeming competency.

r26. Records

No areas requiring attention were identified during the audit of SP AusNet Transmission and Basslink records.

Table 18: ESMS audit: Areas requiring attention and non-conformance

Regulation	Grading	SP AusNet Transmission	Basslink
r.22 Internal monitoring, auditing and reviewing	NC	0	0
	ARA	3	1
r.23 Key performance indicators	NC	0	0
	ARA	0	3
r.25 Competence and training	NC	0	0
	ARA	2	0
r.26 Records	NC	0	0
	ARA	0	0
Total	NC	0	0
	ARA	5	4

9 ESV investigation into the safety of Advanced Meters

In 2006, as part of the Advanced Metering Infrastructure (AMI) program, the Victorian Government committed to the installation of electrical meters in all residences and small businesses in Victoria that are capable of being remotely read and controlled (smart meters). The rollout of smart meters to approximately 2.6 million Victorian customers is well advanced and expected to be completed by the end of 2013.

In 2011, ESV undertook a review of smart meter installation practices, to confirm workers and public safety. The review concluded that the public could rest assured that smart meters were being installed safely and by qualified and trained people.

Throughout the smart meter installation program, a number of unwarranted concerns had been expressed about the safety of smart meters. In 2012 a number of smart meter incidents were reported as “smart meters exploding”. Initially these were reported as resulting from HV injection. ESV investigations concluded that there were more than 100 smart meter incidents in 2012 and they were the result of criminal damage. None of the incidents resulted in an injury or significant damage and the ESV investigations concluded that;

- There is no evidence to suggest that the safety risks associated with smart meters are any greater than the safety risks associated with the older style electronic or electromechanical meters
- There is no evidence, at this stage, to indicate that the electrical malfunction of a smart meter has caused an explosion or fire
- When smart meters fail, they fail safely and do not increase the risk of personal injury or damage
- The meter failures in the Pascoe Vale area, reported since December 2011, occurred as a result of criminal damage rather than HV injection
- The Metropolitan Fire and Emergency Services Board (MFESB) Fire Investigation and Analysis Unit found that the number of fires relating to switchboards/meter boxes is trending downwards
- Electricity companies are following Victorian Electricity Supply Industry (VESI) procedures for responding to a HV injection, including the requirement to inspect metering equipment and conduct testing
- The smart meters being installed in Victoria comply with the current Australian Standards and those standards are robust and appropriate
- The condition assessment procedures relating to switchboards and meter panels, prior to meter installation, were found to be appropriate
- While it is generally the responsibility of customers to replace “switchboards” that are no longer serviceable, more than 40,000 “switchboards”, found to be in poor condition, have been replaced by the electricity companies during the meter installation program at no cost to the customer
- The smart meter rollout has also identified over 15,000 safety defects by the end of 2012, which have been or are being rectified.

A Indicators published in annual safety performance report and abbreviations

The following information will be published annually by ESV. Statistics based on calendar year (January to December).

Item	Reporting Requirement
Fire starts in vegetation (grass/trees and shrubs)	Number of fire starts in HBRA in vegetation (all fires due to electrical causes)
Power pole and crossarm fires	Number of pole and crossarm fires due to electrical causes
Conductor failure	Number of conductor failures (excluding service cables and failure due to impact)
Power pole failure	Number of pole failures (all poles, i.e. 66kV, HV, LV and P/L – excludes poles struck by vehicle)
Reverse polarity	Number of incidents
HV injections	Number of incidents
No Go Zone Infringements	Number of incidents
Unauthorised access	Number of incidents
Bushfire Mitigation Index	Number of days where BFM Index is above zero during the fire danger period as declared by the Country Fire Authority (relates to previous year's declared fire period)
Fatal injury (electrical causes), MEC workers	Number of incidents (Includes contractors)
Serious injury (electrical causes), MEC workers	Number of incidents (Includes contractors)
Electric shocks from MEC assets	Electric shocks from MEC assets (split into HV and LV)
Shock due to neutral failure	Number of incidents

AC	Alternating current
ACR	Automatic circuit reclosers
AER	Australian Energy Regulator
AMI	Advanced metering infrastructure
BMP	Bushfire mitigation plan
BPL	Basslink Pty Ltd
CBD	Central business district
CP	CitiPower
DC	Direct current
ELCMP	Electric Line Clearance Management Plan
ESMS	Electricity Safety Management Scheme
ESV	Energy Safe Victoria
GFN	Ground fault neutraliser
HBRA	High bushfire risk areas
HV	High voltage
kV	kilovolt (1000 volts)
LBRA	Low bushfire risk area
MEC	Major electricity company
OIC	Order in Council
PAL	Powercor Australia Ltd
PBST	Powerline Bushfire Safety Taskforce
REFCL	Rapid earth fault current limiter
SWER	Single wire earth return
UE	United Energy
VBRC	Victorian Bushfire Royal Commission
VESI	Victorian Electricity Supply Industry